



Port Said University  
Faculty of Engineering  
Department of Architectural  
Engineering & Urban Planning

**The USE OF COMPUTER SIMULATED  
VISUALIZATION TECHNIQUES TO EVALUATE  
RIVERFRONT'S LANDSCAPE**  
An Approach to Public Participation in river Nile Banks'  
Regeneration

Thesis Submitted By

**Ahmed Mohamed Saleh Khadr**

Master Degree of the Landscape and Urban design 2001  
Assistant Lecturer-Architecture Department-Ismailia  
Faculty of Engineering-Suez Canal University

IN PARTIAL FULFILLMENT FOR THE  
DOCTOR OF PHILOSOPHY DEGREE IN ARCHITECTURE

Port Said, Egypt  
July, 2010





Port Said University  
Faculty of Engineering  
Department of Architectural  
Engineering & Urban Planning

**The USE OF COMPUTER SIMULATED  
VISUALIZATION TECHNIQUES TO EVALUATE  
RIVERFRONT'S LANDSCAPE**

An Approach to Public Participation in river Nile Banks'  
Regeneration

Thesis Submitted By

**Ahmed Mohamed Saleh Khadr**

IN PARTIAL FULFILLMENT FOR THE  
DOCTOR OF PHILOSOPHY DEGREE IN ARCHITECTURE

Supervised by

**Prof. Dr. MOSTFA  
MOHAMED ABDEL HAFEEZ**

Professor of Architecture & Urban  
Planning  
Faculty of Engineering  
Port Said University

**Prof. Dr. ROWAIDA  
REDA KAMEL**

Professor of Architecture  
Faculty of Engineering  
Cairo University

**Prof. Dr. ESAM BADRAN**

Professor of Urban Planning  
Faculty of Engineering  
Suez Canal University

Port Said, Egypt  
2010





Port Said University  
Faculty of Engineering  
Department of Architectural  
Engineering & Urban Planning

**The USE OF COMPUTER SIMULATED  
VISUALIZATION TECHNIQUES TO EVALUATE  
RIVERFRONT'S LANDSCAPE**  
An Approach to Public Participation in river Nile Banks'  
Regeneration

Thesis Submitted By

**Ahmed Mohamed Saleh Khadr**

IN PARTIAL FULFILLMENT FOR THE  
DOCTOR OF PHILOSOPHY DEGREE IN ARCHITECTURE

**Approved by the Examining Committee:**

---

**Prof. Dr. Hesham Sameh Hussain Sameh**

Professor of Architecture, Architecture Department  
Faculty of Engineering, Cairo University

(Member)

---

**Prof. Dr. Ahmed Reda Abdin**

Professor of Architecture, Architecture Department  
Faculty of Engineering, Cairo University

(Member)

---

**Prof. Dr. Mustafa Mohamed Abdel-Hafeez**

Professor and Head of Architecture and Urban Planning Department  
Faculty of Engineering, Port Said, Port Said University

(Advisor & Member)

---

**Prof. Dr. Essam Badran**

Professor and Vice Dean, Architecture and Urban Planning Department  
Faculty of Engineering, Ismailia, Suez Canal University

(Advisor & Member)

---

Port Said, Egypt  
2010



## Acknowledgement

My most sincere thanks and gratitude to Allah Almighty, first and foremost. Then I would like to thank my advisory committee for their contribution to my research and their willingness to review my dissertation.

To my advisor **Dr. Mustafa Abd ElHafeez**, head of the Architectural and urban planning department in Port Said at Suez Canal University, my deepest gratitude for your continuous guidance, support, especially in the final steps to form the thesis. Special thanks to **Dr. Rowaida**, Prof of housing in the faculty of Engineering – Cairo University, for her support and comments that always kept me on the right path since I was a student in Cairo University, with her continuous guidance I became who I am.

I gratefully acknowledge the support of **Dr. Essam Badran**, professor of urban design and vice dean in faculty of engineering Ismailia, his remarks were always very helpful especially in the thesis revision.

Special and grateful acknowledge to, **Dr. Ahmed Reda Abdin**, professor of architecture in faculty of Engineering – Cairo University, your valuable advises, also Special thanks to **Dr. Hesham Sameh**, professor of architecture in faculty of Engineering – Cairo University, for his time.

Most of all, I thank my family for their love and support. My little daughter, Rawan, and my wife, she made it possible for me to find time to write. I am also thankful to my parents for their encouragement to finish what I started.

**To all those without whom this thesis might not have been written, and to all my teachers and professors, from past and present, in great appreciation for their inspiration and passion for knowledge**

To my parents, wife and precious girl . . . Rawan





# TABLE OF CONTENTS



---



---

## *Table of Contents*

---



---

<b>Table of contents</b>	A1
<b>List of figures</b>	B1
<b>List of tables</b>	C1
<b>Abstract</b>	
<b>Introduction</b>	
0.1. Introduction	1
0.1.1. Where is the world now? And where we are?	1
0.1.2. A New Vision for Urban Riverfronts	1
0.1.3. A New Vision for public participation in environmental issues	1
0.1.4. A New Vision for using Information Technology	1
0.1.5. Emerging new visualization tools in participatory landscape design	1
0.1.6. Focus on the situation of the Nile riverfront in Egypt	1
0.2. Research Problem	1
0.3. Aim of the work	1
0.4. Research Objectives	1
0.5. Research questions	1
0.6. Research Hypothesis	1
0.7. Argued assumptions	1
0.8. Research limitations	1
0.9. Thesis experiment expected evidence	1
0.10. Research methodology	1
<b>PART ONE: Riverfronts, Public Participation and Visualization in Relations, Towards a Successful Regeneration of Riverfront's Landscape</b>	1
<b>CHAPTER 1: Riverfront's Regeneration- Towards Public Accessibility of Riverfronts</b>	
1.1. Introduction- Cities return back to their riverfronts	3
1.2. River, environment and people, in relations	4
1.2.1. River in the natural environment	4
1.2.2. River	5

---

---

## ***Table of Contents***

---

---

1.2.2.1. Youthful River	5
1.2.2.2. Mature river	5
1.2.2.3. Old River	5
1.2.2.4. Rejuvenated River	6
1.2.3. Urban river alternatives	6
1.2.4. The role of river in the built environment	8
1.2.5. River landscape or Riverscape	8
1.2.5.1. Natural river landscape	8
1.2.5.2. Man-made river landscape	8
1.2.6. People & river, in relations	9
1.2.7. Physical contact between people and river	9
1.3. Riverfronts in urban environment	10
1.3.1. Riverfront definition	10
1.3.2. Role of Riverfronts in cities	11
1.3.3. People attraction to the riverfronts	13
1.3.4. Factors of people-riverfront disconnect	13
1.3.5. Social experience of riverfront space	13
1.3.6. Elements of riverfront's view	14
1.3.6.1. The background	14
1.3.6.2. The opposite bank	14
1.3.6.3. Riverbed	14
1.3.6.4. River edge	14
1.3.6.5. The near bank	14
1.3.7. Types of riverfronts	15
1.4. Riverfront as a strategic urban resource	16
1.4.1. Urban riverfronts transformations	16
1.4.2. Concepts of Urban riverfronts transformations	17
1.4.3. Architectural Icons and Urban riverfronts transformations	17
1.5. Regeneration process of urban riverfronts	18
1.5.1. Why is riverfronts regeneration?	20
1.5.2. Key factors in urban riverfronts regeneration	20

---



---

## ***Table of Contents***

---



---

1.5.2.1 Strategic value of riverfront	20
1.5.2.2. Location factor of the riverfront	20
1.5.2.3. A rich heritage of historical buildings	20
1.5.2.4. Direct contact with water	20
1.5.2.5. The evocative and symbolic value of riverfront areas	21
1.5.3. Strategies of urban Riverfront regeneration ...	21
1.5.4. Dimensions of Urban riverfront Regeneration	22
1.5.5. Different typologies of riverfronts regeneration	22
1.5.6. Principles of Urban riverfront regeneration	24
1.5.7. New vision of riverfront regeneration	25
<b>1.6. Riverfront regeneration for riverfront public access</b>	<b>26</b>
1.6.1. Riverfront public access	27
1.6.2. Types of public access to riverfront	28
1.6.2.1 Riverfront Physical access	28
1.6.2.2. Riverfront visual Access	29
1.6.3. Riverfront public access objectives	29
1.6.4. Uses prevent the riverfront' public access	30
1.6.5. Riverfront's public access demands	30
1.6.6. Key elements of Riverfront Public access	31
1.6.6.1. Meet Basic Human Needs	31
1.6.6.2. Provide Recreational Opportunities	31
1.6.6.3. Develop Paths and Promenades	31
1.6.7. Involving the Public in riverfront regeneration	32
<b>1.7. Summary &amp; conclusions</b>	<b>32</b>
<b>CHAPTER 2: Assessment of Public's Interactions with Riverfronts' Landscape</b>	
2.1. Introduction	34
2.2. People's attraction to riverfront's landscape	35
2.2.1. Public perception of riverfront landscape	35
2.2.2. Categories of public needs in riverfront's landscape	35
2.2.2.1. Nature needs	35

---



---

## ***Table of Contents***

---



---

2.2.2.2. Public-interaction needs	36
2.2.3. The ways public can value riverfront' landscape	36
2.3. Perception as interaction between people & landscape	36
2.3.1. Landscape perception	37
2.3.2. How do people perceive landscape objects?	38
2.3.3. Laws of landscape scene perception	39
2.3.4. Aesthetic responses towards landscape	40
2.3.5. Aesthetic factors in riverfronts' Landscape	41
2.4. Public's preference for riverfront's landscape	42
2.4.1. Variation in public's preferences	42
2.4.2. Experts' preference versus public's preference	43
2.4.3. Preferences as a mean to evaluate riverfront's landscape	44
2.4.4. Behavioral Psychology and riverfront's landscape	45
2.5. Assessment of public's response towards riverfront's landscape	46
2.5.1. Public users' response to riverfront's landscape	46
2.5.1.1. Physical Response	47
2.5.1.1.a. Actions done in the riverfronts' landscape	47
2.5.1.1.b. Actions done to riverfronts' landscape	48
2.5.1.2. Emotional response	48
2.5.2. Measuring people's responses to riverfront's landscape	49
2.5.3. Assessing people responses to riverfront's landscape	50
2.5.4. Testing public's response to riverfront's landscape	51
2.5.4.1 Observation	51
2.5.4.1.a. Observing patterns of activities	51
2.5.4.1.b. Observing human's behavioral patterns	51
2.5.4.2. Interviews	52
2.6. Factors affecting users' satisfaction of riverfronts spaces	52
2.6.1. Riverfront's accessibility	54
2.6.2. Uses & activities in riverfronts spaces	54
2.6.2.1. Active uses	55
2.6.2.2. Passive uses	55

---



---

## ***Table of Contents***

---



---

2.6.3. Comfort and image of riverfront' spaces	56
2.6.4. Sociability of riverfronts spaces	57
2.7. Urban riverfront regeneration frameworks	57
2.7.1. Aesthetical quality of in riverfronts' regeneration	58
2.7.2. Aesthetical evaluation of in urban riverfront's landscape	59
2.8. Summary & conclusions	62
<b>CHAPTER 3: Public Participation in Riverfront's Landscape Regeneration</b>	
3.1. Introduction	63
3.2. Community Participation and management of environment	63
3.2.1. Community participation theory and practice	64
3.2.2. Participants of community participants	64
3.2.3. Characteristics of a community participation process	65
3.3. Public participation	66
3.3.1. What is public participation?	66
3.3.2. Public involvement types in participation process	67
3.3.3. How can public are involved	67
3.3.4. Importance of public participation	68
3.3.5. Strategy of public participation	68
3.3.6. Public participation considerations	69
3.3.7. Evaluating trust in participatory processes	69
3.3.8. Evaluating successful participatory processes	70
3.4. Public participation in environmental decision-making	70
3.4.1. Aims of public participation in decision-making	71
3.4.2. Advantages and disadvantages of public participation	72
3.5. Classifications of Public Participation from the past to the future	73
3.5.1. Public Participation ladder	74
3.5.2. Nobre scale for public participation	76
3.5.3. Public participation and digital revolution	77
3.5.4. Public participation in the era of 'cyber-democracy'	78

---



---

## ***Table of Contents***

---



---

3.6. Involving the public in landscape process decision making	79
3.6.1. Levels of involving the public in landscape process decision making	79
3.6.2. Methods of involving the public in landscape process	80
3.6.3. Usefulness of methods by purpose	81
3.7. Public participation in landscape evaluation	81
3.7.1. Relationship between humans' evaluation and their needs	82
3.7.2. Public People's Evaluation versus Expert Evaluation	83
3.7.3. Types of landscape evaluation measurements	85
3.7.3.1. Direct measurement	85
3.7.3.2. Indirect measurement	85
3.7.4. Classification of Public evaluation methods	85
3.7.4.1. Qualitative research methods	85
3.7.4.2 Quantitative research methods	88
3.7.5. Link between qualitative and quantitative methods	89
3.7.6. Reliability of environmental evaluation methods	90
3.8. Public participation in evaluating riverfront's landscape	90
3.8.1. Importance of Public Participation in evaluating riverfront's landscape	90
3.8.2. Previous studies on public participation of riverside environment	91
3.8.3. Stages of public participation in riverfront's landscape regeneration	92
3.8.4. Examples on public participation in riverfront's landscape regeneration	93
3.9. Summary & conclusions	96
<b>CHAPTER 4: Visualization of Riverfront's Landscape Regeneration</b>	
4.1. Introduction	97
4.2. The Process of Visualization	98
4.2.1 Visualization definitions	98
4.2.2 Reference model for visualization	98
4.2.3 Visualization data type	99
4.2.4 Variation of visualization techniques classification	100
4.2.5 Importance of visualization	101



---



---

## ***Table of Contents***

---



---

4.3 Visualization as a link between real and virtual world	101
4.3.1 Visual perception response to visualization	102
4.3.1.1 Understanding Human Perception	103
4.3.1.2 Conscious and Preconscious Vision	103
4.3.1.3 Color Perception	103
4.3.1.4 Comparing Two Images by Flicking	103
4.3.1.5 Change to Oblique	103
4.3.2 Perceived reality of Real and Virtual Space	104
4.3.3 Modes of Visual Representation of visualized objects	105
4.3.3.1 Realism	105
4.3.3.2 Abstraction ...	105
4.3.3.3 Symbolism	106
4.3.4 Level of realism of visualization	106
4.3.5 Choosing appropriate level of detail in design stages	106
4.4 Landscape visualization	109
4.4.1 The role of landscape visualization	109
4.4.2 Purposes of landscape visualizations	111
4.4.3 Landscape visualization from Static to dynamic	111
4.4.3.1 Static visualization	111
4.4.3.2 Dynamic visualization	112
4.4.3.3 Interactive visualization	112
4.4.3.4 Animated visualization	112
4.4.3.5 Immersive visualization	112
4.4.4 2D, 3D, & 4D Landscape Visualization comparison	112
4.4.5 Progression of landscape Visualization techniques	113
4.4.5.1 From pen and paper to Electronic sketching	114
4.4.5.2 From paper maps to GIS mapping	116
4.4.5.3 From photographs to computer photo imaging	117
4.4.5.4 From 3-d physical models to 3-d digital models	117
4.4.5.5 New media: hypermedia and the internet	119
4.4.5.6 Virtual reality and the internet	120
4.4.6 Visualization for representation in landscape	120

---



---

## ***Table of Contents***

---



---

4.4.7 Code of ethics for landscape visualization	122
4.4.8 General Principles for landscape visualization	123
4.4.9 Visualizing landscape visible and invisible phenomena	124
4.5 Visualization for participation in landscape architecture	124
4.5.1 Landscape visualization and participation	124
4.5.2 Communication medium between experts and lay public	125
4.5.3 Visualization and landscape participatory decision making	125
4.5.4 Visualization techniques for effective public participation	127
4.5.5 Visualization for participation in riverfront's landscape regeneration	127
4.6 Summary & Conclusion	128
<b>PART TWO: Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape</b>	130
<b>CHAPTER 5: Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn</b>	
5.1. Introduction	132
5.2. Examples of existing regenerated riverfronts	132
5.2.1 Rhine Riverfront (River Rhine Promenade)	133
5.2.2 Allegheny Riverfront	136
5.2.3 Battery Park City Riverfront	139
5.2.4 North Shore Riverfront Park	144
5.2.5 Louisville riverfront	148
5.2.6 Anderson Riverfront	152
5.2.7 Brooklyn Riverfront (Brooklyn Heights Promenade)	154
5.2.8 Chattanooga Riverfront	157
5.2.9 Hudson Riverfront	160
5.2.10 Paris Pelage riverfront	162
5.3 Examples of under construction projects of riverfronts' regeneration	165
5.3.1 Regeneration of Cincinnati Riverfront Park, Cincinnati, Ohio	166
5.3.2 Regeneration of Nashville Riverfront Park, Tennessee	168

---



---

## ***Table of Contents***

---



---

5.3.3 Regeneration of Anacostia Riverfront, Washington, DC	171
5.3.4 New Orleans Reinventing the Crescent, New Orleans, Louisiana	173
5.3.5 St. Louis Riverfront, Great Rivers Greenway District	175
5.3.6 River Manzanares Riverfront, Madrid, Spain	177
5.4. Summary & conclusions	178
<b>CHAPTER 6: Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation</b>	
6.1. Introduction	181
6.2. Riverfront's landscape types	181
6.2.1 Modular landscape	181
6.2.2 Arpent landscape	182
6.2.3 Ecological landscape	182
6.2.4 Hybrid landscape	182
6.3 Ideas for riverfront's landscape regeneration	183
6.3.1 Urban forest	183
6.3.2 Play or entertainment plaza	184
6.3.3 Riverfront esplanade or continuous Promenade	185
6.3.4 River mixture of lawn & deck	185
6.3.5 Docks	187
6.3.6 Pier overlooks	187
6.3.7 River terraces	188
6.3.8 River banks and islands	188
6.4 Riverfront's landscape elements	190
6.4.1 Riverfront's edge & guardrails (shoreline)	190
6.4.2 Retaining walls, fencing, bollards and railing	193
6.4.3 Side-walk/ paving	194
6.3.4 Stairs/ramps	197
6.3.5 Trees	197
6.4.6 Ground covers, flowers & other vegetation	198
6.4.8 Lighting	200
6.4.9 Signage	200

---



---

## ***Table of Contents***

---



---

6.4.10 Objects of art/ landmarks/ flags & banners	202
6.4.11 Water features	202
6.4.12 Structures, Gates & other amenities	203
6.4.13 Cars/ vehicles parking	204
6.4.14 Trash receptacles .	204
6.4.15 Flood plain	205
6.4.16 Other Utilities	205
6.5 Riverfront's landscape design reference standards	205
6.6 Keys of riverfront's landscape evaluation	211
6.6.1 Access & Linkages	211
6.6.2 Comfort & Image	215
6.6.3 Uses & Activities	216
6.6.4 Sociability	220
6.7. Summary & conclusions	221
<b>CHAPTER 7: Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation</b>	
7.1. Introduction	222
7.2. Computer Simulated visualization of Riverfront's landscape regeneration	222
7.2.1 Perceived realism of computer simulations of landscapes	223
7.2.2 Reasons for choosing computer simulated visualization	224
7.2.3 Measuring the quality of computer simulated visualization	225
7.2.4 Public Participation & computer simulated landscape visualization	226
7.2.5 Computer simulated landscape visualization among user and non-user groups	228
7.2.6 Interactive features of Computer simulated landscape visualization	228
7.3Landscape's Computer simulated Visualization software	228
7.3.1 Requirements of computer landscape visualization software	229
7.3.2 Problems of computer simulated visualization Software	230
7.4 Selecting the approach tool	230
7.4.1 Criteria of Selecting the Right computer visualization tool	231
7.4.2 Recent computer visualization techniques	232

---



---

## ***Table of Contents***

---



---

7.4.2.1 Electronic Sketching	232
7.4.2.2 2D Map Animations	233
7.4.2.3 Computer photo imaging and photo-montage	234
7.4.2.4 2D and 3D panoramic views	235
7.4.2.5 CAD and 3D animation	236
7.4.2.6 3D-digital models	237
7.4.2.7 Integrated GIS and Game Engines	237
7.4.2.8 Internet communication	238
7.4.2.9 Virtual Reality	239
7.4.3 Comparison between computers simulated visualization techniques	240
<b>7.5 Virtual reality as a riverfront's landscape visualization tool</b>	<b>242</b>
7.5.1 Virtual Reality, the selected tool for the approach	242
7.5.2 Characteristics of Virtual Reality system	242
7.5.3 Components of Virtual Reality system	243
7.5.4 Problems of using VR	246
7.5.5 Classification of Virtual Reality due to immersion of users	246
7.5.6 Data structure of riverfronts' landscape VR modeling	249
7.5.6.1 Terrain	250
7.5.6.2 Vegetation	251
7.5.6.3 Human beings	251
7.5.6.4 Water	251
7.5.6.5 Structures	251
7.5.6.5 Atmosphere and light	252
7.5.7 Virtual Reality software packages	252
7.5.7.1 2D drawing & 3D modeling software	252
7.5.7.2 Transforming 3D model to Virtual Reality Model	254
7.5.7.3 Choosing of Virtual Reality navigation Browser	256
<b>7.6 The components of virtual reality system for the approach</b>	<b>262</b>
<b>7.7. Summary &amp; conclusions</b>	<b>262</b>

---



---

## ***Table of Contents***

---



---

<b>CHAPTER 8: Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration</b>	
8.1. Introduction	263
8.2 Approach methodology	264
8.2.1 Approach objectives	264
8.2.2 Approach Assumption	265
8.2.3 Understanding Riverfront landscape in urban regeneration projects	265
8.2.4 Determining of evaluation criteria of riverfront's landscape	266
8.2.5 Establish an evaluation factor set for design criteria of riverfront's landscape elements	266
8.2.6 Establishing a checklist between riverfronts' landscape elements and design criteria	269
8.2.7 Establishing a Radar format to represent public's evaluation for riverfront's landscape	272
8.2.8 Determining Public responses towards proposed computer simulated visualization	273
8.2.9 Determining proposed computer simulated visualization stages and components	274
8.2.10 Participative riverfront's landscape regeneration using the tool of computer visualization	275
8.2.11 Participative riverfront's landscape regeneration cycle	276
8.2.12 Public participation in different stages of the regeneration of riverfront's landscape process	276
8.3 Towards a comprehensive approach	279
<b>PART THREE: Applying the Approach in Evaluating Nile Riverfront's Landscape Regeneration</b>	
<b>CHAPTER 9: The Reliability of Computer-Simulated- Visualization as a Tool for Public Participation in evaluating the Regeneration of Nile Riverfront's Landscape</b>	
9.1. Introduction	281
9.2 Applied study and the reliability of the approach	281
9.2.1 Applied study goals	281

---

---

## ***Table of Contents***

---

---

9.2.2 Applied study Hypothesis	282
9.2.3 Applied study limitations	282
9.2.4 Applied study methodology	283
9.3 Nile riverfront in Egypt	284
9.3.1 Nile River in human history	285
9.3.2 Nile River among World Rivers	285
9.3.3 Current situation of Nile's riverfront	287
9.3.4 Disconnect from Nile's riverfront	288
9.3.4.1 Fences prevent the public from access the riverfront	288
9.3.4.2 Private projects prevent public access to the riverfront	288
9.3.5 Existing Riverbank Conditions	289
9.3.5.1 Natural bank	289
9.3.5.2 Rip rap	290
9.3.5.3 River garden- man made landscape	290
9.3.5.4 River wall	291
9.3.5.5 Structures	291
9.3.5.6 Bio-technical and bio-engineered banks	291
9.3.5.7 Unclassified fill	292
9.4 Nile's riverfront landscape regeneration goals	292
9.4.1 Remove the Physical Barriers to the River Nile	293
9.4.2 Create Continuous Linear Access	294
9.4.3 Create gathering places on river banks	294
9.5 Applied study case (Al-Gazeera Garden)	296
9.5.1 The architecture of riverfront's park	297
9.5.2 Case study features	298
9.5.3 Usage and users of the park	299
9.5.4 Activities in the riverfront park	299
9.5.5 Unresolved accessibility problems	300
9.5.6 Problems of riverfront's landscape elements	301
9.5.7 Analysis of the landscape elements of the case study	303
9.6 Experiment design	307

---



---

## ***Table of Contents***

---



---

9.6.1 Parameters design	307
9.6.2 Proposed alternatives of Al-Gazeera riverfront's landscape	308
9.6.3 Virtual Reality model design	313
9.6.3.1 Current status modeling	313
9.6.3.2 Proposed regeneration alternatives modeling	315
9.6.4 Sample design	322
9.6.5 Questionnaire design	322
<b>9.7 Statistical analysis</b>	<b>332</b>
9.7.1 The used methods of Statistical analysis	332
9.7.2 The outputs of Statistical analysis	332
9.7.3 Suggested modifications of selected alternative (1) to reach the optimum alternative	372
<b>9.8 Reliability study findings</b>	<b>376</b>
<b>CHAPTER 10: Conclusions &amp; Recommendations</b>	
<b>10.1 Conclusions</b>	<b>378</b>
10.1.1 Conclusions about riverfront landscape regeneration	378
10.1.2 Computer simulated visualization techniques	379
10.1.3 General conclusions	379
<b>10.2 Results of Applied study</b>	<b>380</b>
10.2.1 Designing a computer program to help in evaluating riverfronts' landscape alternatives	385
<b>10.3 Recommendations for further research</b>	<b>396</b>
<b>REFERENCES</b>	<b>R-1</b>





# LIST OF FIGURES



## LIST OF FIGURES

### Part One

Fig(P1-1)	Examples on riverfront regeneration	2
Fig(P1-2)	Example of Visualization of promenade at New Orleans riverfront's landscape regeneration	2

### Chapter 1

Fig(1-1)	cities rediscovering their neglected riverfronts, through deindustrialization	3
Fig(1-2)	River in natural environment	5
Fig(1-3)	River variation in width	6
Fig(1-4)	Diagram of urban river alternatives	7
Fig(1-5)	Left: Danube River with urban edge, right: River Gambia with natural edge	8
Fig(1-6)	Physical contact with river: natural and artificial banks	10
Fig(1-7)	Urban riverfront at Asfahan, Iran	11
Fig(1-8)	riverfront features	12
Fig(1-9)	Examples on types of riverfronts	15
Fig(1-10)	New architectural iconic building on world riverfronts	18
Fig(1-11)	Example on riverfront regeneration process of New Orleans riverfront	19
Fig(1-12)	The four strategies of urban riverfront	21
Fig(1-13)	Examples on typologies of riverfront's regeneration	23
Fig(1-14)	Different Principles of urban riverfront regeneration, according to site conditions	25
Fig(1-15)	Two different riverfront regeneration projects, however public access is a common goal	26
Fig(1-16)	Different features of riverfront public access	27
Fig(1-17)	Physical access to riverfront, left is linear, right is perpendicular	28
Fig(1-18)	perpendicular and lateral access	29
Fig(1-19)	Riverfront from today to the future	33

### Chapter 2

Fig(2-1)	landscape perception process as interaction between people and landscape	37
Fig(2-2)	landscape perception & aesthetic as interaction between people and place	38
Fig(2-3)	Gestalt laws for scene perception	39
Fig(2-4)	Components of Aesthetic Response	40
Fig(2-5)	Expert's preference versus public's preference as an approach to assess landscape quality	43

---



---

## *List of Figures*

---



---

Fig(2-6)	Aesthetic and emotional models	46
Fig(2-7)	Dimensions of emotional responses	49
Fig(2-8)	the four keys of making public pace successful	53
Fig(2-9)	Riverfront's accessibility	54
Fig(2-10)	Examples of uses and activities on riverfronts	55
Fig(2-11)	Passive and active uses according to riverfront's landscape type	56
Fig(2-12)	Comfort and image of riverfront's spaces	56
Fig(2-13)	Sociability of riverfronts' spaces	57
Fig(2-14)	Urban Riverfront Regeneration Framework	58
Fig(2-15)	The relationship between people, city and river	59
Fig(2-16)	Aesthetic Evaluation of Urban Riverfront (fundamental viewpoints)	60

### **Chapter 3**

Fig(3-1)	Possible goals and sub goals of public participation	71
Fig(3-2)	Participation ladder	74
Fig(3-3)	public Participation Ruler together with the political profile and the proceeding status	76
Fig(3-4)	A ladder of e-participation	77
Fig(3-5)	Increasing level of public participation	79
Fig(3-6)	Importance of public participation in evaluation of riverfront's landscape	91
Fig(3-7)	Public comments in a meeting to participation	93
Fig(3-8)	A group presenting their ideas during the public meeting, Nashville riverfront	94
Fig(3-9)	Public comments in a meeting to participate Nashville riverfront' regeneration	95

### **Chapter 4**

Fig(4-1)	Reference model for visualization	99
Fig(4-2)	Variation of visualization techniques	100
Fig(4-3)	Visualization is the link between real & virtual environment	101
Fig(4-4)	Visualization as link between real and virtual world	102
Fig(4-5)	Components of Perceived Reality in Real and Virtual Space	104
Fig(4-6)	Abstraction vs. Realism	107
Fig(4-7)	Abstract visualization	107
Fig(4-8)	Semi realistic visualization of Cincinnati Riverfront Park regeneration	108
Fig(4-9)	Photo-realistic visualization of Chicago Riverfront's regeneration	108

---



---

## *List of Figures*

---



---

Fig(4-10)	progression of visualization tools from traditional to computerized/contemporary	114
Fig(4-11)	Visualization with sketching for new Shanghai riverfront's landscape regeneration	114
Fig(4-12)	Freehand sketching of New Orleans riverfront regeneration alternatives	115
Fig(4-13)	Visualization with electronic sketching	115
Fig(4-14)	Paper maps and plans as traditional landscape visualization method	116
Fig(4-15)	GIS maps and plans as traditional landscape visualization method	116
Fig(4-16)	Computer photo imaging for Visualization	117
Fig(4-17)	3d physical model for Toronto riverfront	117
Fig(4-18)	Computer rendering Visualization of riverfront regeneration for Don River	118
Fig(4-19)	Two methods for rendering Toronto riverfront's regeneration	118
Fig(4-20)	virtual reality and the internet as recent advances in landscape visualization	119
Fig(4-21)	Visualization as a tool to imagine before and after status of riverfront changes	120
Fig(4-22)	Landscape visualization for representing seasonal changes and design alternative	121
Fig(4-23)	Visualization day and night landscape of Chicago riverfront	121
Fig(4-24)	Visualization as the common ground for communication between expert landscape architects and the public	125
Fig(4-25)	the push and the pull of information in participatory making	126
Fig(4-26)	some visualization had been used in public participation process to regenerate New Orleans riverfront's landscape	128

## **Chapter 5**

Fig(5-1)	Main aspects of evaluation of riverfront's regeneration	132
Fig(5-2)	Rhine Riverfront, Dusseldorf	133
Fig(5-3)	Features of Rhine Riverfront, Dusseldorf, Germany	134
Fig(5-4)	Sociability on riverfront	134
Fig(5-5)	Allegheny Riverfront	136
Fig(5-6)	Access and uses at Allegheny Riverfront	137
Fig(5-7)	Green esplanade at Allegheny Riverfront	137
Fig(5-8)	Aerial view and main features of Battery Park City Riverfront	139
Fig(5-9)	Battery Park City Riverfront	140
Fig(5-10)	Access, uses and sociability of Battery Park City Riverfront	141
Fig(5-11)	access, uses and sociability Battery Park City Riverfront	143
Fig(5-12)	Some of landscape elements of Battery Park City Riverfront	143
Fig(5-13)	North Shore Riverfront Park	144
Fig(5-14)	Features of North Shore Riverfront Park	145

---



---

## ***List of Figures***

---



---

Fig(5-15)	high density vegetation as a feature	147
Fig(5-16)	water steps as landscape elements	147
Fig(5-17)	Louisville Riverfront	148
Fig(5-18)	Aerial view of Louisville Riverfront	148
Fig(5-19)	Main features of Louisville Riverfront, water plays, steps and ramp to water	149
Fig(5-20)	Louisville Riverfront, landscape treatments of riverfront's edge, green steps, riverwalk	151
Fig(5-21)	Louisville Riverfront, new regeneration project	151
Fig(5-22)	Anderson Riverfront	152
Fig(5-23)	Brooklyn Riverfront	154
Fig(5-24)	Brooklyn Riverfront Visitors enjoy the views of Manhattan and the East River along the Promenade	155
Fig(5-25)	Aerial view of Brooklyn Riverfront	155
Fig(5-26)	Chattanooga Riverfront	157
Fig(5-27)	Main features of Chattanooga Riverfront, water plays, steps and ramp to water	158
Fig(5-28)	Hudson Riverfront	160
Fig(5-29)	Paris Plage Riverfront	162
Fig(5-30)	Uses and Activities in Paris Pelage Riverfront	163
Fig(5-31)	Aerial views of Paris pelage Riverfront	165
Fig(5-32)	Features of Cincinnati Riverfront regeneration	166
Fig(5-33)	Cincinnati Riverfront's landscape regeneration	167
Fig(5-34)	Features of Nashville Riverfront regeneration	168
Fig(5-35)	New ideas in regeneration of Nashville riverfront	169
Fig(5-36)	Nashville Proposed public riverfront Adventure Park	170
Fig(5-37)	Features of Anacostia Riverfront regeneration	171
Fig(5-38)	Existing conditions of New Orleans riverfront	173
Fig(5-39)	New ideas in regeneration of New Orleans riverfront	173
Fig(5-40)	New Orleans riverfront's regeneration goals	174
Fig(5-41)	some features of New Orleans riverfront's regeneration	174
Fig(5-42)	Aerial view of proposed are of riverfront's regeneration of St. Louis riverfront	175
Fig(5-43)	Four alternatives for St. Louis Riverfront's landscape regeneration	176
Fig(5-44)	Manzanares Riverfront's landscape regeneration	177

---

---

## List of Figures

---

---

### Chapter 6

Fig(6-1)	Modular riverfront's landscape	181
Fig(6-2)	Arpent riverfront's landscape	182
Fig(6-3)	Ecological riverfront's landscape	182
Fig(6-4)	Hybrid riverfront's landscape	183
Fig(6-5)	Idea of urban forest at Nashville riverfront	184
Fig(6-6)	Media projection is one of ideas in New Orleans riverfront regeneration	184
Fig(6-7)	entertainment plaza	185
Fig(6-8)	Various promenade from East river, New York	185
Fig(6-9)	three ideas for riverfront's landscape regeneration from Delaware Riverfront's regeneration alternatives	186
Fig(6-10)	Lawn as passive riverfronts landscape	187
Fig(6-11)	River park and adjacent dock	187
Fig(6-12)	Pier overlooks at Nashville riverfront (right), St. Louis riverfront. (Left)	188
Fig(6-13)	river terraces and direct contact with water	188
Fig(6-14)	river banks and islands	188
Fig(6-15)	St. Louis riverfront proposals similar to Nile's riverfront case	189
Fig(6-16)	natural and built riverfront's edge	191
Fig(6-17)	Various types of river edge vary from natural green to built edges	192
Fig(6-18)	Various types of guardrails	192
Fig(6-19)	Retaining wall, fencing, and railing	193
Fig(6-20)	Bollard and railing	193
Fig(6-21)	side-walk in different riverfronts, with multiple activities	194
Fig(6-22)	Different types of riverfront's sidewalk	195
Fig(6-23)	Four zones of riverfront's sidewalk	196
Fig(6-24)	Stairs and ramps in riverfront's landscape	197
Fig(6-25)	trees in various order and various functions in riverfront landscape	198
Fig(6-26)	Different kinds of ground covers and vegetation	198
Fig(6-27)	Hamburg riverfront- steps as seating	199
Fig(6-28)	Different types and designs of seating	199
Fig(6-29)	Lighting features of riverfront's landscape	200
Fig(6-30)	Signage in riverfronts landscape	201
Fig(6-31)	Examples of landmarks, flags and objects of art in riverfronts' landscape	202

---



---

## ***List of Figures***

---



---

Fig(6-32)	Examples of water features, with different uses in riverfronts' landscape	203
Fig(6-33)	Cars/ vehicles parking in riverfronts' landscape	204
Fig(6-34)	Trash receptacles	205
Fig(6-35)	Examples of flood plain	205
Fig(6-36)	Aspects and sub-aspects of riverfront's landscape evaluation	212
Fig(6-37)	left- Sydney, Australia, right Lake Como, Italy	213
Fig(6-38)	Laguna Beach, CA	213
Fig(6-39)	left- Battery Park City, New York, right- Cleveland	214
Fig(6-40)	Left- Shelter, New Zealand, right-River Taxi, Toronto, Ontario	214
Fig(6-41)	Portland riverfront New York	214
Fig(6-42)	Left- Brooklyn, right- Boston	215
Fig(6-43)	Paris, France	216
Fig(6-44)	Left- Portland, right- Central Park, New York	216
Fig(6-45)	Different uses on East riverfront	217
Fig(6-46)	left-Fort Worth, right- Pioneer Courthouse Square, Portland	218
Fig(6-47)	left- Swan Boats, Boston, right Battery Park City, New York	218
Fig(6-48)	left- Riverplace, Portland, right Ottawa, Ontario	218
Fig(6-49)	left- Albert Park, San Rafael, right Boat House, Central Park, New York	219
Fig(6-50)	left- riverfront Amphitheatre, Zurich, right Lake Como, Italy	219
Fig(6-51)	uses and activities proposed for New Orleans riverfront's regeneration	219
Fig(6-52)	above Tuileries, Paris, France, below- New Orleans	220

## **Chapter 7**

Fig(7-1)	computer simulated visualization of regeneration of New Orleans Riverfront	223
Fig(7-2)	reasons fro choosing computer visualization to contribute the public in riverfront's landscape regeneration	224
Fig(7-3)	Requirements for features of 3D landscape visualization software	229
Fig(7-4)	some types of computer visualization techniques used to support landscape design	231
Fig(7-5)	Electronic sketching and sketchpad	233
Fig(7-6)	2D map animation	234
Fig(7-7)	Computer photo imaging of photo montage for New Orleans Riverfront' landscape regeneration	235
Fig(7-8)	Panorama views	235
Fig(7-9)	CAD and 3D animation	236



---



---

## ***List of Figures***

---



---

Fig(7-10)	3D-digital models for Chicago riverfront	237
Fig(7-11)	Integrated GIS and Game Engine (Community Viz)	238
Fig(7-12)	Online survey through the Internet	238
Fig(7-13)	Application Virtual Reality visualization techniques in landscape	239
Fig(7-14)	Components of VR systems, hardware and software, the input and output devices, the data and the users	244
Fig(7-15)	Examples of VR hardware components	245
Fig(7-16)	Interaction devices: Spacemouse, Stylus, holobench set-up, Stylus, HMD set-up, Hornet and data glove	246
Fig(7-17)	Left, Augmented Reality, Right, Mixed Reality	248
Fig(7-18)	Mixed Reality	248
Fig(7-19)	The complex data structure of Landscape VR Modeling and diverse issues that Landscape models and modelers need to address	250
Fig(7-20)	Components of the need 3D landscape scene for VR model	254
Fig(7-21)	Screen shot of Instant Player interface	257
Fig(7-22)	Screen shot of Flus Player interface	257
Fig(7-23)	Screen shot of Cortona Player interface	257
Fig(7-24)	Screen shot of Sony Player interface	258
Fig(7-25)	Screen shot of Octaga Player interface	258
Fig(7-26)	Screen shot of BS Contact Player interface	258
Fig(7-27)	Screen shot of Cosmo Player interface	258
Fig(7-28)	Octaga player interface	261
Fig(7-29)	Octaga player & Octaga expotrter	261

## **Chapter 8**

Fig(8-1)	Schematic design of the approach	263
Fig(8-2)	Evaluation criteria (aspects) and sub-criteria of Riverfront's Landscape	267
Fig(8-3)	Radar format of public's Evaluation criteria of riverfront's landscape	272
Fig(8-4)	An example of representing evaluation mean on Radar format landscape	272
Fig(8-5)	framework for using computer simulated technique to enhance public participation	273
Fig(8-6)	The four stages of virtual riverfront's landscape modeling	274
Fig(8-7)	The components of Virtual Reality system for the approach	274
Fig(8-8)	participative riverfront's landscape regeneration in real world via shared virtual world	275
Fig(8-9)	participative riverfront's landscape cycle	276

---



---

## *List of Figures*

---



---

Fig(8-10)	Public participation in different stages of the regeneration of riverfront's landscape process.	277
Fig(8-11)	public participation in different stages of the regeneration of riverfront's landscape process, using proposed computer simulated visualization, showing the stages which need this proposal urgently	278
Fig(8-12)	Approach to using computer simulated visualization to enhance Public participation in the process of alternatives' evaluation of riverfront's regeneration	280

## **Chapter 9**

Fig(9-1)	applied study methodology diagram	283
Fig(9-2)	Nile River in great Cairo	284
Fig(9-3)	Left Nile in Asuit , Right Ibrahimya Canal	285
Fig(9-4)	Seine River in paris	285
Fig(9-5)	Okinawa River in Japan	285
Fig(9-6)	Left Manzanares River, Madrid- Right Tiber River, Rome	285
Fig(9-7)	Current situation of Nile's riverfront in Cairo	287
Fig(9-8)	Fences prevent the public from Nile riverfront access	288
Fig(9-9)	The drift boots and bulk constructions prevent the public from Nile riverfront access	288
Fig(9-10)	Nile river edge as Natural bank	289
Fig(9-11)	Nile river edge as Rip rap	289
Fig(9-12)	Nile river edge as man made landscape	289
Fig(9-13)	Nile river edge as a wall	290
Fig(9-14)	Nile river edge dominated by structures	290
Fig(9-15)	Nile river edge as bio engineered banks	290
Fig(9-16)	Unclassified Nile river edge	291
Fig(9-17)	River Nile landscape regeneration goals	292
Fig(9-18)	some ideas for Nile's riverfront regeneration	293
Fig(9-19)	Some proposals for riverfront landscape for River Nile	294
Fig(9-20)	two shots of map of the case study location at River Nile	295
Fig(9-21)	focus on the case study area	295
Fig(9-22)	Shots from Qasr El-Nile Bridge for the case study area	296
Fig(9-23)	Varies categories of park's users	298
Fig(9-24)	Some types of activities in the riverfront's park	299
Fig(9-25)	disconnect between users and river	300
Fig(9-26)	Examples of the park problems	301

---



---

## *List of Figures*

---



---

Fig(9-27)	Alternative (1) for Nile's riverfront landscape regeneration	308
Fig(9-28)	Alternative (2) for Nile's riverfront landscape regeneration	309
Fig(9-29)	Alternative (3) for Nile's riverfront landscape regeneration	310
Fig(9-30)	Shots from AutoCAD program using to trace satellite image to draw the existing situation	312
Fig(9-31)	Shots for iconic building to help modeling the context	313
Fig(9-32)	Modeling existing status	313
Fig(9-33)	Shot from AutoCAD program, in which the alternatives have been designed and drawn in 2d format as a base map for the 3d model	314
Fig(9-34)	Import from AutoCAD to 3DSMAX	314
Fig(9-35)	Shots from 3DSMAX program, in which the textured model was created	315
Fig(9-36)	Export models by using Octaga plug-in	315
Fig(9-37)	Sequence of Exporting models by using Octaga plug-in to be navigated or visualized by Octaga player	316
Fig(9-38)	Nile riverfront's from existing view to three regeneration alternatives	317
Fig(9-39)	Rendered shots from the three alternatives	318
Fig(9-40)	Bird's eye views for the three alternatives	319
Fig(9-41)	The three virtual reality models in Octage Browse	320
Fig(9-42)	Alternatives' evaluation by public users, the selected alternative is alternative (1)	333
Fig(9-43)	Alternative (1) differences between users' evaluation mean, once as all criteria have the same weight, the other with consideration of experts' evaluation factor	334
Fig(9-44)	Alternative (2) differences between users' evaluation mean,	335
Fig(9-45)	Alternative (3) differences between users' evaluation mean	335
Fig(9-46)	suggested format (Radar technique) for displaying how alternative (1)	336
Fig(9-47)	suggested format (Radar technique) for displaying how alternative (2)	337
Fig(9-48)	suggested format (Radar technique) for displaying how alternative (3)	337
Fig(9-49)	comparison between the three alternatives using the suggested format (Radar technique)	338
Fig(9-50)	suggested format (Radar technique) for displaying how alternative (1) was evaluated by public users in the participation process in each sub-criterion	338
Fig(9-51)	suggested format (Radar technique) for displaying how alternative (2)	339
Fig(9-52)	suggested format (Radar technique) for displaying how alternative (3)	339
Fig(9-53)	chart representing results of table (9-4)	340
Fig(9-54)	chart representing results of table (9-5)	341
Fig(9-55)	chart representing results of table (9-6)	341
Fig(9-56)	chart representing results of table (9-7)	342

---



---

## *List of Figures*

---



---

Fig(9-57)	chart representing users' evaluation of river edge and sidewalk in improving physical access	343
Fig(9-58)	chart representing users' evaluation of river edge and sidewalk in improving visual access	343
Fig(9-59)	chart representing users' evaluation of river edge and sidewalk and effect on walk-ability and convenient	344
Fig(9-60)	chart representing users' evaluation of effect of river edge and sidewalk on feeling of safety	344
Fig(9-61)	chart representing users' evaluation of effect of river edge and sidewalk on visual aspects and sense of beauty	345
Fig(9-62)	chart representing users' evaluation of effect of river edge and sidewalk on providing varieties of uses as an example users' preferences of uses and activities	345
Fig(9-63)	3D chart representing results of table (9-8)	348
Fig(9-64)	3D chart representing results of table (9-9)	348
Fig(9-65)	3D chart representing results of table (9-10)	349
Fig(9-66)	3D chart representing results of table (9-11)	349
Fig(9-67)	3D chart representing results of table (9-12)	350
Fig(9-68)	3D chart representing results of table (9-13)	350
Fig(9-69)	3D chart representing results of table (9-14)	351
Fig(9-70)	3D chart representing results of table (9-15)	351
Fig(9-71)	3D chart representing results of table (9-16)	352
Fig(9-72)	3D chart representing results of table (9-17)	352
Fig(9-73)	3D chart representing results of table (9-18)	353
Fig(9-74)	3D chart representing results of table (9-19)	353
Fig(9-75)	3D chart representing results of table (9-20)	355
Fig(9-76)	3D chart representing results of table (9-21)	355
Fig(9-77)	3D chart representing results of table (9-22)	356
Fig(9-78)	3D chart representing results of table (9-23)	356
Fig(9-79)	3D chart representing results of table (9-24)	357
Fig(9-80)	3D chart representing results of table (9-25)	357
Fig(9-81)	3D chart representing results of table (9-26)	358
Fig(9-82)	3D chart representing results of table (9-27)	358
Fig(9-83)	3D chart representing results of table (9-28)	359
Fig(9-84)	3D chart representing results of table (9-29)	359
Fig(9-85)	3D chart representing results of table (9-30)	361
Fig(9-86)	3D chart representing results of table (9-31)	361
Fig(9-87)	3D chart representing results of table (9-32)	362

---



---

## ***List of Figures***

---



---

Fig(9-88)	3D chart representing results of table (9-33)	362
Fig(9-89)	3D chart representing results of table (9-34)	363
Fig(9-90)	3D chart representing results of table (9-35)	363
Fig(9-91)	3D chart representing results of table (9-36)	364
Fig(9-92)	3D chart representing results of table (9-37)	364
Fig(9-93)	3D chart representing results of table (9-38)	365
Fig(9-94)	3D chart representing results of table (9-39)	365
Fig(9-95)	3D chart representing results of table (9-40)	366
Fig(9-96)	3D chart representing results of table (9-41)	366
Fig(9-97)	3D chart representing results of table (9-42)	367
Fig(9-98)	3D chart representing results of table (9-43)	367
Fig(9-99)	3D chart representing results of table (9-44)	368
Fig(9-100)	3D chart representing results of table (9-45)	368
Fig(9-101)	3D chart representing results of table (9-46)	369
Fig(9-102)	3D chart representing results of table (9-47)	369
Fig(9-103)	first proposed modification of selected alternative	371
Fig(9-104)	Second proposed modification of selected alternative	372
Fig(9-105)	Third proposed modification of selected alternative	373

## **Chapter 10**

Fig(10-1)	Suggested approach of using Computer Simulated Visualization to enhance public participation	382
Fig(10-2)	Main program's screen to evaluate riverfronts' landscape alternatives	385
Fig(10-3)	screen of demographical information	386
Fig(10-4)	screen of selection project name, no. of alt., evaluated landscape element	386
Fig(10-5)	Landscape elements drop down menu	387
Fig(10-6)	first evaluation criteria (points related to access and linkage)	388
Fig(10-7)	warning screen appears after the participant finishes the related point to access and linkage	388
Fig(10-8)	screen of the points related to comfort and image	389
Fig(10-9)	Screen of the points related to uses and activities	389
Fig(10-10)	screen of the points related to sociability	389
Fig(10-11)	screen of alternative (2)	390
Fig(10-12)	screen of alternative (3)	390

---

---

## ***List of Figures***

---

---

Fig(10-13)	Screen tells the participant that he finished evaluation of all alternatives and thanks him for his participation	391
Fig(10-14)	Screen of participant's survey result	391
Fig(10-15)	landscape architect screen, that he could prepare survey data	392
Fig(10-16)	Screen of project data preparing	392
Fig(10-17)	Screen of selecting regenerated landscape element (elements) which will be evaluated in the survey	393
Fig(10-18)	Screen of modifying evaluation criteria data for each project	394
Fig(10-19)	Another Screen of modifying evaluation criteria data for each project	394
Fig(10-20)	Screen for new set of evaluation criteria data for each project	395
Fig(10-21)	Screen shows selection of (show the statistical report) to review evaluation results for experts or landscape architects	395
Fig(10-22)	The statistical report sheet which show participants' survey results as data need for experts and landscape architects	396



# LIST OF TABLES





**LIST OF TABLES****Chapter 1**

Table(1-1)	Landscape elements of the river	9
Table (1-2)	Types of riverfronts	16
Table (1-3)	Dimensions of urban riverfront regeneration	22
Table (1-4)	Principles of urban riverfront regeneration	24
Table (1-5)	The new vision of riverfront regeneration	25

**Chapter 2**

Table(2-1)	Kaplans' landscape preference model	44
Table(2-2)	Measuring users' satisfaction of riverfronts spaces	53
Table(2-3)	Measuring accessibility to riverfronts	54
Table(2-4)	Elementary viewpoints of the river components	61
Table(2-5)	Elementary viewpoints of the city components	61
Table(2-6)	Elementary viewpoints of the people components	62

**Chapter 3**

Table(3-1)	Participants of community participation	65
Table(3-2)	Public involvement types	67
Table(3-3)	Techniques for public participation	67
Table(3-4)	Strategy of public participation	68
Table(3-5)	Definitions and measurements of Criteria for evaluating participatory processes	69
Table(3-6)	Aims of public participation and applicable method level	72
Table(3-7)	advantages and disadvantages of public participation	73
Table(3-8)	Participation ladder from traditional methods to e-participation	78
Table(3-9)	Methods and purposes of citizen participation	80
Table(3-10)	Purposes of citizen involvement—usefulness of methods by purpose	81
Table(3-11)	Approaches to landscape evaluation	84
Table(3-12)	Comparison between different methods of landscape evaluation	84

**Chapter 4**

Table(4-1)	Advantages and Disadvantages of Three Visualization Modes	113
Table (4-2)	Code of Ethics for Landscape Visualization	122
Table (4-3)	Criteria for evaluating landscape visualization	123

---



---

## ***List of Tables***

---



---

Table (4-4)	visualizing landscape visible and invisible phenomena	124
-------------	---	-----

### **Chapter 5**

Table(5-1)	Riverfront's landscape regeneration aspects of Rhine Riverfront	135
Table(5-2)	Riverfront's landscape regeneration aspects of Allegheny Riverfront	138
Table(5-3)	Riverfront's landscape regeneration aspects of Battery Park City Riverfront	142
Table(5-4)	Riverfront's landscape regeneration aspects of North Shore Riverfront Park	147
Table(5-5)	Riverfront's landscape regeneration aspects of Louisville Riverfront Park	150
Table(5-6)	Riverfront's landscape regeneration aspects of Anderson Riverfront Park	153
Table(5-7)	Riverfront's landscape regeneration aspects of Brooklyn Riverfront	156
Table(5-8)	Riverfront's landscape regeneration aspects of Chattanooga Riverfront	159
Table(5-9)	Riverfront's landscape regeneration aspects of Hudson Riverfront	161
Table(5-10)	Riverfront's landscape regeneration aspects of Hudson Riverfront	164
Table(5-11)	Principles of riverfront public space framework	179
Table(5-12)	Steps to create a great regeneration of riverfronts	180
Table(5-13)	Problems with regeneration of riverfronts	180

### **Chapter 6**

Table(6-1)	Riverfront's landscape elements, their aspects, their design indicators, and their evaluation variable	206-211
------------	--	---------

### **Chapter 7**

Table(7-1)	The quality of computer simulated visualization	226
Table(7-2)	Problems of computer simulated visualization software	230
Table(7-3)	comparative analysis between computer simulated visualization techniques to choose the most suitable a for the public to participate in evaluating riverfront's landscape regeneration	241
Table(7-4)	characteristic of VR system which make it valuable for landscape visualization	243
Table(7-5)	VR users' immersion levels	247
Table(7-6)	Comparison of Virtual Reality Browsers to select suitable one for the research Approach	259

### **Chapter 8**

Table(8-1)	Evaluation Factors of criteria and sub-criteria of riverfront's landscape regeneration	268
Table(8-2)	checklist between riverfront's landscape elements and design criteria	270
Table(8-3)	checklist between riverfront's landscape elements and design criteria, points not highlighted are not important for related landscape elements	271

---



---

## *List of Tables*

---



---

<b>Chapter 9</b>		
Table(9-1)	Nile Riverfront's landscape elements	306
Table(9-2)	Comparison between proposed regenerated landscape elements in the three alternatives	311
Table(9-3)	Mean factors for evaluation sub-criteria for the modified landscape elements in the three alternatives	315
Table(9-4)	comparison between mean of evaluation of two criteria, improving physical access and safety in the three alternatives	340
Table(9-5)	Comparison between mean of evaluation of two criteria, safety and visual aspects or sense of beauty in the three alternatives	341
Table(9-6)	comparison between mean of evaluation of two criteria, physical and visual access in the three alternatives	341
Table(9-7)	comparison between mean of evaluation of two criteria, improving physical access, walk-ability and convenient in the three alternatives	342
Table(9-8)	Correlation between gender and evaluation of quality of physical access to river	348
Table(9-9)	Correlation between age and evaluation of quality of physical access to river.	348
Table(9-10)	Correlation between gender and evaluation of quality of visual access to river	349
Table(9-11)	Correlation between age and evaluation of quality of visual access to river	349
Table(9-12)	Correlation between gender and evaluation of the connection between land and water	350
Table(9-13)	Correlation between age and evaluation of the connection between land and water	350
Table(9-14)	Correlation between gender and evaluation of the continuity of whole landscape design	351
Table(9-15)	Correlation between age and evaluation of the continuity of whole landscape design	351
Table(9-16)	Correlation between gender and evaluation of walk-ability and convenient	352
Table(9-17)	Correlation between age and evaluation of walk-ability and convenient	352
Table(9-18)	Correlation between gender and evaluation of how can the landscape elements (river edge, and sidewalk) create direct contact with water	353
Table(9-19)	Correlation between age and evaluation of how can the landscape elements (river edge, and sidewalk) create direct contact with water	353
Table(9-20)	Correlation between gender and evaluation of feeling of safety	355
Table(9-21)	Correlation between age and evaluation of feeling of safety	355
Table(9-22)	Correlation between gender and evaluation of the modified landscape elements and legibility within riverfront space	356
Table(9-23)	Correlation between gender and evaluation of the modified landscape elements and legibility within riverfront space	356
Table(9-24)	Correlation between gender and evaluation of coherence and harmony between modified landscape elements and other landscape elements	357
Table(9-25)	Correlation between gender and evaluation of coherence and harmony between modified landscape elements and other landscape elements	357

## ***List of Tables***

Table(9-26)	Correlation between gender and evaluation of attractiveness and charming with the modified landscape elements	358
Table(9-27)	Correlation between age and evaluation of attractiveness and charming with the modified landscape elements	358
Table(9-28)	Correlation between gender and evaluation of sense of beauty of the modified elements within other landscape elements	359
Table(9-29)	Correlation between age and evaluation of sense of beauty of the modified elements within other landscape elements	359
Table(9-30)	Correlation between gender and evaluation of how the modified elements can maximize access to different uses	361
Table(9-31)	Correlation between age and evaluation of how the modified elements can maximize access to different uses	361
Table(9-32)	Correlation between gender and evaluation of how the modified elements can provide varieties of uses	362
Table(9-33)	Correlation between age and evaluation of how the modified elements can provide varieties of uses	362
Table(9-34)	Correlation between gender and evaluation of how the modified elements can provide enough space for activities	363
Table(9-35)	Correlation between age and evaluation of how the modified elements can provide enough space for activities	363
Table(9-36)	Correlation between gender and evaluation of functional flexibility with the modified elements	364
Table(9-37)	Correlation between age and evaluation of functional flexibility with the modified elements	364
Table(9-38)	Correlation between gender and evaluation of attraction of uses with the modified elements	365
Table(9-39)	Correlation between age and evaluation of attraction of uses with the modified elements	365
Table(9-40)	Correlation between gender and evaluation of how the modified elements can make interactivity between space visitors	366
Table(9-41)	Correlation between age and evaluation of how the modified elements can make interactivity between space visitors	366
Table(9-42)	Correlation between gender and evaluation of how the modified elements can make the space more welcoming	367
Table(9-43)	Correlation between age and evaluation of how the modified elements can make the space more welcoming	367
Table(9-44)	Correlation between gender and evaluation of how the modified elements can make the space lively	368
Table(9-45)	Correlation between age and evaluation of how the modified elements can make the space lively	368
Table(9-46)	Correlation between gender and evaluation of how the modified elements can increase the sense of pride and ownership	369
Table(9-47)	Correlation between gender and evaluation of how the modified elements can increase the sense of pride and ownership	369
<b>Chapter 10</b>		
Table(10-1)	Main criteria and sub-criteria, their codes and the experts' evaluation factor for each of them	384



**ABSTRACT**



---

---

## ***Abstract***

---

---

The research presents the idea that computer simulated visualization, if used appropriately, can revolutionize the process of public participation in evaluating the process of riverfronts' landscape regeneration alternatives in an effective way, so the research aims to develop an approach to enhance public participation in river Nile banks regeneration using new computer simulated visualization techniques, and then testing the reliability of this suggested approach through a limited experiment that is applied on evaluation of proposed alternatives of riverfront's landscape regeneration.

The research emphasized on a new point of research which has never been discussed before with this methodology. The research emphasized on the importance of a computer generated visualization tool to improve public participation which is becoming increasingly recognized within the landscape architecture, urban landscape and design community, as a tool may be used to evaluate modifications in landscape elements which are prepared by landscape architects to regenerate the riverfront's landscape.

The area between Qasr-El-Nile Bridge and 6 October Bridge adjacent to River Nile banks is chosen as the case study of the research. This area is named Al-Gazeera garden, is designed before as a public garden, but its landscape design has some problems which prevent the lay public to fully access the riverfront. As a result the researcher suggested making some modifications in landscape elements treatments of this area according to public evaluation of the regeneration of this riverfront space which affected with their preferences and needs, further the research suggested a computer program which can help the experts to analyze the evaluation outputs of public users evaluation.

For further research, the study recommends to suggest more various ideas of using computer simulated visualization techniques (especially Virtual Reality by VrmI/X3D language) in another researches to share the lay public in decision making process of landscape architecture alternatives for any built environment.

**This research focuses on the idea that computer simulated visualization, if used appropriately, can revolutionize the process of public participation in evaluating the process of riverfronts' landscape regeneration alternatives in an effective way.**

**"It is the time for a new approach to public participation in riverfront's landscape regeneration."**





# INTRODUCTION



## 0.1 Introduction

Landscape architecture today in the beginning of twenty-first century has three new features; first feature is a new trend which is landscape regeneration of world's riverfront which they were neglected for a long time. Second feature is a new decision-making method by involving the lay public in the design process in all stages. The third feature is the wide use of computer technology in landscape architecture with different ways, especially in the representation of design ideas, so computer simulated visualization is considered now an essential tool in design processes.

From previous three new features of landscape architecture the research idea has been developed to discuss an idea that computer simulated visualization, if used appropriately, can revolutionize the process of public participation in evaluating the process of riverfronts' landscape regeneration alternatives in an effective way. As shown in the next figure (0-1).

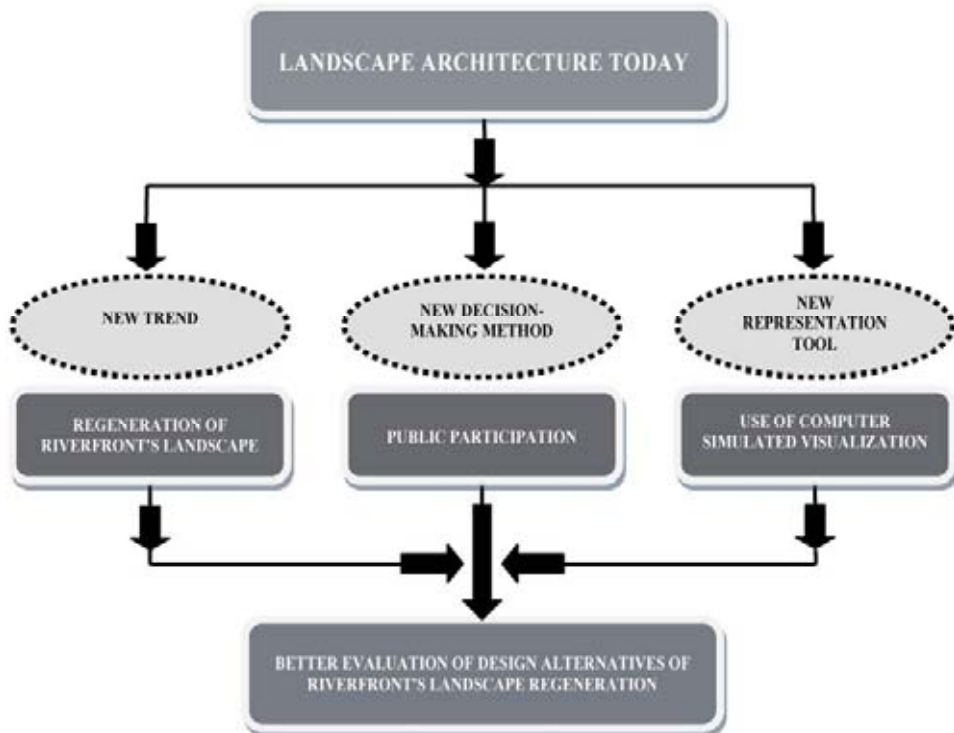


Figure (0-1) Research idea. By researcher.

### **0.1.1 Where is the world now? And where we are?**

As urban design and landscape architecture for community development especially concerns to riverfronts' regeneration evolves into the twenty-first century, the process of citizen participation and the language of 3D-computer visualization, are becoming extremely significant as they relate to each other. The thrust of virtual reality technology has the potential to help shaping a new paradigm in which people are informed about and communicate issues on form, space, and quality of life. This potential lies in the fact that this 3D technology, computer simulated visualization, serves as a common visual language. This language fosters ideas that can be realized immediately in a compelling, easily understandable and interactive environment.

Most cities now returned to their riverfronts trying to regenerate their landscape to provide their citizens with good access to the preferable environment adjacent to water especially in contact with rivers. The designers in these cities try to involve the citizens in the regeneration process by different means. But if we compare that with our cities like in Egypt we find a disconnect between citizens and designers in such projects, so the final product of designers may not success in meeting people needs, so to find a new tool to help the lay public to share the designers in decision making of riverfront landscape projects is essential subject.

### **0.1.2 A New Vision for Urban Riverfronts**

Riverfronts' regeneration since the 1960s has been a widespread phenomenon occurring in different parts of the globe. Aesthetic appeal and emotional satisfaction, recreational values, environmental values, and historical values are the four ways in which people value water and riverfronts. However, the broad goals of public riverfront producers do not always contribute to designed landscapes in tune with these values. To restore the historic links between the populace and the riverfronts through design and management, public values and perceptions must be taken into account.<sup>1</sup>

---

<sup>1</sup> Anna, L. (2002), p.14

---

---

## ***Introduction***

---

---

In the past 10 years, communities all over the world have turned their attention to their once-neglected riverfronts, especially riverfronts, and now people are also moving back to the water. They feel a need to see and touch the water. So in recent years developers have taken abandoned riverfronts and turned them into parks, marinas, housing developments—things that make their communities more attractive and improve the quality of life.<sup>1</sup>

Cities around the world are restoring their waterways and reshaping major riverfront sites to meet the complex needs of 21st century urbanism. Riverfronts present an opportunity for cities to reinvigorate large, strategically-positioned urban areas. The challenge is to create plans that allow sustainable environments and dynamic urban riverfronts to evolve together.<sup>2</sup>

Across the world, great cities are regenerating, transforming and seizing new urban opportunities on their historic riverfronts. Improving urban quality and reinforcing sustainability in dynamic and changing city contexts is a challenge for urban communities everywhere. Successful results can be seen in Barcelona, Amsterdam, Sydney and London. These initiatives are reclaiming and opening riverfront ports globally for everyone to access and experience.<sup>3</sup>

Many cities make the mistake of trying to maximize the amount of development property on new areas of riverfront. Private investors, in turn, are understandable protective of their property's riverfront edges, but, in fact, public investments and returns can best be maximized on riverfronts when the public open spaces are designed to maximize its natural assets.<sup>4</sup>

Finally hence, the digital revolution is influencing and changing various field of society in general. Then it is the time for a new approach to public participation in riverfront's landscape.

---

<sup>1</sup> Dennis, Q., (2006), p. 1-3

<sup>2</sup> Harken, B. (2006), p.2

<sup>3</sup> Amanda M. et al., (2006), p.9

<sup>4</sup> Previous, p.3

### **0.1.3 A New Vision for public participation in environmental issues**

Participation in landscape and design processes points out dates back to the 1970s.<sup>1</sup> Although there are several different ways to conduct public participation in landscape and design processes, Thomason(2006)<sup>2</sup> suggests the following methods are more common ones: Charrette, workshops, planning-for-real, design game, public meeting, steering group, focus group(s), and community forum. In all these types of involvements designers refer to some sort of a visual aid in order to disseminate their ideas and engage public in the development. Lange (2005)<sup>3</sup> believes that so far, visualizations in landscape are mainly seen as a tool that allows visualizing a certain pre-defined proposal.

However, traditional methods of spatial representation, orthographic plans and sections, are difficult for the lay-person to discover. Many of the problems contributing to unsuccessful public participation processes are caused by a communication breakdown between the public and professionals, which visualization can aid in overcoming.

### **0.1.4 A New Vision for using Information Technology**

During the 20th century we have witnessed the rapid accumulation of technological advance leading to the creation of computer technology and beyond. The advance of computer technology has led us to a world where the development of artificial intelligence is a goal of computer scientists and where we can play in a virtual world of our own making. The speed at which information travels to inform or educate the recipient is now measured in terms of bits per second, reflecting the pace of change today.<sup>4</sup>

Therefore governmental parties all over the world try to include citizens and stakeholders, their expertise and local knowledge as early in the environmental process as possible. Together with this increased request for public participation there is a need to effectively communicate

---

<sup>1</sup> Podevyn, M., et al. (2008), p.176

<sup>2</sup> Thompson, E. (2006),p.135

<sup>3</sup> Lange, E. (2005), p. 3

<sup>4</sup> Dazhong, Y. (2007), p.395

information about the proposed transformations to participants and stakeholders. Several visualization methods have been used the last decades to communicate the type and impact of spatial transformations of the landscape.<sup>1</sup>

### **0.1.5 Emerging new visualization tools in participatory landscape design**

In recent years the use of new types of visual aids in participation process are slowly becoming in practice. As Lange (2005)<sup>2</sup> explains, computer-based visual simulations can potentially function as the link between the classic top-down approach in planning, i.e. experts providing information to the general public, and the bottom-up approach, i.e. the general public being consulted and participating in decision making.

Landscape architects, urban designers, Planners, and other planning professionals use computerized visualization techniques to encourage public participation. Many of the techniques they employ—digital maps, digital imaging and video, urban simulation, virtual reality, and Web-based interactive maps, also Virtual Reality and Virtual Environments are the most growing fields of information technology and have a great media attention.<sup>3</sup>

While many communities have increased the frequency of public meetings and enhanced presentations with visual media ("SHOW ME"), citizens who attend these meetings often experience difficulty understanding the spatial relationships portrayed on maps and plans. The resulting frustration frequently leads to mis-communication and mistrust of planners and politicians.<sup>4</sup>

Nowadays, digital visualizations are increasingly gaining importance in landscape design, landscape planning and environmental planning. The current visualization technology enables us to model and visualize natural, rural and urban environments in a highly realistic way.<sup>5</sup>

---

<sup>1</sup> Tessa H., & Lammeren, R. (2005), p.57

<sup>2</sup> Lange, E. (2005), p. 5

<sup>3</sup> Tress, G., Tress, B., (2003), p.163

<sup>4</sup> Lange, E. (2005), p. 6

<sup>5</sup> Previous, p. 7

---

---

## ***Introduction***

---

---

In practice, landscape visualizations have, up until now, primarily been used to present, explain and market landscape planning scenarios, rather than being used to provide a meaningful contribution towards improving final results.<sup>1</sup> Real-time virtual 3D landscapes represent communication tools that allow experts as well as non-experts to use, explore, analyze, and understand landscape information.<sup>2</sup>

Nowadays landscape modelers are increasingly taking advantage of the “computer generated three dimensional interactive environments”- VR environments, to help find solutions for the real-world problems by using the wide range of possibilities that these environments offer. Since it is not feasible to try what-if scenarios and possible solutions for a design problem by experimenting in situ, three-dimensional models, animations, fly-through, simulations and VR models are increasingly used for representing design solutions and to facilitate the decision-making process in landscape architecture.<sup>3</sup>

However, for the general public and most decision makers, the professorial landscape design, combining different skills and knowledge, is complicated and difficult to understand. This situation makes communications between landscape architects, urban designers, the general public, and decision makers difficult. The difficulties in communication lead to uncertainty and lack of consistency in landscape processes. Designers need a tool to improve communication efficiency in the landscape process and engage the general public involvement in landscape process. Computer Simulated Visualization can be that tool.<sup>4</sup>

### **0.1.6 Focus on the situation of the Nile riverfront in Egypt**

The Nile riverfront in the city of Cairo, Egypt, has experienced numerous changes in the form of designed projects to take advantage of the river's potential for attracting visitors and users by accommodating their various leisure and recreational needs.<sup>5</sup>

---

<sup>1</sup> Paar, P. (2006), p. 817

<sup>2</sup> Paar, P. & Clasen, M. (2007), p.209

<sup>3</sup> Thompson, E. (2006), p.128

<sup>4</sup> Huang, B. & Claramunt, C. (2004), p.75

<sup>5</sup> Gabr, H. (2004a), p.155



---

---

## ***Introduction***

---

---

Design interventions along the river edge differ greatly, varying from public and private, nature dominant and built, serviceable and unserviceable, and water accessible(physically or visually) and inaccessible. Generally, many of the changes along the Nile riverfront were private projects that have been directed for selected group of individuals such as engineers or police officers. The general public or nonmembers of the social or professional group are denied access to these private projects.

Other changes have been in the form of privately owned or leased projects that are accessible to the general public, such as cafeterias where guests are expected to pay for their leisure time. Other type of changes is the publicly owned and fully accessible places where visitors are free to wander along the riverfront without having to worry about spending money.

Recently, there have been rising concerns over the increasing number of publicly inaccessible projects along the Nile riverfront (the first type), because of the negative social consequences of denying the general public access to a supposed vital public domain. Other visual implications result from the visual blockage made by insensitive design of structures blocking the view of the Nile from the main street and sidewalk.

The ideological assumption is that the general public should have **undeniable access** to the river edge similar to situations in many riverfront or generally riverfront cities around the world. However, understanding people's perception of the design interventions should shed light upon desirable types of changes to be made along the river edge, by offering the public **visualization** of different modalities using the **new computer simulation techniques**, which will be clarified in this research.

### **0.2 Research Problem**

There is a new trend in Egypt to redevelop the River Nile banks landscape to provide more public accessibility with no concern to the public themselves, or their preferences, and ignoring their participation in these developmental procedures.

---

---

## ***Introduction***

---

---

Most behavioral and environmental researches don't test the public response to the riverfronts landscape or provide any new techniques to evaluate public access to it now or to the future regenerations, this may be due to the lack of experience to how to introduce different environmental design alternatives to the public for testing their preferences and their judgment.

"Therefore a gap between the public and landscape architects or urban designers in understanding their spatial concepts and ideas". So the research will try to establish an approach to solve the research problem.

### **0.3 Aim of the work**

The gap between the public and designers spatial concepts and ideas about the new regenerations of the riverfronts' landscape can be compacted by clarifying these ideas to public and allowing them to visualize and percept the different designers' concepts and ideas, using the new computer simulated techniques, and evaluating their preferences using virtual reality techniques.

### **0.4 Research Objectives**

From the previous aim of the work, the research primary objective is:

*"Developing an approach to enhance public participation in the process of evaluating the alternatives of regeneration of River Nile landscape using new computer simulated visualization techniques and then testing this approach".*

Under this objective there are some secondary objectives such as:

- Defining riverfronts and the new visions of riverfronts' regeneration.
- Discussing the relations and the interactions between public users and riverfront's landscape.
- Discussing new visions of public participations and their role in the evaluation of riverfront's landscape.
- Discussing of visualizations techniques as tools in riverfront's landscape process.

---

---

## ***Introduction***

---

---

- Analyzing some successful riverfront's landscape regenerations projects around the world, to learn the successful indicators and landscape elements.
- Discussing new computer simulated visualization tool as a suggested tool for the research approach.
- Developing an approach for enhancing public access to the riverfront of the river Nile, through design guidelines for its urban landscapes.
- Designing a methodology for using virtual reality (selected computer simulated visualization technique) as a tool for public participation.

### **0.5 Research questions**

- Why and how does the world turn the attention to riverfronts' regeneration? And why this attention concentrates on public access to their landscapes?
- How and why should public involved or participate in these regenerations?
- What are the public participation tools and methods which can be used in such types of regenerations?
- Who can people response to the riverfronts' environments? And how they can evaluate their redesign alternatives?
- What is the importance of visualization in the urban landscape design?
- What Role Does Visualization Play in Communication with public?
- To what extent can computers improve the traditional methods used by urban and landscape professionals to visually represent ideas to the public?
- Which characteristics of the visualizations are crucial for the support of public participation in the riverfront' urban landscape process?
- Which of the visualization methods are best suited for the different riverfront' urban landscape tasks?
- How can visualization be successfully employed in public participation activities?
- Can Egyptian citizens deal with the computer visualization, and if they can, then to what extent?
- To what extent can Egyptian environmental professionals see the future of enhancing public participation in evaluating riverfronts' regenerations

---

---

## ***Introduction***

---

---

alternatives? Are they able to use new computer techniques to make public participation more effective?

### **0.6 Research Hypothesis**

Computer generated simulations of the built environment, are an effective means of improving the public's participation in evaluating urban landscape design alternatives, such as alternatives concern with riverfronts' regeneration.

### **0.7 Argued assumptions**

It is a fact that an attractive riverfront helps make a city more livable and generates economic benefits of tourism, although the intention is not necessarily commercial but to give residents a chance to get to the water.<sup>1</sup>

- There should be a public right of access along rivers, so all humans can enjoy their natural heritage.<sup>2</sup>

-That better public participation is in general consequential to better decision making (necessary, but not sufficient).

- That there is such a thing as "commonly used" decision-making procedures within democracies in developments requiring environmental impact assessment.

- That the use of visualization technologies especially computer generated is useful component of decision-making. Or by other words, computerized visualization methods facilitate democratic decision-making.<sup>3</sup>

- A computerized visualization method offer planners, urban designers and architects some new ways to support and facilitate democratic decision-making. However, the uses of this technology in public participation are just beginning to be explored

---

<sup>1</sup> [http://www.charlestonbusiness.com/pub/4\\_27](http://www.charlestonbusiness.com/pub/4_27) -accessed June 2007

<sup>2</sup> <http://www.riversaccess.org/pages/pv.asp?p=rac97&v=0&fsize=0>-accessed Mai, 2007

<sup>3</sup> Al-Kodmany, K. (2002), p.220

---

---

## ***Introduction***

---

---

- The need to understand the interaction between people and the physical environment is a main goal of perception studies.
- The need to understand people's response to or preference for types of design interventions is a main goal of aesthetic perception studies.
- The need to understand people's needs from physical environment is a main goal of public participation.
- The need to understand the way could people understand the design proposals and communicate with designer is a main goal of visualization studies.
- The need to understand what visualization of design proposals simply means is using computer simulated techniques such as virtual reality.

### **0.8 Research limitations**

- The research will discuss riverfronts only from the point view of landscape only.
- The research will focus only on public participation in the stage of riverfront's landscape evaluation only in the stage of design alternatives.
- When dealing with riverfront the research will focus only on the space attached to the river and its landscape not with its architecture or building attached to it.

### **0.9 Thesis experiment expected evidence**

- New computer simulated visualization techniques can help lay public, or common citizens play a more knowledgeable and effective role, in public consultation concerning decisions involving technical arguments.
- That the presence alone (or even introduction) of new computer simulated visualization techniques does not necessarily promote better public participation nor improve decision-making procedures favoring public participation and is actually unlikely to do so, unless
  - a) There is a good understanding of the underlying landscape of riverfronts in presence, and

b) An effort is made to shape both new visualization techniques and a new institutional framework in order to build bridges between designers and lay people.

## **0.10 Research methodology**

Towards achieving the main goal and objectives, and testing the hypothesis, the research relies on introduction and three parts, each of first and second part consists of four chapters, when chapter three consists from two chapters.

### **0. Introduction: where is the world now? And where we are?**

The introduction begins with a review of some of the world new trends which the research based on (riverfront regeneration, public participation, revolution of computer technology), then making a scope on the research problem, then presenting the research hypothesis, objectives, limitation, and methodology. The first four chapters cover the theoretical background; the fifth chapter concentrates on the proposed theoretical approach. Then the sixth chapter covers the applied study. The last chapter deals with the conclusions and recommendations of the research.

### **- The theoretical approach (Part One)**

"Riverfronts, Public Participation and Visualization in Relations, Towards a Successful Regeneration of Riverfront's Landscape". This part focuses here on the theoretical backgrounds. This part will highlights on the three proposed components of research approach and the relations between them. This part relies on four chapters, as:-

### **Chapter one: Riverfront's Regeneration towards Public Accessibility of Riverfronts**

This chapter will discuss the world new attention to riverfront's regenerations, with the main aim of making its landscape access to public. This chapter will also discuss the riverfront's regeneration goals and methods then highlights on some examples from allover the world.

---

---

## ***Introduction***

---

---

### **Chapter two: Assessment of Public's behavioral responses Assessment of Public's Interactions with Riverfronts' Landscape**

This chapter will discuss public's responses to the built environment of riverfronts, such as their perception to landscape and their cognition then discuss their preferences to landscape aesthetics, their needs.

### **Chapter three: Public Participation in Riverfront's Landscape Regeneration**

This chapter will begin by providing a brief introduction to the concept of public participation in the urban and landscape profession. The chapter will provide an insight into the current method of public participation and high light the importance of the public's role in the decision making of landscape process. Finally the public's ability to evaluate the landscape as introduction to the importance of visualization.

### **Chapter four: Visualization of Riverfront's Landscape Regeneration**

This chapter makes a review of the importance and role of visualization in landscape, especially the regeneration of riverfront's landscape and its importance for public participation.

## **-The analytical approach (Part Two)**

"Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape". This part here is trying to go closer to the research approach by determining the approach field, the approach parameters, and the approach tool, so at the end the research will introduce the research approach. This will come in four chapters.

### **Chapter five: Approach Field- International Examples on Riverfront's Landscape Regeneration... to Learn**

This chapter will first analyze some international examples on riverfront's landscape regeneration, some of them are existing and the other are under construction or under study, to learn how they deal with landscape elements, and what aspects and sub-aspects they rely on, this

---

---

## ***Introduction***

---

---

will help later in introduction the evaluation criteria which can measure public's evaluation of riverfront's landscape.

### **Chapter six: Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation**

This chapter will come after previous chapter to determine riverfront's components, types, and landscape element, then determines the evaluation factors of each element, and shows who they affect the riverfronts aspects and sub-aspects to define finally a matrix between riverfront' landscape aspects and the landscape elements and their factors.

### **Chapter seven: Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation**

This chapter will review computer visualizations techniques to select one of them to use as an approach tool for testing public's evaluation of riverfront's landscape alternatives, then this chapter by comparison between different techniques will select the most suitable tool to be used in the approach.

### **Chapter eight: Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration**

This chapter will collect the outputs of previous chapters to develop the approach through studying riverfront's landscape design, and how the public can participate in the evaluation of the design alternatives, and how the proposed computer simulated visualization technique will help in participation process, in addition to study possibility and levels of users participation in the process, in order to deduce a comprehensive approach for public's participation.

So this chapter presents a new approach to public participation in evaluating landscape design alternatives of riverfronts, using computer technique of virtual reality to make the public able to visualize the design alternatives.

### **-The Reliable-applied- approach (Part three)**

This part will come to test the reliability of the proposed approach stated in the previous part, through an experiment based on



---

---

## ***Introduction***

---

---

local riverfront's space on the Nile riverfront, this chapter will include two chapters, as:-

### **Chapter nine: The Reliability of Computer–Simulated-Visualization as a Tool for Public Participation in evaluating the Regeneration of Nile Riverfront's Landscape**

This chapter contains the applied study, it test the reliability of the approach on a selected space along the Nile Riverfront in Egypt. This chapter ends with the applied findings.

### **Chapter ten: Conclusions & Recommendations**

The chapter covers the research conclusion that emerged from the three parts of the research. This chapter also ends with a set of recommendations that consists of general recommendations, design recommendations, and directions of further researches.

The next diagram describes the research methodology.

## ***Introduction***

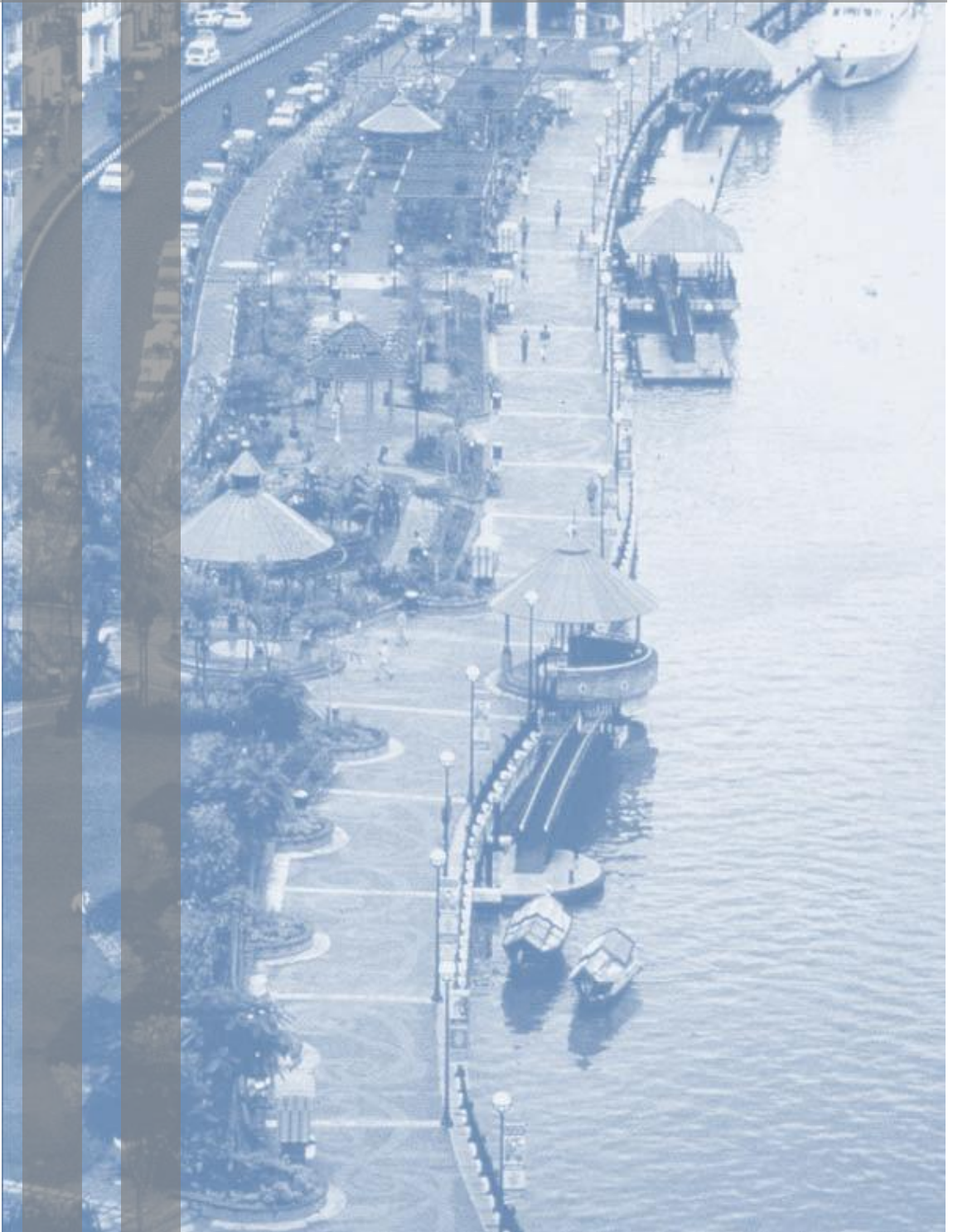
### *Research Main Goal*

**Developing an approach to enhance public participation in the process of evaluating the alternatives of regeneration of River Nile landscape using new computer simulated visualization techniques**

<b><i>PART ONE: Theoretical Approach</i></b>	<b>Chapter 1</b>	<b>Riverfront's Regeneration Towards Public Accessibility of Riverfronts</b>
	<b>Chapter 2</b>	<b>Assessment of Public's Interactions with Riverfronts' Landscape</b>
	<b>Chapter 3</b>	<b>Public Participation in Riverfront's Landscape Regeneration</b>
	<b>Chapter 4</b>	<b>Visualization of Riverfront's Landscape Regeneration</b>
<b><i>PART Two: Analytical Approach</i></b>	<b>Chapter 5</b>	<b>Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn</b>
	<b>Chapter 6</b>	<b>Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation</b>
	<b>Chapter 7</b>	<b>Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation</b>
	<b>Chapter 8</b>	<b>Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration</b>
<b><i>PART Three: Reliable Study</i></b>	<b>Chapter 9</b>	<b>The Reliability of Computer-Simulated- Visualization as a Tool for Public Participation in Evaluating the Regeneration of Nile Riverfront's Landscape</b>
	<b>Chapter 10</b>	<b>Conclusions &amp; Recommendations</b>

**PART  
ONE**

**Riverfronts, Public Participation and Visualization in  
Relations, Towards a Successful Regeneration of  
Riverfront's Landscape**





---

---

## ***PART 1***

---

---

Rivers flowing through cities provide ecological benefits, including water supply, pollution control and biological protection.<sup>1</sup> Because of the public's preference for the river landscape,<sup>2</sup> rivers are the most attractive zones as well as the most active zones in cities. In recent years, most cities have begun to pay attention to the landscape design of urban rivers and tried not only to protect the ecological environment but also provide a place of recreation for the public.<sup>3</sup> However, some problems have appeared during the landscape design, of which the most common is the neglecting of public participation in evaluating the riverfront's landscape.

Evaluating the regeneration alternatives of the landscape design of urban rivers before implementation has become a burning issue, because the lay public are who these projects for, so they have to be involved in the regeneration process, this require using of communication tools between experts and the public, these tools may be the visualization tools of design alternatives, so the first part will be the basis of this process.

The first part is named "Riverfronts, Public Participation and Visualization in Relations, Towards a Successful Regeneration of Riverfront's Landscape". This part focuses here on the theoretical backgrounds. This part will highlights on the three proposed components of research approach and the relations between them. This part relies on four chapters, as:-

**The first chapter** will discuss the world new attention to riverfront's regenerations, with the main aim of making its landscape access to public. This chapter will also discuss the riverfront's regeneration goals and methods then highlights on some examples from allover the world.

**The second chapter** will discuss public's responses to the built environment of riverfronts, such as their perception to landscape and their cognition then discuss their preferences to landscape aesthetics, their needs.

**The third chapter** will begin by providing a brief introduction to the concept of public participation in the urban and landscape profession.

---

<sup>1</sup> Chen et al. 2007, p. 334

<sup>2</sup> Wang, Z. 2007, P.15

<sup>3</sup> Qiao, L, et al. (2008), p.75

---

---

## ***PART 1***

---

---

The chapter will provide an insight into the current method of public participation and high light the importance of the public's role in the decision making of landscape process. Finally the public's ability to evaluate the landscape as introduction to the importance of visualization.

**The fourth chapter** will discuss the tools of visualization in order to make a review of the importance and role of visualization in landscape, especially the regeneration of riverfront's landscape and its importance for public participation.



Figure (p1-1) Examples on riverfront regeneration. Source ([www.neworiverfront.com](http://www.neworiverfront.com)).



Figure (p1-2) Example of Visualization of promenade at New Orleans riverfront's landscape regeneration. Source ([www.neworiverfront.com](http://www.neworiverfront.com)).

**PART  
ONE**

**Riverfronts, Public Participation and Visualization in  
Relations, Towards a Successful Regeneration of  
Riverfront's Landscape**

DAY VIEW OF PROPOSED RIVERWALK

NIGHT VIEW OF PROPOSED RIVERWALK

**Chapter  
1**

**Riverfront's Regeneration  
Towards Public Accessibility of Riverfronts**

**Chapter  
2**

**Assessment of Public's Interactions with Riverfronts'  
Landscape**

**Chapter  
3**

**Public Participation in Riverfront's Landscape  
Regeneration**

**Chapter  
4**

**Visualization of Riverfront's Landscape Regeneration**





**Introduction- Cities return back to their riverfronts**

**River, environment and people, in relations**

**Riverfronts in urban environment**

**Riverfront as a strategic urban resource**

**Regeneration process of urban riverfronts**

**Riverfront regeneration for riverfront public access**

**Summary & conclusions**



---

---

## Chapter 1

---

---

*"Communities all over the world have turned their attention to their once-neglected riverfronts, and now people are also moving back to the water. They feel a need to see and touch the water."<sup>1</sup>*

*"The public increasingly expects and desires access to the riverfronts"<sup>2</sup>.*

### 1.1 Introduction- Cities return back to their riverfronts

Over the last decades, riverfronts in many cities have been neglected, blocked by highways, encased by concrete walls, or abandoned by industrial facilities that have, moved to outlying suburbs.<sup>3</sup>

Cities have been rediscovering their riverfronts for at least the past 30 years, using reinvestment to proclaim their heritage and to redefine their civic identity. These changes can be traced in change urban geography, as new modes of transportation, deindustrialization, and new economies of scale have led formerly important industries to move away from the urban core.<sup>4</sup>



Figure (1-1) Cities rediscovering their neglected riverfronts, through deindustrialization as Nashville riverfront (above), and make new form of urban core as Regeneration of Delaware Riverfront, Philadelphia (bottom). Source (Moretti, M., 2008).

---

<sup>1</sup> Dennis, Q., (2006), p.3

<sup>2</sup> Schjetnan, M., (2005), p.3

<sup>3</sup> Kashef, M., (2008), p.1

<sup>4</sup> Steiner, F., (2008): p.18

Cities and towns have been turning back to their rivers, transforming industrial and derelict land into new parks, residences, and commercial space. After abusing urban rivers of hard use and neglect, cities have come to realize they are valuable economic and community assets.<sup>1</sup>

In this chapter the research will discuss the relations between river, people and environment, then highlight on the role of riverfront in urban environment, their classification and new trends in riverfront regeneration. The chapter will also discuss the goals of riverfront regeneration especially enhancing public access to riverfronts.

## **1.2 River, environment and people, in relations**

In his article about river regeneration, Culvahouse, T., said:

*“Understanding how environments inhabit people, rather than the other way around, remains a difficult subject.... Rivers in particular enter deeply into our minds and lives, making our depictions of them impossible to fully rationalize.”*<sup>2</sup>

From the previous words, it is clear that rivers have great effects on people in all the matters of their lives, and rivers shape the environment either natural or built. So the next section will discuss the relations between river, people and environment.

### **1.2.1 River in the natural environment**

A river is a natural watercourse, usually freshwater, flowing toward an ocean, a lake, a sea or another river.<sup>3</sup> The water in a river is usually confined to a channel, made up of a stream bed between banks. In larger rivers there is also a wider floodplain shaped by flood-waters overtopping the channel. Flood plains may be very wide in relation to the size of the river channel. This distinction between river channel and floodplain can be blurred especially in urban areas where the floodplain of a river channel can become greatly developed by housing and industry.<sup>4</sup>

---

<sup>1</sup> David, J., (2010), p.7

<sup>2</sup> Culvahouse, T., (2008), p.1

<sup>3</sup> <http://en.wikipedia.org/wiki/River>

<sup>4</sup> Henry, P., (2006), pp. 7-11.

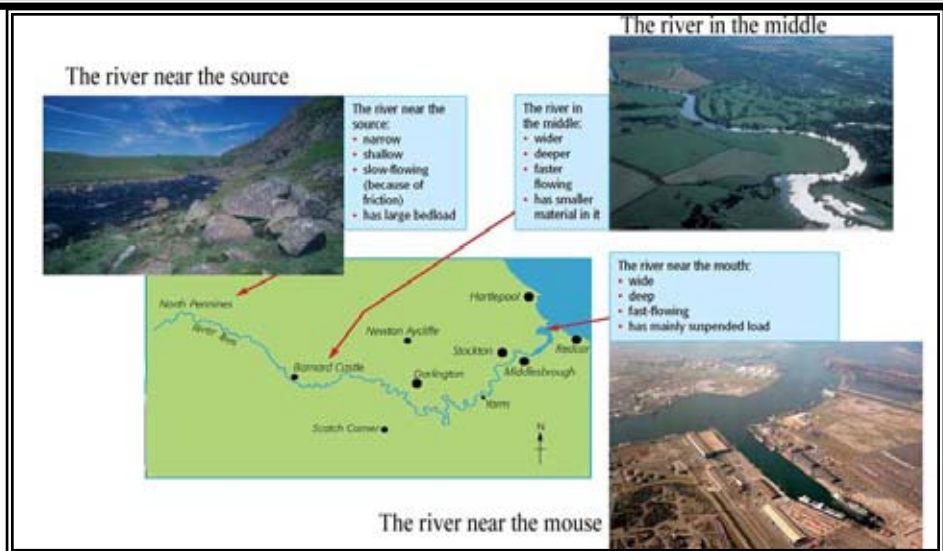


Figure (1-2) River in natural environment. Source (Otto, B., McCormick, K, & Leccese, M., 2004).

### 1.2.2 River classification

The following classes are a useful way to visualize rivers. Gradient is controlled largely by tectonics, but discharge is controlled largely by climate, and sediment load is controlled by various factors including climate, geology in the headwaters, and the stream gradient.<sup>1</sup>Rivers can be classified to:

#### 1.2.2.1 Youthful River

A river with a steep gradient that has very few tributaries and flows quickly. (Examples: Brazos River, Trinity River, Ebro River).

#### 1.2.2.2 Mature river

A river with a gradient that is less steep than those of youthful rivers and flows more slowly than youthful rivers. (Examples: Mississippi River, St. Lawrence River, Danube River, Ohio River, River Thames).

#### 1.2.2.3 Old River

A river with a low gradient and low erosive energy. Old rivers are characterized by flood plains. (Examples: Huang He River, Ganges River, Tigris, Euphrates River, Indus River, Nile River).

<sup>1</sup> Luna, P., (1994), P.7

### 1.2.2.4 Rejuvenated River

A river with a gradient that is raised by tectonic uplift.

Rivers are also can be classified according to its with as shown in figure (1-3).

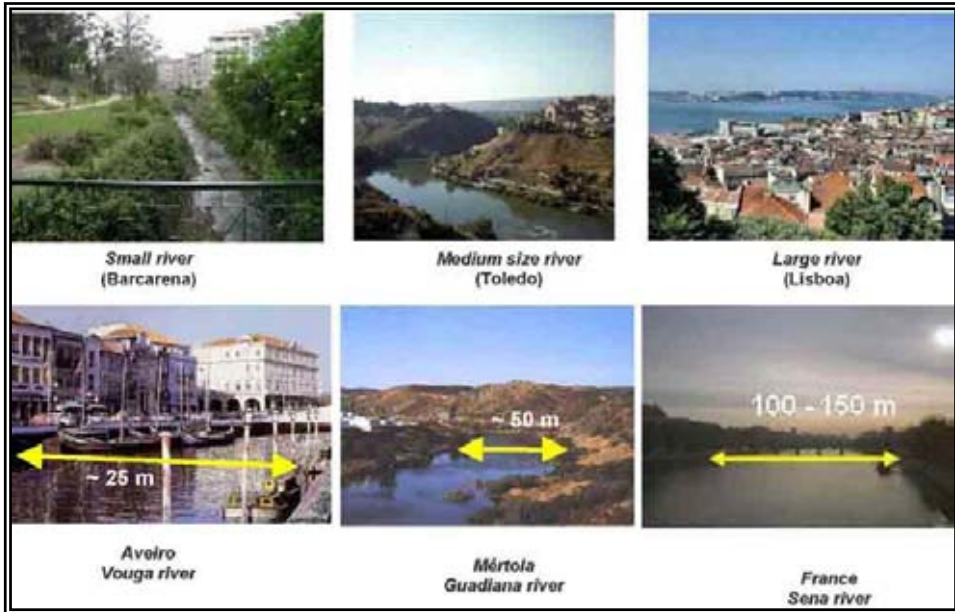


Figure (1-3) River variation in width. Source (www.wikipedia.com)

### 1.2.3 Urban river alternatives

Respect for the river is one of the ten steps to good urban design. The river and its edge are part of a significant ecosystem.<sup>1</sup> The river in nature is distinguished by flood plain, so any urban development respects this feature to reduce its probable damage.

As shown in figure (1-4) a diagram shows urban river alternatives. In which natural characters of river appear and also man-made modification to river edges to control floodplain.

---

<sup>1</sup> Harris S., (2007), p.5

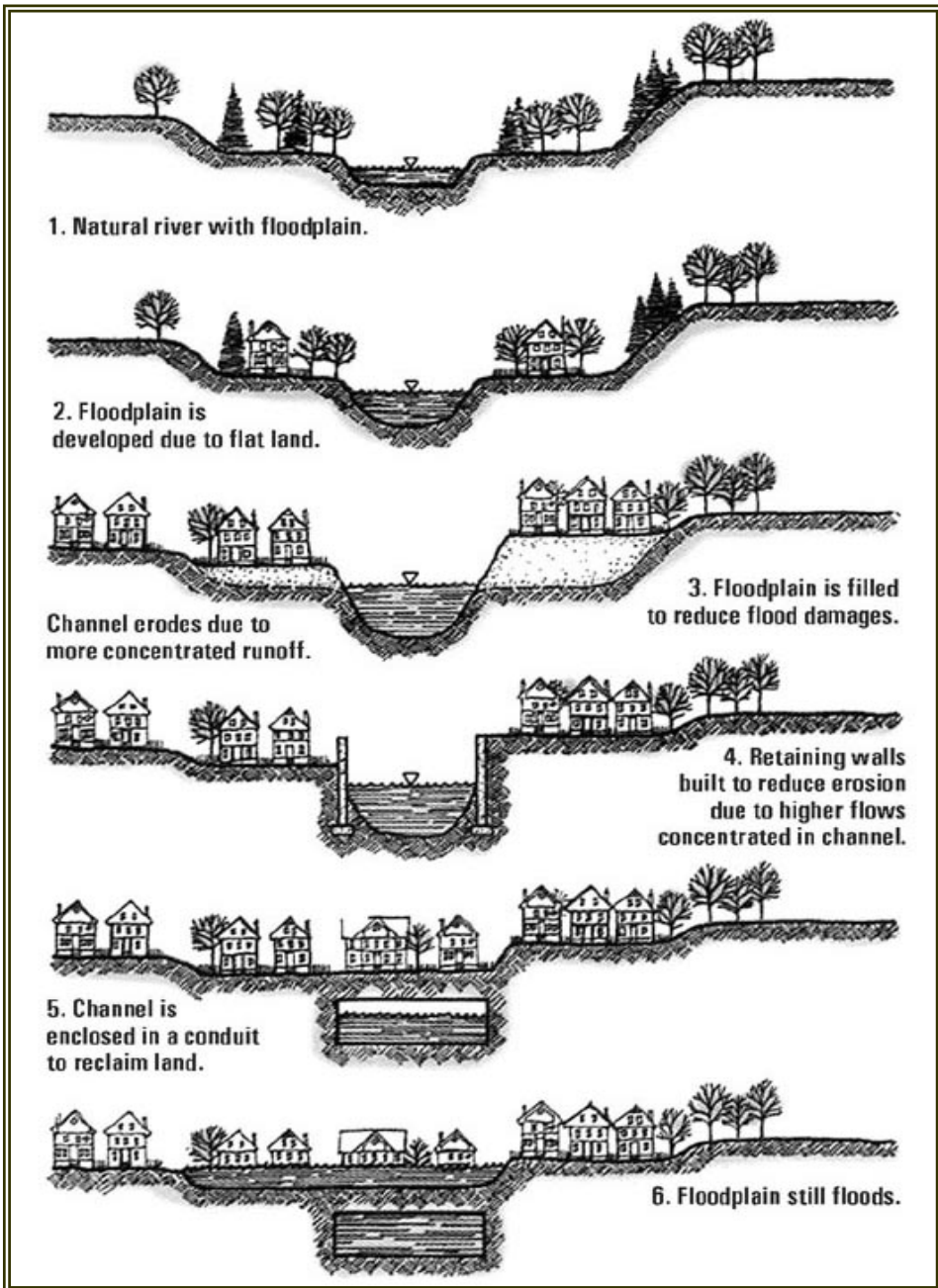


Figure (1-4) Diagram of urban river alternatives. Source (Otto, B., McCormick, K., & Leccese, M., 2004).

## **1.2.4 The role of river in the built environment**

This role can be summarized as: "*To deny the river is to deny the origin of the city. To rethink the river is to discover a unique opportunity to define urban places, join neighborhoods and communities together and reconnect us to our landscape and our history.*"<sup>1</sup>

Rivers have had a crucial part in the emergence of human society, being strongly present in almost every single stage of the human journey, and heavily implicated in the process of human settlement. The city was born "In between rivers" (Mesopotamia) and, throughout history, most cities tended to be founded about or near rivers, with notable events along the river course chosen for location.<sup>2</sup>

## **1.2.5 River landscape or Riverscape**

Riverscape comprises the features of the landscape which can be found along a river.<sup>3</sup> It can be divided into two categories natural and manmade

### **1.2.5.1 Natural river landscape**

- Along the upper course of a river, these include: Waterfall, Gorge or canyon
- Along the lower course of a river, these include: Meander, Flood plain, Levee, River delta

### **1.2.5.2 Man-made river landscape**

Which the research will discuss in chapter five as elements which evaluation approach will be based on.



Figure (1-5) Left: Danube River with urban edge, right: River Gambia with natural edge. Source. (<http://en.wikipedia.org/wiki/River>)

---

<sup>1</sup> Golding, A., (2008).

<sup>2</sup> Silva, J., Serdoura, B., & Pinto, P., (2006), p. 3

<sup>3</sup> <http://en.wikipedia.org/wiki/Riverscape>



---

---

## Chapter 1

---

---

Elements of river landscape can be categorized to natural landscape elements, and artificial ones, as shown in table (1-1)

Type of landscape elements	landscape elements
Natural Landscape elements	
Natural vegetation landscapes	Broad-leaved trees, bamboo groves, mangroves, low riverbank vegetation, high riverbank vegetation
Wildlife landscapes	Terrestrial animals (birds, amphibians, mammals, insects); aquatic animals (fishes, mollusks, benthos)
Topography landscapes	Islands, sandbanks, beaches, alluvial fans, riffles, erosion topographies, cliffs, gorges, waterfalls, lakes, hills
Ephemeral landscapes	Sunrises/sunsets, brumes, flying fish
Artificial landscape elements	
Production landscapes (vegetation)	Rice fields, dry farmlands (e.g. vegetable gardens, sugarcane fields, and corn fields), orchards, tea plantations, nurseries
Production landscapes (farms)	Fishponds/aqua-farms, farms (e.g., hoggeries, henneries and quackeries)
Cultural landscapes	Temples/churches, traditional Chinese schools, monuments, scattered villages, bamboo fences, villages, irrigation channels
Built-facility landscapes	Reservoirs, water gates, weirs, submerged dams, earth dams, fieldstone levees, reinforced concrete levees, suspension bridges, reinforced concrete bridges, ditches, burial grounds, high tension towers, utility poles, stonepits, superhighways/main roads, country roads, trails, railways, tunnels, factories and landfills

Table (1-1) Landscape elements of the river. Source (Chen, S & Yang Lin, J., 2007)

### 1.2.6 People & river, in relations

In Cultural and Developmental Comparisons of Landscape Perceptions and Preferences, Thomas R. Herzog divided the landscape into six perceptual categories: vegetation, open smooth, open coarse, rivers, agrarian and structure. The author compared several subgroups Australian and American students as test samples. By showing each group the slides of the six landscape categories, he found that both the Australian and American samples preferred rivers.<sup>1</sup> It is evident from these findings that human are attracted to rivers and their riverfronts.

### 1.2.7 Physical contact between people and river

Physical contact refers to small dimension spaces where the access with the river is done only by one path. The contact zone can have several types, such as:

a) Near the river: there is no physical contact with water but there is a very strong sensorial relationship with the watercourse;

---

<sup>1</sup> Thomas, R., et al., (2000), p.323

b) Close to river: there is a physical and complete relationship with the watercourse in the river bank.

c) Over the river: this is a quite intense form of contact with the watercourse because the observer is over or inside water.

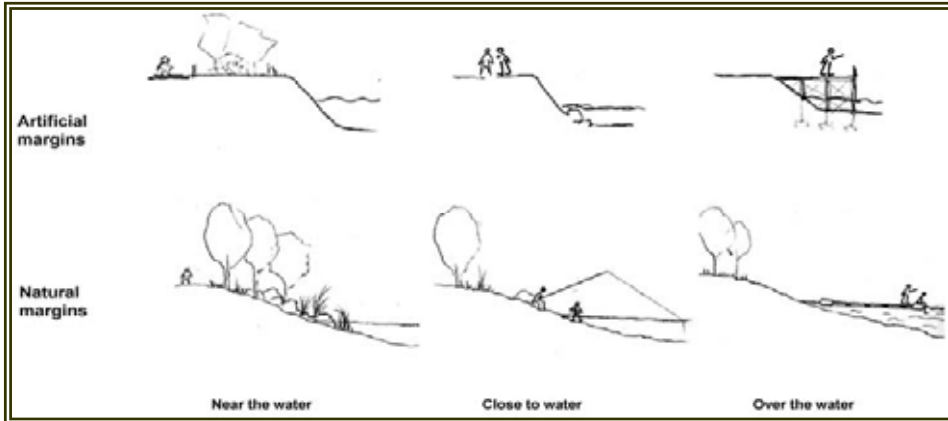


Figure (1-6) Physical contact with river: natural and artificial banks.

Source (Silva, J., 2005)

### **1.3 Riverfronts in urban environment**

Riverfronts are dynamic places by nature. As an edge environment, the overlap of different communities of users and dramatically different conditions make for enormous amounts of complexity and energy. Urban riverfronts are generating considerable debate about their role as spaces of promise where struggles for the city are enacted. While riverfronts have always been special places where land and water meet, they have recently become sites where urban restructuring processes are doing battle.<sup>1</sup>

#### **1.3.1 Riverfront definition**

A riverfront is a region along a river; often in larger cities that border a river, the riverfront will be lined with marinas, docks, parks, trees, or minor attractions. Today many riverfronts are a staple of modernism and city beautification.<sup>2</sup>

Riverfronts are one of the most complex and challenging urban lands in cities. For contemporary riverfront cities, it is very critical to

---

<sup>1</sup> Basset et al., ( 2002), p. 1758

<sup>2</sup> <http://en.wikipedia.org/wiki/Riverwalk>

---

---

## Chapter 1

---

---

understand the changing structure of urban riverfronts and their integration with the existing city structure.<sup>1</sup>



Figure (1-7) Urban riverfront at Asfahan, Iran. Source (Google Earth)

### 1.3.2 Role of Riverfronts in cities

Cities seek a riverfront that is a place of public enjoyment. They want a riverfront where there is ample visual and physical public access -all day, all year- to both the water and the land. Cities also want a riverfront that serves more than one purpose: they want it to be a place to work and to live, as well as a place to play. In other words, they want a place that contributes to the quality of life in all of its aspects: economic, social, and cultural.<sup>2</sup>

---

<sup>1</sup> Butuner, B., (2006), p.1

<sup>2</sup> Mann, R., (1988), p. 7

---

---

## ***Chapter 1***

---

---

Riverfronts in cities appeared in many different features, such as architecture, parks, plazas, riverscape, gardens, batture, greenroof, and bridges, as shown in figure (1-8)

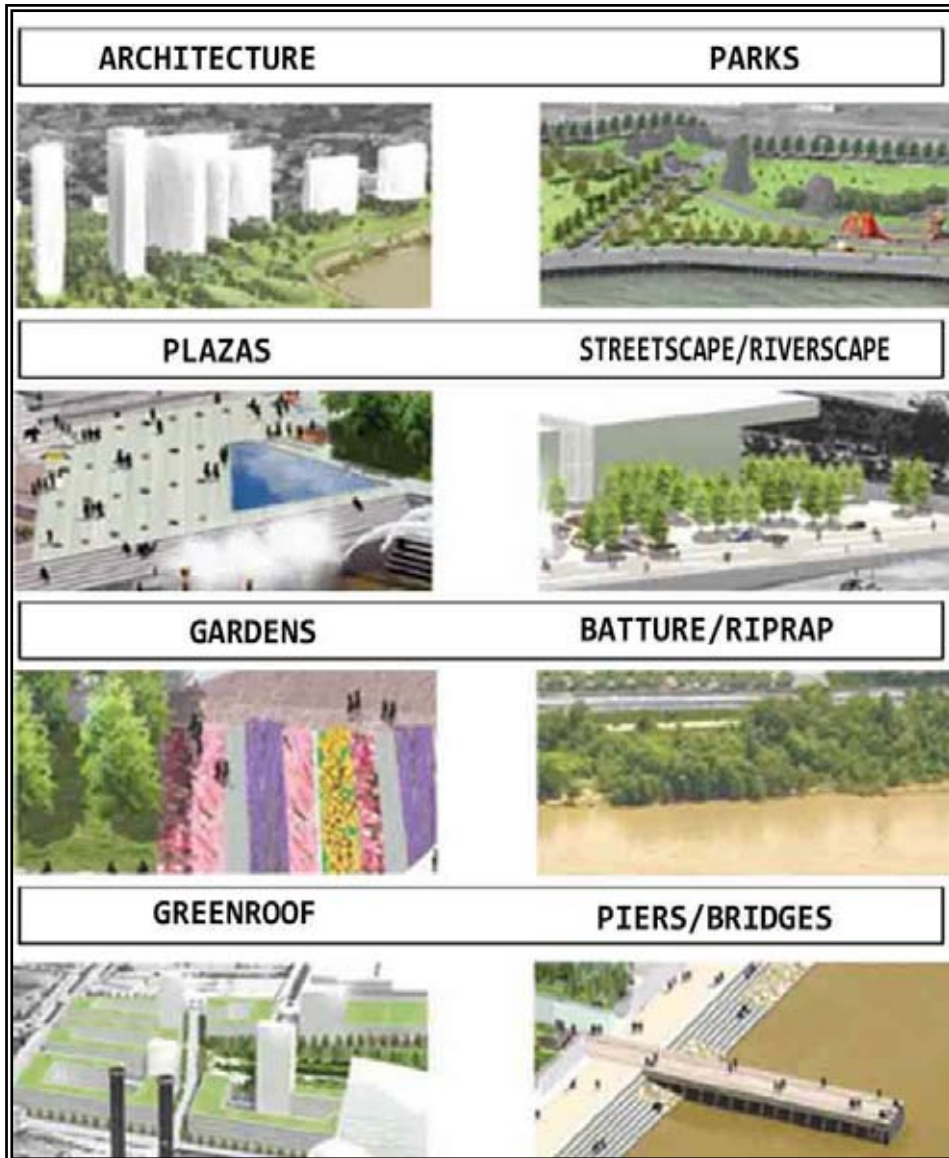


Figure (1-8) Riverfront features. Source (by researcher adapted from [www.neworriverfront.com](http://www.neworriverfront.com))

### **1.3.3 People attraction to the riverfronts**

Riverfront, the place connecting land with water, is an innate and timeless attraction for people. Riverfronts provide ample opportunities and hence can afford a variety of leisure activities and experiences. That is the way the current riverfront regeneration is shifting the uses of riverfronts from only transportation to more recreation-type activities.<sup>1</sup>

Thomas R. Herzog divided the landscape into six perceptual categories: vegetation, open smooth, open coarse, rivers, agrarian and structure. The author compared several Australian subgroups (primary school students, secondary school students, college students, and adults) and American college students as test samples. By showing each group the slides of the six landscape categories, he found that both the Australian and American samples preferred rivers.<sup>2</sup> It is evident from these findings that human are attracted to riverfronts.

### **1.3.4 Factors of people-riverfront disconnect**

As riverfront is evolved, three categories of functional entities have distanced people from the riverfront:<sup>3</sup>

- Buildings: The First Barriers
- Transportation Infrastructure Forms a Barrier to the Riverfront
- Flood Protection Distances People from the Riverfront

### **1.3.5 Social experience of riverfront space**

There are four dimensions of the social experience of an urban riverfront space:<sup>4</sup>

- Escape from the everyday
- Mixing with people who are different
- Consumption of spectacle
- Exploratory action

---

<sup>1</sup> Gabr, H., (2004a), p.156

<sup>2</sup> Thomas, R., et al., (2000), pp 15-16

<sup>3</sup> Andrew, G., (2006), p.5

<sup>4</sup> Stevens, Q., (2003), p.2

### **1.3.6 Elements of riverfront's view**

In order to be able to discuss riverfront generation it is necessary to explain what the research means by 'riverfront'. Owen categorized "riverfronts" into four sectors: river edge, perforated water edge, set back buildings and banks.<sup>1</sup>

Rivers distinguished generally from seas and other water bodies with its two banks, that when we see towards the opposite river bank it appears in the back of the water body and gives clear end to the whole view, so the person who look at the scene will see some visual elements, they are from the far to the near:<sup>2</sup>

#### **1.3.6.1 The background**

The background is usually the sky which its visual characteristics affect the person's perception or the high buildings line which presents the skyline.

#### **1.3.6.2 The opposite bank**

It seems far or near according to river with, it may be the main element of the scene if it is near, or it may be as apart of the background if it is far.

#### **1.3.6.3 Riverbed**

The river's water itself: its purity, its color, the river rapid, and the water components as floating objects, rocks, visible bottom, boats. This appearance is different from daylight scene to night scene.

#### **1.3.6.4 River edge**

Means constructions rising straight from the water.

#### **1.3.6.5 The near bank**

Means an open space adjacent to river, which has the main effects on the people who use the place through its shape, proportions, and landscape elements. This is the item of the research, which can be access to public and can be designed as open space.

---

<sup>1</sup> Owen, J., (1993), p.4

<sup>2</sup> Moretti, M., (2008), p.12

### **1.3.7 Types of riverfronts**

In his book "The River in the urban river landscape." (Homero, 2004) Identified some categories characterizing different types of riverfronts,<sup>1</sup> they are shown in figure (1-9) and table (1-2)



Figure (1-9) Examples on types of riverfronts. Source (www.pps.org)

---

<sup>1</sup> Homero, M., (2004), pp.13-22



Table (1-2) Types of riverfronts. By researcher.

## **1.4 Riverfront as a strategic urban resource**

Riverfront is considered to be a ‘strategic urban resource’. It is a fact that the riverfront is not just another ‘district’ in the city (business district, residential or commercial areas...), but riverfront is above all a very valuable resource for the city, because it is a precious, limited and non-renewable asset. Its major value derives primarily from its territorial position that is from being an area located on the border between earth and water, which enjoys indubitable advantages of location, such as, for example, being an authentic seam between movement systems on the sea and on the mainland.<sup>1</sup>

### **1.4.1 Urban riverfronts transformations**

Contemporary urban riverfront transformations both reflect and constitute changes in governance, economic regulation, and societal imaginaries of the non-human environment.<sup>2</sup>

Urban riverfronts have become key draw cards for foreign tourists, visitors from the suburbs, and new up-market residents. They provide extensive new areas of high-quality public open space, they also establish

---

<sup>1</sup> Bruttomesso, R., (2006), p. 5-7

<sup>2</sup> Bunce, S. & Desfor, G., (2007), p.253.



new linkages between existing inner-city areas, intensifying the interconnectedness of urban functions. They have dramatically increased the activity in inner cities during evenings and weekends.<sup>1</sup>

### **1.4.2 Concepts of Urban riverfronts transformations**

Four concepts in environmental science related to urban transformations processes restoration, regeneration, reclamation, and healing- relate to the process of resolving problems associated with riverfronts' ecosystems. **Restoration**, typically, returns an ecosystem to its original structure and function. **Regeneration**, which revives an ecosystem in structure and function, enhances value and livability and improves visual characteristics. **Reclamation** enhances value and livability and improves visual characteristics. **Healing** works to make the ecosystem more self sufficient in its function.<sup>2</sup> This research will focus on the concept of regeneration because of its characteristics.

### **1.4.3 Architectural Icons and Urban riverfronts transformations**

Build New Architectural Icons or Landmarks that Offer an Authentic 21st century design, is a trend in urban riverfronts transformation. From Sydney's Opera House, Bilbao's Guggenheim, or even Cleveland's Rock-and-Roll Hall of Fame not juxtaposed against each city's body of water? Boston's one-year-old Institute of Contemporary Art, the first new museum built in the city in several generations, sits right on the harbor, with an amphitheater-like outdoor stairway leading people directly to the water. Taking the trend a step further, the London Eye that city's majestic Ferris wheel actually sits in the Thames.<sup>3</sup>

---

<sup>1</sup> Stevens, Q., (2003), p.2

<sup>2</sup> Eric, w., (2004), p. 3

<sup>3</sup> www.neworiverfront.com, accessed 2008



Figure (1-10) New architectural iconic building on world riverfronts.  
Source (www.neworiverfront.com)

## **1.5 Regeneration process of urban riverfronts**

The focus of regeneration is for access, recreation, community revitalization, preserving working riverfronts, or preserving water dependent uses, partnerships at all levels have made the projects of riverfront regeneration -all over the world- successful.<sup>1</sup>

---

<sup>1</sup> Carver, J. et al., (2007), p.218



## **1.5.1 Why is riverfronts regeneration?**

In recent history, riverfront regeneration has lured people back to the urban riverfront by once again providing a place for public interaction, commerce, and recreation. Creating an intimate relationship between riverfront users and the adjacent waterway can maximize the riverfront experience, making it especially important that design guidelines address the treatment of existing functional barriers and create immediate physical, visual, and auditory access to the riverfront.<sup>1</sup>

The focus of regeneration is for access, recreation, community revitalization, preserving working riverfronts, or preserving water dependent uses, partnerships at all levels have made these projects successful.<sup>2</sup> The phenomena "Riverfront regeneration" does not call for removing all buildings or preventing any new structures, but it does espouse a strong view that minimizing impacts and keeping urban riverfronts as natural as possible.

## **1.5.2 Key factors in urban riverfronts regeneration**

### **1.5.2.1 Strategic value of riverfront areas for the development of the city as a whole**

- They were the answer to the need for city expansion in central areas.
- They were convenient in terms of 'quality' and 'quantity'.

### **1.5.2.2 Location factor of the riverfront**

- Located very close to city centers.
- Available spaces for new activities.

### **1.5.2.3 A rich heritage of historical buildings**

- Restoration of buildings of great historical-architectural value.
- Preservation and maintenance of the site's original identity.

### **1.5.2.4 Direct contact with water**

- A sort of 'water renaissance' has taken place.
- Water is once again seen as a resource.

---

<sup>1</sup> Andrew, G., (2006), p.1

<sup>2</sup> Carver, J. et al., (2007), p. 215

- Water has emerged as a positive and influential element for a new urban quality and with the capacity to attract a wide range of activities and people.

#### **1.5.2.5 The evocative and symbolic value of riverfront areas**

- For example port areas, vibrant places, often symbol of wealth and power for many cities on water around the world.

### **1.5.3 Strategies of urban Riverfront regeneration**

To discuss accurately urban riverfront regeneration, we have to highlight first riverfront strategies. There are four strategies for the river focus on the various systems of the river -as shown in figure (1-4) they are: natural system, economic system, built environment system and social or human system. <sup>1</sup>

This research will not discuss economic or natural systems.

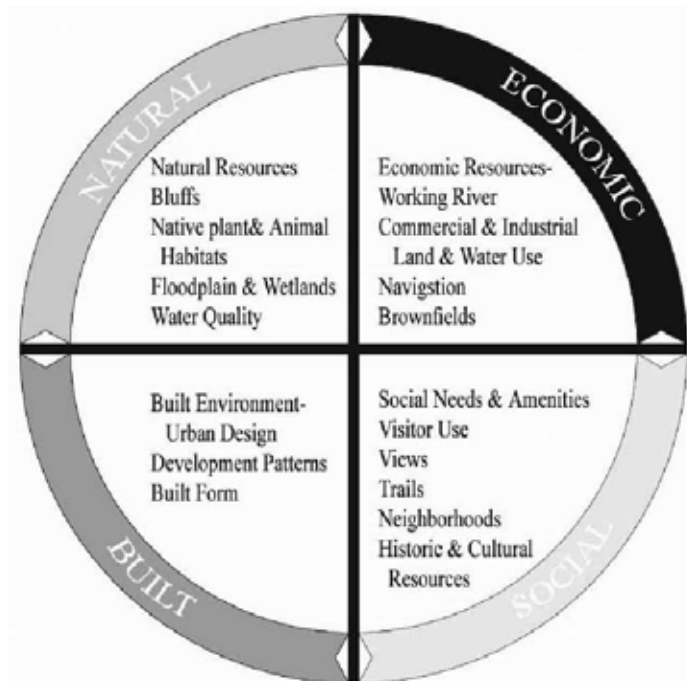


Figure (1-12) The four strategies of urban riverfront. Source (Bruttomesso, R., 2006)

---

<sup>1</sup> Bruttomesso, R., (2006), p.5

### **1.5.4 Dimensions of Urban riverfront Regeneration**

The character of riverfronts is formed from both their physical characteristics and the behavioral activities taking place, so urban riverfront regeneration has to take into consideration the complexity of urban riverfront dynamics, and its schemes necessarily involve a variety of economic, social, environmental and preservation issues. Priority dimensions of urban riverfront regeneration may be: <sup>1</sup>

<b>DIMENSIONS OF URBAN RIVERFRONT REGENERATION</b>	
<b>ECONOMIC</b>	To attract investors, create employment, renew the urban riverfront economy.
<b>SOCIAL</b>	To enlarge the supply of urban housing on riverfront, or bring people back to their cities' riverfronts.
<b>ENVIRONMENTAL</b>	To enlarge the supply of urban housing on riverfront, or bring people back to their cities' riverfronts.
<b>Cultural</b>	To enhance architectural heritage and urban tourism.

Table (1-3) Dimensions of urban riverfront regeneration. By researcher.

### **1.5.5 Different typologies of riverfronts regeneration**

According to Moretti, M., (2008) there are seven new typologies of riverfront regeneration, they are:<sup>2</sup>

- New Urban Expansion.
- Reuse of Port Areas.
- Flood Defenses.
- Urban Riverfront landscape Regeneration.
- Urban Beaches.

---

<sup>1</sup> Evren, U., (2007), p. 210

<sup>2</sup> Moretti, M., (2008), pp.15-22

---

---

## Chapter 1

---

---

- Riverfronts and Great Events.
- New residential communities.

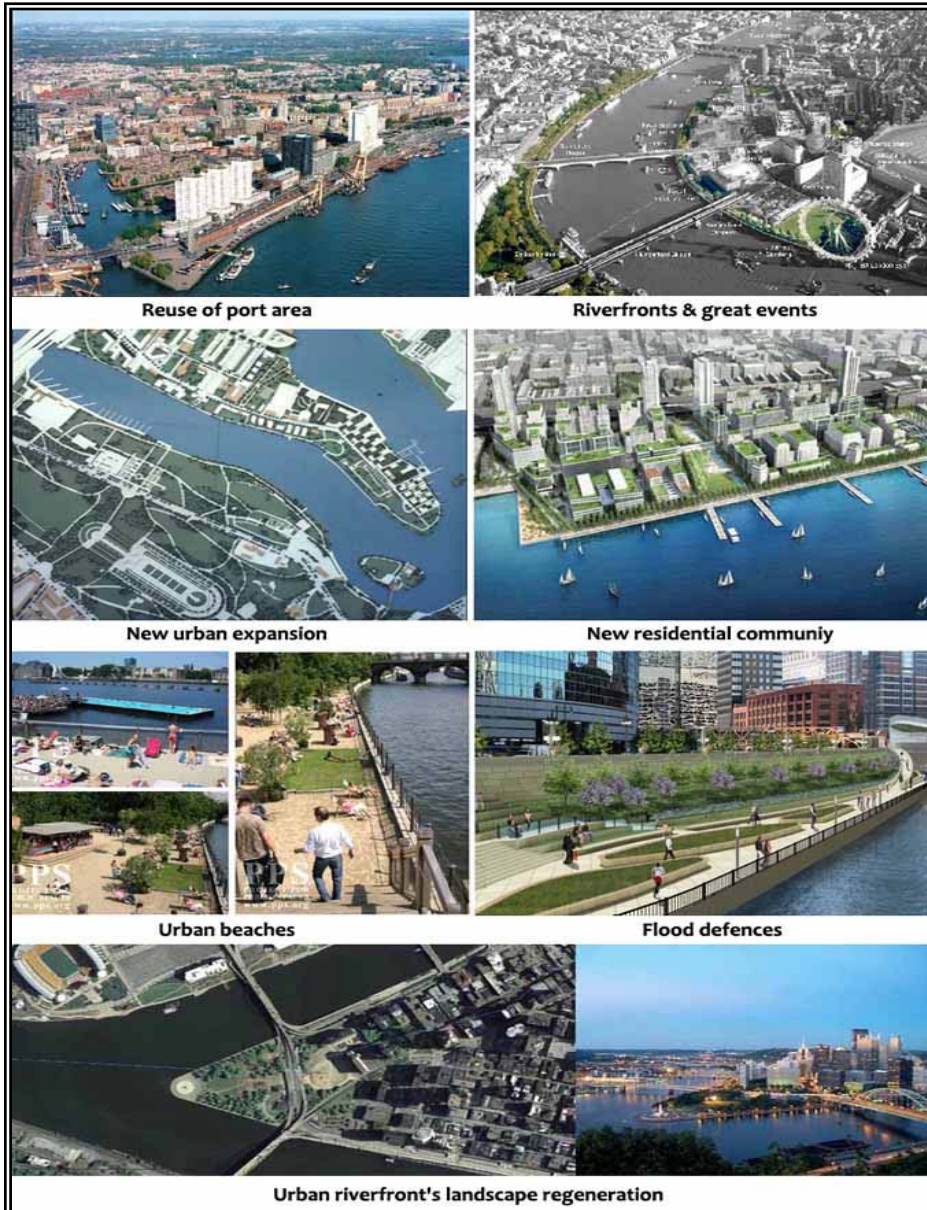


Figure (1-13) Examples on typologies of riverfront's regeneration.  
Source (www.pps.org, & Moretti, M., 2008)

### **1.5.6 Principles of Urban riverfront regeneration**

There were ten principles approved during the world conference under the aegis of the United Nations Urban 21, and were drawn up at international seminars promoted by Wasserstadt GmbH, Berlin with the co-operation of the International Centre Cities on Water, Venice.<sup>1</sup>

<b>PRINCIPLES OF URBAN RIVERFRONT REGENERATION</b>	
<b>1</b>	<b>Secure the quality of water and the environment</b>
<b>2</b>	<b>Riverfronts are part of the existing urban fabric</b>
<b>3</b>	<b>The historic identity gives character</b>
<b>4</b>	<b>Mixed use is a priority</b>
<b>5</b>	<b>Public access is a prerequisite</b>
<b>6</b>	<b>Planning in public private partnerships speeds the process</b>
<b>7</b>	<b>Public participation is an element of sustainability</b>
<b>8</b>	<b>Riverfronts are long term projects</b>
<b>9</b>	<b>Regeneration is an ongoing process</b>
<b>10</b>	<b>Riverfronts profit from international networking</b>

Table (1-4) Principles of urban riverfront regeneration. Adapted by researcher.

Every riverfront has its own characters, conditions and needs. So every regeneration process has to respect that, and has to determine its regeneration goals. So standardization of riverfront regeneration is a big mistake.<sup>2</sup>

---

<sup>1</sup> Moretti, M., (2008), p.10

<sup>2</sup> Andrew, G., (2006), p.17





Figure (1-14) Different Principles of urban riverfront regeneration, according to site conditions. Source (www.neworeiverfront.com)

### **1.5.7 New vision of riverfront regeneration**

In the regeneration of there are some principles must be take place in new regeneration process:<sup>1</sup>

THE NEW VISION OF RIVERFRONT REGENERATION	
1	THE RIVERFRONT AS A GATEWAY TO THE CITY
2	THE RIVERFRONT AS A GREAT PLACE TO LIVE, WORK & VISIT
3	THE RIVERFRONT AS AN URBAN SPACE OPENED FOR THE PUBLIC
4	THE RIVERFRONT AS A CENTER FOR CULTURAL OPPORTUNITIES
5	THE RIVERFRONT AS A PLACE FOR A VIBRANT ACTIVITIES
6	THE RIVERFRONT AS A MAJOR NEW ECONOMIC ENGINE FOR THE CITY

Table (1-5) The new vision of riverfront regeneration. By researcher

---

1 Jinnai, H., (2007), p.63

## **1.6 Riverfront regeneration for riverfront public access**

Many of the new world riverfronts try to make public access the common goal of any regeneration process, to give the public the opportunity to return back and access their riverfronts.

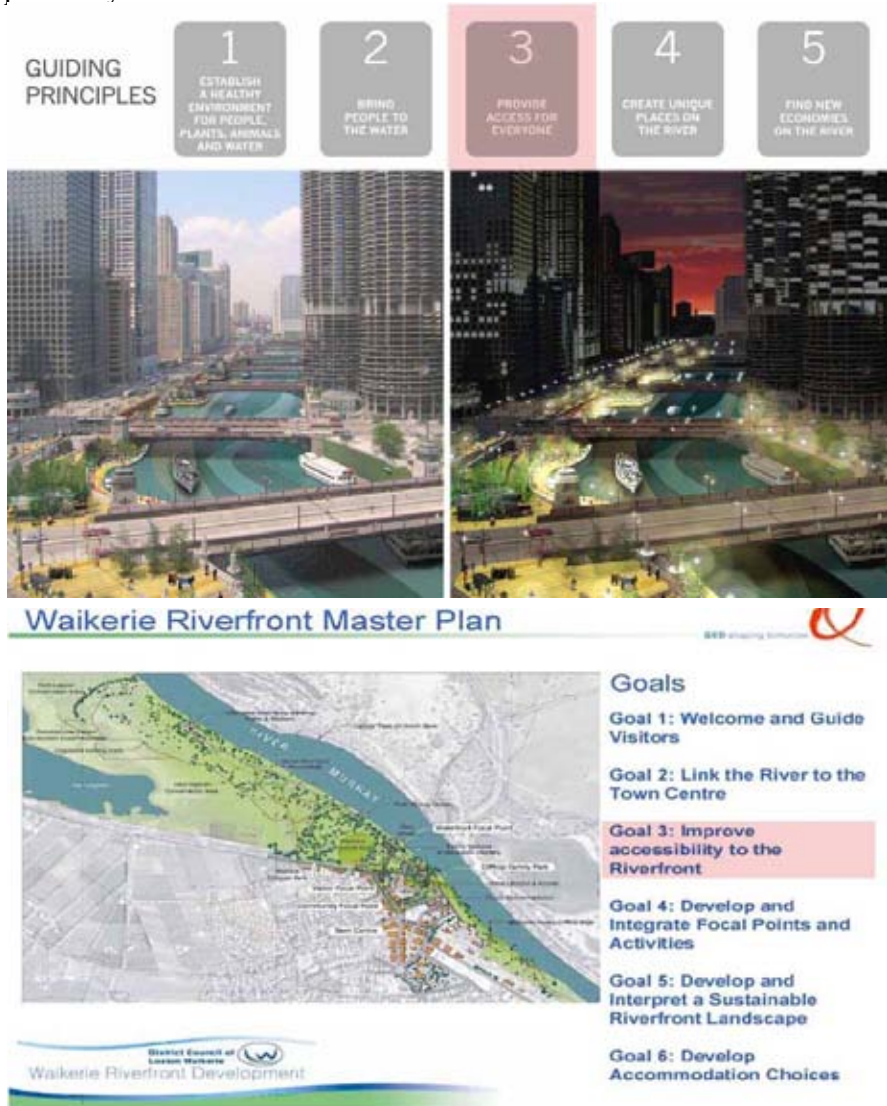


Figure (1-15) Two different riverfront regeneration projects, however public access is a common goal. Source (www.google.co.uk).

### 1.6.1 Riverfront public access

Public access is defined as the ability of the general public to reach, touch, and enjoy the water's edge, to travel on the waters of the state, and to view the water and the shoreline from adjacent locations.<sup>1</sup>

Physical improvements may include riverfront promenades, trails, plazas, play areas, overlooks, parking spaces, landscaping, site furnishings and connections from public streets to the water's edge. Visual access can be achieved through thoughtful site planning and design, including roadway layout, building sitting and massing and use of intrinsic opportunities at the site, such as natural grade changes and shoreline variations, to enhance Bay sight lines and views.<sup>2</sup>

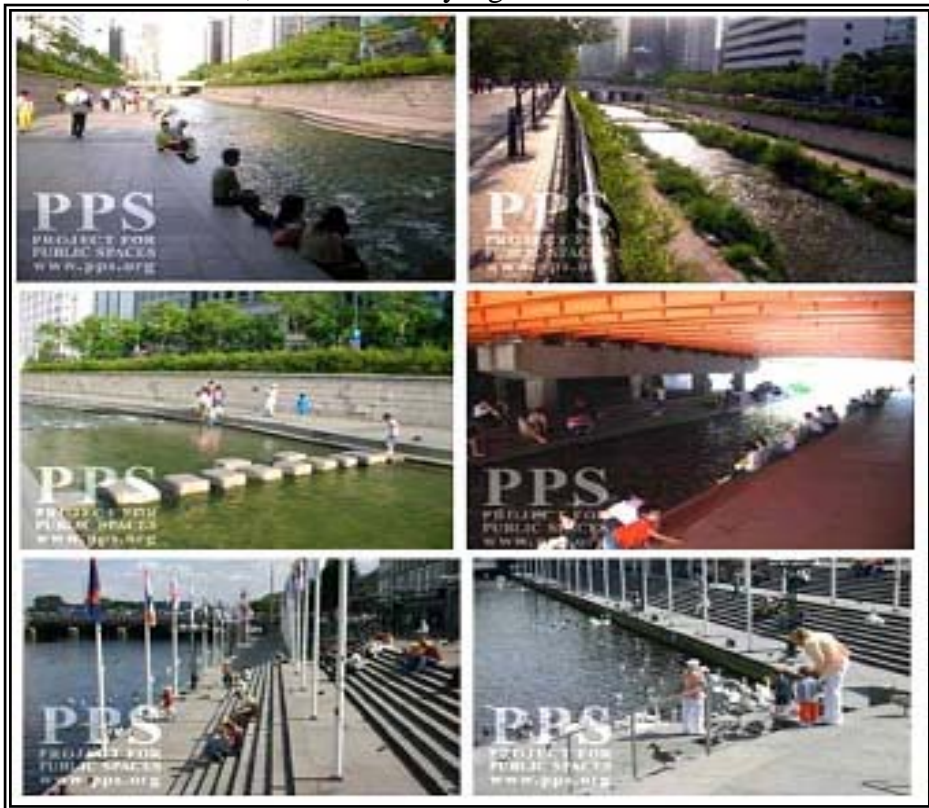


Figure (1-16) Different features of riverfront public access. Source (www.pps.com).

---

<sup>1</sup> Freudenberg, R., (2005), p.302

<sup>2</sup> previous, p.3

## 1.6.2 Types of public access to riverfront

Riverfront “Public access” includes physical public access to and along the riverfront and visual public access (views) to the river from other public spaces.

According to Gabr, (2004) Riverfront accessibility types are:<sup>1</sup>

### 1.6.2.1 Riverfront Physical access

Physical access is what is usually meant by riverfront access; if we can get to the water and along it. The physical access issue is joined in conflicts between private sector developers and public advocates seeking a walkway or some other means of approach.

Physical access can be classified into different types, including linear/lateral & perpendicular access:<sup>2</sup>

#### 1.6.2.1 .a Linear/Lateral Access

Linear or lateral access refers to access along rivers and their banks; the public has the right to use waterways and their banks for activities including boating, walking, sitting, riding bicycles...etc. In addition, the public has the right of access to and use of landscapes along shores. Anyone should be allowed to walk uninhibited within this area and free of charge.



Figure (1-17) Physical access to riverfront, left is linear, right is perpendicular. Source (www.pps.org)

---

<sup>1</sup> Gabr, H., (2004,b), p.2.

<sup>2</sup> Sieber, R., (1993), pp. 2-6

### 1.6.2.1.b Perpendicular Access

Perpendicular access refers to the ability of the public to reach rivers and their banks by corridors across land that may or may not be publicly or privately owned.

### 1.6.2.2 Riverfront visual Access

People can not feel connected to the water or having access, unless they can see the water. Visual access is the ability of the public to have access to views of riverfronts without these views being unreasonably obstructed.



Figure (1-18) Perpendicular and lateral access. By researcher.

## 1.6.3 Riverfront public access objectives

According to Evren, U., there are seven objectives of Riverfront public access, they are:<sup>1</sup>

- Make public access *PUBLIC*.
- Make public access *USABLE*.
- Provide, maintain and enhance *VISUAL ACCESS* to the river
- Maintain and enhance the *VISUAL QUALITY* of the river shoreline.

---

<sup>1</sup> Evren, U., (2007), pp.211-214

- Provide *CONNECTIONS* and *CONTINUITY* along the riverfront.
- Take advantage of the river *SETTING*.
- Ensure that public access is *COMPATIBLE WITH* Natural setting.

#### **1.6.4 Uses prevent the riverfront' public access**

Public access cannot be applied in all spaces adjacent to riverfronts because of some uses which prevent fully public access, these uses may be.<sup>1</sup>

- The use of local government land use regulations: new riverfront development can be required, under certain circumstances, to provide public access or recreational facilities as part of the development; site plan regulations can have standards that require buildings to be sited to protect views to or from the water; land can be zoned for recreational use only
- Partnerships between riverfront businesses and local government can be established with business improvement districts that create public riverfront amenities that enhance business and public access
- Non profit organizations, particularly land trusts and environmental organizations, can work with communities to improve public access
- Any remaining State interest in formerly underwater lands can be used to provide public access as part of new development
- Large institutional facilities, whether public or private, such as hospitals or schools, located along the shore can provide public access and recreation on their grounds.

#### **1.6.5 Riverfront's public access demands**

In order to improve riverfront's public access, some information will be needed about:

- The nature of the demand for more access and recreation on the riverfront by type of access, and who in the community wants/needs the access or recreational opportunities, neighborhoods, specific

---

<sup>1</sup> <http://www.Nysriverfronts.org>

- recreational interests, e.g. competitive rowing, fishing, or scuba divers, the community at large, the region, or tourists and visitors
- The sites that have potential for providing access and recreation, the site's conditions that make the site appropriate or inhibit its use
  - The environmental constraints on increasing access and recreation at a particular site
  - The capacity of necessary infrastructure to support new or improved access and recreation
  - Property ownership, including the nature of ownership of underwater lands, particularly lands that were once underwater and have been filled.

### **1.6.6 Key elements of Riverfront Public access**

Riverfront regeneration encourages people to come back to the water for entertainment, recreation and quality of life amenities. In providing for the public, the University of Idaho Community Design and Planning Center recommends planning for these three key elements:<sup>1</sup>

#### **1.6.6.1 Meet Basic Human Needs**

This includes creating a safe environment through lighting and clear sight lines, rest rooms, drinking fountains, seating, trash receptacles, aesthetically pleasing locations with a view of the water and clear signage directing visitors through the area. Creating year-round use is preferred as is the overall emphasis on the riverfront.

#### **1.6.6.2 Provide Recreational Opportunities**

Many riverfronts are peppered with parks, trails and public performance spaces. There is room for variety and creativity as recreational areas can feature any combination of playgrounds, grassy spaces, skate parks, fishing piers and more. Multi-purpose spaces are also encouraged.

#### **1.6.6.3 Develop Paths and Promenades**

It is important to connect the riverfront to the downtown commercial and retail district with pedestrian and bicycle paths. These connections should be secure and provide for pedestrian access separate from automobile access. The location of these paths and their construction

---

<sup>1</sup> <http://www.glc.org/wiconference/benefits.html>

should contribute to a sense of place either complementing the current design or enhancing it through landscaping, benches, public art and architecture features.

### **1.6.7 Involving the Public in riverfront regeneration**

The process of riverfront regeneration is like any urban or planning process, it is most successful when the public is actively involved.<sup>1</sup> From the previous discussion about riverfronts regeneration, and finally to public access to riverfronts, it is clear now that public access is a common goal for all world riverfronts regeneration, so the public themselves have to be involved in regeneration process, how, is the question which the rest chapter will try to reach an effective approach.

## **1.7 Summary & conclusions**

Riverfront landscape plays a significant role in urban landscape and brings people the enjoyment of the beautiful. But how to design an appropriate riverfront landscape is a problem of the landscape designers. The designer should not only focus on the ingenious design of transforming nature, but also on the ideas of innovation of technology, aesthetics and concepts based on the environment protection. Finally, find the balance between natural landscape and artificial landscape.

Riverfront regeneration focuses on improving people's ability to connect with their riverfronts and create a sense of place, by preserving or providing access, protecting historical and cultural resources, and by preserving traditional riverfront uses and activities.

Thousands of riverfront regeneration projects all over the world are promoted to bring people and the public back to their city's riverfront.

The better management of redevelopment or regeneration on river banks is to safeguard public access.

Partnerships at all levels of Riverfront regeneration will make these projects successful.

Effectively manage and regenerate riverfront assets on:

Maximize the major public investments and natural assets.

---

<sup>1</sup> Gillotti, T., (2005), p.2



---

---

## Chapter 1

---

---

- Effectively manage and develop riverfront assets.
- Implement Comprehensive Plan related to riverfront.
- Increase and enhance public access to the riverfront, both physically & visually.
- Develop partnerships (public and private).
- Improve appearance of riverfront.
- Enhance Public Access along the River, to the River, and from the River.

The next figure shows a comparison between today's riverfront and the future riverfront according to regeneration process.

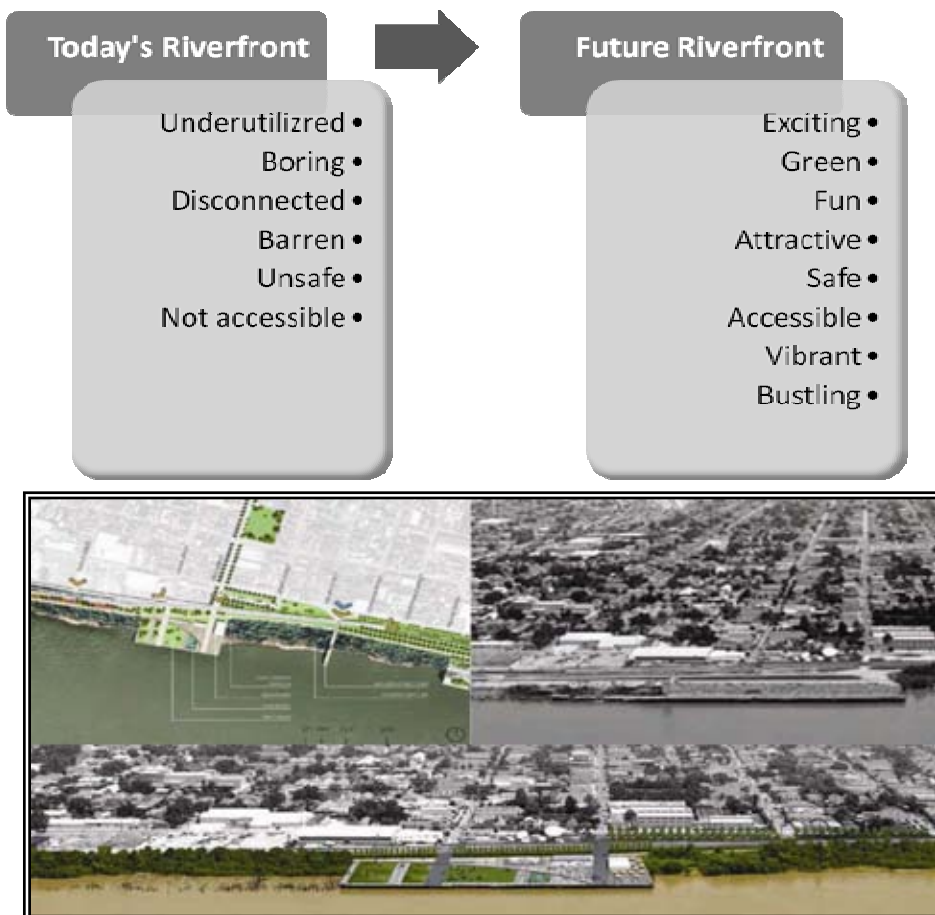


Figure (1-19) Riverfront from today to the future, by researcher & bottom:  
<http://www.reinventingthecrescent.org/>



**PART  
ONE**

**Riverfronts, Public Participation and Visualization in  
Relations, Towards a Successful Regeneration of  
Riverfront's Landscape**

**Chapter  
1**

**Riverfront's Regeneration  
Towards Public Accessibility of Riverfronts**

**Chapter  
2**

**Assessment of Public's Interactions with Riverfronts'  
Landscape**

**Chapter  
3**

**Public Participation in Riverfront's Landscape  
Regeneration**

**Chapter  
4**

**Visualization of Riverfront's Landscape Regeneration**



**Introduction**

**People's attraction to riverfront's landscape**

**Perception as interaction between people &  
landscape**

**Public's preference for riverfront's landscape**

**Assessment of public's response towards riverfront's  
landscape**

**Factors affecting users' satisfaction of riverfronts  
spaces**

**Urban riverfront regeneration frameworks**

**Summary & conclusions**



*"Built environments could be designed in such away as to better accommodate user needs"*

*"The need to understand the interaction between people and the physical environment is a main goal of perception studies".*

*"The need to understand people's response to or preference for types of design interventions is a main goal of aesthetic perception studies"<sup>1</sup>.*

## **2.1 Introduction**

The previous chapter discussed the riverfront regeneration, and the world's trend to enhance public access to riverfronts, also the world's trend to participate lay public in the riverfront regeneration process. So this chapter will discuss the public's interaction with the physical environment of riverfronts, also discusses public's responses towards the riverfront's landscape and the regeneration processes which aims to enhance the public access to the river edges though making modification in the landscape of the riverfronts.

The most effective factor determining the interaction between lay public and the physical environment of riverfronts is visual perception of physical environments, which called "environmental aesthetics".<sup>2</sup> So this chapter seeks to understand the human values and perceptions associated with the public open spaces on riverfronts, and the implications of them in regeneration the water's edge as a healthy urban component.

Effective design review and creation of design standards requires knowing about people's landscape preferences and their desires for the future of the landscape. It also requires determining whether or not there is consensus of perceptions among different interest groups and, if there is not, where and how perceptions diverge. There is a direct connection between these needs and the work of environmental psychologists.<sup>3</sup>

---

<sup>1</sup> Gabr, H., (2004a), p.155

<sup>2</sup> previous, p.156

<sup>3</sup> Anne R., et al., (2008), p.117

## **2.2 People's attraction to riverfront's landscape**

Thousands of projects all over the world are promoted to bring people and the public back to their city's riverfront. People are attracted to the river edge and the water as part of their intrinsic attraction to nature.<sup>1</sup>

Natural environments including riverfronts provide ample opportunities and hence can afford a variety of leisure activities and experiences.<sup>2</sup> That is why current riverfront regeneration is shifting the uses of riverfronts only from transportation to more recreation-type activities especially for lay public.

The need to understand the interaction between public and physical environment is a main goal of perception studies. The need to understand public's response to or preference for design interventions- such as riverfront's landscape regeneration- is a main goal of aesthetic perception studies. If such goals are achieved, design implications that follow could be tremendous. Built riverfront environments could be designed in such a way s to better accommodate user needs and wants.<sup>3</sup>

### **2.2.1 Public perception of riverfront landscape**

A river in the urban context can be analyzed as a public space, defined as an open space accessible to the public, and where people can develop individual or public activities. To understand the public river landscape perception, as a public space it is necessary to identify the cognitions, feelings and behavior of its users.

### **2.2.2 Categories of public needs in riverfront's landscape**

According to Andrew (2006), public needs in riverfront's landscape divided into two categories:<sup>4</sup>

#### **2.2.2.1 Nature needs**

- Contact with nature:
- Aesthetic preference.

---

<sup>1</sup> Kaplan, S. & Kaplan, R. (1989), p. 17

<sup>2</sup> Gabr, H. (2004a), p.156

<sup>3</sup> Previous, p.157

<sup>4</sup> Andrew, G. (2006), pp.9-10



- Recreation and play.
- Basic human needs.
- Sense of security & safety.

#### **2.2.2.2 Public-interaction needs**

- Social interaction and privacy.
- Citizen participation in the design process.
- Sense of identity, Sense of Place/Uniqueness.

### **2.2.3 The ways public can value riverfront' landscape**

Riverfront regeneration has been a widespread phenomenon occurring in different parts of the globe. To restore the historic links between the populace and the riverfronts through design and management, public values and perceptions must be taken into account. There are four ways in which people can value riverfront and riverfront's landscape, they are:<sup>1</sup>

- Aesthetic appeal and Emotional satisfaction.
- Recreational values.
- Environmental values.
- Historical values.

### **2.3 Perception as interaction between people & landscape**

One goal of perception studies is to understand the interactions between people and physical environments.<sup>2</sup> Perception is constituted by opinion and attitude. Opinion refers to judgments, verbally or conceptually expressed, in favor or against a topic, activity, or an object. In contrast, attitude is a psychological disposition acquired and organized through one's own moral standards, experiences, and expectations, which incites the individual to act or react in a particular way when confronted with people, objects, and situations.<sup>3</sup>

The public's sensitivity to scenery of how the landscape looks was one of the first and is perhaps still one of the most important catalysts of environmental awareness and action.<sup>4</sup>

---

<sup>1</sup> Anna, L. (2002), p.2

<sup>2</sup> Gabr, H., (2004), pp. 158

<sup>3</sup> Cervantes, O., (2008), pp. 249-264

<sup>4</sup> James, F. (2004), p.201

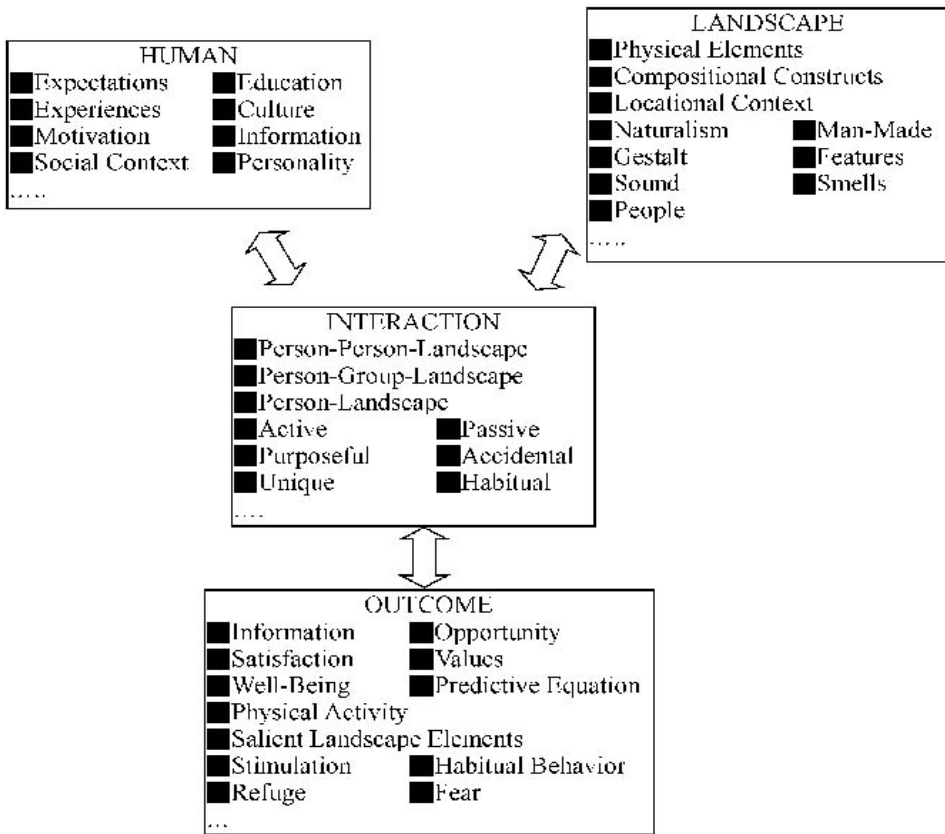


Figure (2-1) landscape perception process as interaction between people and landscape. Source (Cheng, C., 2007).

### 2.3.1 Landscape perception

Landscape perception is a function of the interaction between people and the landscape, the properties of the landscape itself has an enormous effect on visual perception and preference. Also important, however, are the characteristics of the individual perceiver—their previous knowledge and experience, familiarity with the landscape, attitudes, and cultural background.<sup>1</sup>

Perception of landscapes involves circulation. As we move, our perspective of the place physically changes, and what is previously

<sup>1</sup> Anne R., et al., (2008), p.118

experienced affects our perception. As we know, perception is not only a matter of sight, all senses butane which involves taste, smell, touch and hearing. The rate, order, type, degree of perception is a matter of design control, which is affected by planning patterns of circulation and movement. Circulation pattern is a major function of the planned development, because it establishes the rate sequence, and nature of its sensed realization or visual, and unfolding.<sup>1</sup>

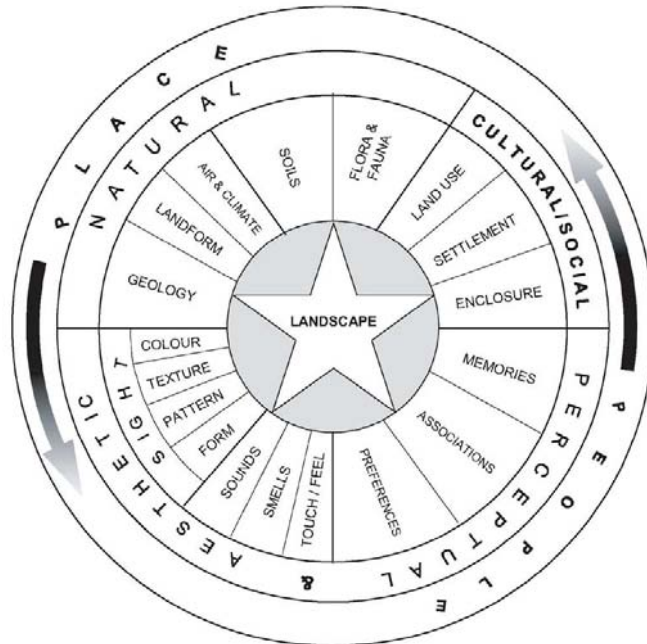


Figure (2-2) landscape perception & aesthetic as interaction between people and place.  
Source (Kamel O., et al., 2005)

### **2.3.2 How do people perceive landscape objects?**

People can perceive objects in the real environment in ways such as:<sup>2</sup>

- Distance perception
- Visual angle
- Convergence

---

<sup>1</sup> Bradley, G., Kearney, A. (2007), p.43

<sup>2</sup> Froner, B., (2003)., p. 24

- Binocular disparity
- Motion parallax
- Color and brightness
- 3D perception
- Size perception
- Motion perception
- Shape constancy
- Dark and light adaptation, visual simulations, etc.

### 2.3.3 Laws of landscape scene perception

The Gestalt psychologists stressed the importance of the process of visual perception, the division, by the visual system, of a scene into figure and ground, as an early step in the analysis of a visual scene. The process of visual perception, central and fundamental to the understanding of human vision, is not yet completely understood.<sup>1</sup> The main guidelines, often called Gestalt laws as shown in figure (2-3), are:<sup>2</sup>

- **Proximity law:** elements spaced more closely together are seen as belonging together
- **Similarity law:** elements that look more similar are grouped together
- **Smoothness law:** elements group together if their spatial alignment follows a smooth path
- **Enclosed-ness law:** Objects group together if they are arranged on a closed path
- **Simplicity law:** Simplest configurations of parts result in the objects actually perceived.

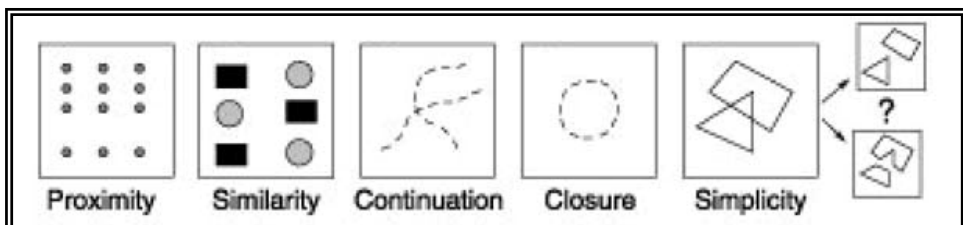


Figure (2-3) Gestalt laws for scene perception. source (Gert J., et al., 2002).

---

<sup>1</sup> Koenderink, J., Van Doorn, A. & Kappers, A.(1992), p.487

<sup>2</sup> Gert J., et al., (2002), p. 6

### 2.3.4 Aesthetic responses towards landscape

Aesthetics is formally defined as the study of the principles that guide the formation and evaluation of art. The word aesthetics literally refers to perception. Aesthetic response in this study corresponds to the broader definition. It refers to evaluative aesthetic experience in relation to the environment.<sup>1</sup>

The aesthetic response consists of three main components as shown in figure (2- ). Affective appraisal, emotional reaction, and changes in behavior. An affective appraisal represents an attribution to the environment such as an individual's judgments that they like a certain environment.<sup>2</sup> Affective appraisal is used here synonymously with cognitive perception; although in a strict sense the concepts are different. Affective appraisal is a psychological assessment of places whereas emotional reaction is physiological response to place. An emotional reaction refers to an internal state such as pleasure or arousal that relates to the environment<sup>3</sup>

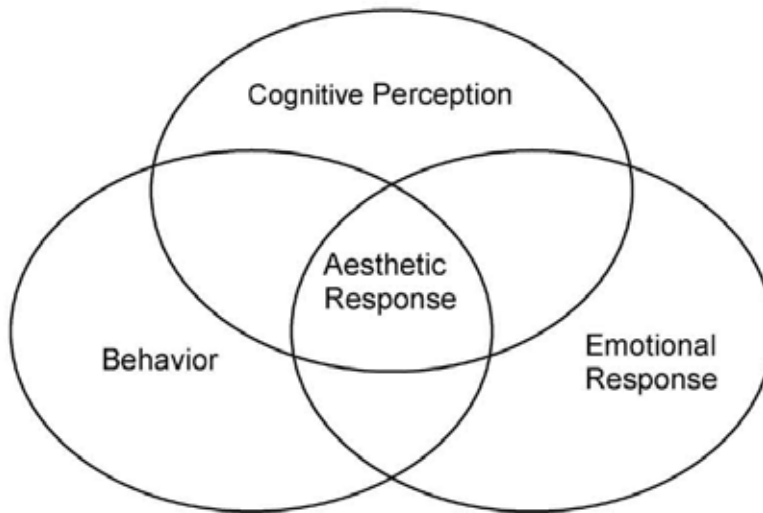


Figure (2-4) Components of Aesthetic Response. Source (Surendra N., et al., 2008)

---

<sup>1</sup> Chon, J. (2004), p. 34

<sup>2</sup> Nasar, J. (1997), p.151

<sup>3</sup> Surendra N., et al.(2008), p.340

### **2.3.5 Aesthetic factors in riverfronts' Landscape**

According to Chen, S. & Lin, J. (2007) in their research about Developing a simplified river landscape assessment model, riverfront's landscape perception can be realized through some aesthetic factors which are:<sup>1</sup>

#### **Balance and Proportion**

The relative quantities of different elements within the view affect balance and proportion.

#### **Scale**

The overall scale of the landscape must be assessed once the factors that define it have been established. These include the degree of enclosure by landform and the main positions from which the landscape is viewed.

#### **Enclosure**

Where elements are arranged so that they enclose space, this has an effect on the overall composition, the space and mass become as one.

#### **Texture**

This varies according to scale, but can be defined in relative terms as coarse, intermediate or fine.

#### **Color**

This refers to the dominant colors of fields, woodlands, the built environment and other landscape elements. It includes any notable seasonal effects due to farming activity and seasonal change.

#### **Diversity**

This needs to be assessed in two ways. First, within the boundaries of the landscape type the minor variations of the landscape should be assessed to determine overall how uniform or diverse the landscape is. Second, the diversity of a typical composition should be evaluated.

---

<sup>1</sup> Chen, S. & Lin, J. (2007), pp.490-493

### **Unity**

The repetition of similar elements, balance and proportion, scale and enclosure, all contribute to unity.

### **Form/shape**

This term describes the shapes of fields, e.g. rectangular, curvilinear, rounded, flat, etc. It is a very important factor in defining ancient or planned landscapes.

## **2.4 Public's preference for riverfront's landscape**

Because of the public's preference, for the river landscape, rivers are the most attractive zones as well as the most active zones in cities. In recent years, most cities have begun to pay attention to the landscape design of urban rivers and tried not only to protect the ecological environment but also provide a place of recreation for the public.<sup>1</sup> So landscape architects throughout the world have to perform both evaluation of scenic beauty of the present environment and visual impact assessments of projects that could lead to changes in the environment.<sup>2</sup>

### **2.4.1 Variation in public's preferences**

Prior studies have shown that while there is general agreement between different groups of people about which types of scenery are preferred, there are also major and important differences between different groups of people.<sup>3</sup>

It has also been shown that certain individual differences such as impairment of sight and spatial skills can also affect our visual perception. There are also other factors that influence how we perceive things such as:

- Familiarity with the landscape and previous experiences.
- Personality.
- Cognitive, cognitive styles.
- Religious beliefs.

---

<sup>1</sup> Lifang, Q., (2009), p. 75

<sup>2</sup> Roth, M., (2006), p. 179

<sup>3</sup> Catherine, Q. & Purves, D. (2005), p.3

- Education level.
- Values, attitudes, motivation.
- Economic status.
- Professionals compared to lay people.
- Environmental background.
- Ethnicity.
- Age.
- Gender.
- Distance from the landscape, and income.
- Cross-cultural preferences.

The previous factors have to be considered in any landscape evaluation process, so in the research approach these factors will affect any evaluation of riverfront's landscape regeneration.

### **2.4.2 Experts' preference versus public's preference**

Differences in preference between experts and other groups can be particularly problematic in situations where experts are making decisions about landscape aesthetics on behalf of the public or other interest groups.<sup>1</sup>

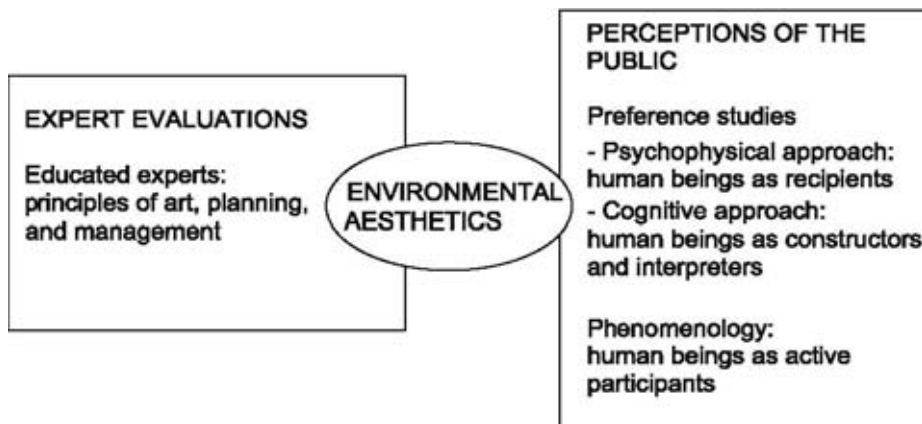


Figure (2-5) Expert's preference versus public's preference as an approach to assess landscape quality. Source (Karjalainen, E., 2006).

---

<sup>1</sup> Anne R., et al., (2008), p. 119



Several approaches tried to evaluate the environmental preferences (e.g.: Berlyne, 1974; Kaplan, 1987; Bernaldez, 1981; Saraiva, 1999; Zube, 1984). Some propose expertise evaluations and some underline the importance of user or public evaluation. It is considered two types of evaluation: (a) an expertise evaluation of aesthetic preferences and; (b) public evaluation of river landscape. <sup>1</sup> Preferences evaluation, even if positive or negative, represents emotional feelings about built environment indirectly. Public user's evaluation reflects their values, priorities, and functional needs. It may conflicts with experts' (specialists') evaluation and opinions.

### **2.4.3 Preferences as a mean to evaluate riverfront's landscape**

It is possible to identify different approaches and methodologies to evaluate the aesthetic characteristics of a riverfront's landscape. Kaplan and Kaplan (1989) developed a model of environmental preferences that combine nativity and constructivist elements. In one hand they consider that the human being prefer environments that landscapes in which the traits of our species are most useful. So, for instance, they like green areas, and the presence of water. One other the couple Kaplan concludes that humans have a fondness for environments that provide rapid and comprehensive information.<sup>2</sup>

The Kaplan's model includes four main components: coherence, legibility, complexity and mystery, as shown in table (2-1)

	Understanding (sense making)	Involvement (exploration)
Effort in perception of immediate aspects of the scene	Coherence	Diversity or complexity
Effort in perception of future aspects of the scene	Legibility	Mystery

Table (2-1) Kaplans' landscape preference model. Source (Surendra N., et al., 2008).

---

<sup>1</sup> Surendra N., et al., (2008), p.340

<sup>2</sup> previous, p. 341

- Coherence: degree of organization of a scene, or to which a scene “hangs together”. The coherence is positively correlated with the preference.
- Legibility: or degree of distinctiveness that allows the viewer to understand the content of a scene. The greater the legibility, the greater the preference.
- Complexity: or number and variety of elements in a scene.
- Mystery: degree to which a scene contains hidden elements that stimulate the search of this information. The human being like complex scenes and scenes with some degree of mystery.

The experts may use this approach to classify the river landscape in relation to these four components.

#### **2.4.4 Behavioral Psychology and riverfront's landscape**

Understanding the reasons for human behavior is an effective tool for designers of public spaces because people’s preferences will ultimately determine if a space is successful and, therefore, will determine the effectiveness of the design.<sup>1</sup>

In their study, the Kaplans discuss various preferences concerning riverfront regeneration. For instance riverfront's users. Further, the water’s edge can be perceived as less attractive if water overflows its edge. Although eroded and unkempt edges are not preferred, hard-surfaced bank treatments score even lower preference ratings. The Kaplans found that preferred water edges, on the other hand, often contain a water element and follow a natural form, rather than having constructed straight edges. Users prefer vegetative banks for appearance and performance enhancement.

Also Whyte is an advocate for immediate accessibility, stating, “It’s not right to put water before people and then keep them away from it.” He expands on the importance of intimacy with water in the following excerpt.<sup>2</sup>

---

<sup>1</sup> Karjalainen, E., (2006), p.5

<sup>2</sup> Whyte, H. (2000), p.138

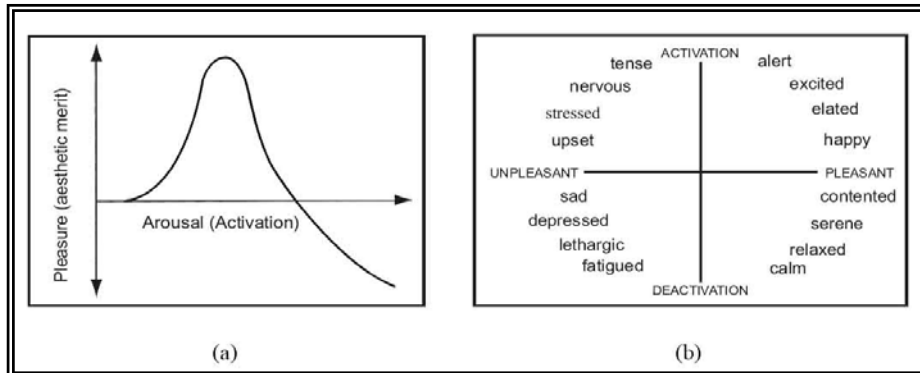


Figure (2-6) Aesthetic and emotional models. A) Berlyne's aesthetic model. Aesthetics stimulate arousal and pleasure is a function of arousal. B) Baltisenn and Ostermann's affective model. Emotions vary on bipolar scales, activation and pleasure.

Source(Karjalainen, E., 2006)

Also to understand public's behavior towards riverfronts' landscape we have to know factors that affect significantly on human behavior; which can be classified into four influences:<sup>1</sup>

- Physical influences (age, sex, features).
- Cultural influences (values, traditions, norms).
- Social influences (relationship between man and his society).
- Personal influences (personal opinions, motivations, and preferences).

## **2.5 Assessment of public's response towards riverfront's landscape**

This will be the approach to make an evaluation of riverfront's landscape through assessment of public's preferences towards riverfront' landscape.

### **2.5.1 Public users' response to riverfront's landscape**

Human being emotions are stimulated by surrounding, his response may appear to be linked to his surrounding, and more over it also relies on his mental situation. People respond actively to environmental stimuli depending on the way they perceive these stimuli.<sup>2</sup>

---

<sup>1</sup> Galindo,P. & Antonio, J. (2000), p.15

<sup>2</sup> Anne R., et al., (2008), p. 121

Zeisel study is one of the most distinctive ones about public users' response to built environment. In his model, Zeisel clarify that public users' response may be **physical** or **emotional**. He further states that individuals express their feeling about their built environment in the form of opinions and criticism (negative or positive). On the other hand, Zeisel means by physical responses, activities and behaviors of individual.<sup>1</sup>

### **2.5.1.1 Physical Response**

Zeisel refers to the physical response to built environment as what users do in built environment (activities and behaviors), and what users do towards built environment (behaviors that express their human needs such as: privacy, identify, singularity...etc).

#### **2.5.1.1.a Actions done in the riverfronts' landscape**

Many researchers are concerned with different patterns of activities that public users do in built environment. It is observed that activities like eating, drinking, reading, listening, observing-even while sitting, standing or walking-occupies large ratio in urban spaces ( exceed 90%).

Al-sayyad engaged human activities; where he defines urban space as a public, uncovered space used for urban activities. He points that urban activities are not only these which done by individuals or groups, but also those which done by institutions and companies.<sup>2</sup>

Seating is one of the most frequent urban activities that can be seen in urban spaces especially parks and spaces of riverfronts. Sometimes the absences of seats in urban spaces forces users to seat randomly on stairs, level changes, and flower boxes.<sup>3</sup>

Pedestrian activity can be considered the product of two components: the configuration of the street network and the location of particular attractions (shops, offices, public buildings ...etc.) on the network.<sup>4</sup>

---

<sup>1</sup> Zeisel, J. (1981), p.5

<sup>2</sup> Al-Sayyad, N., & Bristol, K. (1992) p. 194

<sup>3</sup> Schelhorn, T., et al., (1999), p. 3

<sup>4</sup> Porteous, D. (1996), p. 93

### **2.5.1.1.b Actions done to riverfronts' landscape**

People usually attempt to do some behavioral patterns to fulfill certain personal needs such as: adaptation, self-accentuation, territory...etc. these behaviors can be regarded as indicators for the degree of individual's acceptance or rejection of his built environment.

Man's reaction towards built environment elements changes in case of absence of principle needs in built environment. For example:

- When there are no access to river front they gathering on bridges which viewing the river from above.
- When there are no seats in riverfronts' parks people usually sit on stairs, sidewalks, flowerboxes....etc.

### **2.5.1.2 Emotional response**

Beside physical response, an emotional response is generated between riverfronts' built environment and its users. This emotional response is a result of the different meanings and values of built environment elements on one hand, and also a result of the functional link between public users and built environment. <sup>1</sup>

For planning city appearance, however, image ability is not enough. Humans have feelings, both negative and positive about their surroundings and the imaginable elements. The feelings and emotions generated in urban spaces are varying from enclosure to exposure; familiarity to expatriation; safety to unsafe; ....etc. many pioneers of urban design tried to study principles and design guidelines of urban spaces, which lead to those feelings, putting into consideration their variety among human beings.

The word (likeability) derives from the psychologist Gibson's (1979) concept of "affordance". Gibson saw the visual environment as central to human perception. Hence, likeability shows a human connection. It refers to the probability that an environment will evoke a strong response from the public. Likeability has two components: affect and image ability. <sup>2</sup>

---

<sup>1</sup> Schelhorn, T., et al., (1999), p. 3

<sup>2</sup> Nasar, J. L. (1990). p.51

### **2.5.2 Measuring people's responses to riverfront's landscape**

The primary interest is in measuring people degree of liking or dislike for a riverfront's landscape. To achieve this, it is also helpful to track the type of emotional response people have to an image.

A universal model to describe people responses to environment has been developed by (Russell, Ward and Pratt, 1981). The model was developed both using empirical data and is supported by psychological theory. It presents an approach for explaining the variety of people emotional (or affective) responses to the environment. This is a circular model, where people responses to the environment exist as a continuum, and where any response can be plotted according to the strength of association with four main axes (Figure 2-7). The model also recognizes that it is possible to have more than one response to a single environment.<sup>1</sup>

This circumplex model was originally developed to describe people (in-situ) responses to all environmental settings.

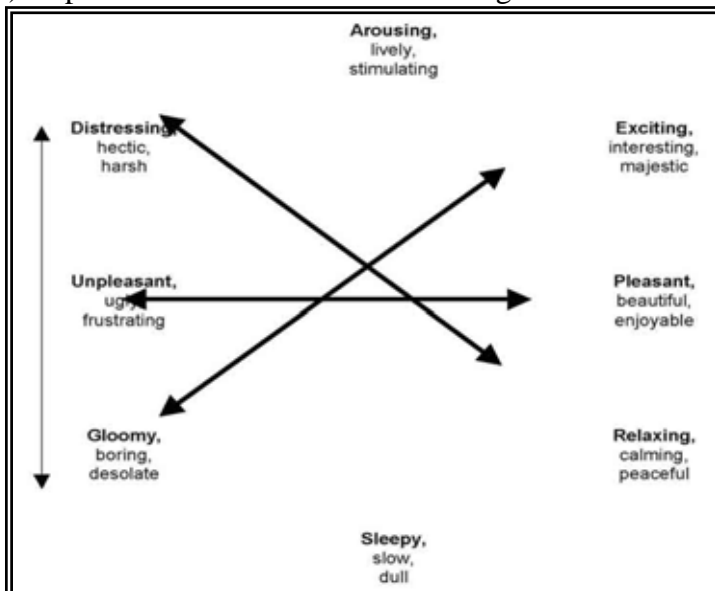


Figure (2-7) Dimensions of emotional responses. Source (Cheng, C., 2007).

---

<sup>1</sup> Cheng, C., (2007), p. 33

Thus, the vertical axis (arousing, sleepy) is less relevant than the other three axes for describing people responses to scenery. This deduction is relevant in developing a language set to describe people response to scenery. The model provides both a structure for developing an expanded set of questions about people responses to scenery, and for analyzing and interpreting survey results.

### **2.5.3 Assessing people responses to riverfront's landscape**

In broad terms, four different methods adopted from Zube, Sell and Taylor (1982) can be used to assess how people respond to the landscape. The methods, which are described below, are:<sup>1</sup>

- Expert techniques
- Quantitative surveys
- Focus groups
- Individual experiential approaches.

Expert techniques are methods that are often applied by experienced landscape architects and are based on previous experience and formal landscape theory, taking into account features such as line, form, color, and texture.

Quantitative survey methods researchers seek to use quantitative social research techniques to measure the relationship between human responses to the environment and physical features of the landscape through testing of observers' preferences.

Focus group methods use social research techniques to understand and describe the feelings and perceptions of groups of people who interact with the landscape. It is usual to seek to describe the meaning that landscapes can hold for people.

Individual experiential approaches are methods based on understanding the individual experience in the human landscape interaction, a person's subjective feelings, expectations, and their interpretations of an encounter with the landscape. The experiential methods are often conducted on site and with individuals, therefore

---

<sup>1</sup> Zube, E., et al., (1982), p.5

avoiding the approximations and assumptions inherent in all other techniques.

The last method is considered the most appropriate for this study because it provides direct interaction with individuals through desktop Virtual reality, and then the individuals evaluation of riverfront landscape alternatives can be gathered in an easy way.

## **2.5.4 Testing public's response to riverfront's landscape**

This can be applied by two means, observation and interviews.

### **2.5.4.1 Observation**

Observation has five dimensions: the behavior, the environment, the time, the observer, and the record of observation. As in a method for recording observation called: "behavioral specimen records".<sup>1</sup>

#### **2.5.4.1.a Observing patterns of activities**

In an attempting to study most frequent activities done in urban riverfronts' spaces, the activities done all over the day can be classified the into three major types concerning the dynamic status of users. These types are:<sup>2</sup>

- Activities done while walking.
- Activities done while standing.
- Activities done while sitting.

#### **2.5.4.1.b Observing human's behavioral patterns**

In an attempting to link between behavioral patterns and physical environment, Rapoport says: "it is social situation that influences people behavior, but it is the physical environment that provides the cues".<sup>3</sup>

There are many methods and techniques for observing human's behavior in riverfronts' environment. Behavioral mapping is a comprehensive method for such observation. Behavioral mapping process consists of three major phases:

- Drawing the site.

---

<sup>1</sup> Bechtel, R., et al. (1987), p.20

<sup>2</sup> Cooper, C. & Francais, C. (1990), p.23

<sup>3</sup> Rapoport, A. (1982), p. 57



- Making specific description for the types, places of the activities.
- Measuring and observing behaviors each segment of time, and recording the results in simplified manner.<sup>1</sup>

#### **2.5.4.2 Interviews**

Interviews are the second method researcher can rely on to test users' response to riverfront's environment. An interview helps in:<sup>2</sup>

- Explorations of information.
- Identification of cause and effect.
- Making clear questions asked before.
- Following up (more information, questions not completed, etc...).

Interviews as a procedure:

- Identifying interviews.
- Determination of type of interviews.
- Design of interview protocol.
- Determining place of interviews.
- Obtaining consent for participation.
- Sticking to the questions.

Interviews can be done in one of the following forms:

- Face to face.
- Telephone: useful when informants cannot be directly observed.
- Groups: useful for gathering a general impression.

## **2.6 Factors affecting users' satisfaction of riverfronts spaces**

The most of riverfronts spaces are in the new paradigm of riverfronts regeneration considered public spaces, as mentioned previous. From this viewpoint factors affecting the satisfaction of the users of riverfronts spaces are classified as accessibility, congestion levels, measures of comfort, the variety of activities and facilities, indicators of quality, safety, physical attractiveness or maintenance as an aesthetic consideration.<sup>3</sup> Previous factors have been identified as key variables for measuring the utilization of public spaces, as shown in table (2-2).

---

<sup>1</sup> Bechtel, R., et al., (1987), p.21

<sup>2</sup> Previous, p.23

<sup>3</sup> Pasaogullari, N. (2004), p.225

## Chapter 2

Theory	What to measure	Method
<i>Comfort</i> Comfortable space has a good image and used efficiently	Safety	Determination of safety levels in public spaces and factors affecting safety
<i>Quality</i> Variety of activities and facilities in public spaces are the main building blocks of successful spaces	Variation in activities and facilities	Determination of the types of existing activities or facilities in public spaces (observation and questionnaire)
<i>Aesthetic consideration</i> Physical attractiveness and maintenance is among the most important factors of successful place making	Maintenance and cleanliness  Appearance	Determination of the maintenance levels and physical appearance through questionnaire (observation and questionnaire)

Table (2-2) Measuring users' satisfaction of riverfronts spaces.  
Source (Pasaogullari, N. 2004).

according to Whyte, (2000) “ There are four key qualities that make a public space successful: they are accessible, people are engaged in activities, the space is comfortable and has a good image, and it is a sociable space where people meet each other and increased social interaction is provided”.<sup>1</sup>

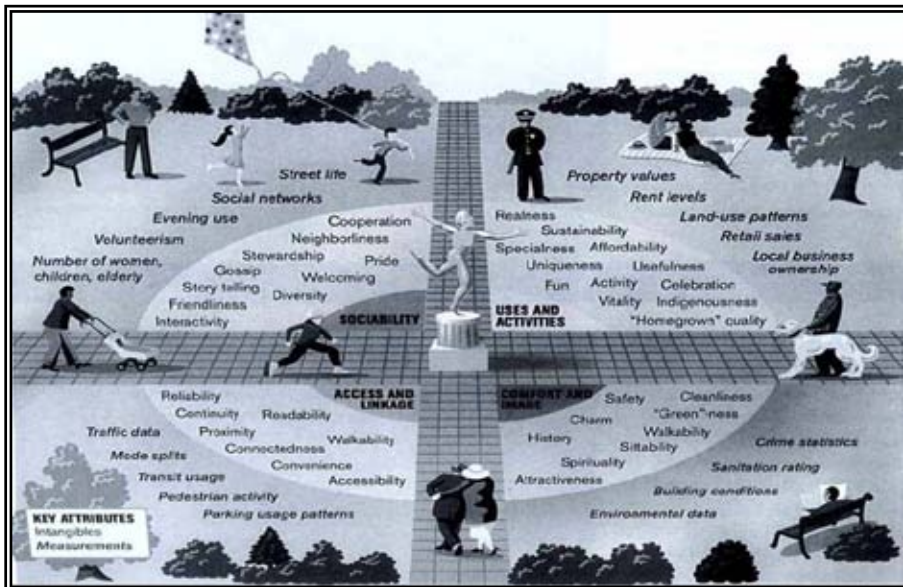


Figure (2-8) the four keys of making public pace successful. Source (www.pps.org).

<sup>1</sup> Whyte, H., (2000), p.6

**2.6.1 Riverfront's accessibility**

Poor accessibility is one of the major deterrents affecting the use of public riverfronts. However, once a public space is accessible, other factors have also role to play in defining and affecting the quality of the public riverfronts space, which, in turn, increase its utilization by the public or citizens<sup>1</sup>, as shown in table (2-3)

Theory	What to measure	Method
<i>Dispersion</i> Dispersed located public spaces is preferable to concentrated located ones	Allocation of public zones and distance between public spaces and households	Preparation of allocation map Questioning the travel time through questionnaire
<i>Proximity</i> Increase in the public spaces' accessibility when people live nearby	Proximity	Determination of whether public space can be seen from the house (through questionnaire)
<i>Ways and means of accessibility</i> Physical structure and type of streets are effective on access Public transport and car ownership enhance accessibility	Street type sidewalks Public transport car ownership	Determination of street type on the way of access Determination of the adequacy of sidewalks and public transport Determination of car ownership rate and effects on access

Table (2-3) Measuring accessibility to riverfronts. Source (Pasaogullari, N., 2004).



Figure (2-9) Riverfront's accessibility. Source (www.pps.org).

**2.6.2 Uses & activities in riverfronts spaces**

Activities are the basic building blocks of a place, as having something to do give people a reason to come to a place. The more activities

<sup>1</sup> Pasaogullari, N., (2004), p.225

included in a riverfront's space gives people an increased opportunity to participate.<sup>1</sup>



Figure (2-10) Examples of uses and activities on riverfronts. Source (www.nyc.gov)

Riverfront uses and activities can be divided into two categories active and passive; the landscape of riverfront affects these uses.<sup>2</sup>

#### **2.6.2.1 Active uses**

- Balance regional and local recreational uses.
- Coordinate places for large-scale civic gatherings with transit and infrastructure.
- Incorporate more water-oriented recreation.
- Coordinate active recreation areas with transit and school access.

#### **2.6.2.2 Passive uses**

- Integrate River-walk and park programming with wetland creation, habitat, and edge improvements.
- Enhance existing facilities and local uses of the parks.

---

<sup>1</sup> Pasaogullari, N. (2004), p.226

<sup>2</sup> Chen, S & Yang Lin, J. (2007),p.492

---

---

## Chapter 2

---

---

- Incorporate local history and heritage in park elements, programming, and the River-walk through signage and public.



Figure (2-11) Passive and active uses according to riverfront's landscape type. Source ([www.pps.org](http://www.pps.org)).

### 2.6.3 Comfort and image of riverfront' spaces

When a comfortable space presents itself well and has a good image, this is a key to its success. Comfort includes perceptions about safety, cleanliness, and the availability of places to sit. Maintenance is among the most important factors in successful place making, achieving comfort and increasing utilization. It is an often-ignored part of what must be considered an unending process.<sup>1</sup>

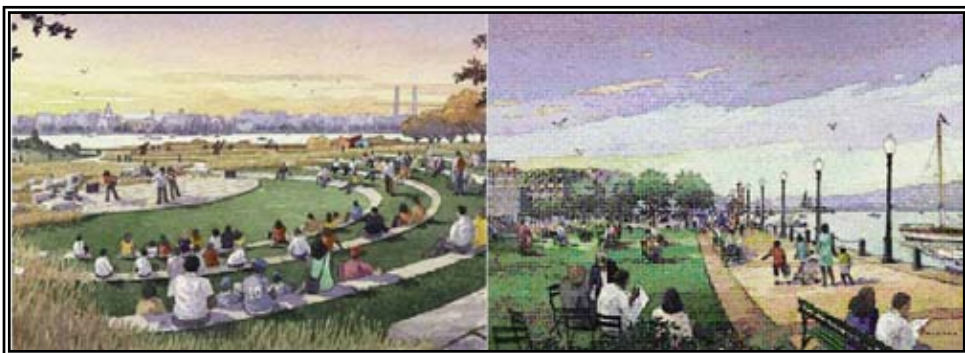


Figure (2-12) Comfort and image of riverfront's spaces. Source ([www.theanacostiawaterfront.com](http://www.theanacostiawaterfront.com))

---

<sup>1</sup> Anne, M., (2002), p.88

### **2.6.4 Sociability of riverfronts spaces**

When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of space or attachment to their community, and to the place that fosters these types of social activities.<sup>1</sup>



Figure (2-13) Sociability of riverfronts' spaces. Source (www.pps.org)

### **2.7 Urban riverfront regeneration frameworks**

According to Silva, (2005) urban riverfront regeneration process should based on three dimensions (as shown in fig (2-14), these dimensions are: River as our material world, City as social world, and the third dimension is people as personal world.

#### **River or material world as Objectivity**

Consists of Observation, material and physical attributes and processes, natural laws, requires care

#### **City or Social world as inter-subjectivity**

Participation, language meaning, social practices, culture and power relations, rules, resources, constraints

#### **People or personal world as Subjectivity**

Experiences, individual thoughts, emotions, values, beliefs

---

<sup>1</sup> Anne, M., (2002), p.89

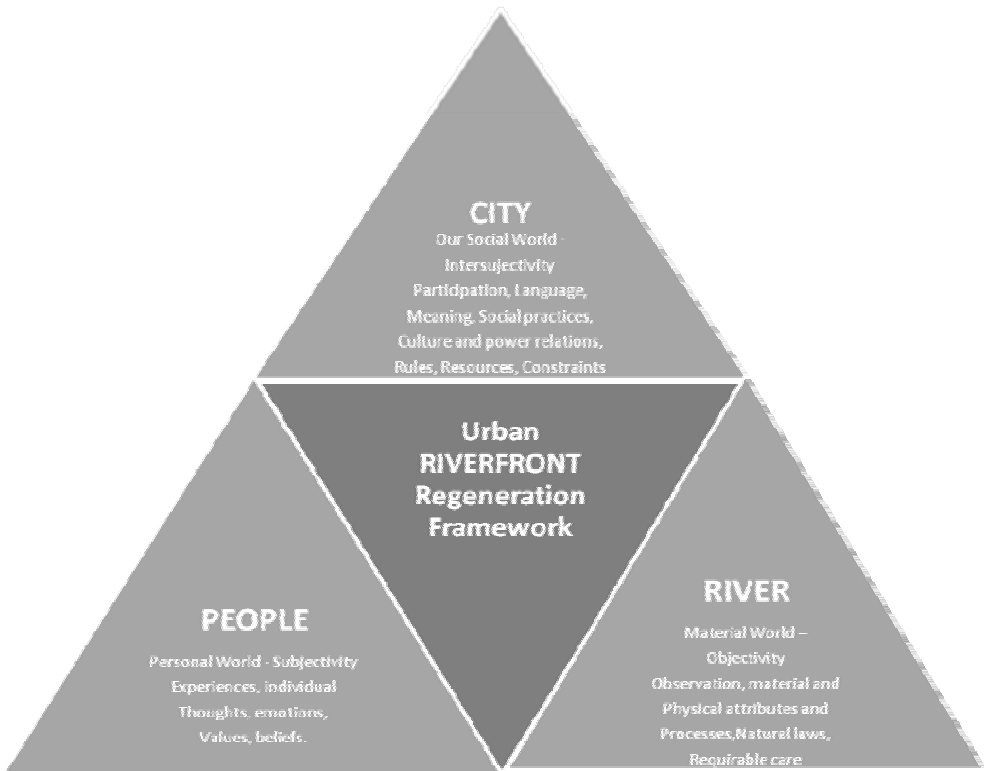


Figure (2-14) Urban Riverfront Regeneration Framework. Source (Silva, J., 2005).

### **2.7.1 Aesthetical quality of in riverfronts' regeneration**

From previous points, there is a strong relationship between city, river, and people. This relationship can be presented as aesthetical quality of riverfronts in cities. This can be clarified in figure (2-15)

The fundamental viewpoints considered more relevant to aesthetical classification of urban watercourses. This network confirms the classical dialectics Natural-Artificial which is particularly relevant in urban contexts. This dialectics, in terms of evaluation, means that there is a pre-positioning of people facing natural and artificial world that determine and influence their value system of preferences.

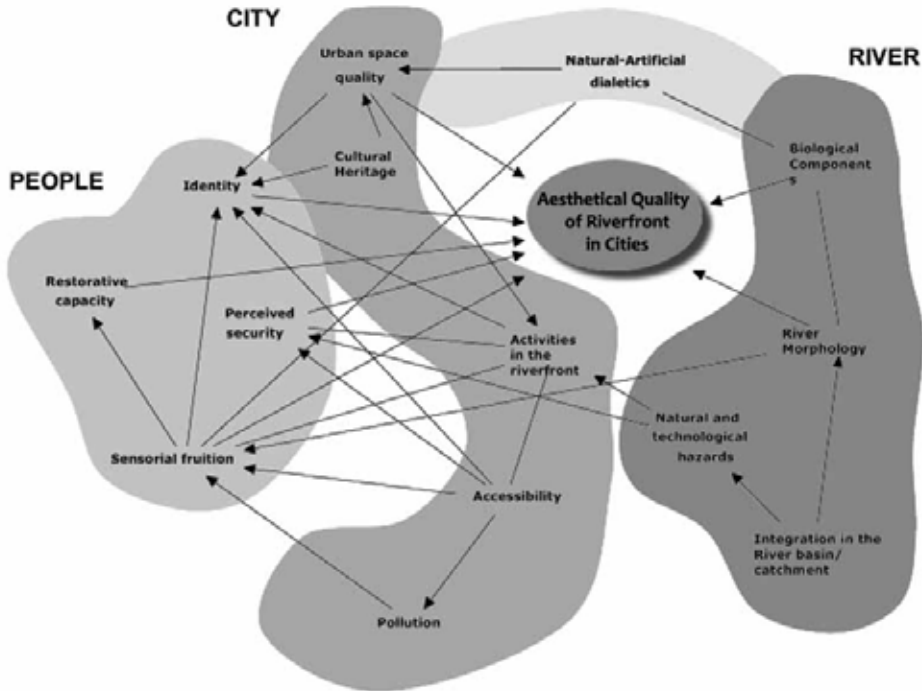


Figure (2-15) The relationship between people, city and river. Source (Silva, J., 2005).

### **2.7.2 Aesthetical evaluation of in urban riverfront's landscape**

There are three phases of riverfront's landscape evaluation:<sup>1</sup>

- Landscape measurement: an inventory of what actually exists in the landscape.
- Landscape value: an investigation and measurement of value judgments or preferences in the visual landscape;
- Landscape evaluation: an assessment of the quality of the objective visual landscape in terms of individual or societal preferences for different landscape types.

The third phase is the main item in this research, so here the research will highlight on a tree describes the main components of aesthetical evaluation of urban riverfront which depends on the three dimensions of urban riverfront's regeneration, as shown in figure (2-16).

---

<sup>1</sup> Kamel O. et al. (2005), p.237



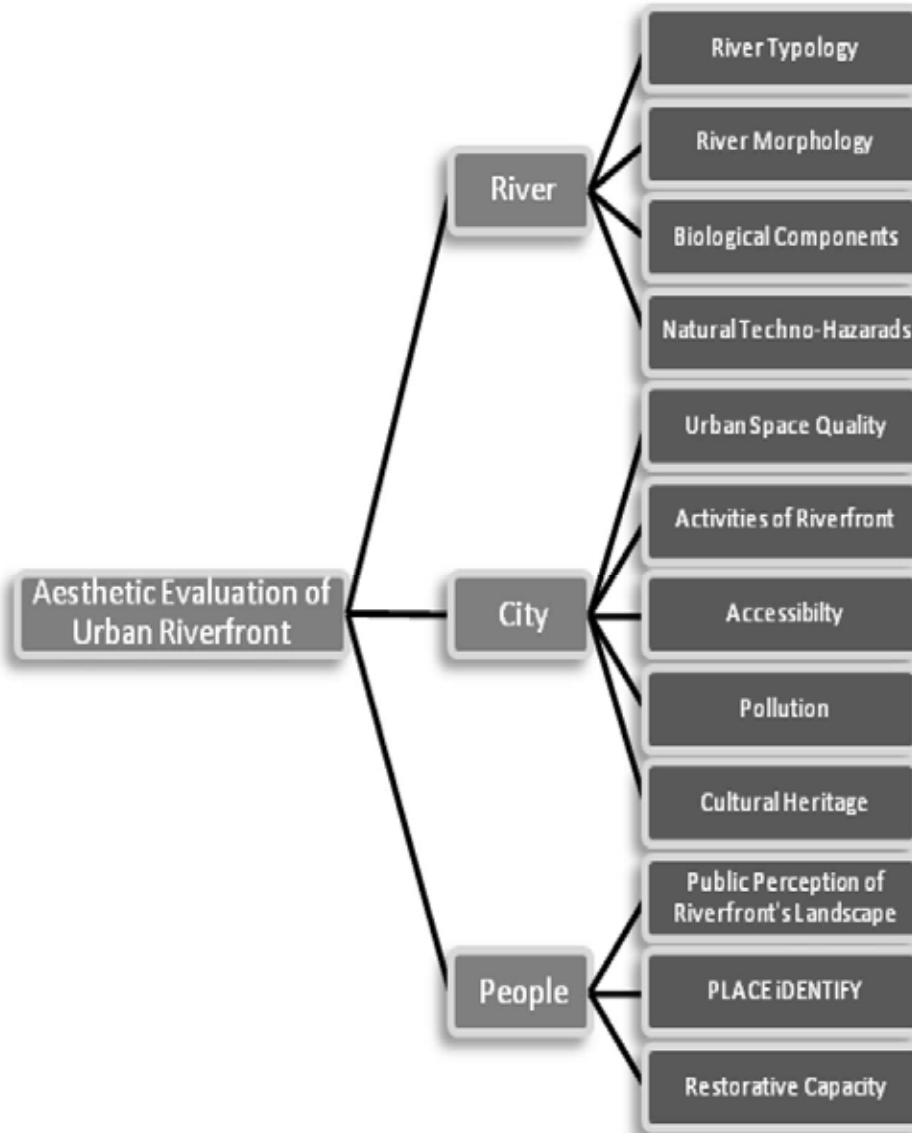


Figure (2-16) Aesthetic Evaluation of Urban Riverfront (fundamental viewpoints), by researcher.

The next three tables summarized the detailed components of each dimension of urban riverfront's regeneration, river, city and people. In other words detailing fundamental viewpoints to elementary viewpoints.

---



---

## Chapter 2

---

<b>River Typology</b>	Basin size
	Stream order
	River width
	Valley morphology
<b>River Morphology</b>	Degree of disturbance of the natural dynamics
	Sinuosity
	Bank shape
	Presence of hydro-morphological elements
<b>Biological Components</b>	Biological diversity
	Presence of riparian vegetation in the river banks
	Width of riparian vegetation
	Presence of different type of vegetation species
<b>Natural and Technological Hazards</b>	Flood vulnerability
	Bank erosion and landslide risk

Table (2-4) Elementary viewpoints of the river components.  
Adapted from (Silva, J., 2005)

<b>Urban Space Quality</b>	Visual Permeability	Visual contact
		Depth of views
		Width of views
	Density of landmarks	
	Built space quality	
<b>Cultural Heritage</b>	Public utility of riverfront	
	Intensity of construction	
	Cultural heritage	
<b>Activities</b>	Diversity of uses	
	Attractiveness of riverfront	
<b>Accessibility</b>	River crossings	Bridges
		Use of bridges
	Surface of parking	
	Public transport	
	Walkways and bikeways	
	Level of disruption	
	Anchorage places	
Use of river by boats		
<b>Pollution</b>	Pollution	

Table (2-5) Elementary viewpoints of the city components.  
Adapted from (Silva, J., 2005)

<b>Public Perception</b>	In relation to the River	Aesthetic
		Biodiversity
		Flood risk
	In relation to the City	Urban quality
		Accessibility
		Security infrastructure
Relation People-River	Relax	
	Attachment	
<b>Place Identity</b>	Continuity	
	Self-esteem	
	Self-efficacy	
	Distinctiveness	
<b>Restorative Capacity</b>	Being away	
	Fascination	
	Extent	
	Compatibility	

Table (2-6) Elementary viewpoints of the people components.  
Adapted from (Silva, J., 2005)

## 2.8 Summary & Conclusion

Aesthetic appeal and emotional satisfaction, recreational values, environmental values, and historical values are the four ways in which people value water and riverfronts. However, the broad goals of public riverfronts producers do not always contribute to designed landscapes in tune with these values. To restore the historic links between the populace and the riverfronts through design and management, public values and perceptions must be taken into account.

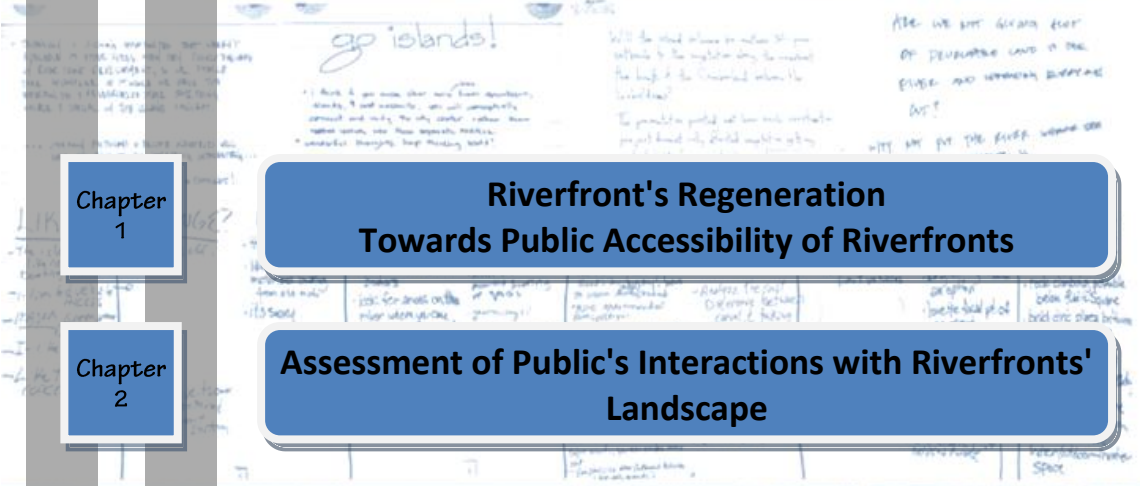
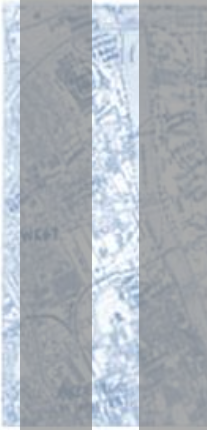
Landscape aesthetical evaluation is now a recognized key aspect of urban riverfront regeneration projects, so to gain a better understanding of the different dimensions and characteristics that can be improved through a riverfront regeneration scheme:

- The River or Riverfront, or natural dimension.
- The City or social dimension.
- The People or public perception dimension.



**PART  
ONE**

**Riverfronts, Public Participation and Visualization in  
Relations, Towards a Successful Regeneration of  
Riverfront's Landscape**



**Chapter  
1**

**Riverfront's Regeneration  
Towards Public Accessibility of Riverfronts**

**Chapter  
2**

**Assessment of Public's Interactions with Riverfronts'  
Landscape**

**Chapter  
3**

**Public Participation in Riverfront's Landscape  
Regeneration**

**Chapter  
4**

**Visualization of Riverfront's Landscape Regeneration**



**Public Participation in Riverfront's Landscape  
Regeneration**

**Introduction**

**Community Participation and management of  
environment**

**Public participation**

**Public participation in environmental decision-  
making**

**Classifications of Public Participation from the past  
to the future**

**Involving the public in landscape process decision  
making**

**Public participation in landscape evaluation**

**Public participation in evaluating riverfront's  
landscape**

**Summary & conclusions**





*Tell me, I forget.  
Show me, I remember.  
Involve me, I understand.<sup>1</sup>*

### **3.1 Introduction:**

This chapter comes to discuss the role which the lay public can play in participating the riverfronts' landscape regeneration process through the means of environmental evaluation. It begins with the idea of participation, next the role of public as participants especially in evaluating riverfronts' landscape regeneration process, participation techniques, technology effects, the differences between expert evaluation and public evaluation.

Since the daily life landscape is pressured by space demanding urban functions like housing, business, recreation and traffic, public participation has become an actual subject in the processes of transforming rural and urban areas. Public consensus and support are considered to be important aspects for successful realization of spatial transformations.<sup>2</sup>

Therefore governmental parties all over the world try to include citizens and stakeholders, their expertise and local knowledge as early in the environmental process as possible. Together with this increased request for public participation there is a need to effectively communicate information about the proposed transformations to participants and stakeholders.<sup>3</sup>

### **3.2 Community Participation and management of environment**

Community participation is the involvement of people in the creation and management of their built and natural environments. Its strength is that it cuts across traditional professional boundaries and cultures. The activity of community participation is based on the principle that the built and natural environments work better if citizens are active and involved in

---

<sup>1</sup> Moore, C. & Davis, D., (1997), p.3

<sup>2</sup> Tress, G. & Tress, B. (2003), p.163

<sup>3</sup> Tessa, H. & Lammeren, R. (2005), p.57

its creation and management instead of being treated as passive consumers.<sup>1</sup>

### **3.2.1 Community participation theory and practice**

The theories and practices of participation can be synthesized into the following five statements:<sup>2</sup>

- **There is no “best” solution to design problems.**

Each problem can have a number of solutions, based traditionally on two sets of criteria:

**-Facts.** The empirical data concerning material strengths, economics, building codes, and so forth

**-Attitudes.** Interpretation of the facts, the state of the art in any particular area, traditional and customary approaches, and value judgments.

- **Expert decisions** are not necessarily better than “lay” decisions.

Given the facts with which to make decisions, citizens can examine the available alternatives and choose among them.

- **Professionals** often consider alternatives that are frameworks in their minds. They should be presented for users to discuss.
- **All individuals and interest groups** should come together in an open forum. In this setting, people can openly express their opinions, make necessary compromises, and arrive at decisions acceptable to all concerned.
- **The product** is not the end of the process. It must be managed, reevaluated, and adapted to changing needs.

### **3.2.2 Participants of community participants**

It is important to involve all sectors of the community related to demographics (age, sex, income level, etc.). For example, women, youth and children are often not well integrated into the decision-making

---

<sup>1</sup> Sanoff, H. (2000), p.109

<sup>2</sup> previous, p.111

process. Specific participants are often identified and invited to insure the success of the engagement process.<sup>1</sup>

PARTICIPANTS IN THE COMMUNITY PARTICIPATION PROCESS	
1	Project personnel, the "experts"
2	Community organizations
3	Groups to be affected, the stakeholders
4	Influential individuals
5	Public at-large

Table (3-1) Participants of community participation, by researcher.

Table (3-1) list five groups that should be considered. The first group includes the experts who can provide information on the proposal and also assist in facilitating the process. In our research these experts may be (architects, landscape architects, etc.). Leaders and representatives from local community organizations can articulate issues and needs. The third group is perhaps the most important and includes those people that will be directly affected by the project. It may be important to invite local politicians or other influential individuals and could help support the activity. Finally the general public must be also be given the opportunity to participate.<sup>2</sup>

### **3.2.3 Characteristics of a community participation process**

Although any given participation process does not automatically ensure success, it can be claimed that the process will minimize failure, if essential characteristics of participation can be identified as.<sup>3</sup>

---

<sup>1</sup> Willis, A. (2008), p.34

<sup>2</sup> James R. (2006), p.4

<sup>3</sup> Laurini, R. (2004), p. 2

- Community-based, that is to say that everyone in the whole community/city should be involved.
- Reciprocal, i.e. any potential "consumer of information" should be a producer as well.
- Contribution-based, because forums are based on contributions of participants.
- Unrestricted, i.e. anyone can offer his participation.
- Accessible and inexpensive, that is to say that the use of the system must be free of charge to everyone.
- Modifiable, the evolutions must be taken easily into account.

### **3.3 Public participation**

In this section the research will begin to define public participation and who the public are and discuss the characteristics of public participation process.

#### **3.3.1 What is public participation?**

To participate is to express one's self at the proper time and in the proper forum. The citizen has communicated his/her opinion to the right people at the right time, so it may influence the decision.<sup>1</sup>

Public participation is defined as direct participation in decision-making by the organized stakeholders and unorganized groups (the "general public"). This covers many different forms and degrees of participation.<sup>2</sup>

Public participation is broadly defined as 'forums for exchange that are organized for the purposes of facilitating communication between government, citizens, stakeholders and interest groups, and businesses regarding a specific decision or problem'.<sup>3</sup>

Participation provides local knowledge for decision making, empowers communities by contributing to social and political capital, and increases the credibility of planning decisions by officials. Many view public participation as a principle of democratic society and an indisputable

---

<sup>1</sup> Angel, V. (2008), p.12

<sup>2</sup> Mostert, E. (2003), p3

<sup>3</sup> Danahy, J. (2006), p.4

“good” thing: the public’s involvement in the planning process is essentially positive and more participation is often assumed to be better.<sup>1</sup>

### **3.3.2 Public involvement types in participation process**

There are three types of involvement for public participation:

Physical, social and psychological. Public involvement processes should consider the incorporation of all three types of involvement, as shown in table (3-2)

<b>Involvement Type</b>	<b>Benefits</b>
<b>Physical</b>	<b>Allows for a community of citizens to gather together to consider an issue</b>
<b>Social</b>	<b>Allows for an affected citizens group to receive and share information</b>
<b>Psychological</b>	<b>Provides a context for solving problem together as a community</b>

Table (3-2) Public involvement types. Source (adapted from James R. 2006)

### **3.3.3 How can public are involved**

The facilitators of citizen engagement process require an understanding of participation techniques and group dynamics to properly manage the activity. Prior to initiation, a public participation process must be carefully designed to identify the key stakeholders, the techniques to be used and the scheduling of activities.<sup>2</sup>

<b>Participation Techniques</b>
<b><i>Informal approaches</i></b>
1. “in the street” conversations
2. Open house (presentation &/or exhibit
3. Mass media
<b><i>Formal approaches</i></b>
1. Surveys
2. Focus groups
3. Facilitated workshops
4. Design charettes

Table (3-3) Techniques for public participation. Source (James R. 2006)

---

<sup>1</sup> Daniel, M. (2008), p. 45.

<sup>2</sup> James R. (2006), p.7

### **3.3.4 Importance of public participation**

The use of citizen participation is an essential component in reaching a public consensus or “common philosophy” within the community.

There are five benefits from public participation:<sup>1</sup>

- Identify Issues.
- Enhance Mutual Understanding.
- Make Better Decisions.
- Enhance Community Support and Minimize Delays.
- Promote Environmental Justice.

### **3.3.5 Strategy of public participation**

There are some steps should be taken to carry out a public participation process, they are as shown in table (3-4):<sup>2</sup>



Table (3-4) Strategy of public participation. Source (adapted from Danahy, J., 2006)

---

<sup>1</sup> Daniel, M. (2008), p. 47.

<sup>2</sup> Danahy, J. (2006), p.4

### **3.3.6 Public participation considerations**

The following points are important in conducting adequate public participation programs:<sup>1</sup>

- The process of public participation should be agreed between the agency and participants.
- Public participation should start early in the decision making process.
- The objectives of the public participation need to be clearly stated.
- People need to be aware of the level of power being offered
- Information should be freely available to all participants.
- Participants should know how their submissions will be processed.
- Where appropriate, costs for participants should be reimbursed.

### **3.3.7 Evaluating trust in participatory processes**

One of the most often cited reasons for including the public in decision making process are to promote trust between policy makers and the public. Evaluating trust in participatory processes is intricately bound up with other elements of the process.

Criterion	Defining question
Impact	Has the process has a marked influence upon policy/ public debate?
Representativeness	Have all relevant human and non-human interests been identified and efforts made to assist them in becoming involved in the process?
Values and Attitudes	Does the process facilitate the exploration of participants underlying values and attitudes towards the issue?
Nature of involvement	To what extent is public involvement in the policy development process early, ongoing and interactive?
Efficiency	Is the use of resources in conducting the participatory process justifiable?
Transparency	Is the process itself and the process of determining outputs transparent to both participants and external parties?
Learning	Are participants provided with the time, information and instruction to enable them to integrate evidence and values to adequately learn about the issue at hand?
Process fairness	Are all participants equally free to contribute meaningfully to the process?
Legitimacy	If the process is fair and participants are representative, is it open to the public and are outputs disseminated widely?

Table (3-5) Definitions and measurements of Criteria for evaluating participatory processes. Source (Kenyon, W., 2005)

---

<sup>1</sup> Homero, M. (2004), p.33

In the previous table Criteria for evaluating trust in participatory processes will be shown:<sup>1</sup>

### **3.3.8 Evaluating successful participatory processes**

Beierle and Cayford (2002) note that there are three general types of evaluation of public participation programs: those that evaluate how successful public participation is in democratizing agency decision-making; those that evaluate how successful public participation is in achieving a set of broad social goals; and those that evaluate how successful the program is in achieving the specific goals of one or more of the participant.<sup>2</sup>

Kenyon suggests that involvement of the public to stimulate good ideas and build a consensus amongst a diverse community requires three modes of communication:<sup>3</sup>

- Presentation of information to the public.
- Receipt of information from the public.
- Exchange of ideas and opinions that build upon shared information as the ideas evolve.

### **3.4 Public participation in environmental decision-making**

Recent decades have seen a dramatic increase in public participation in environmental decision-making conducted by government agencies. This increase has been driven both by citizens who demand a greater role in shaping the decisions that affect their well-being, and by agencies that recognize the benefits of involving citizens in their decision making processes. It is now widely believed that members of the public should participate in environmental-decision-making<sup>4</sup>, and there are many laws, regulations, and policies that call for public participation in environmental decision-making. Evidence suggests that involving stakeholders results in better quality decisions.<sup>5</sup>

---

<sup>1</sup> Kenyon, W. (2005), p.334

<sup>2</sup> Beierle, T. & Cayford, J. (2002), p.9

<sup>3</sup> Kenyon, W. (2005), p.336

<sup>4</sup> Charnleya, S. & Engelbert ,B. (2005), pp. 165-166

<sup>5</sup> Beierle, T. & Cayford, J. (2002), p. 69



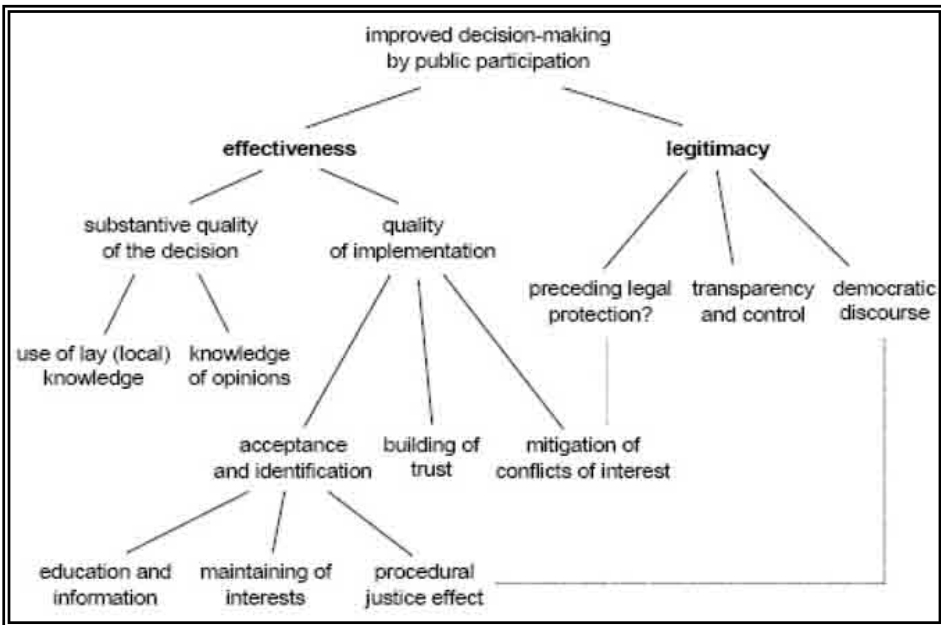


Figure (3-1) Possible goals and sub goals of public participation. Source (Homero, M., 2004 & Newig, 2005)

### **3.4.1 Aims of public participation in decision-making**

According to Craig (1998) organizing public participation in a city can have the following objectives:<sup>1</sup>

- Expand the public's role in defining questions and making decisions in which location or geography have a bearing on the issues addressed.
- Increase public participation in the identification, creation, use and presentation of relevant information in various problem solving.
- Enable wider public involvement of stakeholders in planning, dispute resolution and decision-making environments through a computer-based public participation process.

There may be a variety of reasons for involving the public in decision-making and it is important to choose the method that will most effectively

---

<sup>1</sup> Craig, W. (1998), p. 394

---

---

## Chapter 3

---

---

and efficiently achieve those aims. Table (3-6) presents some possible reasons with suitable categories of communication technique.

<b>Aims</b>	<b>Applicable method level</b>
To satisfy statutory requirements to consult	1: Education and information provision <i>and/or</i> 2: Information feedback
To resolve conflicting views	4: Extended involvement
To increase transparency	1: Education and information provision <i>and/or</i> 2: Information feedback <i>and/or</i> 3: Involvement and consultation <i>and/or</i> 4: Extended involvement
To increase defensibility	2: Information feedback <i>and/or</i> 3: Involvement and consultation <i>and/or</i> 4: Extended involvement
To change people's views about an issue through education	1: Education and information provision <i>and/or</i> 4: Extended involvement
To improve services	2: Information feedback <i>and/or</i> 3: Involvement and consultation
To determine needs and desires	2: Information feedback <i>and/or</i> 3: Involvement and consultation <i>and/or</i> 4: Extended involvement
To empower citizens	1: Education and information provision <i>and</i> 4: Extended involvement
To enable social learning	1: Education and information provision <i>and/or</i> 4: Extended involvement

Table (3-6) Aims of public participation and applicable method level. Source (Petts, J., & Leach, B., 2000)

### 3.4.2 Advantages and disadvantages of public participation

The strengths and weaknesses reflect the developed understanding of purpose. In democratic societies the individual has the right to be informed, to be consulted and to express his or her own views on matters which affect them personally. Public involvement in decision-making, not merely consultation upon a preferred decision, supports both institutional legitimacy, and the "bottom-up" approach to decision-making, and allows those with a weak voice to exert influence on decision outcomes to feel some degree of ownership of the issue. It is also something to be valued

---



---

## Chapter 3

---



---

in its own right, social learning, responsibility and environmental awareness being significant outcomes.<sup>1</sup>

<p><b>Strengths</b></p> <p>Public participation can...</p> <ul style="list-style-type: none"> <li>Bring out technical knowledge from the public and others</li> <li>Use local knowledge not known to the authority</li> <li>Encourage diverse perspectives (and so identify issues not thought of)</li> <li>Allow the public to understand the system better</li> <li>Use the public's passion and enthusiasm</li> <li>Enable a better evaluation of the issues</li> </ul>	<p><b>Weaknesses</b></p> <p>Public participation can be weakened by...</p> <ul style="list-style-type: none"> <li>A lack of resources (time, money staff)</li> <li>An inadequate legal framework</li> <li>A lack of awareness/experience of participation</li> <li>Difficulties in gaining access to information</li> <li>A lack of technical support for the public</li> <li>Limited consideration of the results of participation</li> <li>Not enough public participation is a weakness</li> </ul>
<p><b>Opportunities</b></p> <p>Public participation offers the opportunity to ...</p> <ul style="list-style-type: none"> <li>Build trust and capacity</li> <li>Improve the environment, build a community and avoid wasting resources</li> <li>Empower people by starting a dialogue and improving openness</li> <li>Expand the limits of understanding (working together to solve problems)</li> <li>Prevent conflicts by early involvement of the public</li> <li>Save time in the overall decision process by reduction of opposition</li> </ul>	<p><b>Threats</b></p> <p>Public participation processes can be threatened if ...</p> <ul style="list-style-type: none"> <li>The public thinks that the process is a formality (that minds are already made up)</li> <li>A vocal minority dominate public meetings</li> <li>Not enough time is allowed to make a decision or discuss the proposals</li> <li>The long term implications are not understood (e.g. if 'planning gain' wins over the long-term interests)</li> <li>EIA submissions are not good quality and do not cover all the issues</li> </ul>

Table (3-7) advantages and disadvantages of public participation. Source(Petts, J., & Leach, B.,2000)

### 3.5 Classifications of Public Participation from the past to the future

According to Arnstein, real participation involves the cooperative sharing of power, i.e. in form of partnership, delegated power or citizen control. In contrast, attempts to manipulate the public opinion cannot be regarded as participation at all. Today's classifications of participation largely include levels of information, consultation, advice and really collaborative production and decision of plans. It has been argued that a higher level of involvement also requires more interaction between the participants and hence, more interactive tools.<sup>2</sup>

---

<sup>1</sup> Petts, J., & Leach, B.(2000), P.18

<sup>2</sup> Schroth, O. & Schmid, W. (2006), p.117

### 3.5.1 Public Participation ladder

Sherry Arnstein, developed and published a highly regarded theory in 1969 called the "ladder of participation," which categorized how institutions use citizen participation methods based on motive and effectiveness. The least effective levels include manipulation and therapy where it is assumed that an action has public support simply by the lack of substantial opposition. At these levels, no real effort is made to inform the public objectively. The second tier involves forms of tokenism such as informing and consultation where more of an effort is made to educate public of future actions, but the underlying power lies within the professional to make the decisions. Finally there are the most effective levels of representation, which include partnership, delegated power, and citizen control. At these levels, there is exchange of power through negotiation and consensus building.

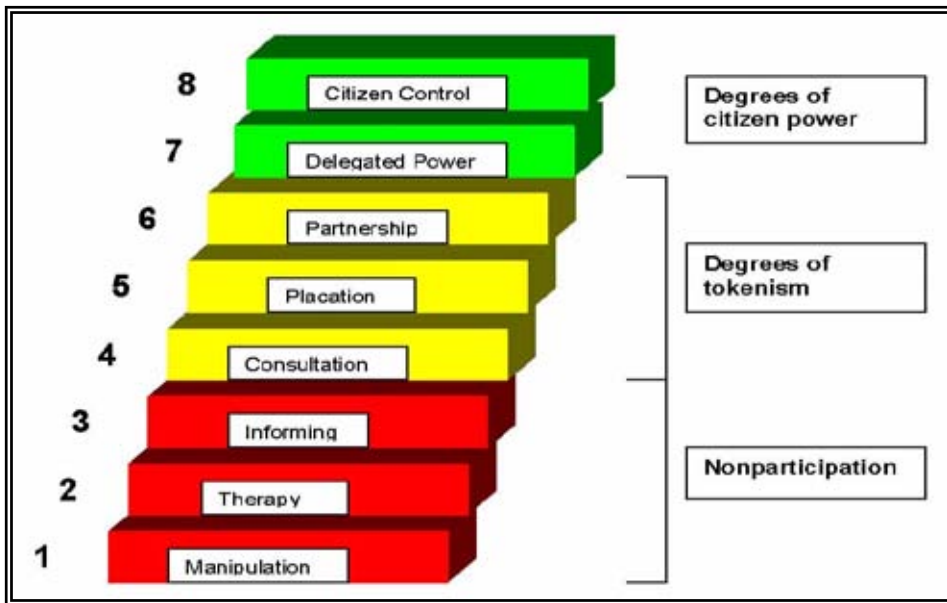


Figure (3-2) Participation ladder. Source adapted from (Bailey, K. and Grossardt, T. 2004)

The levels of participation according to Arnstein, can be summarized as following:

- **Manipulation:** places people on advisory boards to rubberstamp decisions; to educate them to the agency perspective; distorting the participation into a public relations ploy
- **Therapy:** engages citizens in numerous activities, under the guise of citizen involvement in planning/decision making, but where experts subject the citizens to ‘clinical group therapy’ to cure them, rather than fix the original problem
- **Informing :** provides information that is one way to the citizens, or too late to really affect decisions and fails to achieve real input; news media, pamphlets, response to inquiries, and information giving meetings are frequent forms of one-way communication.
- **Consultation :** involves citizens in a significant manner, but is a shame if there are no assurances that their input will be fully incorporated in the decisions, or the full range of options are considered; frequent forms are attitude surveys, neighborhood meetings, and public hearings.
- **Placation :** represents tokenism if those previously excluded from power remain a numerical minority on the board and/or are not accountable to any constituency in the community, another form is giving only powers of advice or planning, but not to turn them into actual decisions.
- **Partnership:** represents real citizen participation when citizens and governments agree to share planning and decision-making responsibilities through joint structures, and neither partner can unilaterally change the agreement; implicit in this is that citizens have access to resources comparable to the government partner
- **Delegated power:** occurs when through negotiations between government and citizens, citizens gain the dominant decision making position on programs affecting them to insure accountability to the client’s needs
- **Citizen control:** falls short of the rhetoric of absolute control, but the intent is that citizens actually have managerial and policy control and can set the conditions under which government can alter the institution or program.

### 3.5.2 Nobre scale for public participation

Another way to present the different scales of involving the public in the environmental process is given Figure (3-3)<sup>1</sup>

Nobre has established four main degrees of public participation: to inform, to consult, to discuss and to share. Lower levels are one-way procedures as they do not necessary ask for any particular feedback from the community. On the contrary, higher levels of participation require two-way procedures as they imply capturing the public's reactions and feed the decision-making process with such data.

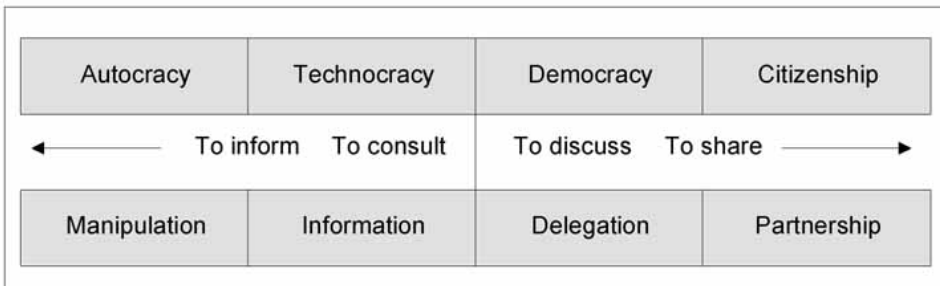


Figure (3-3) Public Participation Ruler together with the political profile and the proceeding status. Source (Laurini, R. 2004)

**"To inform"** the first level is the minimal proceeding that one organization must provide to assure any operation's success, whether a designer or a marketing operation.

**"To consult"** it means not just "to inform" but also to collect from some representatives' institutions their opinion, by organizing public inquiries and discussion encounters. It can be considered a two-way procedure if and when the environmental promoters accept to introduce the inquiries results as an input in their decision-making process.

**"To discuss"** is somehow accepting **"to share"** knowledge, but sharing power decision is clearly the highest level of community participation. It is a turning point on this subject as well.

Being able to exert citizenship is as important as the will of the administrations to improve community participation to all urban life issues.

---

<sup>1</sup> Laurini, R. (2004), p. 3

### 3.5.3 Public participation and digital revolution

The digital revolution is influencing and changing the lay public habits in various fields and changing society in general. When communicating design, the digital representation of space, especially the computer visualization medium, represents a clear improvement in relation to what was achieved with only the use of conventional representation methods. Nevertheless, for effective communication to take place the digital representation of space and computer visualization must be used carefully and sensibly so that their potential is not undermined.<sup>1</sup>

Smith and colleagues (2002)<sup>2</sup> suggest that e-participation ladder could be varied as the top three rungs of the hierarchy: decision support, design systems and virtual worlds are defined with examples of current practice in mind rather than based on any fundamental differences in the process of participation.

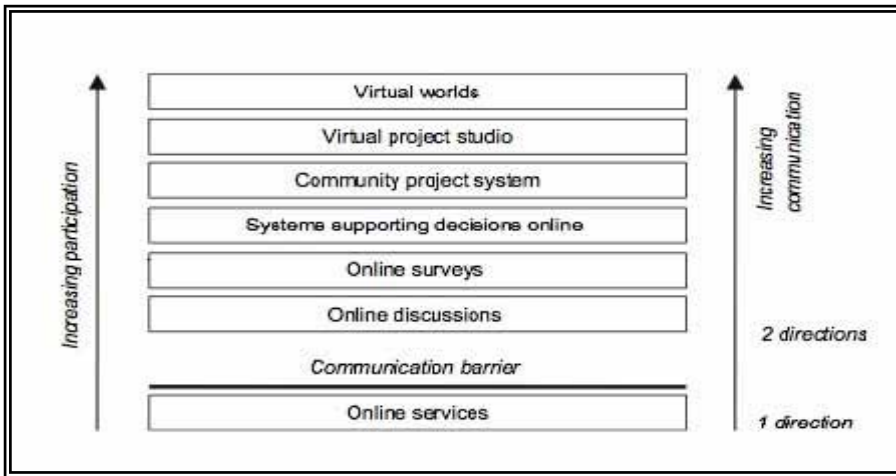


Figure (3-4) A ladder of e-participation increased levels of e-participation in different web-based systems and the types of participation. Source (Hanzl, M., 2007)

In his modifications to the e-participation ladder, Metla (2008) proposed a new ladder named online participation and he made a comparison between participation ladders from traditional ladder to e-participation ladder, as shown in table (3-8).

---

<sup>1</sup> Pedro, N. (2006), p.75

<sup>2</sup> Metla, J.,(2008), p.9

## Chapter 3

Arnstein (1969)		Wiedemann and Femers (1993)		Carver & Kingston (2000)		Adapted ladder for online participation	
Citizen control	Degrees of Citizen Power	Public participation in final decision	Increasing public involvement/ stages of participation		Increasing levels of communication/ stages of participation		Increasing decision level support/ (embedded within decision-making)
Delegated Power		Public participation in assessing risks and recommending solutions		Virtual Worlds		Online Design Support (optional)	
		Public participation in defining interests and actors and determining agenda		Virtual Design Studios		Online collaborative decision support	
Partnership		Public right to object		Community Design Systems			
Placation	Degrees of Tokenism		Increasing public involvement/ stages of participation	Online Opinion Surveys	Increasing levels of communication/ stages of participation	Online Discussion w/ public input	Increasing decision level support/ (embedded within decision-making)
Consultation				Online Service Delivery		Online Information Delivery	
		Informing the public					
Informing		Public right to know					
Therapy	Non-ppn		Increasing public involvement/ stages of participation		Increasing levels of communication/ stages of participation		Increasing decision level support/ (embedded within decision-making)
Manipulation							

Table (3-8) Participation ladder from traditional methods to e-participation. Source (Metla, J. 2008)

### 3.5.4 Public participation in the era of ‘cyber-democracy’

As public participation moves towards ‘cyber-democracy’ and increasingly members of the public have access to inexpensive modeling and analysis software, urban designers and landscape architects need to keep ahead lest they risk becoming inconsequential in the debate over our urban environments. It is well within the capabilities of community groups now to create their own visualizations of projects and create web sites for display and forums for comment. Without visualization skills themselves, planning authorities will be limited in their ability to respond to this kind of public participation. The growing sophistication of the



public affects their expectations of involvement. When the public can purchase cheap interactive games such as Electronic Arts' "SimCity" or Info games' "Monopoly Tycoon" or play with Google Earth online, those expectations flow into their interactions with everyday planning practice: that planning their urban environments should be as easy and accessible as the games.<sup>1</sup>

## 3.6 Involving the public in landscape process decision making

### 3.6.1 Levels of involving the public in landscape process decision making

There are five different levels of involving lay public in the landscape architecture process.<sup>2</sup> As shown in figure (3-5).

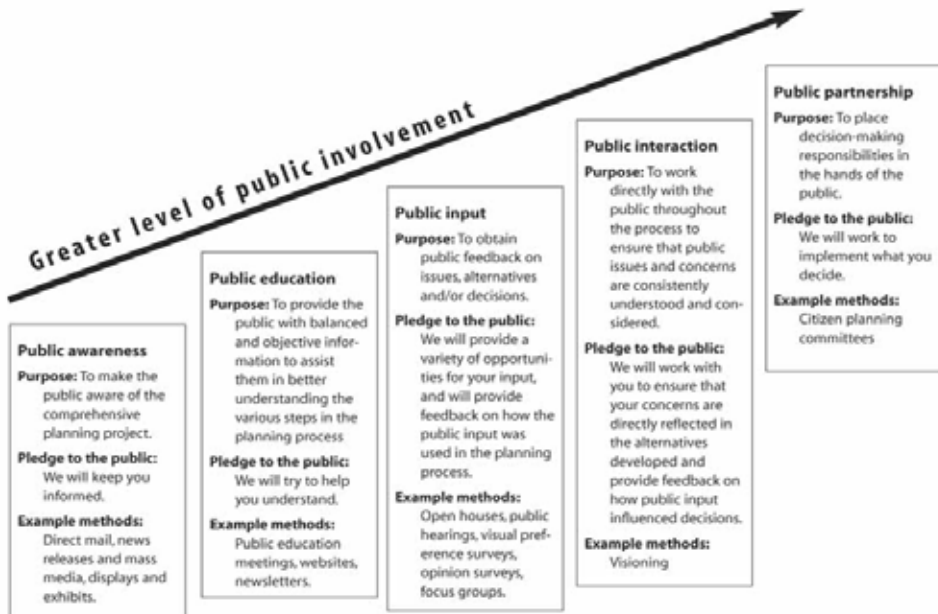


Figure (3-5) Increasing level of public participation. Source (Steven, H. et al., 2006)

- **Public partnership:** formal involvement in meaningful decision-making process, highest level and most challenging.

---

<sup>1</sup> Pietsch, S. et al. 2005, p.5

<sup>2</sup> Steven, H. et al., 2006, p.47

---



---

## Chapter 3

---



---

- **Public interaction:** enabling effective dialogue between citizens and government.
- **Public input:** communicates to local governments from citizens
- **Public education:** provides information and education to the public.
- **Public awareness:** lowest level and least challenging

The last level can be the appropriate level for the research approach, with making the lay public participate in decision making of riverfront's landscape regeneration process

### 3.6.2 Methods of involving the public in landscape process

Table (3-9) shows the 14 methods of public participation along the left. Across the top of the table, the various purposes for public participation are listed. For each method listed an “X” appears in a corresponding purpose box. For example, Direct Mail has an “X” in the “Communicate to Citizens from Local Governments (Public Awareness)” purpose box. This indicates that Direct Mail has a primary purpose of local government communicating to the lay public, or more simply, to increase public awareness.

Method	Public awareness Local government communicates to citizens	Public education Provide information and education to the public	Public input Citizens communicate to local government	Public interaction Enable effective dialogue between citizens & government	Public partnership Formal involvement in meaningful decision making process
Direct mail	X				
News releases and mass media	X				
Displays and exhibits	X				
Public educational meetings		X			
Websites		X			
Open houses			X		
Public hearings			X		
Visual preference Survey			X		
Focus groups			X		
Opinion surveys			X		
Citizens' advisory committee			X		
Visioning				X	
Citizens' planning committee					X
Referenda					X

Table (3-9) Methods and purposes of citizen participation.  
Source (Steven, H. et al., 2006)

### 3.6.3 Usefulness of methods by purpose

Table (3-10) further refines the information contained in table (3-8) by showing the relative usefulness for each of the 14 methods. The usefulness of each tool for a particular purpose is indicated in the table by “high,” “moderate,” “low” or “possible”. Using Direct Mail as an example again, you can see that for promoting public awareness, this method has a “high” usefulness. For public education it has a “moderate” usefulness.<sup>1</sup>

<b>Method</b>	<b>Public awareness</b> Local government communicates to citizens	<b>Public education</b> Provide information and education to the public	<b>Public input</b> Citizens communicate to local government	<b>Public interaction</b> Enable effective dialogue between citizens & government	<b>Public partnership</b> Formal involvement in meaningful decision making process
Direct mail	High	Moderate			
News releases and mass media	High	Moderate			
Displays and exhibits	High	High			
Public educational meetings	Moderate	High			
Web sites	Moderate	High	Possible		
Open houses	Low	Moderate	High		
Public hearings		Moderate	High		
Visual preference Survey		Moderate	High		
Focus groups			High		
Opinion surveys			High		
Citizens' advisory committee			High	Low-Moderate	
Visioning			High	High	
Citizens' planning committee			High	High	High
Referenda			High (advisory)		High (binding)

Table (3-10) Purposes of citizen involvement—usefulness of methods by purpose.  
Source (Steven, H. et al., 2006)

### 3.7 Public participation in landscape evaluation

As public people's evaluation of built environment such as manmade landscape lies in the scope of environmental and behavioral researches, it is important to shed the light on the nature, techniques, and applications of these kinds of research.

---

<sup>1</sup> Steven, H. et al., 2006, p.53

Environmental evaluation has now been dealt with how people understand their surroundings through concepts, how memory can influence attention, storing and retrieval of memories, and how the relation between people and environment can be viewed. These aspects have been more or less cognitive aspects dealing with information processing and understanding. This is just one part of the experience people have of environments, a part not explicitly dealing with whether people like an environment or not.<sup>1</sup>

To evaluate something is to decide if something affects you positively or negatively, to ascertain the value of something. There is some evidence that affect can occur independent of cognition, but there has been a widespread agreement and a large body of evidence supporting that cognition influence affect.<sup>2</sup>

### **3.7.1 Relationship between humans' evaluation and their needs**

The last category was added later by Maslow in his human needs categories is cognitive/ aesthetic needs,<sup>3</sup> which is important for understanding humans ability to evaluate the world around them.

Where **cognitive needs** that human had the need to increase their intelligence and thereby chase knowledge. Cognitive needs is the expression of the natural human need to learn, explore, discover, create, and perhaps even dissect in order to get a better understanding of the world around them.

**Aesthetic needs** Based on Maslow's beliefs, it is stated in the hierarchy that humans need beautiful imagery or something new and aesthetically pleasing in order to continue up towards Self-Actualization. Humans need to refresh themselves in the presence and beauty of nature while carefully absorbing and observing their surroundings to extract the beauty that the world has to offer.

Zeisel suggested five common needs among people to link human needs with landscape, which can be applied on the research point of riverfront's landscape these needs are:<sup>1</sup>

---

<sup>1</sup> Rodney H. Matsuoka, R. & Kaplan, R. (2008), p. 12

<sup>2</sup> Nasar, J. L. (1997), p.151

<sup>3</sup> [http://en.wikipedia.org/wiki/Maslow's\\_hierarchy\\_of\\_needs](http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs)

- a) **Security:** the need for security is one of the vital needs for performing the different activities.
- b) **Clarity:** the clarity of design and planning of built environment ease the liability of user' movement.
- c) **Privacy:** the liability of users to control the degree of contact with others is different from one culture to another.
- d) **Social interaction:** some of the elements of the built environment can encourage the interaction between people.
- e) **Identify:** part of man's personality is formed his identification with his surrounding places. People usually prefer the places that provide them with transparency and romantic sense towards surrounding elements.

### **3.7.2 Public People's Evaluation versus Expert Evaluation**

The fields of Landscape design face a main problem (between the designer's vision and lay people's vision), the value differs among lay people and experts concerning built environment. Kaplan (in Nasar, 1988) noted that *"although experts are invaluable when used appropriately, they are a dubious source of 'objective' judgments about what people care about in the landscape"*.<sup>2</sup>

El-Hosseney points out another aspect of the problem that some schools of urban design deviate from the norms, using the process of urban design for sake of achieving certain design desires. These schools even design strange structure of the buildings and public spaces as an art which only suits a specific group of people, without taking into consideration the economic and social dimensions.<sup>3</sup>

This problem occupied the minds of a lot who are interested in landscape design, like (Appleyard) and (moughtin) who stated that it is possible to bridge the gap between the urban designers and lay people by understanding the complicated and different characteristics of these users. According to (Moughtin, 1992), this gap can be bridged if the designer understood that a culture is not constant, but it changes continuously. Moughtin also speaks of the importance of developing the tools and the

---

<sup>1</sup> Kurbat, E., (1985), p.162

<sup>2</sup> Nasar, J.L. (1988), p.9

<sup>3</sup> El-Hosseney, O. M. (1998), p.26

## Chapter 3

techniques used by the urban designers when it comes to dealing with users.<sup>1</sup>

Appleyard believes that to solve this problem, designers should follow a conscious methodology, which can give the landscape architects and the urban designers the elements of urban characteristics. These characteristics help the designers to achieve the integration between the urban morphology of buildings and spaces, and the clarity of vision on the one hand and the experiences of inhabitants on the other hand.<sup>2</sup>

APPROACH					
	Expert (aesthetic or ecological)	Psychophysical	Cognitive	Socio-cultural	Experiential (phenomenological)
Human	Passive				Active
Landscape	Dimensional				Holistic

Table (3-11) Approaches to landscape evaluation.  
Source (Swaffield, S. & Foster, R., 2000)

EXPERT		PSYCHOPHYSICAL	COGNITIVE	SOCIO-CULTURAL	EXPERIENTIAL
USER-INDEPENDENT METHODS		USER-DEPENDENT METHODS			
'Ecological'	'Aesthetic'	Predominantly quantitative		Primarily qualitative	
<ul style="list-style-type: none"> <li>Field survey</li> <li>GIS analysis</li> <li>Systematic valuation of biophysical landscape attributes against defined quality criteria based on ecological or biodiversity principles</li> </ul>	<ul style="list-style-type: none"> <li>Field survey</li> <li>Systematic valuation of visual and physical attributes against defined criteria based on principles of fine art, or derived from cognitive research</li> <li>Expert critique from philosophical principles of aesthetics</li> </ul>	<ul style="list-style-type: none"> <li>Quasi-experimental surveys of landscape users (visitors, community, general population) using photographs which are rated or ranked according to perceived beauty, attractiveness etc. and analysed using multiple regression type techniques</li> </ul>	<ul style="list-style-type: none"> <li>Quasi-experimental photo preference surveys (as in psychophysical) used to test hypotheses derived from functional themes of perception etc.</li> <li>Quasi-experimental questionnaire surveys based on psychological techniques (e.g. semantic differentials) to determine meanings assigned to landscape settings or features</li> </ul>	<ul style="list-style-type: none"> <li>Qualitative type surveys (e.g. participant observation, depth interviews, focus groups, self-administered surveys) interpreted by reference to social and political interests, or cultural theory</li> <li>Iconographic or semiotic analysis of cultural products (e.g. advertisements)</li> <li>Action research (e.g. charettes)</li> </ul>	<ul style="list-style-type: none"> <li>Ethnographic surveys of key informants</li> <li>Qualitative analysis and interpretation</li> <li>Self reflection upon key landscape phenomena</li> </ul>

Table (3-12) Comparison between different methods of landscape evaluation.  
Source (Swaffield, S. & Foster, R., 2000)

<sup>1</sup> Moughtin, C. (1992). p.12

<sup>2</sup> previous, p. 14

### **3.7.3 Types of landscape evaluation measurements**

Evaluation process involves a systematic determination of quality, value, and efficiency. Post occupancy evaluation is an example of built environment evaluation, but in the architectural level. There are two types of landscape evaluation measurements:<sup>1</sup>

#### **3.7.3.1 Direct measurement**

Which means measurements made by the researchers themselves, for example through aerial photos, inventories, direct observations, and similar devices.

#### **3.7.3.2 Indirect measurement**

Which means measurements that are obtained by asking the persons under study to report the characteristics of their environment?

The new approach this research will scope on is the evaluation of redesign of the environment alternatives or in other words the regeneration of spaces related to riverfront.

Attributes of built environment elements to be evaluated can be: comfort, safety, accessibility, appearance, functional efficiency, structure, and emotional atmosphere.

### **3.7.4 Classification of Public evaluation methods**

There are two main methods of public evaluation of environmental research such as riverfront's landscape.

#### **3.7.4.1 Qualitative research methods**

Qualitative research methods are inductive methods, depends on description (words). In qualitative research methods, explanation grows from data. Naturalistic observation techniques often used in such methods. The collection of data is done in unstructured way. Finally qualitative research methods are usually based on specific case study.

Researcher usually use qualitative methods in order to humanize problems and data, make things come alive, describe complex

---

<sup>1</sup> Batista, J., et al. (2005), p.3

phenomena, provide a holistic view, dig into emotions and feelings, and finally get a handle on a problem with no obvious starting place.

**Qualitative method includes:**

- **Archival strategies:** content analysis, literary criticism, and history.
- **Interview strategies:** oral history, biography, and investigative journalism.
- **Observation strategies:** unobtrusive versus participant observation.

**Qualitative methods are used when:**

- Exploring new, uncharted territory, or new breakthrough ways of looking at old territories.
- Need an in-depth understanding of subtle nuances, or a complex dynamic phenomenon.
- The insider's perspective is likely to be very different from the external observer's.
- A holistic picture will restore perspective to the issue.
- Unexpected side effects may be very important.
- Researcher needs some in-depth descriptive "meat" to put on statistical "bones".

The analysis process of qualitative data is called: coding, this process is done through three main steps: data organizing, work simplification, and data reduction or elimination.

Here are some specific examples (techniques) of qualitative research methods in environmental and behavioral research:

- Semantic differential method: an old number scale between two opposite adjectives.
- Scenic beauty estimate (SBE): Is a measurement method in which numbers of pictures for specific site are shown to the sample. A measurement scale (for the beauty of this site) is constructed i.e.



(zero means ugly, 9 means very beautiful), and it is required from each sample to mark each picture.

- The environmental response inventory (ERI): is a qualitative measurement based on a scale from 1 to 5, (1 means: I completely agree, 5 means: I completely disagree).<sup>1</sup>
- Trade-off games: Trade off means: a balancing of two opposing situations or qualities, both of which are desired (ex: there is a trade-off between doing the job and doing it quickly).
- Adjective checklists: consists of a printed list of words that the respondent can check off as being appropriate or inappropriate to the environment, or which can be arranged very much like the semantic differential method with scaled spaces between each dichotomy.<sup>2</sup>
- Experience notation form: the central concept around which the experience notation form is organized is to capture the various experiences of the subject as he walked through and around the architectural stimulus. The stimulus is a three dimensional entity such that the subject can walk in and around it. The subject's responses are expected to change each time he encounters a different aspect of the environment.<sup>3</sup>
- Mapping: another method that attempts to capture the temporal and three-dimensional aspects of the environment is the technique of mapping. There are really two kinds of mapping: Cognitive mapping: the researcher attempts to find out or influence the internal map or orientation a person carries with him about a particular place. In behavioral mapping, the researcher plots the places where behavior occurs on a map of the location being studied.<sup>4</sup>
- Conjoint experiments: responses are collected to hypothetical multi-attribute alternatives. In the analysis, the overall responses is decomposed into the separate contributions of the various attributes, these contributions can be estimated very efficiently because the

---

<sup>1</sup> Bechtel, R.B. et al., (1987), p. 91

<sup>2</sup> Michelson, W. (1975), p. 49

<sup>3</sup> Previous reference, p.50

<sup>4</sup> Previous reference, p.53

researcher can use optimal experimental designs to generate the multi-attribute stimuli.<sup>1</sup>

#### **3.7.4.2 Quantitative research methods**

Quantitative research methods are deductive methods, depending on statistics. In such methods, data drives explanation. Controlled observation techniques are usually used. The collection of data is done in structured way. Quantitative methods usually structured around cause and effect.

Quantitative methods have the advantages of accuracy and ease of comparison. Therefore, it will be important to apply quantitative methods to the evaluation of the rationality of the landscape design of urban rivers. At present, most landscape planning and design methods rely on the experiences and subjective opinions of landscape architects, with low measurability. Many landscape characteristics of urban rivers have been highlighted, but many important elements have been neglected. For example, the cultural features have been highlighted, but the ecology has been neglected; or the ecology has been highlighted, while the amusement and leisure features have been neglected.<sup>2</sup> Therefore, a unified standard should be established.

Here are some terms related to Quantitative research methods:

- **A number:** the characteristic of an individual by which it is treated as a unit or of a collection by which it is treated in terms of units.
- **A variable:** a concept or characteristic that contains variations.
- **Measurements:** the assignment of numbers to indicate different values of a variable. Measurement is used in quantitative methods to provide the basis for the results, conclusions, and significance of the research. Measurement also provides information about the variables that are being studied.

Here are some definitions related to quantitative research methods:

---

<sup>1</sup> Oppewall, H. & Timmermans, H. (1999), p. 46

<sup>2</sup> Qiao, L, et al. (2008), p.75-76

- **Standard deviation:** express the degree of contrast between sample's answers, i.e. when the s.d. approaches zero, the similarity between samples' answer increase.
- **Correlation:** measure of relation between two or more quantitative variables.
- **Correlation coefficient:** a number between -1 and +1, which indicates the direction and strength of the relationship, i.e. 1 means: very strong positive correlation, -1 means: Very strong negative correlation and zero means: no relationship is found.
- **Construct:** a characteristic that can't be directly measured (e.g., intelligence).
- **Operational definition:** a breakdown of what the elements are of that construct (e.g., verbal, quantitative, and analytical ability), or what that construct "look like" in reality.
- **Measure:** a numerical representation of part of the construct (e.g., items on an IQ test).<sup>1</sup>

### **3.7.5 Link between qualitative and quantitative methods**

By accompanying the qualitative data with descriptive quantitative data, it is often possible to get a sense of quantitative weights of the insights into casual relations.<sup>2</sup>

Attributes are described even by percentage (10%- 20% ....etc.) or by adjectives (very bad- moderately bad- moderately good- ... etc.) the first description is quantitative, whereas the second description is qualitative.

If qualitative and quantitative data point in the same direction, the results will be robust. If they tell something different, it is time to try again.

In Okabe experiment (analyzing the perception of the area of an open space), he used qualitative and quantitative judgment of the simulated open spaces. He says: "it is important to note that the same results were obtained from two different kinds of questions. One is a qualitative task

---

<sup>1</sup> Oppewall, H. & Timmermans, H. (1999), p. 55

<sup>2</sup> Michelson, W. (1975), p. 12

of comparing two spaces and judging which open space is larger (paired comparison of area), the other is a quantitative task of estimating the open-space ratios (numerical judgment of area).<sup>1</sup>

### **3.7.6 Reliability of environmental evaluation methods**

Reliability means effectiveness and clarity of the test, whereas validity means that the test succeed in measuring. Reliability of measurements in qualitative methods refers to the consistency with which a test or instrument produces results.<sup>2</sup>

For the test to be reliable, it must achieve the following points:

- Internal consistency: all the items (single question) within a scale (set of items added up) are measuring the same thing.
- Equivalence: different forms of the test generate about the same scores.
- Stability: the re-test reliability. People score about the same no matter when they take it (assuming no change has occurred in between).

## **3.8 Public participation in evaluating riverfront's landscape**

### **3.8.1 Importance of Public Participation in evaluating riverfront's landscape**

To make a good and effective public Participation in the process of riverfront's landscape is a vital matter, because of the conflicts which can occur if the design neglect human needs, and in the other side if the human needs conflict with the effects of the regeneration processes on the environment.

Conflicts can arise while trying to satisfy human needs in the design of riverfront's landscapes. For example, contact with nature can clash with recreational needs when the preservation of ecological reserves is involved. Likewise, aesthetic preference can conflict with human recreational desires or ecological issues.<sup>3</sup>

---

<sup>1</sup> Okabe, A. et al, (1988), p.10

<sup>2</sup> Previous, p.12

<sup>3</sup> Rodney H. Matsuoka, R. & Kaplan, R. (2008), p. 9



Figure (3-6) Importance of public participation in evaluation of riverfront's landscape.  
Source ([www.neworiverfront.com](http://www.neworiverfront.com))

Given the diverse and potentially conflicting needs and preferences, a balance must be sought to attain wide public support. As some of these studies demonstrate, people's desire to participate in decisions that affect them is expressed in many nature-based situations.<sup>1</sup>

Given the importance that such settings play, involving local groups early in the planning process is particularly valuable. Conflicts can be anticipated and addressed in the design solutions of sites and facilities.

Participation can also lead to outcomes that respect the local culture, religion, or history of the community. Although one can argue that the human needs are universally desired, the ways to address them are not universal and require sensitivity to local circumstance.<sup>2</sup>

### **3.8.2 Previous studies on public participation of riverside environment:**

Many studies have been made to the ideas and behaviors of public to riverside environment. For example,

---

<sup>1</sup> Rodney H. Matsuoka, R. & Kaplan, R. (2008), p. 9

<sup>2</sup> Previous, p. 10

- The relationship between the improvement of the riverside and public Evaluation of a riverside Environments recreation,
- Analyses of factors contributing to riverside utilization behaviors,
- The effect of the existence of a riverside to the residential environment,
- The relationship between river utilization behaviors and the physical characteristics, and
- Evaluation of river utilization.
- However, the studies made only a few of the relationship between the citizens' perception of the riverside and those who are satisfied with the riverside environment and those who are not.<sup>1</sup>

### **3.8.3 Stages of public participation in riverfront's landscape regeneration**

The following 6 stage model can be used a framework for involvement in riverfront regeneration schemes:<sup>2</sup>

#### **Communication**

Promotion and dissemination through a variety of mechanisms Engagement

#### **Involvement**

Making use of the best techniques and tools for maximizing input and encouraging /facilitating expression of views

#### **Action**

Develop ideas through open debate and discussions in order to identify priorities and realistic deliverables. Decision making through a 'partnership' Steering Group of broad representation. Bring forward balanced and objective decisions.

#### **Feedback and Learning**

Develop draft documents for further discussion. Explanation of decisions.

---

<sup>1</sup> Wada, Y. et al., (2006), p. 2

<sup>2</sup> Prochorskaite A.(2005), p. 5

### Review

Monitor and review, update the plan. Over time this may involve starting the process again.

### 3.8.4 Examples on public participation in riverfront's landscape regeneration

Many riverfront's landscape regeneration projects all over the world now give the opportunity to the public to participate in these projects in different ways, hence the public are the users of these projects so they have the right to participate in the design in its various stages.

For example, in a project of regeneration of New Orleans riverfront, the experts want to know what will draw the public to the Downriver Park. What activities do they want to enjoy in this space? The experts asked the public about their ideas and dreams about riverfront landscape.<sup>1</sup>

There was also a series of public meetings associated with the Reinventing the Crescent Downriver Park design and construction process. During the Program Advancement Phase, there was a series of three public meetings which address the scope and specific uses for the Downriver Park. In the following phases of design including schematic design and design development, there were bi-monthly public presentations.

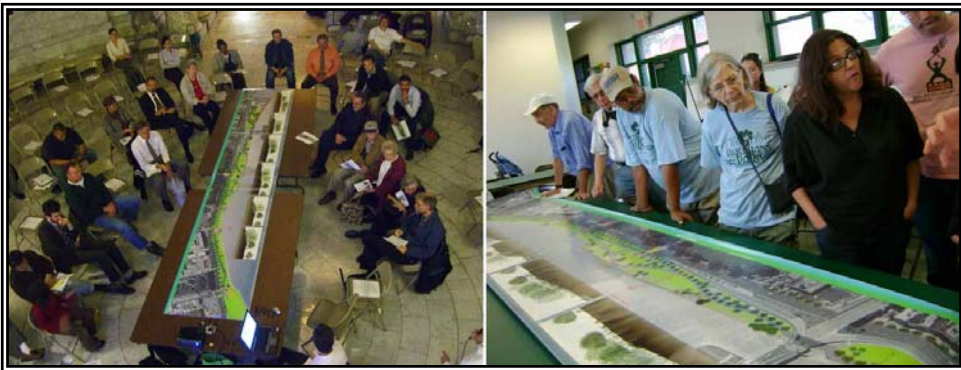


Figure (3-7) Public comments in a meeting to participation. Source (<http://newarkriver.files.wordpress.com>).

---

<sup>1</sup> [www.neworiverfront.com](http://www.neworiverfront.com), accessed sep.2008

---

---

## Chapter 3

---

---

There were also multiple opportunities for public input through the normal and customary permitting processes.

- Scope, Schedule, Quality of Life
- Activities and Uses
- Uses and Governance
- Schematic Design
- Design Development
- Design Development
- Construction Drawing Progress
- Construction Drawing Progress





**Chapter 3**

Figure (3-8) A group presenting their ideas during the public meeting, Nashville riverfront. Source ([www.civicdesigncenter.org](http://www.civicdesigncenter.org))

**Accessibility to river** + Bluffs + Existing views + Keep access along river + Skyline Preservation + Views from bluffs + Culture and history along river + Great French Lick + Keep memory of industrial feel + Maintain Music City Identity + Preserve what makes Nashville unique + Baptist Seminary + Existing industrial vestiges- use in the future + 1st & 2nd Avenue- historic character + Fort Nashborough + General hospital buildings + Historic architecture + Historic industrial structures + **Retain Stadium, greenways, parks** + Riverfront Park + Apartments + Use of riverfront park for events + Keep connection with Rutledge Hill and Thermal Transfer Site + Keep upper Broadway and river + Retain Rolling Mill Hill development + Preserve Railroads + Rail access/Tracks (future access) + Transportation architecture + Wildlife species + **Vegetation on banks** + Boat and Barge traffic Navigability + Nashville Island + Existing Riverbed- stone walls + Natural bank forms + Water Quality + Bridges (Architecture) + Crane structure at Shelby Street Bridge + Preserve boat docks

Relocate non-river business - **Remove Philip Metals** - Remove truck stop - Remove ash dump - Remove chain link fences - Remove Thermal Plant for Baseball Stadium - **Remove waste water plant NO SMELL**- Rid of toxic mound - Remove rag plant - Remove warehouses on East Side of River- Relocate industry - **Get rid of overhead power lines** - Move I-24 for reconnection/realign/adjust - Remove I-24 on the East Bank - Remove Oil and Gas tanks- Remove surface parking around stadium

Job creating industrial + Keep Citgo Terminals + Keep residential/ neighborhoods + Keep variety of development + Nashville Bridge building + **Keep bridges and Nashville Bridge Building** + Navy Reserve Building + PSC Metals & Industrial uses that are active + Stadium + Preserve Neuhoff site (make it great) + Preserve Stone Walls + Trinity building (next to Shelby bridge) + **Pre-serve Stockyard restaurant** + Preserve mixed-use entertainment + Preserve public art + Statue (Mr. Demonbreun) + Maintain Historic Markers + Existing Greenways + Existing public space + Preserve Metro Center Lakes

*Handwritten notes:*

- go islands!
- What the idea means to me... I'll be glad to see it... I'll be glad to see it... I'll be glad to see it...
- ARE WE GOING TO...? ARE WE GOING TO...? ARE WE GOING TO...?
- LIKE? CHANGE? LIKE? CHANGE? LIKE? CHANGE? LIKE? CHANGE? LIKE? CHANGE? LIKE? CHANGE? LIKE? CHANGE?

Figure (3 -9) Public comments in a meeting to participate Nashville riverfront' regeneration. Source (<http://www.nashville.gov/parks/riverfront>. accesses Mai 2008, and <http://www.civicdesigncenter.org/projects/projects/2009/02/17/nashville-riverfront-redevelopment>. accessed Aug, 2009).

### **3.9 Summary & conclusions:**

Many riverfront's landscape regeneration projects all over the world now give the opportunity to the public to participate in these projects in different ways, hence the public are the users of these projects so they have the right to participate in the design in its various stages.

Environmental management now covers a very wide range of issues and the public are concerned with a great many of these. At the same time as technology has advanced the opportunity for visualization, public interest has increased the need.

Modern information technologies allow to radically changing the nature of public participation to decision regarding landscape design.

So the next chapter will try to introduce visualization tools as means to help public people to communicate with experts and landscape architects.

**PART  
ONE**

**Riverfronts, Public Participation and Visualization in  
Relations, Towards a Successful Regeneration of  
Riverfront's Landscape**

**Chapter  
1**

**Riverfront's Regeneration  
Towards Public Accessibility of Riverfronts**

**Chapter  
2**

**Assessment of Public's Interactions with Riverfronts'  
Landscape**

**Chapter  
3**

**Public Participation in Riverfront's Landscape  
Regeneration**

**Chapter  
4**

**Visualization of Riverfront's Landscape Regeneration**



**Introduction**

**The Process of Visualization**

**Visualization as a link between real and virtual  
world**

**Landscape visualization**

**Visualization for participation in landscape  
architecture**

**Summary & conclusions**



*The Picture Is Worth a Thousand Words*  
(Confucius, Chinese philosopher)<sup>1</sup>

## **4.1 Introduction**

One of the great challenges that landscape architect and urban designers face is communicating their spatial concepts and ideas to the broader public.<sup>2</sup> Many of the problems contributing to unsuccessful public participation processes are caused by a communication breakdown between the public and professionals, which visualization can aid in overcoming.<sup>3</sup>

In order to discuss the landscape of the future, we must be able to see it.<sup>4</sup> This seems to be a fundamental for strategic visions of futuristic public participation in landscape process such riverfront's landscape regeneration, which is the research point.

The importance of a visualization tool to improve public participation is becoming increasingly recognized within the urban landscape, urban planning and design community. The effective application of such a visualization tool in this context, however, remains relatively under explored.<sup>5</sup>

Several visualization methods have been used the last decades to communicate the type and impact of spatial transformations of the landscape.<sup>6</sup> Nowadays these visual representations are increasingly generated by geographic information systems (GIS), CAD systems, and virtual reality techniques.

This chapter will talk about visualization, what it means, why and how urban designers and landscape architects use, this chapter will also discuss the potential and limitations of a visualization tool in improving public involvement in environmental design especially in urban landscape concerns to riverfront spaces and its landscape. This chapter will answer

---

<sup>1</sup> Howard, D. (1998), p.302

<sup>2</sup> Eran, B. (2002), p.195

<sup>3</sup> Lange, E. (2005), p17

<sup>4</sup> Emmelin, L. & Michael, J. (1995), p.23

<sup>5</sup> Shen, Z. and Kawakami, M. (2007), p.123

<sup>6</sup> Tessa H., & Lammeren, R. (2005), P. 57

some questions like why is visualization important. How is it done? What are the ethical issues? What are the major applications?

## **4.2 The Process of Visualization**

The process of visualization is an approach “to form a mental vision, image, or picture of (something not visible or present to sight or of an abstraction); to make visible to the mind or imagination”.<sup>1</sup> The next part will discuss visualization definitions and criteria.

### **4.2.1 Visualization definitions**

Visualization can be defined as "Visualization is a method of computing. It transforms the symbolic into the geometric, enabling researchers to observe their simulations and computations. Visualization offers a method for "seeing the unseen". It enriches the process of scientific discovery and fosters profound and unexpected insights. In many fields it is already revolutionizing the way scientists do science."<sup>2</sup>

While Schroth, O., et al. (2006) described visualization as “an act of cognition, a human ability to develop mental representations that allow us to identify patterns and create or impose order” or, in other words, visualization is the representation of complex issues by visual means as a tool for exploration and communication.<sup>3</sup>

With the advances in computer technology, Batty et al (2004) define visualization as the link between computer graphics and processing in terms “inputs, processes, and outputs associated with symbolic or mathematical models.” This process is supported by a variety of visual tools that continue to evolve as the technology advances.<sup>4</sup>

### **4.2.2 Reference model for visualization**

The model assumes a repository of raw data, which exist in a proprietary format, be it structured or unstructured. To get to a visualization of this data, data have to first undergo a set of transformations. Data transformations comprise filtering of raw data,

---

<sup>1</sup> Huang, H. (2004), p.6

<sup>2</sup> Kwartler, M. (2005), p.331

<sup>3</sup> Schroth, O., Lange, E. & Schmid, W. (2006), p.212

<sup>4</sup> Batty, M. et al., (2004), p.3



computation of derived data as well as data normalization. These steps result in a set of transformed data in a unified structure. Visual transformations map the transformed data onto a corresponding visual structure. From this visual structure, a set of views can now be generated, which allow users to navigate through the display. User interactions can influence the transformation process at different stages. Users can adjust their view on the data, change the visual structure, or even affect the data transformation.<sup>1</sup>

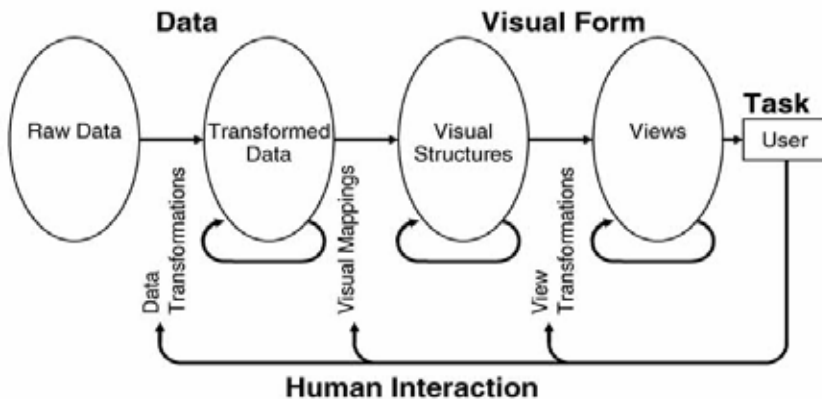


Figure (4-1) Reference model for visualization. Source (Keim, D., 2002)

### 4.2.3 Visualization data type

Shneiderman (1996) suggested taxonomy for visualization designs built on data type and task. He distinguished seven data types. High-level abstractions and specific data-types are treated as subordinates of the types presented. In this model, he assumes that all data in information space are collections of items, where items have multiple attributes.<sup>2</sup>

- 1-dimensional: Text files and alphanumeric list of names
- 2-dimensional: Geographic map or book layout
- 3-dimensional: modeling Real world objects.
- 4-dimensional: animation of models the time is the forth dimension.
- Temporal: Time-series and scientific measurement rows.

---

<sup>1</sup> Keim, D.A. (2002), p. 4

<sup>2</sup> Shneiderman, B. (1996), p.339

- Multi-dimensional: Relational database content.
- Tree: Structured data collections with hierarchy constraints.
- Network: Structured object sets which do not apply to tree constraints.

#### **4.2.4 Variation of visualization techniques classification**

Visualization techniques have many methods to be classified but the following figure can be used to identify the ways in which different types of visualization technique vary. For example, one can have 3d lateral perspectives that vary in the degree of interactivity they offer, as well as showing variation in color, type of shading and presentation style. To construct a comprehensive understanding of visualization would require experiments capable of isolating each of the properties of each type of visualization to measure its impact on different people.<sup>1</sup>

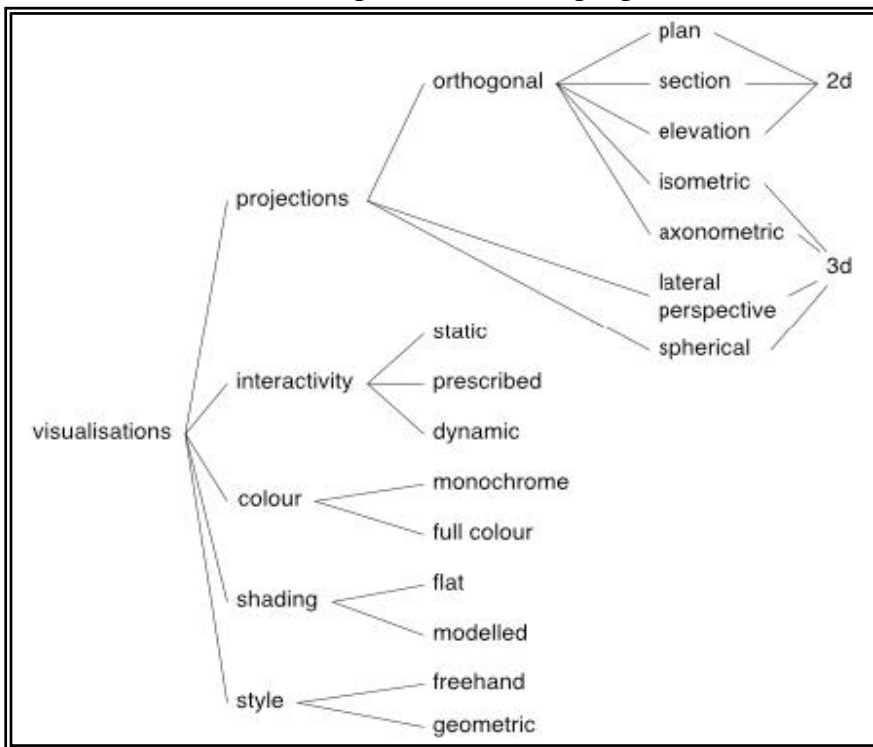


Figure (4-2) Variation of visualization techniques. Source (Tweed, C., 2003)

---

<sup>1</sup> Tweed, C., (2003), p. 17

### 4.2.5 Importance of visualization

According to Conford, (2003) he said: "If men define situations as real, they are real in their consequences."<sup>1</sup>From this phrase the importance of visualization can be as:<sup>2</sup>

- Communicates complex and massive data relationships.
- Reveals solutions to multi-faceted problems.
- Integrates across disciplines and specialties.
- Reveals the intrinsic quality of information.
- Communicates scientific expertise to non-experts.
- Makes the abstract world of data more concrete.
- Promotes understanding and motivates change.

### 4.3 Visualization as a link between real and virtual world

Since the dawn of civilization humans have been trying to create a graphic representation of the world around them. From the hunting scenes on the walls of Altamira cave (14000 B.C.) to the modern 3D models of earthquakes, jet engine combustion, and DNA replication, one thing is clear: An image is worth a 1000 words and literally a dynamic animation is thousands of images. The human brain processes the visual information much more efficiently than textual or audio.<sup>3</sup>

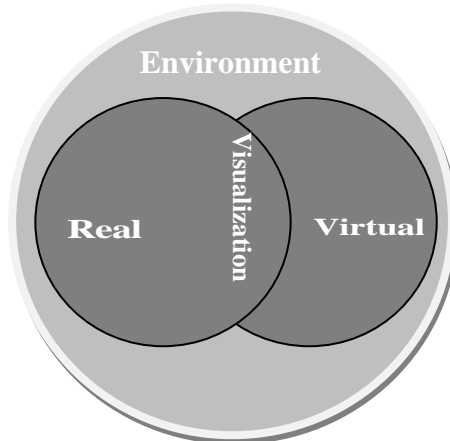


Figure (4-3) Visualization is the link between real & virtual environment, by researcher.

---

<sup>1</sup> Conford, J. (2003), p. 2

<sup>2</sup> Lange, E. & Hehl-Lange, S. (2006), p.196

<sup>3</sup> Reljic, Z. et al, (2005), p.7-9

Today, the main objective of visualization is to enhance human cognition of complex multi-dimensional data and large datasets. <sup>1</sup>

Further, figure (4-3) describes the interactions between real and virtual world during the process of public participation in any environmental design process.

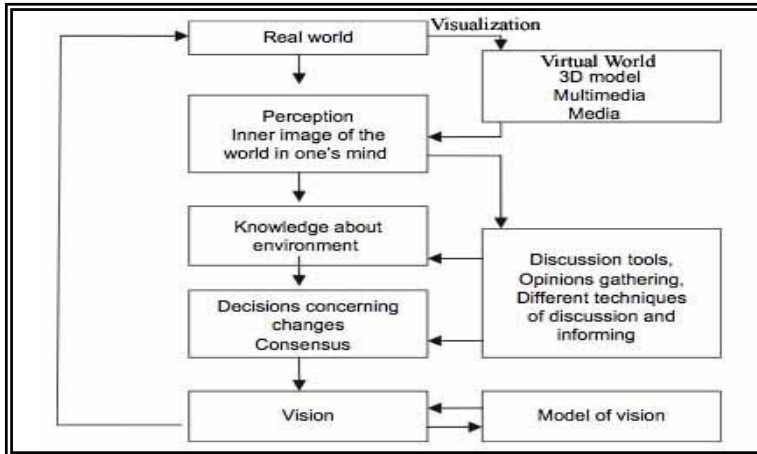


Figure (4-4) Visualization as link between real and virtual world. Source (Hanzl, M., 2007, adapted by researcher).

### **4.3.1 Visual perception response to visualization**

Most empirical studies on the perceptual response to visualizations pertain to landscape quality assessment and restrict the evaluation of psychological responses of visualizations to that of visual perception. More precisely, they attempt to elicit how the imagery appeals to the viewer as compared to the real landscape, making no distinction between the emotional and perceptual dimension of the response. <sup>2</sup>

Successful visualizations require an understanding of the human perceptual system: "just because a technique displays data in a graphical form does not mean the display will be useful". <sup>3</sup>

---

<sup>1</sup> Muhar, A. & Wergles, N. (2009), p.1-2

<sup>2</sup> Previous, P.3

<sup>3</sup> Sheppard, R. & Cizek, P. (2008), p.2

### **4.3.1.1 Understanding Human Perception**

We perceive our environment through a system of senses. By far, the most dominant component is the visual perception. Bruce et al., (1996) state that more than 80 % of man's perception is based on sight. Kurzweil (1990) claims that the eyes can process 50 Billion bits per second where as the ears can only process 1 Billion bits per second. <sup>1</sup>

It is important to understand the relationships between visual perception (the message received by the viewer) and visual stimuli (the product of visualization technique). Having a working knowledge of the basic principle of visual perception will allow us to attack the problem of effective visual communication at a fundamental level.<sup>2</sup>

### **4.3.1.2 Conscious and Preconscious Vision**

The conscious visual process involves thinking and analysis while the preconscious process is performed by the eye before the brain performs active processing.

### **4.3.1.3 Color Perception**

Color is one of the most powerful visual properties in visualization presentation. When using color to represent data, each value or range of values of data is transformed to be associated with a color.

### **4.3.1.4 Comparing Two Images by Flicking**

Simultaneously display of two or more images is a process quite frequently done visually by putting them side-by-side and visually comparing them with the same background locations.

### **4.3.1.5 Change to Oblique**

It is considered that oblique aerial photography would offer a better medium for showing the impacts of the landscape projects, which are environmentally sensitive.

---

<sup>1</sup> Tweed, C. (2003), p.121

<sup>2</sup> Garrick, N. et al. (2005), p.5

### 4.3.2 Perceived reality of Real and Virtual Space

Real space (visual space) is all that we can see. It is the array of objects that surround us, creating when viewed collectively, our environment. Each of these objects has a multitude of different attributes, from variations in light and color to reflectivity.

What does “virtual” really mean? The word "virtual" is nothing new; although its ubiquity is new, as is perhaps its current meaning or meanings "virtual" as: "A philosophical term meaning 'not actually but just as if,'"... “Something can be present in virtual reality without its usual physical limitations. “<sup>1</sup>Virtual space (Digital space) takes many forms, and it is limited only by our imagination.

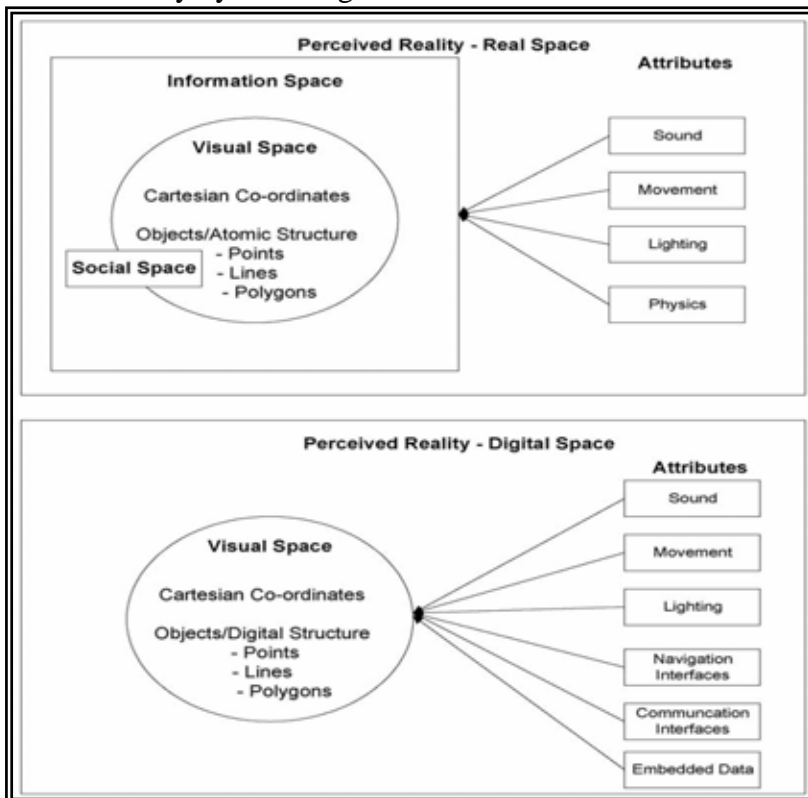


Figure (4-5) Components of Perceived Reality in Real and Virtual Space.  
Source (Hudson, A. 2007)

---

<sup>1</sup> Chen, y. & Knpp, S.(2006), p.277

Figure 4.4 illustrates the components of perceived reality in real and digital space.<sup>1</sup> The combination of visual, information, and social space influences the individual's perception of reality, be it in the real or digital environment and this is what we define as perceptual space. It is this perception that is the key to the digital representation of the built environment.

### **4.3.3 Modes of Visual Representation of visualized objects**

There are various modes of visual representation that is, ways to represent the object as it is perceived visually in the real world (objective reality), the abstract attributes of an object, idea or event, and the symbolic attributes of an object. A person's visual literacy is therefore influenced by three possible attributes or levels of stimuli:<sup>2</sup>

- The object as it is perceived visually, that is the objective reality.
- The abstract attributes of an object, idea or event.
- The symbolic attributes of an object.

A person's visual literacy is consequently determined by his or her knowledge and understanding of these three levels:

#### **4.3.3.1 Realism**

Six factors contribute to the perception of an image as realistic:

- 1) Recognizable scale
- 2) Recognizable forms, especially in terms of their brightness and clarity
- 3) Recognizable detail
- 4) Colors depicted as in the real world
- 5) Recognizable movement depicted either real or suggested (that is, real-time movement, stop-frame movement or animation)
- 6) Perspective depicted as perceived in reality.

#### **4.3.3.2 Abstraction**

Abstraction in visual communication manifests in the simplification or contraction of an idea into a visual representation that has little or no

---

<sup>1</sup> Hudson, A. (2007), p.14

<sup>2</sup> Previous, p.19

relationship with the objective reality. The more realistic the image, the less uncertainty there is about its meaning. Conversely, the more abstract an image, the more generic its meaning becomes.

#### **4.3.3.3 Symbolism**

The development of photography has also played an important part in the development of non-figurative and non-realistic styles in art. Unlike icons and realistic images, with symbols there is no relationship between the appearance of a symbol and its meaning, that is, reality is no longer recognizable.

#### **4.3.4 Level of realism of visualization**

Part of the role of visualization for the public is to provide an opportunity for greater involvement in community decision making. Government, or consultant, reports are often designed for people with an existing knowledge of the issues or processes involved. To broaden the effective use of this information it needs to be in a format (or language) that can be widely consumed.<sup>1</sup>

From a modeling point-of-view, it can be said that visualization is more realistic when more specific textures and more specific geometry are used in the modeling of the represented objects.

#### **4.3.5 Choosing appropriate level of detail in design stages**

In the research on three different visualization tools Al-Kodmany (2002) concluded that the appropriate time to use photo-realistic visualizations is at the final decision-making stage. Further conclusions of Al-Kodmany are that more abstract and less realistic sketches and drawings are useful in the first phases of planning and design process.<sup>2</sup>

- Abstract visualization
- Semi realism visualization
- Photo-realistic visualization

Due to the increased capability of available visualization software, virtual landscapes can be produced in a highly realistic fashion. Still, the

---

<sup>1</sup> Bishop, I. & E. Lange (2005a), p. 25

<sup>2</sup> Al-Kodmany, K. (2002), P.195



---

---

## Chapter 4

---

---

question remains of how realistic and how detailed visualization has to be.

Due to recent advances of visualization techniques Lange (2006), supposed that the visualization quality can be determined by the relation between Geometry and texture. The abstraction level means low or symbolic geometry and low or symbolic texture, the opposite case the realistic level means high or specific geometry and specific texture, so abstraction versus realism<sup>1</sup>, as shown in figure (4-6)

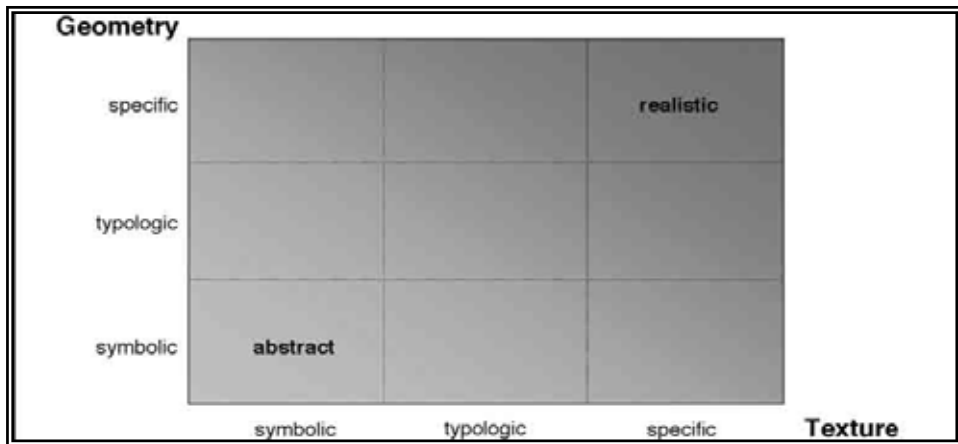


Figure (4-6) Abstraction vs. Realism. Source (Lange, E., 2006)

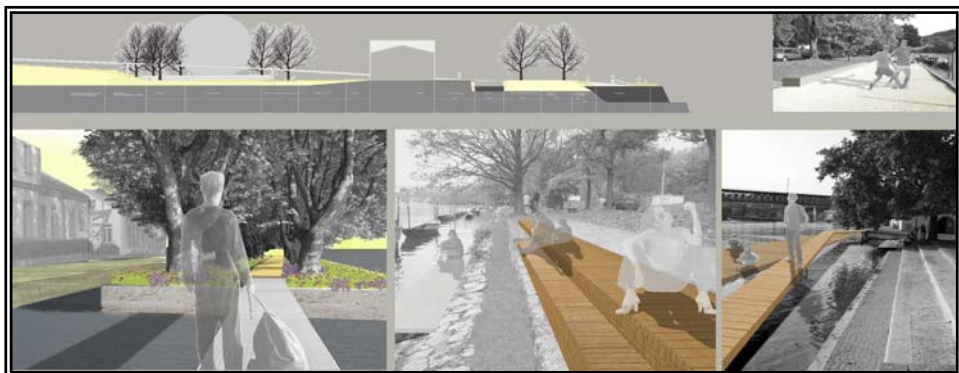


Figure (4-7) Abstract visualization. Source (Chen, S & Yang Lin, J. 2007)

---

<sup>1</sup> Lange, E., (2006), p.5

---

## Chapter 4

---



Figure (4-8) Semi realistic visualization of Cincinnati Riverfront Park regeneration.  
Source ([www.crpark.org](http://www.crpark.org))



Figure (4-9) Photo-realistic visualization of Chicago Riverfront's regeneration.  
Source (Google Earth photos )

## **4.4 Landscape visualization**

Landscape visualizations are pictures of real places seen in perspective that show visible or non-visible features or recognizable landscapes in the future, the present, or the past.<sup>1</sup> So the main goal of landscape visualization is making invisible scenes visible.<sup>2</sup>

Landscape visualization, sometimes referred to as visual simulation or landscape modeling, attempts to represent actual places and on-the-ground conditions in 3D perspective views with varying degrees of realism. It simulates the experience of standing in the landscape and viewing the surrounding environment.<sup>3</sup>

Visualization is an extremely important part of the landscape and urban design process. It is estimated that 50 percent of the brain's neurons are involved in vision; 3-D displays can stimulate more of these neurons and hence involve a larger portion of the brain in the problem solving process.<sup>4</sup> Thus, 3-D computer models can stimulate spatial reality, thus allowing the viewer to more quickly recognize and understand changes in elevation.<sup>5</sup>

### **4.4.1 The role of landscape visualisation**

In presenting design proposals, the primary goal is to communicate to multiple stakeholders their possible impact on an urban space so that the stakeholders can decide if the changes will lead to improvement. Visual presentations are normally used to convey how proposals will alter the appearance of the area, though other types of information can be presented in visual form to ease understanding of abstract concepts (diagrams, charts, graphs).<sup>6</sup>

---

<sup>1</sup> Sheppard, S., et al., (2005), p.3

<sup>2</sup> Huang, H. (2004), p.7

<sup>3</sup> Sheppard, R. & Lewis, J. (2006), p.293

<sup>4</sup> Tessa H., & Lammeren, R. (2005), p. 58

<sup>5</sup> Stoltman, A., et al. (2007), p.138

<sup>6</sup> Sheppard, R. & Cizek, P. (2008), p.2

---

---

## *Chapter 4*

---

---

Visualization is the primary mode for communicating design proposals. Public participation is a major interest, and it offers a particular interpretive context to consider the efficacy of different techniques.<sup>1</sup>

Designers depend on representations to externalize their design thoughts. External representations are usually in the form of sketches (referred to as traditional media) in urban & landscape design during the conceptual design. There are also attempts to integrate the use of digital representations into the conceptual design in order to construct a digital design medium.

Representing the real world by visual means is essential for landscape architects and planners to express and communicate their thoughts. In the past, plans and sections have been predominately used. However, it is important, both for lay persons and the experts, to communicate a proposal in perspective view.

There are five assumptions about the role of visualization in landscape:<sup>2</sup>

- In our complex world, to understand nearly any subject of consequence it is necessary to consider it from multiple viewpoints, using a variety of information;
- We are rapidly moving from an information-poor to an information-rich society;
- The understanding of complex information may be greatly extended if visualized.
- Problem solving and commitment to action in a complex world requires communication and collaboration among many participants, and visualization aids this interaction.
- Visualization aids in communicating with others.

---

<sup>1</sup> Tweed, C., et. al.,(2003), p. 2

<sup>2</sup> Brkljac, N. & Counsell, J.(2007), p.60

## **4.4.2 Purposes of landscape visualizations**

The way landscape architects and urban designers think about and communicate their ideas about landscape problems and their solution is strongly visual. So visualization of landscape is based on three premises:

Professional preparers and presenters of realistic landscape visualizations are responsible for promoting full understanding of proposed landscape changes; providing an honest and neutral visual representation of the expected landscape, by seeking to avoid bias in responses (as compared with responses to the actual project); and demonstrating the legitimacy of the visualization process.<sup>1</sup>

Several disciplines involved in the creation or use of visualizations of landscapes (real places) for various Purposes: <sup>2</sup>

- Public communications and involvement.
- Environmental education.
- Landscape analysis.
- Environmental design.
- Sustainability and land-use/resource.
- Management decision-making.

## **4.4.3 Landscape visualization from Static to dynamic**

Techniques for the landscape visualization or visual simulation of the environment can be categorized into static and dynamic simulations. As described below landscape visualization according to interaction with users can be one of the five methods: <sup>3</sup>

### **4.4.3.1 Static visualization**

A typical static visualization in environmental design includes maps, plans, photos, perspective drawings, photomontage, or physical models where an object is seen by a static observer. Static visualization refers to the process of visualizing the state information of objects.<sup>4</sup>

---

<sup>1</sup> Thompson E. , Horne, M. & Fleming, D. (2006), p. 213

<sup>2</sup> Sheppard, S. (2005), p. 80

<sup>3</sup> Paar, P. & Clasen, M. (2007), p.208

<sup>4</sup> Lange, E. (2001), p.75

#### **4.4.3.2 Dynamic visualization**

Change is a fundamental characteristic of processes in nature and interactions among them. Thus, static representation cannot depict the true characteristics of such a dynamic system.<sup>1</sup>

#### **4.4.3.3 Interactive visualization**

In this approach, not only there is a dynamic linking between the graphical user interface with the underlying geospatial data but also with the end-user. The result is the change in virtual scene as a response to changes in data or end-user actions.<sup>2</sup>

#### **4.4.3.4 Animated visualization**

Animation is the creating a timed sequence or a series of graphic images or frames together to give the appearance of continuous movement. Surprisingly or not, the driving force for the development of animated landscapes was/is the video game industry.

#### **4.4.3.5 Immersive visualization**

Immersion implies feeling of “being inside” the virtual environment on the side of the end-user. Here, the user manipulates virtual objects as in the real world as opposed to pointing, clicking or typing. Most of this feeling of “being in the virtual world” comes from stimulation of different senses in the real world (i.e. sound, visual, touch via feedback and smell).

### **4.4.4 2D, 3D, & 4D Landscape Visualization comparison**

Visualization as a presentation that represents landscape elements and features realistically and, to the extent possible, reproduces accurate spatial orientation and perspective through spatial referencing, can vary among three modes. These visualization modes can be identified as:<sup>3</sup>

- 2D: Two dimensional, static images. 2D images are photorealistic images, sometimes enhanced digital photos.
- 3D: 3D images allow the landscape to be viewed from one location or they can be used to export renderings, that is, animations that

---

<sup>1</sup> Goud, R. (2004), p.2

<sup>2</sup> Batty et al., (2000), p.13

<sup>3</sup> Heldal, I. (2007), p. 150

followed prescribed trajectories. They provide perspective and depth in the landscape.

- Virtual Reality (VR, sometimes termed 4D). In a VR scenario the observer has complete control over an objective viewpoint that can be moved through a virtual landscape in real time. Velocity, heading, and all derivatives of location can be controlled by mouse or keyboard input.

Visualization mode	Advantages	Disadvantages
2D	Readily Available Moderate Expense Easy on Hardware Existing Pool of Users High Level of Realism	Poor Replication and Transferability Hard to Create New Images Low Return on Labor Contour Changes Hard to Show Artistic Product (Not to Scale)
3D	Moderate Price Easy on Hardware Very Close to Photorealism "Movies" Provide Multiple Views Only Build It Once Good at Modeling New Features	Difficult to Learn Demands Processor Time Off-line Demands Sophisticated Data Handling Views Must Be "Pre-scripted" Software Less Reliable
VR	Total Real-time User Control of Views Limited Detail Only Build It Once Potential for Simulator-type Behavior	Expensive Demanding of Hardware Difficult to Learn Lacks Detail Sophisticated Data Handling

Table (4 -1) Advantages and Disadvantages of Three Visualization Modes. Source (Heldal, I., 2007)

### **4.4.5 Progression of landscape Visualization techniques**

Landscape visualization tools and techniques show what the built environment might look like under different design and development scenarios, over time. These tools and techniques allow planners, urban designers, citizens, and decision makers to experience design alternatives that are otherwise difficult or impossible to see in raw data form.<sup>1</sup>

Al-Kodmany (2002) put a summary of the progression of landscape visualization tools and techniques, from its traditional techniques to contemporary techniques as shown in figure(4-10).

---

<sup>1</sup> Frederick R., (2006), p.543

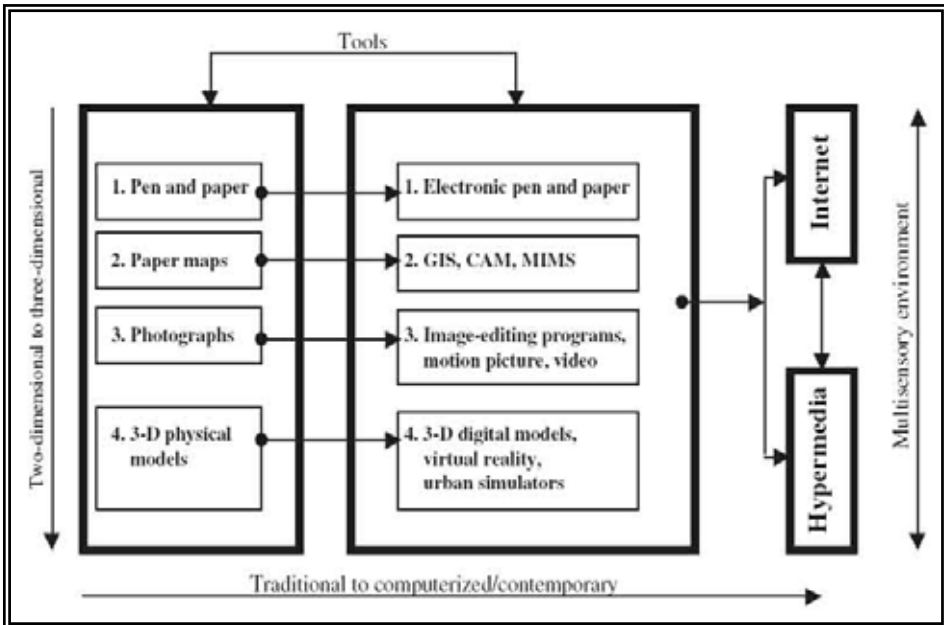


Figure (4-10) Progression of visualization tools from traditional to computerized/contemporary. Source (Al-Kodmany, K. 2002)

#### 4.4.5.1 From pen and paper to Electronic sketching

**Pen and paper:** are the most basic visualization tools. In conceptual stages of landscape, when rapid descriptions of ideas are required, sketching becomes the quickest way to proceed. Sketches are accessible in a small-group workshop format as long as people are willing to speak about their ideas.



Figure (4-11) Visualization with sketching for new Shanghai riverfront's landscape regeneration. Source (Marshall, R., 2001a)



---

---

## Chapter 4

---

---

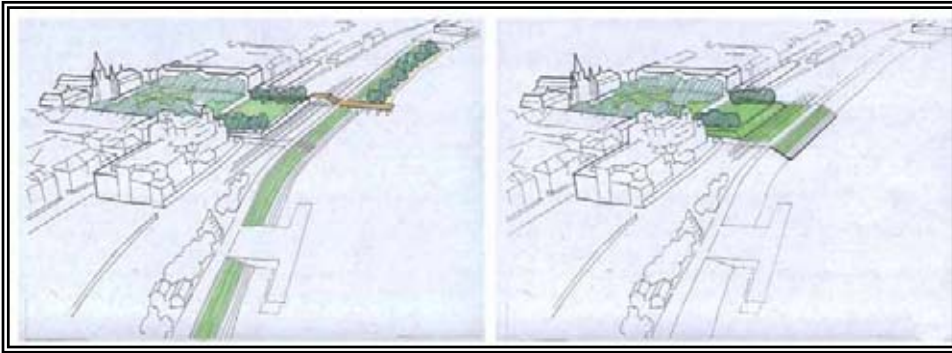


Figure (4-12) Freehand sketching of New Orleans riverfront regeneration alternatives.  
Source (www.neworiverfront.com)

**Electronic sketching:** The computerized version of pen-and-paper sketching is drawing on an electronic sketch board. This tool can overcome some of the limitations of pen and paper.



Figure (4-13) Visualization with electronic sketching. Source (Shang, h., 2006)

### 4.4.5.2 From paper maps to GIS mapping

**Paper map:** at a basic level are scale models of reality. They are powerful landscape tools because they allow us to form mental images that foster both comprehension and communication. They help us to visualize regions and comprehend relative distances and geographic relationships. Maps are more efficient than plain language for recreating and explaining a 3-D place because they are able to communicate spatial facts and relationships.<sup>1</sup>

**GIS mapping** is the move from a paper map to digital mapping technology, as indicated in the conceptual diagram, transforms the way in which maps are used and constructed.



Figure (4-14) Paper maps and plans as traditional landscape visualization method.  
Source ([www.crpark.org](http://www.crpark.org))



Figure (4-15) GIS maps and plans as traditional landscape visualization method.  
Source ([www.neworiverfront.com](http://www.neworiverfront.com))

---

<sup>1</sup> Al-Kodmany, K., (2002), p.190-203

### 4.4.5.3 From photographs to computer photo imaging

**Photographs:** are used to help participants identify features they like or dislike. Photographs work well for an audience that includes non experts. A high degree of realism makes a significant contribution to the comprehension of a model by lay participants. There are several methods that have been devised for using photographs in public-participation landscape design.

**Computer photo imaging:** Just as maps take on new dimensions and capabilities when they are digitized, photographs become more multidimensional in the computerized environment.



Figure (4-16) Computer photo imaging for Visualization of Celeste Park at New Orleans riverfront's landscape regeneration. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

### 4.4.5.4 From 3-d physical models to 3-d digital models, virtual reality and urban simulation

**Physical models:** can be ideal design tools to visualize site plans for those who are unaccustomed to reading two-dimensional drawings. Physical, movable model pieces allow participants to physically interact with the relationships of building elements to the street and open spaces.



Figure (4-17) 3d physical model for Toronto riverfront. Source (Kim, K., et al., 2005)

---

---

## Chapter 4

---

---

**3d digital models:** Computer technology has brought about a revolution in visualizing scenes, plans, and 3-D architecture. Three different tools, or types of software, are now available for creating 3-D representations of real or planned designs: 3-D digital modeling, virtual reality, and urban simulation.



Figure (4-18) Computer rendering Visualization of riverfront regeneration for Don River. Source (Steiner, F., 2008)



Figure (4-19) Two methods for rendering Toronto riverfront's regeneration the left using computer techniques, the right using traditional techniques.  
Source ( Kim, K., et al., 2005).

3D digital modeling, which allows users to view (but not to interact with) 3D models on-screen, is the simplest of the three technologies. Virtual reality and urban simulation are closely related technologies that allow users to interact (virtually) with environments and situations before these environments and situations are implemented in the real world. Whereas virtual reality presents a dynamic virtual environment, urban simulation goes on to provide additional dynamic virtual processes with which the user interacts.<sup>1</sup>

### 4.4.5.5 New media: hypermedia and the internet

Each of the four traditional tools has a computerized counterpart, which is a version of the same (or similar) activity. At the far right side of the diagram, two modes of communication, use of hypermedia techniques and use of the Internet are placed in a perpendicular position to the eight tools to indicate that they are not singular tools or even methods.<sup>2</sup>

They are particularly exciting for use in public participation as they can greatly expand the reach of the various tools.

Hypermedia, also known as interactive multimedia, refers to the combination of various communication tools (video, maps, animation, text, graphics, sound, and statistical data) The Internet now supports interactive programs in a manner similar to stand-alone GIS and stand-alone hypermedia systems.



Figure (4-20) Virtual reality and the internet as recent advances in landscape visualization. Source (Berry, J. 2004)

---

<sup>1</sup> Bishop, I. & Lange, E. (2005), P.6

<sup>2</sup> Al-Kodmany, K. (2002), p.201

#### 4.4.5.6 Virtual reality and the internet

When the power of VR systems is meshed with the public accessibility of the Internet, a powerful tool for landscape design and public participation is created. Members of a community would have to come to a central location to participate using the VR model of their neighborhood. With VR on the Web, participants can participate from any Internet-enabled computer workstation.<sup>1</sup>

#### 4.4.6 Visualization for representation in landscape

Designers depend on representations to externalize their design thoughts. External representations are usually in the form of sketches (referred to as traditional media) in landscape design during the conceptual design. There are also attempts to integrate the use of digital representations into the conceptual design in order to construct a digital design medium.<sup>2</sup>

Representing the real world by visual means is essential for landscape architects and planners to express and communicate their thoughts. In the past, plans and sections have been predominately used. However, it is important, both for lay persons and the experts, to communicate a proposal in perspective view.



Figure (4-21) Visualization as a tool to imagine before and after status of riverfront changes. Source ( [www.newriverfront.com](http://www.newriverfront.com))

---

<sup>1</sup> Thompson, E. (2006), p.128

<sup>2</sup> Sheppard, R. & Cizek, P. (2008), p.182

---

---

## Chapter 4

---

---

Visualization can be used in landscape representation to introduce various alternatives or to predict future status, or the appearance of the landscape during day and night and the seasonal changes in landscape.



Figure (4-22)  
Landscape visualization  
for representing  
seasonal changes and  
design alternative.  
Source  
(<http://www.waterfrontoronto.ca>)



Figure (4-23) Visualization day and night landscape of Chicago riverfront.  
Source (Richard, M. 2005).

### 4.4.7 Code of ethics for landscape visualization

<b>Interim Code of Ethics for Landscape Visualization - Version 4, 2003</b>
<p>The use of landscape visualizations should be appropriate to the stage of development of the project under consideration, to the landscape being shown, to the types of decisions being made or questions being addressed, to the audience observing the visualizations, to the setting in which the presentation is being made, and to the experience level of the preparer. In general, preparers and presenters of landscape visualization should:</p>
<ul style="list-style-type: none"><li>• Demonstrate an appropriate level of qualifications and experience</li></ul>
<ul style="list-style-type: none"><li>• Use visualization tools and media that are appropriate for the purpose.</li></ul>
<ul style="list-style-type: none"><li>• Choose the appropriate level(s) of realism</li></ul>
<ul style="list-style-type: none"><li>• Identify, collect, and document supporting visual data available for or used in the visualization process.</li></ul>
<ul style="list-style-type: none"><li>• Seek community input on viewpoints and landscape issues to address in the visualizations.</li></ul>
<ul style="list-style-type: none"><li>• Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions, appropriate to the area being visualized.</li></ul>
<ul style="list-style-type: none"><li>• Estimate and disclose the expected degree of error and uncertainty, indicating areas and possible visual consequences of the uncertainties.</li></ul>
<ul style="list-style-type: none"><li>• Use more than one appropriate presentation mode for the affected public.</li></ul>
<ul style="list-style-type: none"><li>• Present important non-visual information at the same time as the visual presentation, using a neutral delivery.</li></ul>
<ul style="list-style-type: none"><li>• Avoid the use or the appearance of “sales” techniques or special effects</li></ul>
<ul style="list-style-type: none"><li>• Avoid seeking a particular response from the audience</li></ul>
<ul style="list-style-type: none"><li>• Provide information describing how the visualization process was conducted and key assumptions/decisions taken.</li></ul>
<ul style="list-style-type: none"><li>• Record responses to visualizations as feedback for future efforts.</li></ul>
<ul style="list-style-type: none"><li>• Conduct and document post-construction evaluations to assess accuracy of visualizations or changes in project design/construction/use.</li></ul>

Table (4-2) Code of Ethics for Landscape Visualization.  
Source (Bishop, I. & E. Lange, 2005a)



### 4.4.8 General Principles for landscape visualization

Landscape visualization tools must be applied in appropriate ways by users who are mindful both of their inherent benefits and their potential limitations and disadvantages. Preparers and presenters of landscape visualizations should adhere to the following general principles:<sup>1</sup>

<b>Accuracy</b>	Realistic visualizations should simulate the actual or expected appearance of the landscape as closely as possible, without distortion and at an appropriate level of abstraction/realism for the intended purpose.
<b>Representativeness</b>	Visualizations should represent the typical or important views, conditions, of the landscape.
<b>Visual Clarity</b>	The details, components, and overall content of the visualization should be clearly communicated.
<b>Interest</b>	Visualizations should engage and hold the interest of the audience.
<b>Legitimacy</b>	Visualizations should be defensible by making the simulation process and assumptions transparent to the viewer, by clearly describing the expected level of accuracy and uncertainty, and by avoiding errors.
<b>Access to visual information</b>	Visualizations should be readily accessible to the public via a variety of formats and communication channels.
<b>Framing and presentation</b>	Important contextual and other relevant information (such as labeling, narration, mapping, etc.) should be presented in clear, neutral fashion, along with visualization imagery.

Table (4-3) Criteria for evaluating landscape visualization. Source (adapted from Sheppard, R. & Cizek, P., 2008)

---

<sup>1</sup> Sheppard, R. & Cizek, P. (2008), p.183

### **4.4.9 Visualizing landscape visible and invisible phenomena**

In landscape architecture disciplines people typically visualize physically visible phenomena, but they can also visualize abstract and invisible phenomena. These way experts can help raise the awareness of possible consequences resulting from landscape even if they are reaching far in to the future<sup>1</sup> (see Table 4-4).

	<b>Visualization Contents</b>
<b>Visible Phenomenae</b>	Changes in Land Use Nature and Density of Buildings Impacts, Changes (e.g. Projects subject to EIA) ...
<b>Invisible Phenomenae</b>	Function and Effect Relationships (e.g. Network of Biotopes) Noise Pollutants (Soil, Water, Air) ...

Table (4-4) visualizing landscape visible and invisible phenomena.  
Source (Lange, E., 2006)

### **4.5 Visualization for participation in landscape architecture**

Communication and Visualization is at the heart of the planning system. The importance of a visualization tool to improve public participation is becoming increasingly recognized within the urban landscape, urban planning and design community. The effective application of such a visualization tool in this context, however, remains relatively under explored.<sup>2</sup>

#### **4.5.1 Landscape visualization and participation**

Methods and techniques for landscape visualization are increasingly used in landscape architecture. This way helping to increase understanding and improve decision making. Furthermore, “clear communication about environmental protection strategies is especially important for generating enthusiasm and participation and for preventing confusion”.<sup>3</sup>

---

<sup>1</sup> Lange, E. (2006), p.4

<sup>2</sup> Shen,Z. and Kawakami,M. (2007). P123

<sup>3</sup> Lange, E. (2006), p.8

### **4.5.2 Communication medium between experts and lay public**

A key approach to overcome the potential communication problem between experts and lay persons (the expert vs. lay person paradigm) is to use communication media that both parties can understand. Visualizations are generally to be conceived as a medium that can help to overcome this problem.<sup>1</sup>

As Lange (2005)<sup>2</sup> explains, computer-based visual simulations can potentially function as the link between the classic top-down approach in planning, i.e. experts providing information to the general public, and the bottom-up approach, i.e. the general public being consulted and participating in decision making.

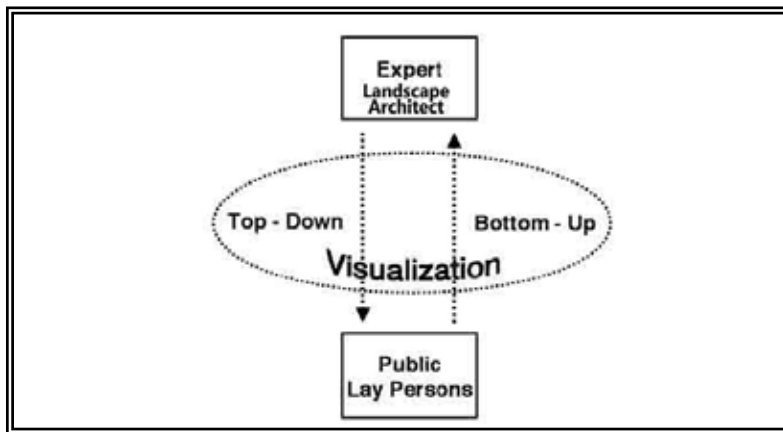


Figure (4-24) Visualization as the common ground for communication between expert landscape architects and the public. Source (Lange, E., 2006)

### **4.5.3 Visualization and landscape participatory decision making**

Presenting commonly understood visual information on the consequences of decisions to potentially affected parties is a necessary early step in participatory design. However, as sophisticated as visualizations have become with the advent of digital technologies, the process by which visualizations are used in communication from

---

<sup>1</sup> Lange, E., (2006), p.5

<sup>2</sup> Lange, E. (2005), p. 18

---

---

## Chapter 4

---

---

presentation to discussion to decision has remained quite traditional. With continuing advances in the representative quality of visualizations and access to widely available communication technologies, such as the Internet, opportunities for public participation in design and planning decisions need not follow tradition.<sup>1</sup>

The ‘digitalization of visualization’ has created a common language of producing and presenting (the ‘Push’) visual consequences of decisions and collecting and analyzing responses (the ‘Pull’) to those potential consequences from a broad and often dispersed public. To maintain a balance in the Push-Pull relationship, both presenting and collected information need be planned for early in the design phase of projects, requiring stakeholder involvement if true participatory design is to be achieved, as shown in figure (4-25).

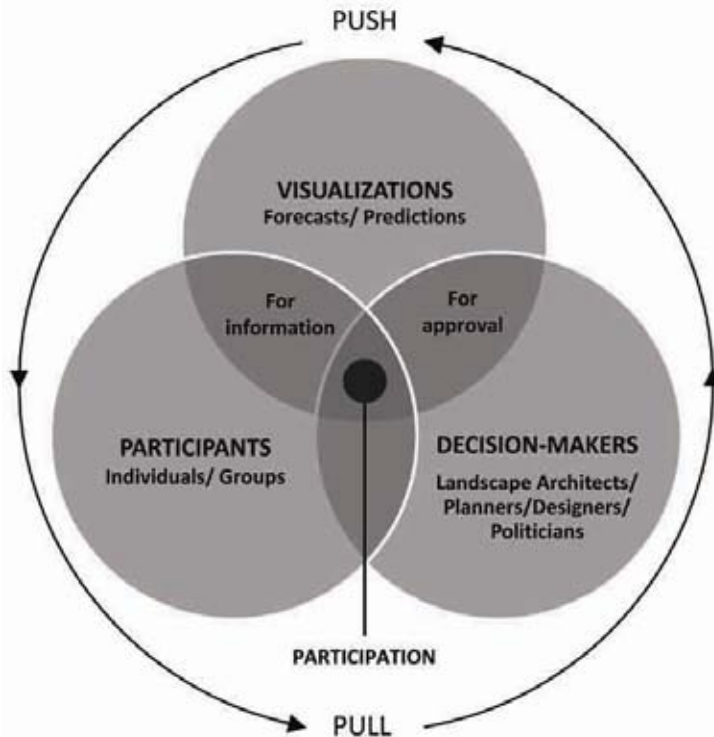


Figure (4-25) The push and the pull of information in participatory making.  
Source (Davison, J., 2007)

---

<sup>1</sup> Bishop, I. & E. Lange,( 2005a), p. 67

### **4.5.4 Visualization techniques for effective public participation**

Environmental management now covers a very wide range of issues and the public are concerned with a great many of these. At the same time as technology has advanced the opportunity for visualization, public interest has increased the need.<sup>1</sup>

Researchers and practitioners increasingly believe that visualization techniques are the key to promoting effective public engagement as they can provide a common language which all participants can understand, helping to overcome problems of more traditional methods of involvement, which have tended to disenfranchise non-design oriented people (Sanoff, 1990 quoted in Al-Kodmany [1999]). Careful use and implementation of visualization techniques can generate debate and discussion amongst stakeholders and communities, raise design awareness and facilitate communication between all interested parties. But we should not take for granted that increasing photorealism will inevitably lead to greater lay understanding of every important concern and in every case.

### **4.5.5 Visualization for participation in riverfront's landscape regeneration**

In some sectors of professional practice, notably urban and environmental planning/design, such visualizations have become widely used, and the benefits of such use to public understanding and design decision-making (when used appropriately) are generally acknowledged.<sup>2</sup>

There is considerable evidence of the communications effectiveness and usability of landscape visualization in planning and decision support from user's evaluations.<sup>3</sup>

Communication and Visualization is at the heart of the planning system. The importance of a visualization tool to improve public participation is becoming increasingly recognized within the urban landscape, urban planning and design community. The effective

---

<sup>1</sup> Bishop, I. & E. Lange (2005a), p. 25

<sup>2</sup> Sheppard, R. & Lewis, J. (2006), p. 293

<sup>3</sup> Sheppard, R. & Meitner, M. (2005), p. 185

---

---

## Chapter 4

---

---

application of such a visualization tool in this context, however, remains relatively under explored.<sup>1</sup>

The objective of the visualization in the riverfront Landscape process was to help lay public or citizens understand the spatial and temporal processes in the riverfront landscape, to comprehend the landscape proposals as well as to promote communication and interest in the landscape plan.



Figure (4-26) some visualization had been used in public participation process to regenerate New Orleans riverfront's landscape. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

### 4.6 Summary & Conclusion

Visualization tools draw people into a design process and provide avenue for immediate feedback on the quality and appeal of different design choices. They allow citizens to become active participants in an iterative decision-making process. Some visualization tools provide visual information coupled with analysis capabilities. This integration allows for

---

<sup>1</sup> Shen,Z. and Kawakami,M. (2007). P123

---

---

## *Chapter 4*

---

---

a better understanding of the potential implications of visual preferences on the environment such as riverfront spaces and their landscape.

. The current visualization technology enables us to model and visualize natural, rural and urban environments in a highly realistic way.<sup>1</sup> Current technological developments within computer graphics, videogames, VR techniques and 3D GIS will certainly assist 3D landscape visualization tools in fulfilling the specific requirements of landscape planners and environmental managers.<sup>2</sup>

As new computerized visualization tools become available, professionals who engage in public participation must have a practical understanding of the benefits and drawbacks of each tool in order to choose the ones appropriate for a given context.

The visualization is perhaps the most significant of all activities in the design process to have been affected by the development of digital technologies

---

<sup>1</sup> Tweed, C. (2003), p.123

<sup>2</sup> Bishop, I. & E. Lange (2005a), p. 25





**PART  
TWO**

**Computer Simulated Visualization for Better Public  
Participation in Evaluating the Regeneration of  
Riverfront's Landscape**





The difficulties in communication between public and landscape architects lead to uncertainty and lack of consistency in landscape policies. Landscape architects and urban designers need a tool to improve communication efficiency in the landscape process and engage the general public involvement in evaluating riverfronts' landscape regeneration alternatives. Computer Visualization can be that tool.

Nowadays, digital visualizations are increasingly gaining importance in landscape design, landscape planning and environmental planning. The current visualization technology enables us to model and visualize natural, rural and urban environments in a highly realistic way. Increasingly visualization via digital photomontages or even virtual landscape representations are becoming an important means for communicating proposed changes to the public or are even used in a collaborative and cooperative process of "developing" future landscapes.<sup>1</sup>

Al-Kodmany (1999)<sup>2</sup> suggests that visualization through digital technology provided a common language for the participants and computer-based visualization techniques could be an important contribution to the evolution of the participatory landscape design. In another example Bishop (2005)<sup>3</sup> goes further and suggests that real-time Visualization is important for certain public participation objectives but either not possible or not important for others. Further more Schroth, O. & Schmid, W. (2006) put forward that 3D landscape visualizations applied as tools for participatory workshops do benefit from interactive features.<sup>4</sup>

To evaluate computer simulated visualization tool (virtual reality) proposals for urban landscape design, one must first establish a criteria system. This enables an understanding of the relationships between influencing factors so the system can make the desired evaluation. Taking landscape design elements and visual simulation theory into account while also referring to the research results of relevant experts.

---

<sup>1</sup> Danahy, M. (2005), P.15

<sup>2</sup> Al-Kodmany, K. (2001),p.332

<sup>3</sup> Bishop, I. (2005c),p.4

<sup>4</sup> Schroth, O. & Schmid, W. (2006), p.180

---

---

## Part 2

---

---

This part comes after discussing literature review about riverfronts and the new world trend for regenerating cities' riverfronts, hence discussing relations and interactions between public users and their riverfronts, and their possible participation in riverfront regeneration process though their evaluation of design alternatives, finally the evolution of visualizations techniques as tools for predicting the future of urban landscape.

This part comes to link between the previous theoretical analytical part and the next part which will be the applied study. This part sets the previous part as a base for the proposed approach.

The following figure explain the approach, which is the structure of part two, through four chapters, the first is about approach field which is riverfronts so it will discuss riverfront's landscape regeneration through a lot of international examples. Second are the approach parameters as riverfront's landscape elements and their relation with aspects of riverfront's landscape evaluation. Third is the approach tool as landscape visualization especially computer simulated visualization. Finally we reach the approach process as public participation for evaluation of riverfront's landscape regeneration.



Research Approach. By researcher.

**PART  
TWO**

**Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape**

**Chapter  
5**

**Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn**

**Chapter  
6**

**Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation**

**Chapter  
7**

**Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation**

**Chapter  
8**

**Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration**



**Introduction**

**Examples of existing regenerated riverfronts**

**Examples of under construction projects of  
riverfronts' regeneration**

**Summary & conclusions**





## 5.1 Introduction

This chapter is the first section of part two which concerns with analytical study. This chapter concerns with approach field -international Examples on Riverfront's Landscape Regeneration... to Learn.

This chapter will first analyze some international examples on riverfront's landscape regeneration, some of them are existing and the other are under construction or under study, to learn how they deal with landscape elements, and what aspects and sub-aspects they rely on, this will help later in introduction the evaluation criteria which can measure public's evaluation of riverfront's landscape.

## 5.2 Examples of existing regenerated riverfronts

Here the research will study a lot of international riverfronts projects form different places all over the world. Each project will be described then analyzed according to the points which were mentioned before in the theoretical part. Four aspects will be the evaluation aspects of each project. These aspects are:

- Access and linkage.
- Comfort and image.
- Uses and activities.
- Sociability.

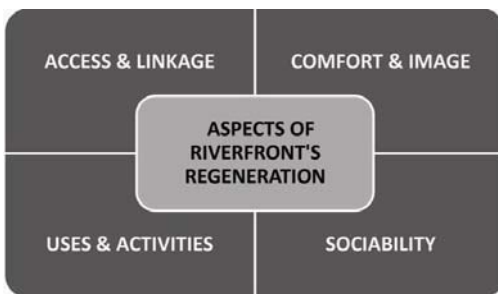


Figure (5-1) Main aspects of evaluation of riverfront's regeneration, by researcher

It was found that successful riverfronts spaces have these four aspects according to different studies on different types of spaces, which riverfronts' spaces are of them. As discussed before in chapter two.

Before the analysis of these aspects each project will be described through its location, components, and full description of its regeneration

### 5.2.1 Rhine Riverfront (River Rhine Promenade)

Location	River Rhine, Dusseldorf, Germany
Components Of Riverfront	Public promenade/ esplanade with square



Figure (5-2) Rhine Riverfront, Dusseldorf,. Source (Google Earth)

#### Rhine Riverfront's landscape regeneration description

This project is one of the most successful riverfront transformations in Germany or anywhere else in Europe. As in so many other cities, this place used to be a wide urban expressway along the river, effectively cutting the city centre off from the riverfront. Finally, in the 1990's the authorities decided to put the expressway into a tunnel and create a new promenade on top.<sup>1</sup>

There is a lower level entirely paved with tarmac (which is not as ugly as it sounds) which is used by skateboarders, inline skaters and cyclists. Several simple and temporary restaurants/ beer gardens with colorful awnings in front have been integrated into the flood wall (permanent structures are not allowed due to flooding). The upper level has two continuous rows of plane trees with benches in between.

The southern stretch is wider and has a sloping lawn down to the river.

---

<sup>1</sup> Blackburn, D. (2006).p.3

---

---

## Chapter 5

---

---

The northern stretch is more urban and features a re-designed square (Burgplatz) with steps down to the river. This is the place where people congregate in summer, sitting on the steps and watching the ships on the river pass by.<sup>1</sup>As the designers have put it: “To see and be seen, to watch other people, is the most important reason why people gather in public spaces - not fancy design features.”



Figure (5-3) Features of Rhine Riverfront, Dusseldorf, Germany. Source ([www.pps.org](http://www.pps.org))



Figure (5-4) Sociability on riverfront. Source (<http://www.duesseldorf-tourismus.de>)

---

<sup>1</sup> Campbell, J. (2008).p.7

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ Easy access for pedestrians.</li> <li>▪ Many people nearby use the space, for example office workers and employees of nearby government buildings.</li> <li>▪ Car access is very limited and restricted.</li> <li>▪ The promenade itself is largely pedestrianized, apart from some very small access roads.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ Seating on benches under plane trees.</li> <li>▪ Clean and well-maintained.</li> <li>▪ Safe.</li> <li>▪ No vehicles in sight.</li> </ul>
<b>Uses &amp; activities</b>	<p>Activities on the promenade include:</p> <ul style="list-style-type: none"> <li>▪ Strolling.</li> <li>▪ Cycling.</li> <li>▪ Inline-skating.</li> <li>▪ Beer-gardens and restaurants.</li> <li>▪ Open-air-cinema in summer.</li> <li>▪ Sunbathing.</li> <li>▪ Occasional public events (markets, exhibitions, concerts).</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ Vibrant.</li> <li>▪ Active.</li> <li>▪ Definitely a meeting place.</li> <li>▪ Find both visitors and locals here</li> </ul>

Table (5-1) Riverfront's landscape regeneration aspects of Rhine Riverfront. By researcher

---

---

## Chapter 5

---

---

### 5.2.2 Allegheny Riverfront

Location	Between Ninth Street Pier and Fort Duquesne Bridge, Pittsburgh, PA
Components Of Riverfront	Consists of two active 4,000 foot promenades running alongside the river there, one upland and the other at river level.



Figure (5-5) Allegheny Riverfront. Source (<http://en.wikipedia.org>)

#### Allegheny Riverfront's landscape regeneration description

Allegheny Riverfront Park has invigorated two long, narrow spaces pinched between the Allegheny River and major expressways, reviving relationships among the city, its inhabitants, and its river. The lower level brings you to the river's edge and is planted with native floodplain

---

---

## Chapter 5

---

---

species that can regenerate themselves after flooding. The upper level promenade is more urbane with spectacular views and with plantings and materials traditionally found in Pittsburgh's public spaces. The two levels are linked by long ramps that use vines to screen park users from the highway.<sup>1</sup>

Pittsburgh has long used its rivers for utilitarian purposes, but not until recently has the city fully recognized their recreational possibilities and their importance as natural resources. Before the park was built, the lower level was an inaccessible parking lot and the upper level was a fairly narrow sidewalk next to a major roadway. The most remarkable thing about this park is the way it has completely transformed these two hostile spaces into a welcoming and well-loved public place.



Figure (5-6) Access and uses at Allegheny Riverfront. Source ([www.pps.org](http://www.pps.org))



Figure (5-7) Green esplanade at Allegheny Riverfront. Source (Google Earth).

---

<sup>1</sup> Amidon, J. (2005),p.17

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ Allegheny Riverfront Park is all about circulation and forming strong ties between downtown and the river's edge.</li> <li>▪ The park is extremely accessible and accommodates people arriving on foot, on bikes, in wheelchairs, and in boats.</li> <li>▪ Special attention has been paid to making the paved spaces feel special.</li> <li>▪ The upper level is comprised of irregular bluestone paving; the lower level is concrete imprinted with plants.</li> <li>▪ Continuous recreational space along the river.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ There is abundant seating, positioned to take advantage of the spectacular river views.</li> <li>▪ The trees on the upper level provide shaded spaces to relax in the summer.</li> <li>▪ The lower level brings people close enough to the river that they can reach down and touch the water.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Allegheny Riverfront is so well-suited to routine uses such as jogging, in-line skating, and dog-walking.</li> <li>▪ Riverfront Park is very active and there are constant streams of visitors, making the park feel very safe.</li> <li>▪ Although the park is too narrow for much programmed recreation other than boating, even a quick visit will offer a little respite from the city.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ The esplanades are wide enough to accommodate the heavy user-ship comfortably.</li> <li>▪ They are also narrow enough to encourage face to face contact and greetings among fellow park users.</li> <li>▪ The marina fosters camaraderie both among boaters and among those who merely like to look at boats.</li> </ul>

Table (5-2) Riverfront's landscape regeneration aspects of Allegheny Riverfront. By researcher

### **5.2.3 Battery Park City Riverfront**

<b>Location</b>	Battery Park City New York City, NY
<b>Components Of Riverfront</b>	Consists of esplanade runs along the Hudson River for the entire length of Battery Park City and is lined with parks, gardens, and marinas - a pedestrian paradise.

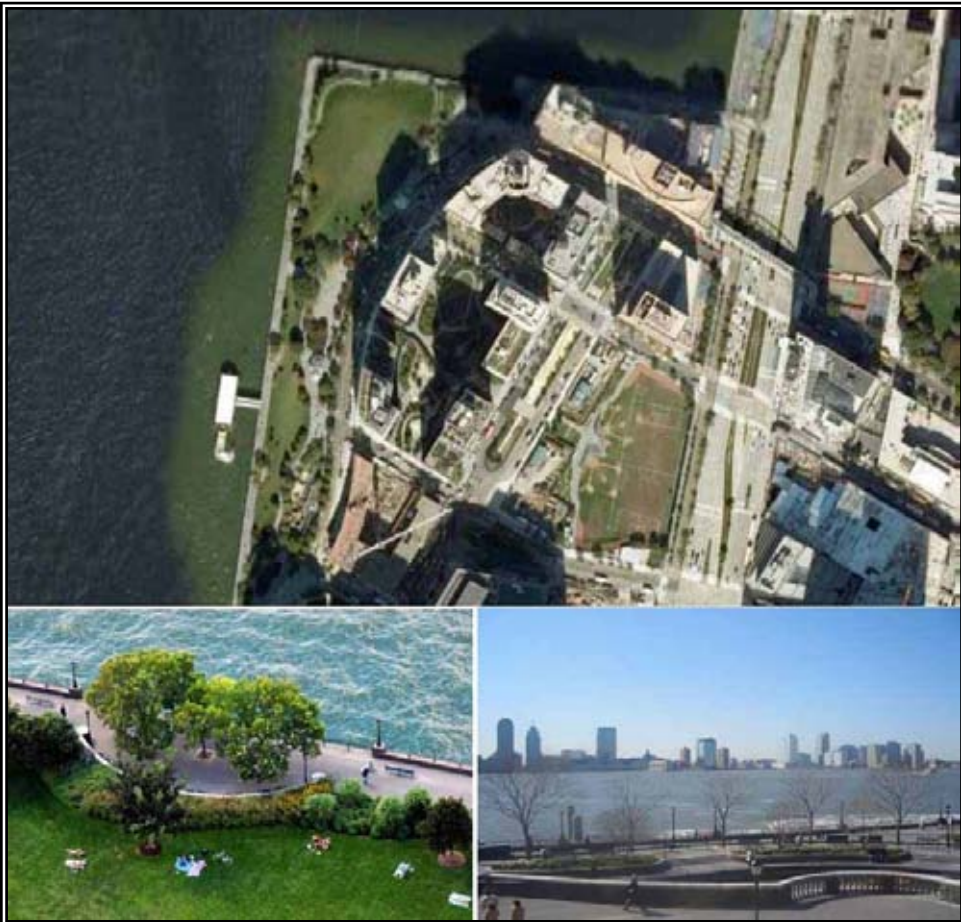


Figure (5-8) Aerial view and main features of Battery Park City Riverfront. Source (Google Earth)



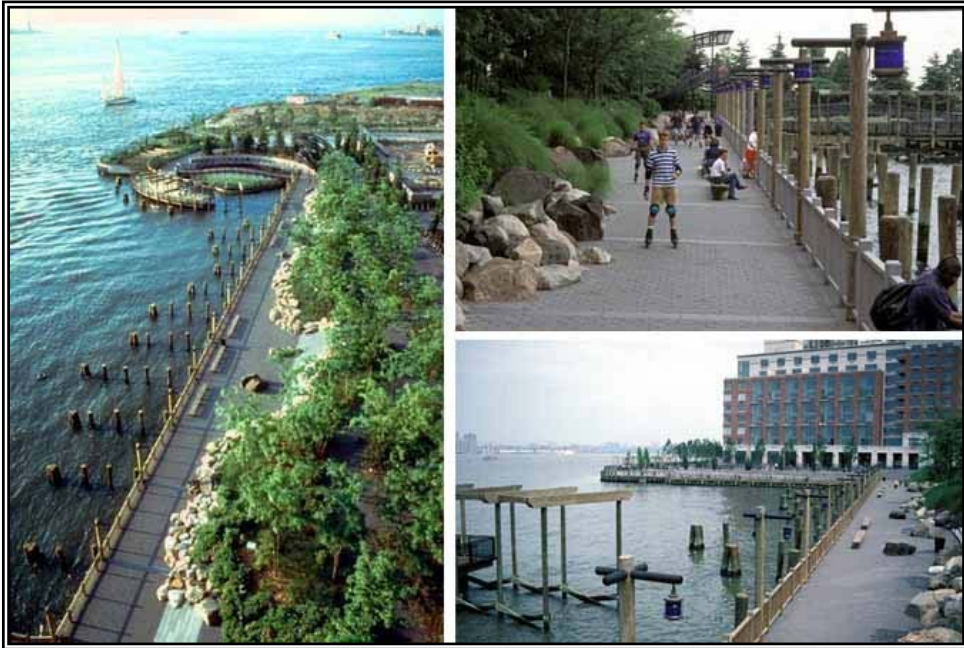


Figure (5-9) Battery Park City Riverfront. Source ([www.pps.org](http://www.pps.org))

### Battery Park City Riverfront's landscape regeneration description

With a grand plaza, an active riverfront, ferry service, a retail level, and a Winter Garden, the central area has all the components of a great place. The retail level has never really connected to the rest of the area. It is hidden behind formal architectural facades that leave most visitors unaware of its presence. The outside plaza has poor edge uses that are compensated with outdoor restaurant seating, but there appears to be little connection to any of the indoor uses. Public use is quite limited. People trying to use the limited seating available.<sup>1</sup>

It has a major problem with the natural area of rocks, trees and an overlook in the small harbor just south of the major residential area. It

---

<sup>1</sup> Scheff, J. (2008), p. 5

---

---

## Chapter 5

---

---

fails to accommodate basic human needs. One quickly sees that natural human activity such as sitting looking out over nice vistas is left out. In an urban setting, nature and human activity can go together quite well giving an elevated spiritual experience that would be better than sitting on a series of rocks trying to achieve some level of comfort.



Figure (5-10) Access, uses and sociability of Battery Park City Riverfront. Source (www.pps.org)

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ There is a walkway and bike path made out of concrete and granite pavers with bronze artwork, lights and railings.</li> <li>▪ There are benches and physical activity areas that border the walkway.</li> <li>▪ On higher ground there is another walkway and bike path.</li> <li>▪ There are small hills and ponds, all of which are beautifully landscaped.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The park is usually impeccable, with a great mixture of people.</li> <li>▪ A lot of sport activity such as soccer, biking, jogging, basketball, tennis, etc.</li> <li>▪ The plantings are changed monthly during spring and summer, once in the fall, and once again in winter.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ The park serves many purposes.</li> <li>▪ Sports, ferry service, public events, and sightseeing are among the many uses.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ People do often meet friends there.</li> <li>▪ Some people also use the park by themselves to read, walk or relax.</li> <li>▪ Active.</li> <li>▪ Definitely a meeting place.</li> <li>▪ Find both visitors and locals here</li> </ul>

Table (5-3) Riverfront's landscape regeneration aspects of Battery Park City Riverfront.  
By researcher



Figure (5-11) Access, uses and sociability Battery Park City Riverfront. Source (www.pps.org)

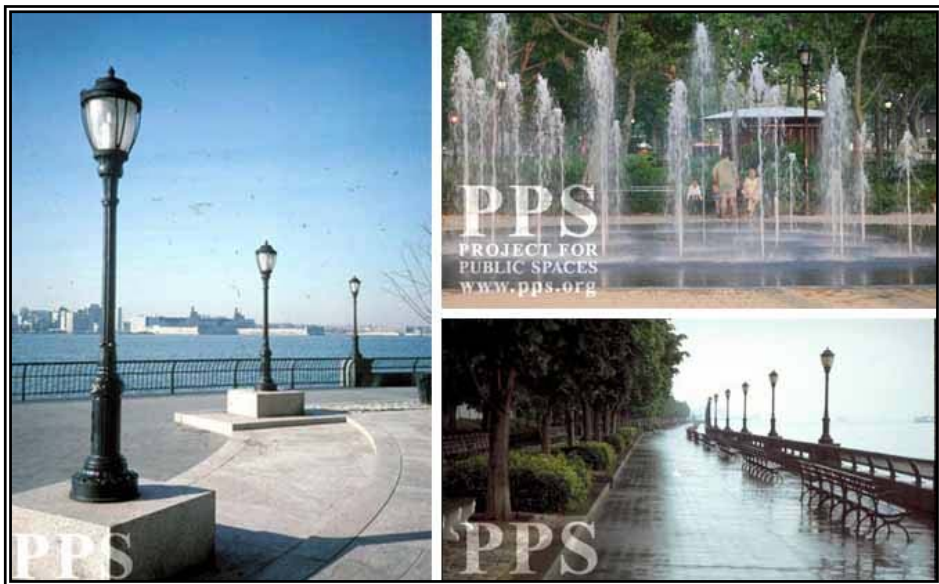


Figure (5-12) Some of landscape elements of Battery Park City Riverfront. Source (www.pps.org)

### 5.2.4 North Shore Riverfront Park

<b>Location</b>	North bank of the Allegheny and Ohio Rivers across from Downtown Pittsburgh, PA.
<b>Components Of Riverfront</b>	Consists of large public riverfront green space and trail connection stretching approximately one mile along the Allegheny and Ohio Rivers



Figure (5-13) North Shore Riverfront Park. Source (<http://en.wikipedia.org>)

#### North Shore Riverfront's landscape regeneration description

This park is special because it successfully achieved the goal of attracting the people of Pittsburgh to their rivers.

A two-level space, it consists of several distinguishing features. The first is the riverwall and riverwalk, which provide a strong trail connection along the water's edge. The riverwalk is 18 feet wide, allowing for various types of recreation. The walk is fitted with boat tie-

---

---

## Chapter 5

---

---

ups meant to encourage water recreation and alternate modes of transportation.

The second level includes large open panels of grass and native landscaping, traversed by accessible paths that run in a southwest orientation, mimicking the river. The esplanade runs at the top level of the park in an east west orientation. The esplanade features a broad walkway of brick, granite and sandstone that varies from sixteen to forty feet in width. As mixed-use development continues on the North Shore, this promenade will be used as a connection between retail shops and as a quiet place for outdoor dining and passive recreation. Other features, such as the water steps (an interactive fountain) have quickly become popular destinations for people of all ages.<sup>1</sup>



Figure (5-14)Features of North Shore Riverfront Park. Source (www.pps.org)

---

<sup>1</sup> Patricia, L.(2007)

Riverfront's landscape regeneration aspects	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ North Shore Riverfront Park has grown increasingly popular.</li> <li>▪ The park is highly visible.</li> <li>▪ Even on busy workdays, it is crowded with lunchtime walkers.</li> <li>▪ Riverboats use water landings in the park to drop off and pick up event-goers, and non-motorized boaters and paddlers use the landings and ramps as access points to the rivers.</li> <li>▪ People may also access the park by bicycle.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The area is both safe and comfortable for people of all ages.</li> <li>▪ Benches are positioned every fifty feet along the esplanade for seating.</li> <li>▪ North Shore Riverfront Park is generously lit, with contemporary fixtures both along the riverwalk and on the esplanade to increase public safety.</li> <li>▪ Emergency call boxes have been installed along the riverwalk for the safety of users.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ People of both genders and of all ages use the space regularly for exercise, recreation and even transportation.</li> <li>▪ Activities are both individual and group oriented in nature.</li> <li>▪ Individuals use the park for walking, jogging, bicycling, rollerblading, fishing and sunbathing.</li> <li>▪ All people, especially children, love to frolic in the water steps on a hot summer day. Men and women use the space with the same frequency.</li> <li>▪ The river walk and water steps tend to see the most visitors, but no section goes unused by the public.</li> <li>▪ The number of groups requesting use the Riverfront Park for special events.</li> </ul>

**Continue, Riverfront's landscape regeneration aspects**

**sociability**

- North Shore Riverfront Park is truly a front yard for local neighborhoods in the City of Pittsburgh.
- The park is easily accessible for elderly patrons, and safe for children.
- The park is inclusive and welcoming for every person, which is evident by the relaxed and friendly atmosphere of the place.
- Residents feel a sense of pride and ownership, and they bring their friends and out-of town guests to see it.

Table (5-4) Riverfront's landscape regeneration aspects of North Shore Riverfront Park.  
By researcher



Figure (5-15) high density vegetation as a feature. Source (www.pps.org)

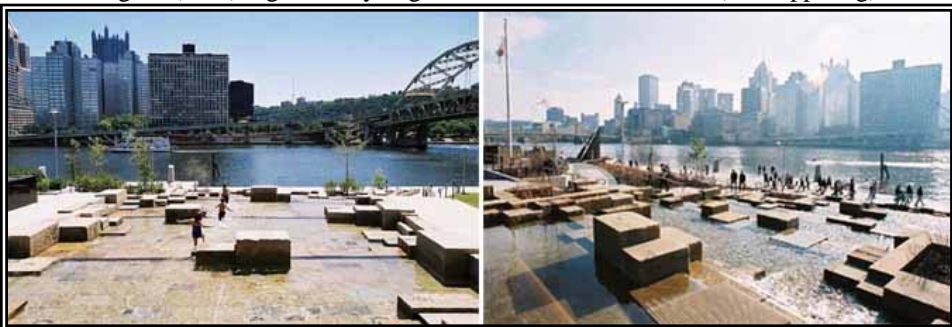


Figure (5-16) water steps as landscape elements. Source (www.pps.org)



**5.2.5 Louisville riverfront**

<b>Location</b>	River Road, on Ohio River Louisville, KY
<b>Components Of Riverfront</b>	Consists of 55 acres of formerly abused land transformed into a nationally recognized, award-winning public park on the banks of the Ohio River in downtown Louisville.

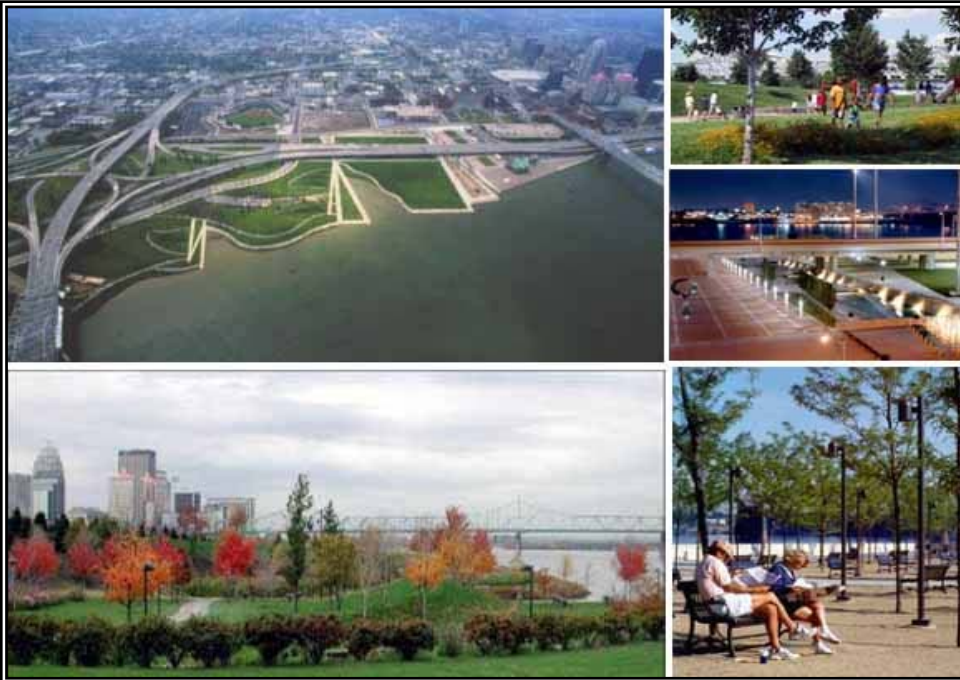


Figure (5-17) Louisville Riverfront. Source (www.pps.org)



Figure (5-18) Aerial view of Louisville Riverfront. Source (Google Earth)

**Louisville Riverfront's landscape regeneration description**

The park, an oasis of green in an urban environment, is located in what was historically a heavily industrial area of sand and gravel operations, scrap yards, petroleum-asphalt terminals, abandoned rail beds, and an interstate highway that effectively cut off all public access to the river. Riverfront Park reconnected the city to the river, and the park has been adopted as a community gathering space. The centerpiece of the park is the 12-acre Great Lawn that gently slopes to the river. It is used for large concerts, pick-up football games, viewing fireworks, flying a kite, or just lazing away an afternoon watching the river.

The wharf is the permanent home of the historic Belle of Louisville steamboat, and it also accommodates transient boaters and visiting riverboats such as the Delta Queen and American Queen. The festival plaza has built-in utilities and water hook-ups, and hosts concerts, festivals, craft fairs, and other events. A 900-foot long Water Feature has pools that cascade down to the river, with water cannons that shoot from pool to pool and an entry fountain called Dancing Waters that kids (of all ages!) jump around in to get wet. Linear Park includes popular children's play area, as well as picnic areas, tree groves, hills and meadows, and walking paths through the park and along the river.<sup>1</sup>



Figure (5-19) Main features of Louisville Riverfront, water plays, steps and ramp to water. Source ([www.pps.org](http://www.pps.org))

---

<sup>1</sup> Green, M. (2007)

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ Riverfront Park is easily accessed by bicycle, trolley, on foot, and by automobile.</li> <li>▪ Access to the Riverfront was improved by rerouting a heavily-used surface road so that it bounds rather than bisects the park.</li> <li>▪ The park was also designed to allow visual connections from downtown to the river that had never before existed.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The park is highly maintained, and it has its own maintenance crew on-site 365 days per year.</li> <li>▪ The combination of constant activity and the daily presence of uniformed park personnel help to impart a feeling of safety and security.</li> <li>▪ Benches and trash cans are conveniently located throughout the park.</li> <li>▪ Parking is available in several small</li> <li>▪ Park users are of all ages, including families with children, office workers, and school groups.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ The Riverfront Park is heavily used, averaging more than 1.25 million visitors per year.</li> <li>▪ Visitors are reading or watching barges go by on the river.</li> <li>▪ Kids playing in Dancing Waters.</li> <li>▪ Vendors and event producers setting up for night concerts.</li> <li>▪ Children's Play area packed with kids from all parts of the community.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ It has been chosen by the community as the central place where people want to be.</li> <li>▪ There are no strangers as kids play together in the fountain and play area.</li> <li>▪ People walking or running in the park smile and nod as they encounter others along the way.</li> <li>▪ The park seems to be the place where everyone starts when they want to show off Louisville to visiting friends or relatives.</li> </ul>

Table (5-5) Riverfront's landscape regeneration aspects of Louisville Riverfront Park. By researcher

---

---

## Chapter 5

---

---



Figure (5-20) Louisville Riverfront, landscape treatments of riverfront's edge, green steps, riverwalk. Source ([www.pps.org](http://www.pps.org))



Figure (5-21) Louisville Riverfront, new regeneration project. Source ([www.louisvillewaterfront.com](http://www.louisvillewaterfront.com))

### 5.2.6 Anderson Riverfront

<b>Location</b>	Rupert Road at Sacramento River Anderson, California.
<b>Components Of Riverfront</b>	A community park along the Sacramento River in the City of Anderson.



Figure (5-22) Anderson Riverfront. Source ([www.pps.org](http://www.pps.org))

#### Anderson Riverfront's landscape regeneration description

Anderson Riverfront Park is comprised of several sections that lend themselves to varied uses by residents of all age groups. The park's facilities include manicured soccer fields, lighted tennis courts, a large covered barbecue/picnic pavilion, horseshoe and bocce-ball pits, fishing ponds, a playground, scout hall, walking trails, Veteran's memorial garden, and an amphitheatre. The park is also home to the Shasta Wildlife Refuge, which shelters and rehabilitates wounded fauna from the area.<sup>1</sup>

---

<sup>1</sup>Erickson, M. (2003)

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ The Anderson River Park is accessible to the community by car, bus, boat, bicycle, or, for those willing to walk about 1/2 mile, by foot.</li> <li>▪ One main two-way paved road loops through the park and provides access to parking, as well as to the park's many amenities.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ Riverfront Park is a beautiful blend of natural surroundings and just enough landscaping to make it user friendly.</li> <li>▪ Seating is provided at picnic tables and on large grassy lawns.</li> <li>▪ The park is kept so clean that because there was not enough trash to pick up.</li> <li>▪ Security is provided for large events, but the park is very safe for family use. Parking areas are visible near the road, but are not dominant, and are not visible from many of the picnic areas.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Anderson River Park offers a variety of uses.</li> <li>▪ Individual and family uses include weddings, picnics and reunions.</li> <li>▪ Examples of free events include multicultural fairs.</li> <li>▪ Summer series of free community concerts.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ It is a place that is shown off with great pride to visitors.</li> <li>▪ families enjoying sports, playground and picnic facilities, encounter an elderly couple or two taking a stroll, observe bicyclists enjoying the cool river breezes, and anglers fishing from the bank or drifting by in boats.</li> </ul>

Table (5-6) Riverfront's landscape regeneration aspects of Anderson Riverfront Park. By researcher

**5.2.7 Brooklyn Riverfront (Brooklyn Heights Promenade)**

<b>Location</b>	Renssen Street to Orange Street along the East River Brooklyn, NY
<b>Components Of Riverfront</b>	Perched above the Brooklyn-Queens Expressway, this 1/3-mile long walkway provides a fantastic place to stroll and stunning views of the Manhattan skyline. A promenade extending about five blocks from Renssen St to Orange St along the East River.

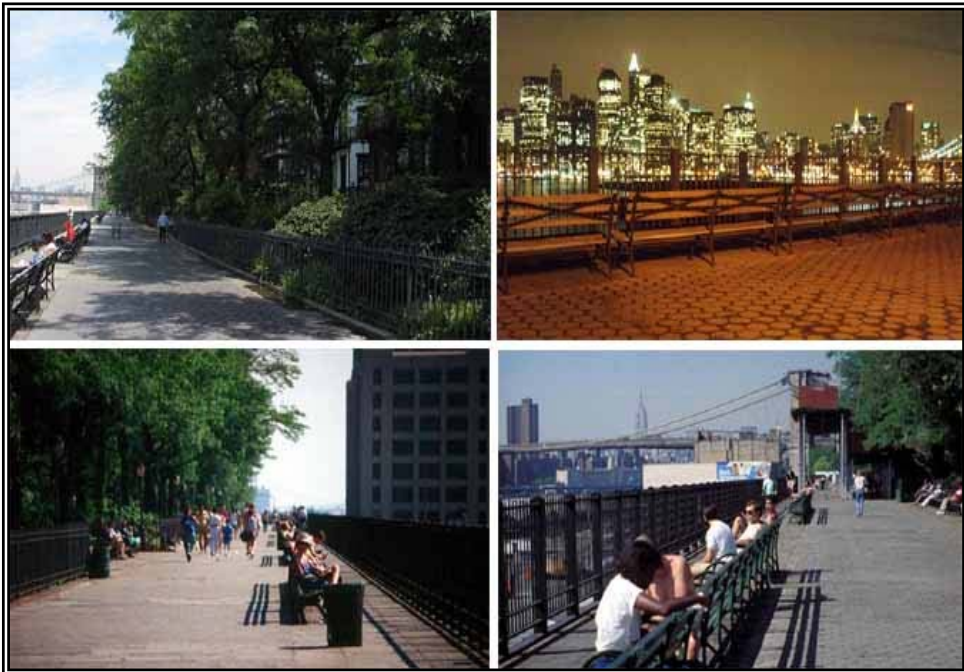


Figure (5-23) Brooklyn Riverfront. Source (<http://en.wikipedia.org>)

**Brooklyn Riverfront's landscape regeneration description**

This exclusively pedestrian walkway offers majestic views of downtown Manhattan, the East River and the Brooklyn Bridge. Lined with flowerbeds, playgrounds, and two rows of benches, the park is a favorite destination for joggers, walkers and roller-bladers. Its width and the plethora of green space also offer places for quieter relaxation and contemplation.<sup>1</sup>

The Promenade, actually an esplanade, cantilevered over the Brooklyn-Queens Expressway is a favorite spot among locals, offering magnificent vistas of the Statue of Liberty, the Manhattan skyline across the East River, as well as views of the Brooklyn Bridge and the Manhattan Bridge.



Figure (5-24) Brooklyn Riverfront Visitors enjoy the views of Manhattan and the East River along the Promenade. Source (www.pps.org)



Figure (5-25) Aerial view of Brooklyn Riverfront. Source (Google Earth).

---

<sup>1</sup> Debby, A., (2006).



<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ The promenade can be accessed on foot from any of the side streets that intersect it.</li> <li>▪ It is within walking distance of many subway stations and countless bus stops.</li> <li>▪ Drivers may have a hard time finding parking on the narrow streets of the adjacent neighborhood.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The benches are quite comfortable and almost full on nice days.</li> <li>▪ The row of trees between the buildings and the promenade creates a nice shade for the benches at the back wall of the promenade.</li> <li>▪ Those desiring a closer view of Manhattan can sit closer to the water.</li> <li>▪ The only problem is that the seats near the water are too low to have an unobstructed view over the fence when sitting.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Every conceivable use for such a narrow space can be found.</li> <li>▪ Many people come to sit and look at the view, read, relax, eat or talk.</li> <li>▪ People stroll or jog along the Promenade.</li> <li>▪ Tourists come to snap photographs.</li> <li>▪ There is also a children's playground.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ People of all ages go to the Promenade to hang out with their friends.</li> <li>▪ It is quite common for two people who find themselves sitting next to each other on the Promenade's benches to strike up conversation.</li> <li>▪ Tourists often ask locals to take their picture in front of the Manhattan skyline.</li> <li>▪ Although the Promenade has helped drive Brooklyn Heights' gentrification, the Promenade draws people from everywhere, and the diversity on display is beautiful.</li> </ul>

Table (5-7) Riverfront's landscape regeneration aspects of Brooklyn Riverfront. By researcher

### **5.2.8 Chattanooga Riverfront**

<b>Location</b>	Hamilton County Tennessee River Walk, United States.
<b>Components Of Riverfront</b>	Park for public access to the river for walking, balding & biking.



Figure (5-26) Chattanooga Riverfront. Source (<http://en.wikipedia.org>)

#### **Chattanooga Riverfront's landscape regeneration description**

Currently expanding to reach from the Chickamauga Dam to Ross's Landing downtown, the Riverwalk has approximately eight miles of wide

---

---

## Chapter 5

---

---

pavement for walking/ biking/ blading along the Tennessee River for recreation. Boat ramps and pavilions are also part of this park system. This greenway system is also being developed to follow the major tributaries along the Tennessee River for enjoyment throughout the city.

21st Century Chattanooga riverfront, Chattanooga, Tennessee, the regeneration project is developing the master plan for these 129 acres of riverfront on both the north and south sides of the Tennessee River. The design identifies distinct district characters and creates a bold new riverfront for all of Chattanooga, grounded in those qualities of site and history that have made Chattanooga unique. The design recaptures the site of the original founding of Chattanooga and reconnects the city to its waterfront, incorporating 83 acres of open space and infrastructure and 46 acres of new mixed-use development, making the city's goal of "living, working, playing and learning at the river" a reality.<sup>1</sup>



Figure (5-27) Main features of Chattanooga Riverfront, water plays, steps and ramp to water. Source ([www.pps.org](http://www.pps.org))

---

<sup>1</sup> <http://www.hargreaves.com/projects/Waterfronts/Chattanooga/>

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ It connects to major roads and there is plenty of parking at the various access points along the eight mile river walk.</li> <li>▪ It is not linked to any residential area - although there is access downtown by bus.</li> <li>▪ Paved sidewalks are very wide to allow passing on bikes and blades.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ Very good first impression.</li> <li>▪ Very clean, Hamilton County maintains the park and the river-walk.</li> <li>▪ It is regularly policed, closed at night and patrolled all the time.</li> <li>▪ The river-walk has an image of safety.</li> <li>▪ Vehicles do not dominate.</li> <li>▪ It seems to be equal between walkers and other modes of transportation (bikes and blades).</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Seems to be more enjoyed by the adults (young and old).</li> <li>▪ Children accompanied by adults (the limited access without an auto keeps children from visiting alone).</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ It is more utilized by natives in the area.</li> <li>▪ It is attractive enough to bring out of town guests for a picnic and a hike.</li> </ul>

Table (5-8) Riverfront's landscape regeneration aspects of Chattanooga Riverfront. By researcher

**5.2.9 Hudson Riverfront**

<b>Location</b>	The Hudson River Riverfront Walkway (HRWW) is a unique public space located along the Hudson River, United states.
<b>Components Of Riverfront</b>	Park for public access to the river for walking, balding & biking.



Figure (5-28) Hudson Riverfront. Source (www.pps.org)

**Hudson Riverfront's landscape regeneration description**

The riverfront walkway is an unsurpassed civic space, serving not only as the front yard to Hudson County, but also creating an iconic image for New Jersey's Hudson riverfront. In establishing unimpeded access to the water's edge, it provides a place for recreational activities, social interaction and community events. In some municipalities, it is the only remaining open space left in a highly congested urban area.

<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ There is a walkway and bike path made out of concrete and granite pavers with bronze artwork, lights and railings.</li> <li>▪ There are benches and physical activity areas that border the walkway.</li> <li>▪ It is within walking distance of many subway stations and countless bus stops.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The benches are quite comfortable and almost full on nice days.</li> <li>▪ Those desiring a closer view can sit closer to the water.</li> <li>▪ The guardrail safe while it is transparent, so visitors can access river's view safely and direct accessibility at the same time.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Every conceivable use for such a narrow space can be found.</li> <li>▪ Many people come to sit and look at the view, read, relax, eat or talk.</li> <li>▪ . River Walk is very active and there are constant streams of visitors, making the park feel very safe.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ People do often meet friends there.</li> <li>▪ Some people also use the park by themselves to read, walk or relax.</li> <li>▪ Active.</li> <li>▪ Definitely a meeting place.</li> <li>▪ Find both visitors and locals here</li> </ul>

Table (5-9) Riverfront's landscape regeneration aspects of Hudson Riverfront.  
By researcher.

### 5.2.10 Paris Pelage riverfront

Location	Pompidou Expressway, Right Bank of the Seine Paris, France
Components Of Riverfront	Cars are stricken from the expressway along the Seine for one month every summer, as it turns into a pedestrian paradise.



Figure (5-29) Paris Plage Riverfront. Source (www.pps.org)

#### Paris Pelage Riverfront's landscape regeneration description

For one month every summer, the Georges Pompidou Expressway along Paris's Right Bank transforms into a pedestrian refuge replete with a sandy beach. A dazzling array of attractions vie for your attention, from activities like dance lessons, climbing walls, games, and swimming (in floating pools, not the Seine, thankfully), to amenities like beach chairs, cafes, misting fountains, and shady palm trees. Its enormous popularity can be traced to strong management and innovative programming, which

---

---

## Chapter 5

---

---

keep the place humming well into the night with shows and performances. Though financed in part by corporate sponsors, the acknowledgements are appropriately modest. There are no outrageous logos on display, and the experience never feels overwhelmed by commercialism. Paris Pelage is a truly public space of tremendous benefit to everyone.



Figure (5-30) Uses and Activities in Paris Pelage Riverfront. Source ([www.pps.org](http://www.pps.org))



<b>Riverfront's landscape regeneration aspects</b>	
<b>Access &amp; linkage</b>	<ul style="list-style-type: none"> <li>▪ There is a walkway and bike path made out of concrete and granite pavers with bronze artwork, lights and railings.</li> <li>▪ There are benches and physical activity areas that border the walkway.</li> <li>▪ It is within walking distance of many subway stations and countless bus stops.</li> </ul>
<b>Comfort &amp; image</b>	<ul style="list-style-type: none"> <li>▪ The benches are quite comfortable and almost full on nice days.</li> <li>▪ Those desiring a closer view can sit closer to the water.</li> <li>▪ The guardrail safe while it is transparent, so visitors can access river's view safely and direct accessibility at the same time.</li> </ul>
<b>Uses &amp; activities</b>	<ul style="list-style-type: none"> <li>▪ Every conceivable use for such a narrow space can be found.</li> <li>▪ Many people come to sit and look at the view, read, relax, eat or talk.</li> <li>▪ . River Walk is very active and there are constant streams of visitors, making the park feel very safe.</li> </ul>
<b>sociability</b>	<ul style="list-style-type: none"> <li>▪ People do often meet friends there.</li> <li>▪ Some people also use the park by themselves to read, walk or relax.</li> <li>▪ Active.</li> <li>▪ Definitely a meeting place.</li> <li>▪ Find both visitors and locals here</li> </ul>

Table (5-10) Riverfront's landscape regeneration aspects of Hudson Riverfront.  
By researcher.

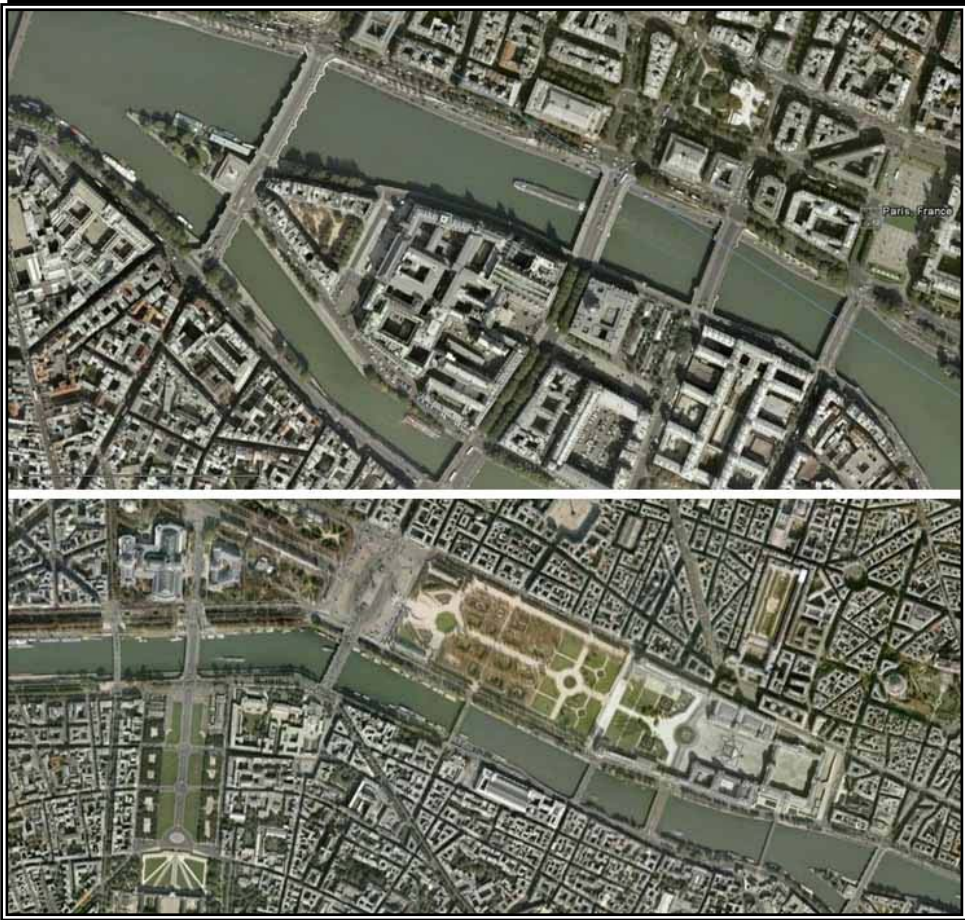


Figure (5-31) Aerial views of Paris pelage Riverfront. Source (Google Earth)

### **5.3 Examples of under construction projects of riverfronts' regeneration**

In the next section the research will present some under construction projects of riverfronts still under study, in purpose of learn from how these projects make regeneration concepts and goals and they deals with different environments.

### **5.3.1 Regeneration of Cincinnati Riverfront Park, Cincinnati, Ohio**

#### **Cincinnati Riverfront's landscape regeneration concept**

The master plan for the Cincinnati Riverfront park creates a grand, civic green space to occupy the primary central riverfront. The park is situated between the new Bengals' football and Reds' baseball stadiums at the landing of the Roebling Bridge. The park will provide a focus for civic celebration on the river, a framework for festivals and development opportunities, recreational space, continuous river access and flood protection for downtown.<sup>1</sup>

Cincinnati Parks will oversee the planning, development and building of the park and subsequently sustain the Park as an enduring riverfront destination landmark.



Figure (5-32) Features of Cincinnati Riverfront regeneration. Source (www.hargreaves.com)

#### **Cincinnati Riverfront's landscape regeneration principles and ideas**

- Major civic space at front door of city
- Setting for festivals and events

---

<sup>1</sup> [http://www.crpark.org/why\\_cincinnati\\_riverfront\\_park.htm](http://www.crpark.org/why_cincinnati_riverfront_park.htm)

---

---

## Chapter 5

---

---

- Access to the river
- Features and activities to draw visitors
  - Playgrounds
  - Water Features
  - Gardens.
  - Boat Landings.
  - Event Lawn.
  - Bike Path / Walkways.
  - Restaurants & Cafes.
  - A river's edge promenade with over-sized "porch" swings.
  - Green spaces for festivals and community events.
  - Tree Groves.
  - Continuous Walk-ways.
- Linkage to existing riverfront parks.
- The park will provide a new river edge.
- The Park will provide flood mitigation and erosion control.
- The park will be an economic engine and regional destination.<sup>1</sup>



Figure (5-33) Cincinnati Riverfront's landscape regeneration. Source ([www.hargreaves.com](http://www.hargreaves.com))

---

<sup>1</sup> [www.hargreaves.com/projects/Waterfronts/CinRiverPark](http://www.hargreaves.com/projects/Waterfronts/CinRiverPark). accesses March.,2009

### **5.3.2 Regeneration of Nashville Riverfront Park, Tennessee.**

#### **Nashville Riverfront's landscape regeneration concept**

The project creates a 150 acre island by carving a new recreational waterway between the existing Titans stadium and inner I-24 loop.

The Urban Forest is connected to a series of a larger framework of public open spaces which stretch through the site. Development within the island is concentrated along a major new north/south boulevard which links fragmented portions of East Nashville. This development also defines a new active rivers edge with a multi-level River-walk framed by commercial, marina, and residential development.<sup>1</sup>



Figure (5-34) Features of Nashville Riverfront regeneration. Source (www.hargreaves.com)

---

<sup>1</sup> [http://www.crpark.org/why\\_cincinatti\\_riverfront\\_park.htm](http://www.crpark.org/why_cincinatti_riverfront_park.htm)



Figure (5-35) New ideas in regeneration of Nashville riverfront. Source ([www.civildesigncenter.org](http://www.civildesigncenter.org))

### Nashville Riverfront's landscape regeneration principles and ideas

- Improve direct access to river.
- Provide public access to the riverfront that is a popular local and regional destination.
- Establish riverfront benchmark quality and sets precedent for future phases.
- Remove fences and make people in direct contact with water. Provide safe, diverse activities and elements for park use day/night; year round.
- Increase green spaces along the riverfront's edge.
- Design a continuous river-walk to improve public activities such as walking and bicycling.
- Create upper promenade as a raised level to increase the visual

access to river.

- Features and activities to draw visitors
  - Playgrounds
  - Water Features
  - Gardens.
  - Boat Landings.
  - Event Lawn.
  - Bike Path / Walkways.
  - Restaurants & Cafes.
- river focus for the community, link adjacent neighborhoods, river quality & use, engage the river, quality open space / recreation, access to the river, sustainable riverfront corridor.



Figure (5-36) Nashville Proposed public riverfront Adventure Park as a new landscape regeneration idea. Source (<http://www.nashville.gov/parks/riverfront>. accessed Mai 2008).

### **5.3.3 Regeneration of Anacostia Riverfront, Washington, DC.**

#### **Anacostia Riverfront's landscape regeneration concept**

This award-winning master plan focuses on improving more than 1,500 acres along the Anacostia River and adjoining urban lands within the District of Columbia, an initiative backed by an unprecedented Memorandum of Understanding among 18 federal and district agency committees. Our work defined the project's environmental agenda and open space framework, and involved interaction with multiple stakeholders in achieving consensus on the design of neighborhood-specific recreation needs, national civic interests, and watershed health as well as district and federal mandates. Environmental recommendations included the delighting of major tributaries flowing into the Anacostia, and the provision of wetlands at the point of outfalls to help retain and filter urban runoff.<sup>1</sup>



Figure (5-37) Features of Anacostia Riverfront regeneration. Source (<http://dcbiz.dc.gov>)

---

<sup>1</sup> [http://www.crpark.org/why\\_cincinatti\\_riverfront\\_park.htm](http://www.crpark.org/why_cincinatti_riverfront_park.htm)



## Anacostia Riverfront's landscape regeneration principles and ideas

### Breaking Down Barriers and Gaining Access through<sup>1</sup>

- Getting to the river.
- Moving along the river.
- Crossing the river.
- Using the river for commuting.
- Minimizing/eliminating barriers.
- Provide continuous pedestrian and bicycle access along the entire riverfront.
- Aggressively promote a modal shift to public transit.
- Create great urban boulevards with mixed uses, landscaping, and great civic spaces.
- Redesign bridges across the Anacostia in tradition of great civic architecture.
- Redesign highways and freeways to become less of a barrier between neighborhoods and riverfront parks.
- Reconnect the city street grid to riverfront parks.

### A Great Riverfront Park System through

- Maritime activities and boating.
- Active recreational and sports facilities.
- Special view-corridors and vistas.
- Great public and open spaces.
- Completing/enhancing promenades and trails.
- Ensure continuous access along the riverfront for pedestrians and bicyclists.
- Increase recreational opportunities along the riverfront parks system.

---

<sup>1</sup> <http://www.planning.dc.gov>

**5.3.4 New Orleans Reinventing the Crescent, New Orleans, Louisiana.**

**New Orleans Riverfront's landscape regeneration concept**

On the conceptual master plan for 4.5 miles of the New Orleans riverfront. 86% of the 174 acre project area was determined to be suitable solely for landscape due to regulations and ownership, resulting in a landscape-focused concept. A continuous route of pedestrian circulation along the Mississippi is punctuated with vehicular access and regeneration opportunities, yielding new connections to the river and new park program at the river.



Figure (5-38) Existing conditions of New Orleans riverfront. Source (Google Earth)

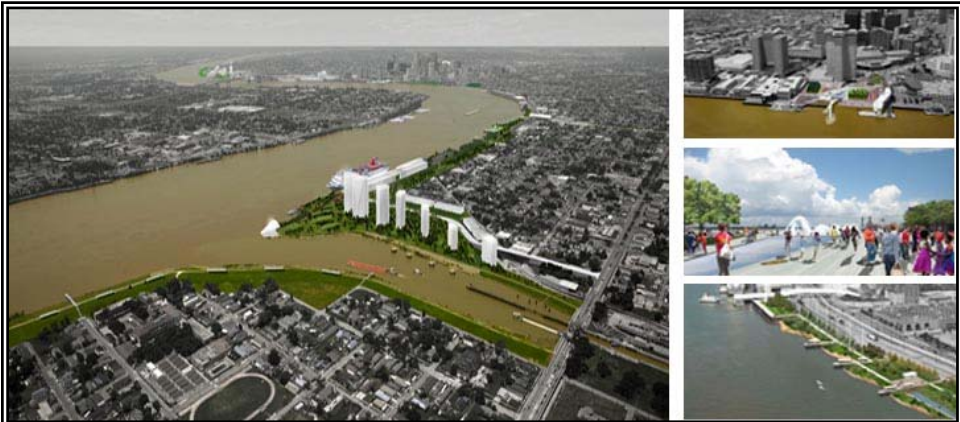


Figure (5-39) New ideas in regeneration of New Orleans riverfront. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

FOUR DESIGN GOALS

*if we...*

<b>1</b> Remove Barriers to River	<b>2</b> Continuous River Access	<b>3</b> Great Gathering Places	<b>4</b> New Iconic Architecture
-----------------------------------	----------------------------------	---------------------------------	----------------------------------

TO ACHIEVE FIVE ECONOMIC GOALS

*then we...*

<b>5</b> Great Places to Live	<b>6</b> Stimulate Economic Growth	<b>7</b> Create New Jobs	<b>8</b> Trigger Private Investment	<b>9</b> Increase Tax Revenue
-------------------------------	------------------------------------	--------------------------	-------------------------------------	-------------------------------

Figure (5-40) New Orleans riverfront's regeneration goals. Source (neworiverfront.com)



Figure (5-41) some features of New Orleans riverfront's regeneration. Source (neworiverfront.com)

### **5.3.5 St. Louis Riverfront, Great Rivers Greenway District**

#### **St. Louis Riverfront's landscape regeneration concept**

On the conceptual master plan for 4.5 miles of the New Orleans riverfront. 86% of the 174 acre project area was determined to be suitable solely for landscape due to regulations and ownership, resulting in a landscape-focused concept. A continuous route of pedestrian circulation along the Mississippi is punctuated with vehicular access and regeneration opportunities, yielding new connections to the river and new park program at the river.



Figurer (5-42) Aerial view of proposed are of riverfront's regeneration of St. Louis riverfront. Source (Google Earth).

#### **St. Louis Riverfront's landscape regeneration principles and ideas**

- Create a new space/experience that is inviting, attractive and vibrant to make the riverfront its own destination.
- Establish the riverfront as a major interconnected greenway within The River Ring.
- Create an environment for future public and private development and investment opportunities,
- Safely integrate pedestrians, automobiles, bicycles and other forms of transportation in a compatible way.
- Accommodate the average daily attendance and infrastructure for

---

---

## Chapter 5

---

---

major civic events,

- Provide an appropriate setting for large performance events,
- Design public space to accommodate the varying water levels.



Figure (5-43) Four alternatives for St. Louis Riverfront's landscape regeneration

### **5.3.6 River Manzanares Riverfront, Madrid, Spain**

#### **Manzanares Riverfront 's landscape regeneration concept**

The banks will be adapted for dams' recuperation, enlarging them in some places, for the river cleaning; will allow the creation of a beach near El Matadero. To avoid the river to be a new barrier, 23 pedestrian bridges will be built.



Figure (5-44) Manzanares Riverfront's landscape regeneration. Source (google.o.uk)

### **5.4 Summary & Conclusion:**

From this chapter it is clearly improved that any successful riverfront's landscape regeneration projects depends on four aspects which in direct contact with the lay public. These aspects are access & linkage, comfort & image, uses & activities and sociability. Each aspect of them relies on sub aspects such as:

- Access & linkage: relies on physical and visual access, access from any where, visibility from distance, ease in walking through, clarity of information and signage, etc.
- Comfort & image: relies on overall attractiveness, feeling of safety, cleanliness and quality of landscape elements, comfort of space to set, good lighting, interactive water features, order of trees and vegetation, etc.
- Uses & activities: relies on diversity of activities, passive & active uses, presence of water and water related activities, presence of cultural and community activities, etc.
- Sociability: relies on number of users, sense of pride and ownership, presence of children and seniors.

It improved that good design of landscape elements is the major factor of riverfront's regeneration; also public access to riverfronts is the main goal of the majority of riverfronts' regeneration projects.

From the previous examples we can extract a series of 10 principles provide a foundation for overall Nile riverfront public space framework.

10 principles provide a foundation for overall riverfront public space framework.	
1	Introduce continuous, publicly accessible and magnificent water's edge
2	Increase and enhance greening and beautification
3	Provide a diversity of public spaces fostering culture and creativity in the city while taking advantage of heritage and archaeological features
4	Design all public spaces to a high environmental standard
5	Strengthen two banks connections along the riverfront
6	Link existing communities to emerging riverfront communities and spaces
7	Design riverfront's landscape which accommodate different users, and accommodate flexible use.
8	Introduce a palette of riverfront design elements fostering clarity and continuity in all public spaces
9	Improve user experience by enhancing the character and quality of the riverfront's landscape through innovative design
10	Create a network of public spaces that attract and invite both citizens and other public all-over the world to the local riverfront

Table (5-11) Principles of riverfront public space framework. By researcher



---

---

## Chapter 5

---

---

Also from previous examples we can determine some steps to make great riverfront's regeneration and other problems have to be taken in consideration when making a regeneration of riverfronts.

Steps to Create a Great Regeneration of Riverfronts	
1	Attention first at the public space
2	Public goals are the primary objective
3	Regeneration has to be on existing assets & context
4	The creation of a shared community vision
5	The creation of a multiple use destinations along a riverfront
6	Make connect destinations along the riverfront
7	Maximize Opportunities for Public Access
8	Balance Environmental Benefits with Human Needs

Table (5-12) Steps to create a great regeneration of riverfronts. Adapted from (www.pps.org)

Problems with Regeneration of Riverfront	
1	Single-Use Developments, Not Multi-Purpose Destinations
2	Too Much Passive Space or Too Much Recreation
3	Private Control, not Public Access
4	Lack of Destinations
5	A Regeneration Process Driven by Development, Not by Community

Table (5-13) Problems with regeneration of riverfronts. Adapted from (www.pps.org)



**PART  
TWO**

**Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape**



**Chapter  
5**

**Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn**

**Chapter  
6**

**Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation**

**Chapter  
7**

**Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation**

**Chapter  
8**

**Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration**



**Introduction**

**Riverfront's landscape types**

**Ideas for riverfront's landscape regeneration**

**Riverfront's landscape elements**

**Riverfront's landscape design reference standards**

**Keys of riverfront's landscape evaluation**

**Summary & conclusions**



## 6.1 Introduction

As we looked at successful riverfronts in different cities, we found a series of common elements; these elements are the structure for the following section, which will explore each of these as fundamental ingredients of successful riverfronts.

This chapter will come after previous chapter to determine riverfront's landscape types, components, and landscape elements, then determines the evaluation factors of each element, and shows how they can affect the riverfronts aspects and sub-aspects to define finally a matrix between riverfront' landscape aspects and the landscape elements and their factors.

## 6.2 Riverfront's landscape types

Riverfront's landscape types can be classified according to its nature or its form as following<sup>1</sup>:

### 6.2.1 Modular landscape

As the riverfront is not uniform, it may be advantageous to create a series of landscape conditions to respond to immediate circumstances. This will reinforce the variety of site and programmatic requirements.

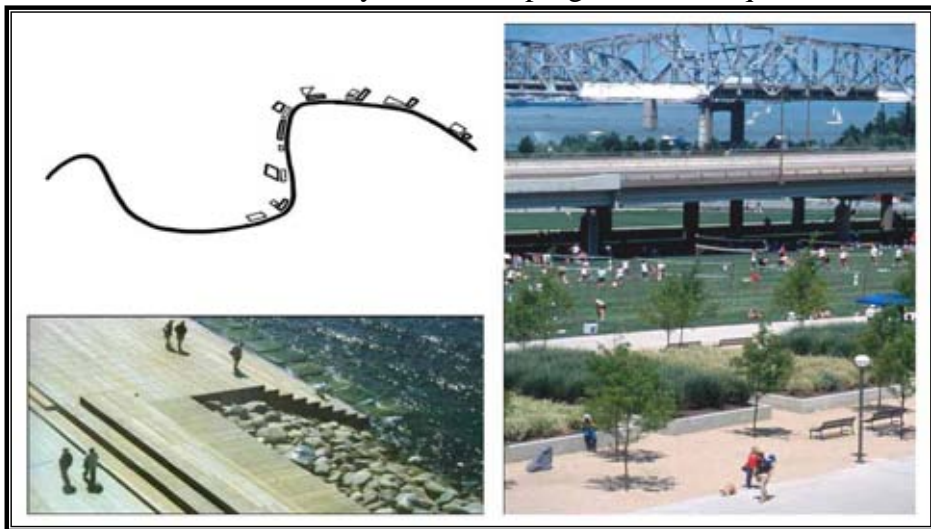


Figure (6-1) Modular riverfront's landscape. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

---

<sup>1</sup> Mayor, C. (2008), p. 17

### **6.2.2 Arpent landscape**

As the historic arpent were the framework for the City and connected it to the river, perpendicular access routes from neighborhoods to the riverfront will enrich the public environments in both.

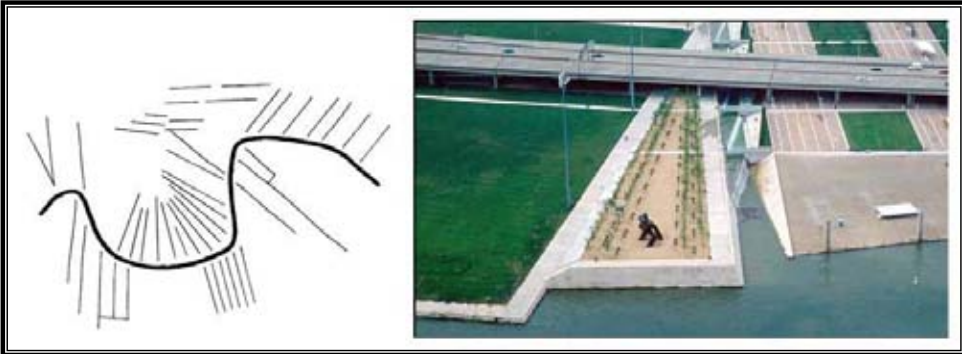


Figure (6-2) Arpent riverfront's landscape. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

### **6.2.3 Ecological landscape**

Allowing the river ecology to reclaim certain areas along the riverfront would be a way to provide a beautiful setting while preserving native species of plants and animals.

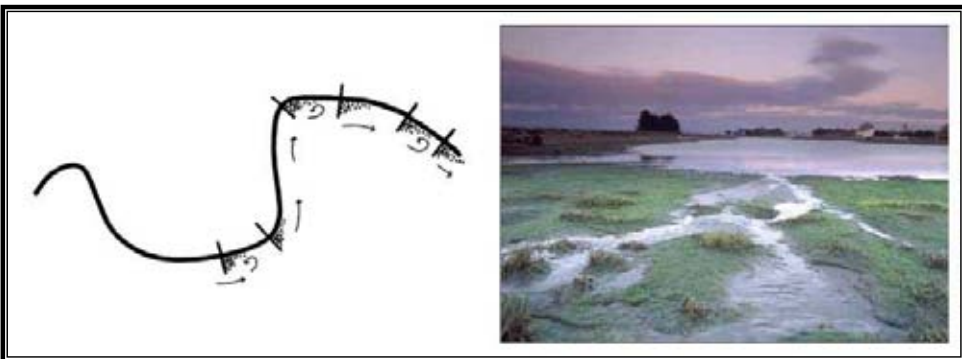


Figure (6-3) Ecological riverfront's landscape. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

### **6.2.4 Hybrid landscape**

A combination of the modular, arpent and ecological landscape strategies would allow for a variety of conditions and experiences along



the riverfront and encourage a collection of public interactions with the riverfront.

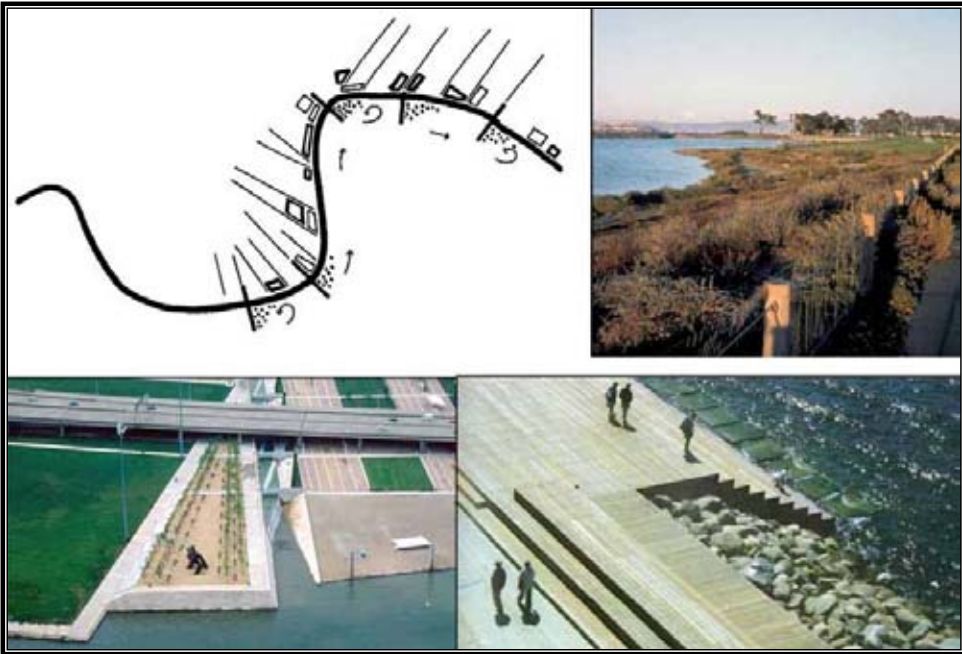


Figure (6-4) Hybrid riverfront's landscape. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

### **6.3 Ideas for riverfront's landscape regeneration**

Here the research, from previous review of different varieties of international riverfront's landscape projects, will try to put some ideas for riverfront regeneration, which differ from urban forest, pavilions, plaza, river lawn, docks, continuous promenade, etc.

These ideas can be the basis of any riverfront projects in the first concept stage to determine what is suitable for the location, contexts, uses and users of the riverfront area which will be under regeneration process.

#### **6.3.1 Urban forest**

The Urban Forest can enhance the game day tailgating experience, while wide spaces can be with reinforced grass. Additional shade trees shall be planted while allowing the existing trees to grow larger. It can be near from natural theme or with ordered trees as artificial forest.



Figure (6-5) Idea of urban forest at Nashville riverfront.  
Source (Ballard, P., et. al., 2007)

### **6.3.2 Play or entertainment plaza**

As a place for families and children to enjoy, it boasts an adventure playground, with age specific play equipment, a splash pad to offset summer heat, a bike circuit for teaching children how to bike, shaded picnic areas, a park pavilion, fishing opportunities, and a walkway park can be used throughout the seasons and individuals can walk easily. It can be used for entertainment like festivals or gathering around huge media projector.



Figure (6-6) Media projection is one of ideas in New Orleans riverfront regeneration.  
Source ([www.neworiverfront.com](http://www.neworiverfront.com))



Figure (6-7) entertainment plaza. Source (<http://www.nashville.gov/parks/riverfront/>)

### **6.3.3 Riverfront esplanade or continuous Promenade**

It is great idea for long riverside space with no level or contour. is a long, open, level area, usually next to a river, where people may walk. It is useful for social activities.<sup>1</sup> It may consist of paved side –walk and seating faced to river.



Figure (6-8) Various promenade from East river, New York.  
Source (Amanda M. et al., 2006)

### **6.3.4 River mixture of lawn & deck**

It can be used in conjunction with Riverfront Park performance docking as well as the new Public Square Amphitheater. A lawn can be passive area used for sitting and relaxing because it consists of large

---

<sup>1</sup> [www.thefreedictionary.com](http://www.thefreedictionary.com)

---

---

## Chapter 6

---

---

space of green area. The deck may be active space, the mixture between may be used for playing and various activities.

The next project is a step towards the vision of a green, accessible riverfront to give opportunities for the public to re-imagine the central Delaware riverfront.<sup>1</sup>



### Scheme 1 “The lawn”

An earthwork hill, ringed with seating and shaped to slope down to the river, forms the centerpiece to a new social pier. A wood seating terrace



### Scheme 2 “The deck”

A rolling wood deck is shaped to dramatically bring the visitor up and then down to the space of the river. Enclosed in the southern “cove” is a social “beach” with umbrellas.



### Scheme 3 “The mixture”

An earthwork hill, ringed with seating and shaped to slope down, forms the centerpiece to a new social pier. A wood seating terrace

Figure (6-9) three ideas for riverfront's landscape regeneration from Delaware Riverfront's regeneration alternatives, show lawn idea, and deck area and a mix between lawn and deck. Source (<http://www.delawareriverwaterfrontcorp.com>)

---

<sup>1</sup> [www.delawareriverwaterfrontcorp.com](http://www.delawareriverwaterfrontcorp.com)



Figure (6-10) Lawn as passive riverfronts landscape. Source (www.pps.org))

### **6.3.5 Docks**

Riverfront's landscape here as boots and water taxi parking, plus it can be serviced by a park of river garden, so it may be recreational dock and enables active uses.

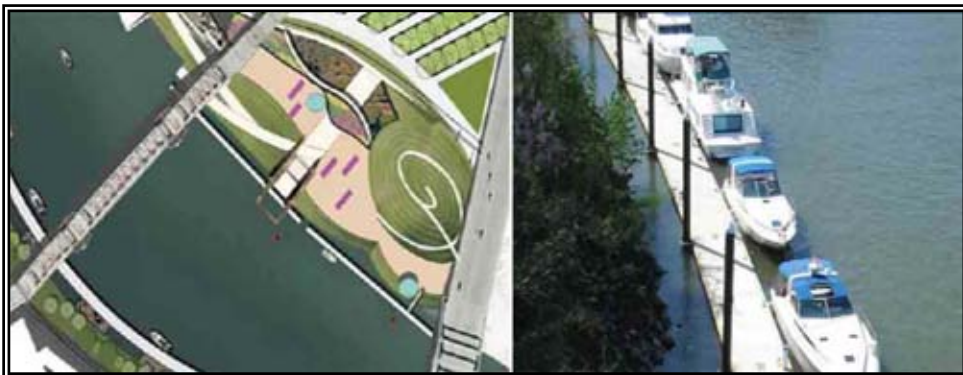


Figure (6-11) River park and adjacent dock. Source (www.hargreaves.com)

### **6.3.6 Pier overlooks**

They visually draw views out toward the river, as well as to river activities below such as fishing, boating, walking, and docking. The piers also serve as accents to key points along the riverbank.

The Pier Overlooks can provide additional plaza space for small group gatherings and events.

---

---

## Chapter 6

---

---



Figure (6-12) Pier overlooks at Nashville riverfront (right), St. Louis riverfront. (Left)  
Source ([www.hargreaves.com](http://www.hargreaves.com))

### 6.3.7 River terraces

The river edge here is the main feature because terraces are adjacent to water edge. Terraces permit the uses but they make direct contact with water



Figure (6-13) river terraces and direct contact with water. Source ([www.nyc.gov/](http://www.nyc.gov/))

### 6.3.8 River banks and islands



Figure (6-14) river banks and islands. Source ([www.greatrivers.info/projects](http://www.greatrivers.info/projects))

---

---

## Chapter 6

---

---

River islands can be built into the river itself and connected to banks by paths on water in areas of wide river width.



Figure (6-15) St. Louis riverfront proposals similar to Nile's riverfront case.  
Source ([www.greatrivers.info/projects](http://www.greatrivers.info/projects))

## **6.4 Riverfront's landscape elements**

From the previous chapter which reviewed a lot of examples from all over the world, this part comes to analyze these examples and then determining the most important elements which any riverfront's landscape consists of, These elements are listed below with some design guidelines, and how they affect riverfront through design aspects, what are they design indicators.

### **6.4.1 Riverfront's edge & guardrails (shoreline)**

Goal: To activate the water's edge by encouraging access to water and variety of edge treatment.<sup>1</sup>

It is the first elements which the user of riverfront sees from the water sheet, it has to safe and secure, it has to provide physical and visual access, it also has to encourage users' interaction with river itself.

The design indicators and variables can be

- Shape: Winding and zigzagging; bending; straight-line form
- Components: Vegetated; rock rip-rap shoreline mix, concrete, Vegetated; rock rip-rap shoreline mix, Variety of retaining wall types
- Embankment: Close- to natural grass slope, stone embankment, concrete embankment, shrubs and grasses, combination of trees,
- Width of vegetation zone
- Coverage of vegetation zone

It can be designed in various ways as:

- Natural/Built
- Straight/Curved
- Vegetative/Hardscaped

It can be classified to its conditions to:<sup>2</sup>

#### **6.4.1.1 Natural bank**

Natural banks appear to be composed of rock outcrop or in-situ native earth materials and to be relatively undisturbed by humans. They may be

---

<sup>1</sup> Lawrence, M. (2006), p. 7

<sup>2</sup> Ricahrd, M., et al. (2005), pp.1-52



---

---

## **Chapter 6**

---

---

variably eroded. Vegetative cover varies; native, exotic, living, and dead vegetation may be present.

### **6.4.1.2 Rip rap**

Rip rap banks have been intentionally armored with rock of various sizes up to at least ordinary high water. They are generally devoid of vegetation.

### **6.4.1.3 River beach**

This is a shallow shelving shoreline usually 5:1 or flatter, that consists of sand, silt, fine gravel or other sedimentary deposits.

### **6.4.1.4 River wall**

These are constructed, impervious vertical walls, generally composed of concrete, timber or sheet pile, that extend below ordinary low water.

### **6.4.1.5 Structures**

Included in this category are piers, wharves, supported docks, buildings and other structures that cover portions of the riverbank.

### **6.4.1.6 Unclassified fill**

These areas appear to have been filled over time with miscellaneous unconsolidated materials. The surfaces of banks composed of unclassified fill have not been covered with engineered rip rap or structures.



Figure (6-16) natural and built riverfront's edge. Source ([www.neworiverfront.com](http://www.neworiverfront.com))

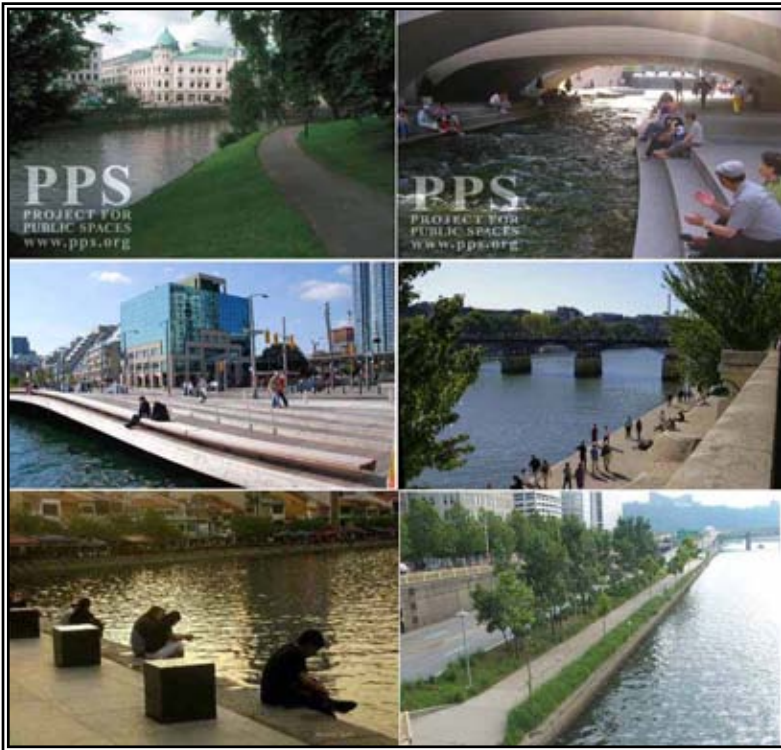


Figure (6-17)  
Various types  
of river edge  
vary from  
natural green to  
built edges.  
Source  
(www.pps.org).

**Guardrails'** goal is to activate the water's edge by encouraging access to water and variety of edge treatment. It is a security sign to users so it has to be designed with different material.

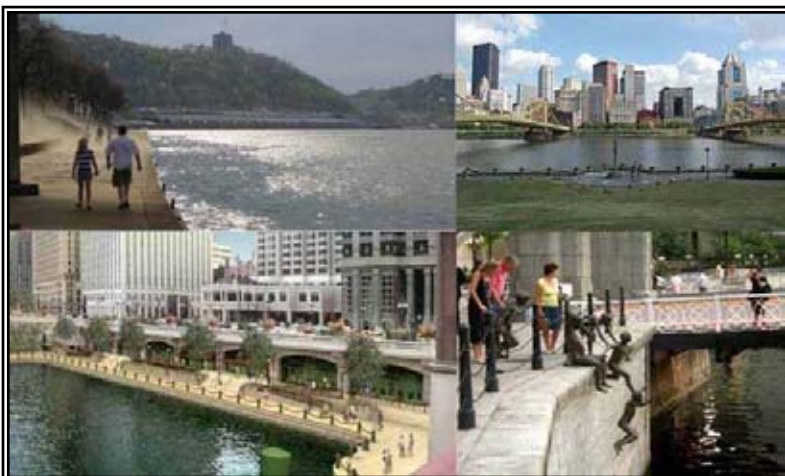


Figure (6-18)  
Various types  
of guardrails.  
Source  
(www.pps.org).

### **6.4.2 Retaining walls, fencing, bollards and railing**

Goal: To improve visual and physical access, and to encourage multi-functional use<sup>1</sup>

- Retaining walls should be faced with masonry or other decorative screening or landscaping to minimize the blank appearance of such walls.
- Fence and rail design should be compatible with the surrounding character of the riverfront development.
- Fencing should not limit actual or visual access to the waterfront, except where necessary for safety or security.



Figure (6-19)  
Retaining wall,  
fencing, and  
railing.  
Source (by  
researcher and  
www.pps.org).



Figure (6-20)  
Bollard and  
railing.  
Source (www.  
nyc.gov/)

<sup>1</sup> Charlie, L et, al. (2000)

### **6.4.3 Side-walk/ paving**

Goal: Enhance multiple activities and gives the users multiple destinations. It is always Liveliness, while it has to be safe and secure

Side walk must be consist of larger palette of paving surfaces that can be installed in permeable manner<sup>1</sup>

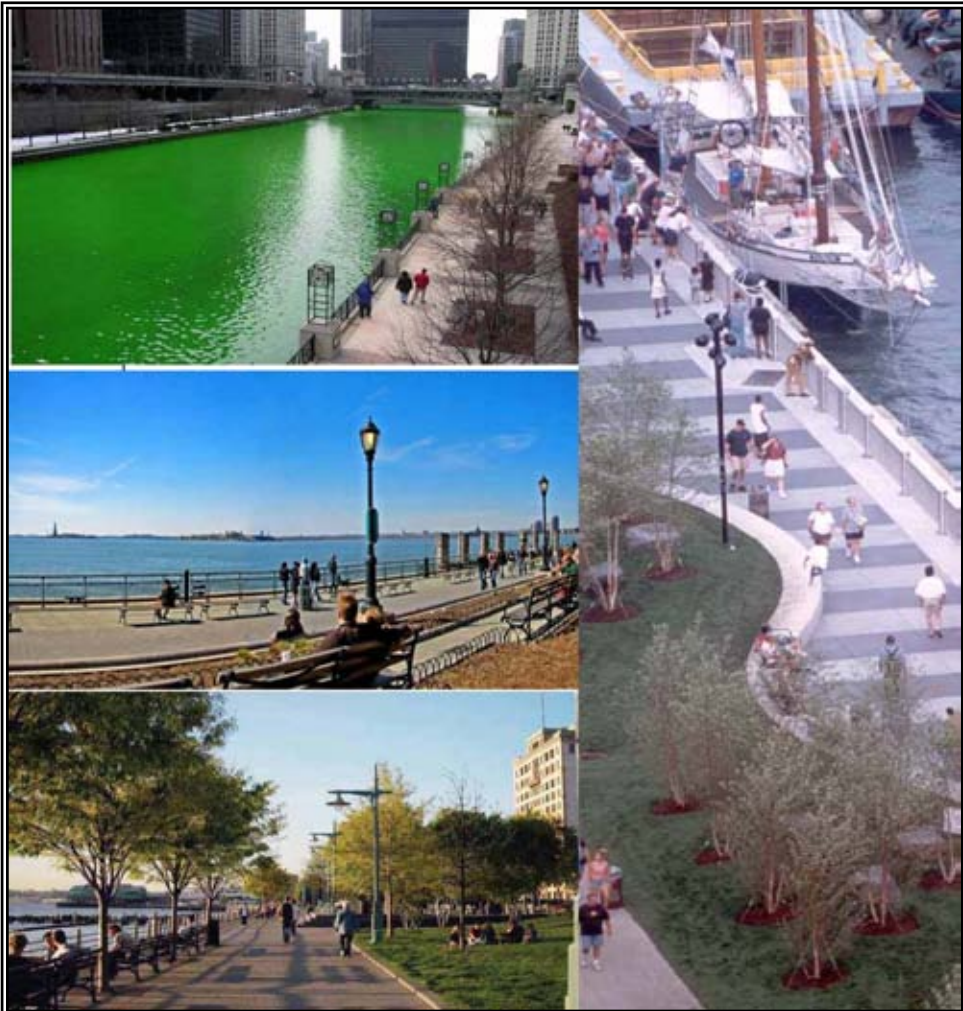


Figure (6-21) side-walk in different riverfronts, with multiple activities.  
Source (www.pps.org)

---

<sup>1</sup> Ballard, P. et al., (2007)



Figure (6-22)  
Different types of  
riverfront's  
sidewalk. Source  
([www.louisville-  
waterfront.com](http://www.louisville-waterfront.com))

As shown in figure (6-23) Riverfronts' walk-side can be divided to four zones, these zones are:

#### **6.4.3.1 Safety Buffer Zone**

If railings, walls and/or other barriers are not desirable along the water's edge, waterfront users need to be warned when coming close to the water safety buffer zone consisting of a rough textured surface that discourages walking.

#### **6.4.3.2 Circulation Zone**

The riverfront circulation zone shall consist of a linear pedestrian walkway or promenade and shall be wide enough. Obstructions to movement (trees, bollards, lighting, etc.) within the circulation zone shall not reduce the clear width of the walkway.

The Circulation Zone shall be constructed of non-slip paving materials with high aesthetic appearance and structural qualities to support emergency vehicle access.

### 6.4.3.3 Passive Zone

The area for sitting, accent landscaping and concessions shall be located along the inland side of the riverfront.

Short lengths of the passive zone may be elevated above the level of the promenade for enhanced river views. The passive zone may be paved in plain concrete or the paver on the main circulation zone.

### 6.4.3.4 Transition and Security Zone

This visual and functional transition from public to private space shall generally be marked by low level shrubbery and overhead shade or ornamental trees.

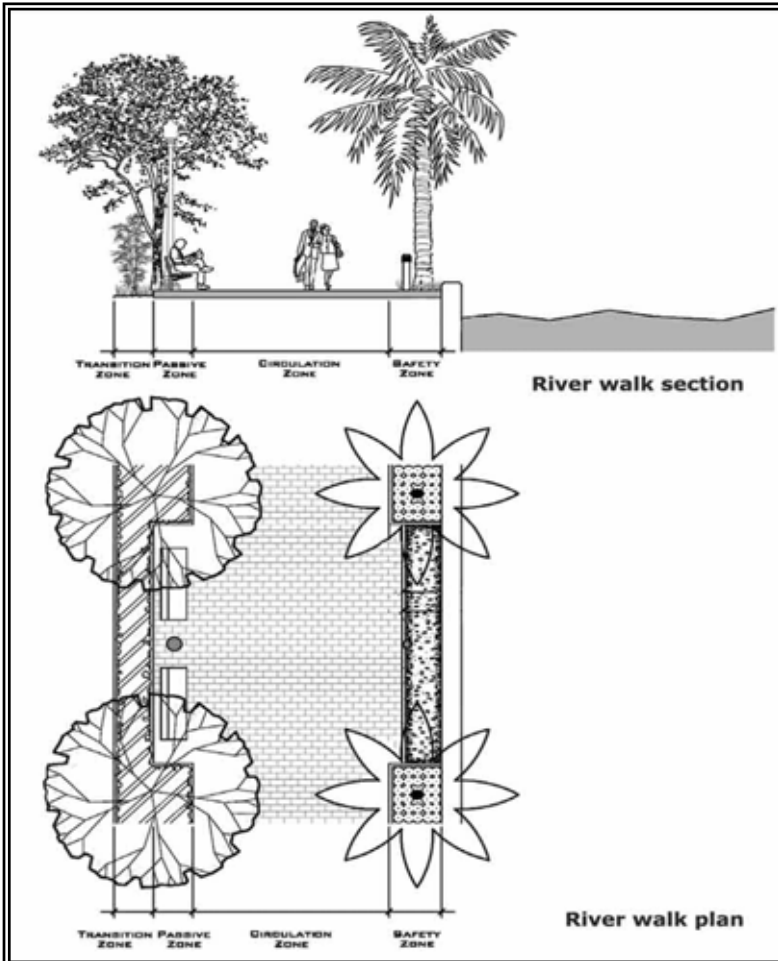


Figure (6-23)  
Four zones of  
riverfront's  
sidewalk.  
Source  
(Ricahrd, M.,  
et al., 2005)

### 6.3.4 Stairs/ramps

Goal: To facilitate variety and quality of landscape design, allow flexible requirements.

They have to be accessible from all riverfront's destinations, the same they encourage accessibility to all riverfront's zones. They have to be safe and comfortable in dimensions and materials.



Figure (6-24) Stairs and ramps in riverfront's landscape. Source (<http://www.delawariverwaterfrontcorp.com> & by researcher)

### 6.3.5 Trees

Goal: To achieve shaded seating areas and open sunlit areas, create more flexible requirements

Is an essential element to provide the image and comfort, but this element has not interrupt the river accessibility physically and visually, this element can be in ordered or in random distribution.

Trees in riverfront have to placed in the background of the space not at the water edge, it can be placed along the river-walk, and don't prevent or prevent uses and activities.

---

---

## Chapter 6



Figure (6-25) trees in various order and various functions in riverfront landscape.  
Source (Google Earth)

### 6.4.6 Ground covers, flowers & other vegetation

Goal: To facilitate variety and quality of landscape design, allow flexible requirements and to encourage a diversity of landscape design, allow a variety of trees and additional ground coverage.



Figure (6-26)  
Different kinds of ground covers and vegetation.  
Source (Google Earth)



### **6.4.7 Seating/ site furniture**

Goal: To increase variety, improve comfort and foster social interaction

- Seating should be durable, comfortable, attractive and securely anchored
- With backs
- Shaded seating required
- Least two types required (fixed, movable, lounging chairs, double seating, etc.)
- Social seating improved with tables.

This element can vary in Design/Shape, Placement, order, material, etc....



Figure (6-27) Hamburg riverfront- steps as seating. Source (www.pps.org)



Figure (6-28)  
Different types and designs of seating.  
Source (Google Earth)

### **6.4.8 Lighting**

Lighting used only when riverfronts are used at night, without glare and without prevent physical and visual access. This element can vary in Lighting Plan, Location, Illumination, and Fixture Design.

- Exterior lighting should enhance the site and building design.
- Specialized lighting is permitted to accent landscape features.
- Lighting should be restrained to prevent excessive brightness and undue glare on adjacent properties and the river.
- Lighting levels and color shall be designed in consideration of the overall effect on patterns, repetition, focal points, and rhythm within the panorama of the riverfront.<sup>1</sup>



Figure (6-29) Lighting features of riverfront's landscape. Source (Charlie, L et, al. 2000)

### **6.4.9 Signage**

Main Goal: To create inviting entry and ensure clear accessibility.

- Signs should be designed to enhance the area's visual appeal and ability to attract the public. The size, height, number and design of

---

<sup>1</sup> Charlie, L et, al. (2000), p.37

---

---

## Chapter 6

---

---

signs shall be reviewed for their ability to achieve these goals as well as their impact on traffic safety.

- In general, attached signs should be designed to fit within the architectural space intended for signage and not cover architectural features.
- Signs seen in relation to other signs should be designed to be compatible in location, shape, style, graphics, size, material, illumination, and color.
- Signage message should be easy to read and direct. It should not contain too much information. The message should clearly relate to its use.
- Freestanding signs should be landscaped with appropriate deciduous evergreen shrubs, ground cover planting, annuals and/or perennials.<sup>1</sup>



Figure (6-30) Signage in riverfronts landscape. Source (www. nyc.gov)

---

<sup>1</sup> Amanda M. et al., (2006), pp.45-48

### **6.4.10 Objects of art/ landmarks/ flags & banners**

Public art is an essential element in ensuring that the riverfront has a definable character and can provide interest, interpretation, direction, or simply act as a conversation topic for users.<sup>1</sup>



Figure (6-31) Examples of landmarks, flags and objects of art in riverfronts' landscape.

Source (www.pps.org)

### **6.4.11 Water features**

This element makes the riverfront as a liveliness space, and makes gathering nodes for riverfront's users.

---

<sup>1</sup> Edinburgh Waterfront Promenade Design Code (2006).

---

---

## Chapter 6

---

---

Fountains/ water features and drinking fountains as water sources for riverfront's users are suggested at specific points to form gathering nodes.

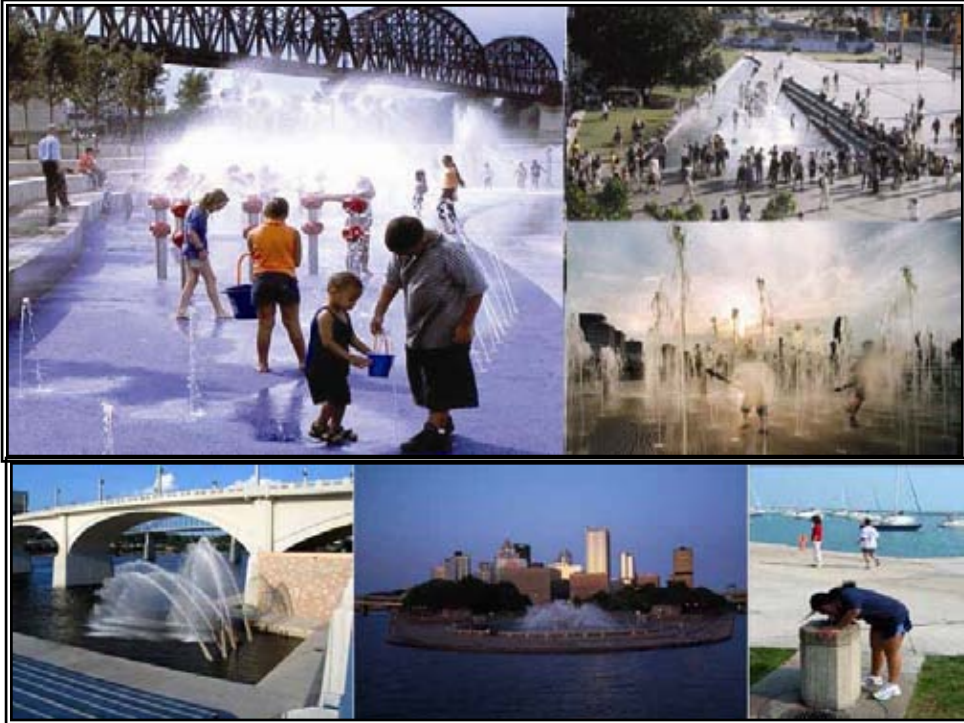


Figure (6-32) Examples of water features, with different uses in riverfronts' landscape.  
Source ([www.nyc.gov](http://www.nyc.gov))

### 6.4.12 Structures, Gates & other amenities

Structures should not prevent physical and visual access to river, and should enhance different uses and activities. The materials of these structures should be in harmony with other riverfront's landscape elements. These structures can be:

- Piers
- Pedestrian Bridge
- Performance Stage
- River Turbines
- Public Restrooms

---

---

## Chapter 6

---

---

- Shade Structures
- Mosques
- Café/Coffeehouse

### 6.4.13 Cars/ vehicles parking

These elements should be accessible easily from and to riverfronts. These elements should not prevent visual accessibility to river.



Figure (6-33) Cars/ vehicles parking in riverfronts' landscape. Source (Google earth)

### 6.4.14 Trash receptacles

- Locate to allow convenient access for maintenance.
- Locate conveniently near (but not next to) seating, trail intersections and at all access points.
- Trash receptacles should relate in appearance and color to other furnishings.
- Attach firmly to pavement or a footing to minimize vandalism.<sup>1</sup>

---

<sup>1</sup> San Diego river park draft master plan, city of San Diego, design guidelines 2005.



Figure (6-34) Trash receptacles, by researcher.

### 6.4.15 Flood plain

- A flood control system shall be integrated within the development's design.
- Physical and visual barriers to the waterfront are discouraged.
- The design of lower levels, exposed to flood elevations, shall be integrated with the structure so it will not be unsightly or unrelated to either the habitable portion of the building or the surrounding landscape.



Figure (6-35) Examples of flood plain. Source ([www.pps.org](http://www.pps.org))

### 6.4.16 Other Utilities

- All utility services (telephone, electrical, cable, and the like) shall be installed underground.
- Utility components required to be above ground (transformers, meters, and the like) shall either be screened by landscaping or decorative wall or located away from public view.

## 6.5 Riverfront's landscape design reference standards

After highlighted the elements of riverfront's landscape, in table (6-1) we can put them in a design reference standards, how they can affect the aspects of riverfronts, they indicators and their variables.

## Chapter 6

Riverfront's landscape element	Aspects	Indicator	variables
<b>Riverfront Edge &amp; Guardrails (Shoreline)</b>	<ul style="list-style-type: none"> <li>● comfort &amp; safety</li> <li>● Should not limit visual access to the riverfront, except where necessary for safety or security.</li> <li>● Encourage interaction with the water's edge.</li> <li>● Liveliness through active edge.</li> <li>● improve visual and physical access</li> </ul>	Shape	Winding and zigzagging; bending, straight-line form, High, low.
		Design/Type	Near to nature, artificial, compatible, incompatible Vegetated; rock rip-rap shoreline mix, concrete, Vegetated; rock rip-rap shoreline mix, Variety of retaining wall types.
		Embankment	Close-to-natural grass slope, stone embankment, concrete embankment, shrubs and grasses, combination of trees,
		Transparency	Transparent, Opaque
		Material	Grass, Stone, Concrete, Metal, Wood.
<b>Retaining Walls, Fencing, Bollards and Railing</b>	<ul style="list-style-type: none"> <li>● comfort &amp; safety</li> <li>● Should not limit visual access to the riverfront, except where necessary for safety or security.</li> <li>● Minimize the blank appearance of such walls.</li> <li>● Provides attractiveness by its decorative function.</li> <li>● Liveliness through active edge.</li> </ul>	Shape	Bending, straight-line form, High, low.
		Design/Type	Near to nature, artificial, compatible, incompatible
		Transparency	Transparent, Opaque
		material	Planting, Stone, Concrete, Metal, Wood
		position	Meets safety requirements, doesn't meet safety requirements.



## Chapter 6

Riverfront's landscape element	Aspects	Indicator	variables
<b>Side-Walk/ Paving</b>	<ul style="list-style-type: none"> <li>● comfort &amp; safety</li> <li>● Liveliness through active edge.</li> <li>● Legibility (wider side-walks suggest the importance of space).</li> <li>● Attractiveness.</li> </ul>	form	Linear, Curved, Zigzag, etc.
		width	Wide, narrow, suitable with different activities, not suitable with different activities
		paving material	Durable, not durable, harmful, no harm, color theme, suitable with different activities, not suitable with different activities.
<b>Stairs/ Ramps</b>	<ul style="list-style-type: none"> <li>● comfort &amp; safety</li> <li>● Legibility, these elements mark entrances, and</li> <li>● transitions between spaces and focal points.</li> <li>● Enhance river access</li> </ul>	position	Successful, not successful
		design	In harmony with other elements, not in harmony
		material	Durable, not durable, harmful, no harm,
		Spacing between	Far, Near,
<b>Trees</b>	<ul style="list-style-type: none"> <li>● Attractiveness.</li> <li>● comfort &amp; safety(shade)</li> <li>● Facilitate variety and quality of landscape design.</li> <li>● allow flexible requirements.</li> <li>● Provide welcoming.</li> <li>● Legibility</li> </ul>	Layout	Wide, Narrow, Random, Regular, formal, informal
		Position	meets safety requirements, doesn't meet safety requirements
		Shape	Suitable for their function, not Suitable for their function
		Purpose	Successful, not successful
		Variety	In harmony, not in harmony

## Chapter 6

Riverfront's landscape element	Aspects	Indicator	variables
<b>Ground Covers &amp; Flowers</b>	<ul style="list-style-type: none"> <li>• Attractiveness.</li> <li>• safety</li> <li>• Facilitate variety and quality of landscape design.</li> <li>• allow flexible requirements.</li> <li>• Legibility</li> </ul>	Order	Random, Regular, formal, informal
		Position	meets safety requirements, doesn't meet safety requirements
		Spacing between	Enough, not enough
		Shape	Harmony, no harmony
		Purpose	Suitable, unsuitable
<b>Seating</b>	<ul style="list-style-type: none"> <li>• Comfort &amp; safety.</li> <li>• Enhance users gathering.</li> <li>• Enhance visual appeal.</li> <li>• Attractiveness.</li> <li>• Doesn't prevent or permit uses and activities.</li> <li>• Meets users' requirements.</li> </ul>	Order	Random, Regular, Linear, Curved, lounging chairs, double seating, etc.
		Position	Facing Water, Doesn't facing water, near to river edge, far from river edge
		Design/Type	With seatback, Without seatback, Shaded, not shaded, semi shaded, with table, without tables
		Move-ability	Fixed, Movable.
		Material	Durable, not durable, meets safety requirements, doesn't meet safety requirements
		Variety	Harmony, no harmony
		Spacing between	Wide, narrow, enough, not enough

## Chapter 6

Riverfront's landscape element	Aspects	Indicator	variables
<b>Lighting</b>	<ul style="list-style-type: none"> <li>● Comfort &amp; safety.</li> <li>● Provides necessary visibility.</li> <li>● Provides attractiveness by its decorative function.</li> <li>● Liveliness in night.</li> <li>● Legibility by providing the importance of space or zone.</li> <li>● Improve social gathering at night the same as daylight.</li> <li>● enhance the site and building design.</li> <li>● Prevent excessive brightness and undue glare on adjacent properties and the river</li> </ul>	Position	Formal order, informal order.
		Design/Type	Decorative, meets safety requirements, doesn't meet safety requirements
		Variety	Harmony, no harmony
		Spacing between	Enough, Not enough,
		Lighting Levels	Comfort, not comfort, high, low.
		Lighting features	meets safety requirements, doesn't meet safety requirements
<b>Signage</b>	<ul style="list-style-type: none"> <li>● Comfort and safety.</li> <li>● Enhance visual appeal.</li> <li>● Attractiveness.</li> <li>● Legibility, these elements mark important nodes and focal points.</li> <li>● Help to reach anywhere in riverfront space.</li> <li>● Compatible with different activities.</li> </ul>	Position	Successful, not successful,
		Design/Type	Size, height, color, style, compatible with other elements, incompatible , meets safety requirements, doesn't meet safety requirements
		Content	Readable, Not readable, achieve their goals, unachieved their goals.
		Spacing between	Enough, Not enough,
		Self Illumination	Readable at night, not Readable at night
		Variety	In harmony, not in harmony

## Chapter 6

Riverfront's landscape element	Aspects	Indicator	variables
<b>Objects of art/ Landmarks/ Flags &amp; Banners</b>	<ul style="list-style-type: none"> <li>• Comfort and safety.</li> <li>• Attractiveness.</li> <li>• Enhance visual appeal.</li> <li>• Legibility, these elements mark important nodes and focal points.</li> </ul>	Position	Successful, not successful,
		Design/Type	meets safety requirements, doesn't meet safety requirements
		shape/ proportions	Suitable, unsuitable.
		material	Compatible with other elements, incompatible.
		Variety	In harmony, not in harmony
<b>Water Features</b>	<ul style="list-style-type: none"> <li>• Specific points to form gathering nodes.</li> <li>• Attractiveness.</li> <li>• Legibility, these elements mark important nodes and focal points.</li> </ul>	Position	Near from water, far from water, near from gathering points.
		Design/Type	Size, height, compatible, incompatible.
		purpose	Suitable, not suitable,
<b>Structures , Gates and other amenities</b>	<ul style="list-style-type: none"> <li>• Comfort and safety.</li> <li>• Image enhancement.</li> <li>• Enhance river accessibility.</li> <li>• Attractiveness.</li> <li>• Facilitate uses and activities.</li> </ul>	position	Enough facilities, moderate, lacking
		Design/Type	Compatible, incompatible
		material	Compatible with other elements, incompatible with other elements
<b>Cars/ Vehicles Parking</b>	<ul style="list-style-type: none"> <li>• Comfort and safety.</li> <li>• Enhance river accessibility.</li> <li>• Legibility and doesn't prevent river access.</li> </ul>	position	Near from water, far from water.
		quantity	Enough, Not enough,

<b>Riverfront's landscape element</b>	<b>Aspects</b>	<b>Indicator</b>	<b>variables</b>
<b>Trash Receptacles</b>	<ul style="list-style-type: none"> <li>● Comfort and safety.</li> <li>● Image enhancement.</li> <li>● Legibility.</li> <li>● Attractiveness in contribution to other riverfront's landscape elements.</li> </ul>	position	Accessible, not accessible, Near from seats, far from seats, easy for maintenance, not easy for maintenance.
		Design/Type	Beautiful, not Beautiful, compatible, incompatible, harmony
		Material	Metal, Wood, No harm, harmful,
<b>Flood Plain</b>	<ul style="list-style-type: none"> <li>● Comfort and safety.</li> <li>● Legibility.</li> <li>● Attractiveness in contribution to other riverfront's landscape elements.</li> </ul>	Design/Type	Integrated with allover design not integrated with allover design.
		material	Stone, concrete, beautiful, ugly, compatible, incompatible.

Table (6-1) Riverfront's landscape elements, their aspects, their design indicators, and their evaluation variable, by researcher

## 6.6 Keys of riverfront's landscape evaluation

In evaluating thousands of public spaces around the world, PPS has found that successful ones have four key qualities: they are accessible; people are engaged in activities there; the space is comfortable and has a good image; and finally, it is a sociable place: one where people meet each other and take people when they come to visit. PPS<sup>1</sup> developed The following Diagram can be used as a tool to help people in judging any place, good or bad.<sup>2</sup>

<sup>1</sup> PPS is projects for public spaces.

<sup>2</sup> <http://accuracyandaesthetics.com/history>

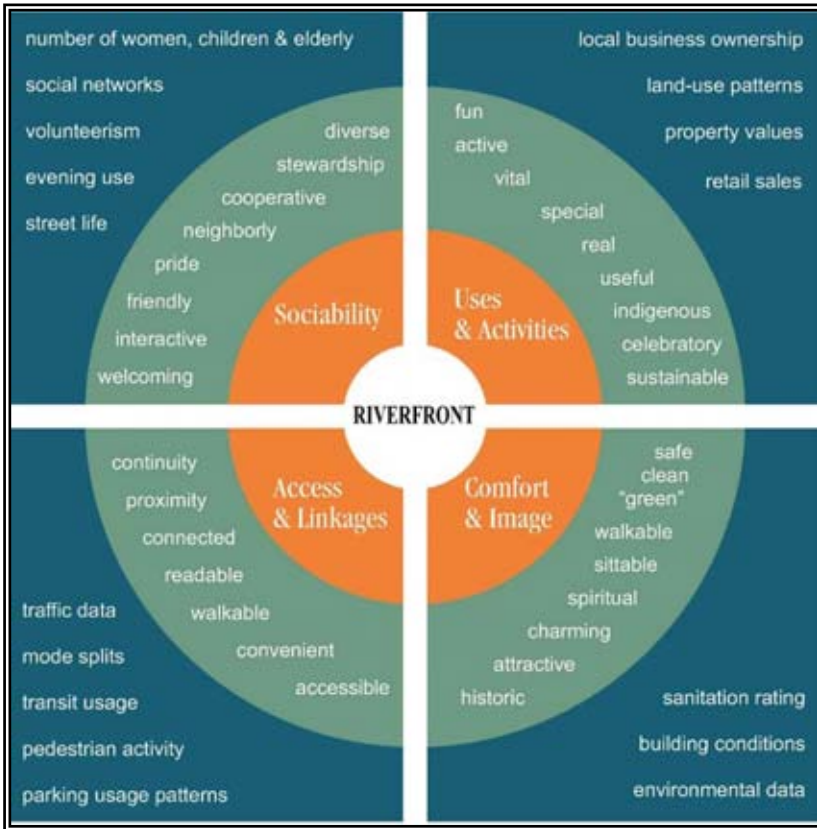


Figure (6-36)Aspects and sub-aspects of riverfront's landscape evaluation. Source (researcher-adapted from pps.org)

In figure (6-36) the center circle on the diagram is a specific space on riverfront. People can evaluate that space according to four criteria in the red ring. In the ring outside these main criteria are a number of intuitive or qualitative aspects by which to judge a place; the next outer ring shows the quantitative aspects that can be measured by statistics or research.

### **6.6.1 Access & Linkages**

One can judge the accessibility of riverfront's space by its connections to its surroundings, both visual and physical. A successful public space is easy to get to and get through; it is visible both from a distance and up close. <sup>1</sup>

---

<sup>1</sup> Andrew, G. (2006), p.18

---

---

## Chapter 6

---

---

- Contact with water
- Continuous public space at the edge
- Open and green
- Connections to the urban core & neighborhoods
- Multi-modal
- Welcoming to all
- Provision of multi-modal access to the River-Parks
- Integrate landscaped trails, particularly for pedestrians and cyclists, into the existing riverfront park access points and employ them to connect park areas.
- Coordinate places for large-scale gatherings with transit.
- Improve and coordinate way finding into riverfront and within the river-parks.

The main sub-aspects are:

### **Accessible from surrounding areas**



Figure (6-37) left- Sydney, Australia, right Lake Como, Italy.

Source (<http://www.pps.org/wfplace/>)

### **Easy & pleasant to walk along**



Figure (6-38) Laguna Beach, CA. Source (<http://www.pps.org/wfplace/>)

**Has a good edge related to the river**



Figure (6-39) left- Battery Park City, New York, right- Cleveland. Source (<http://www.pps.org/wfplace/>)

**Connected to transit by land & river**



Figure (6-40)  
Left- Shelter, New Zealand, right- River Taxi, Toronto, Ontario. Source (<http://www.pps.org/wfplace/>)

**Effective signage**



Figure (6-41)  
Portland riverfront New York. Source (<http://www.pps.org/wfplace/>)



### **6.6.2 Comfort & Image**

Whether a riverfront's space is comfortable and presents itself well – has a good image – is key to its success. Comfort includes perceptions about safety, cleanliness, and the availability of places to sit, the importance of giving people the choice to sit where they want is generally underestimated. Women in particular are good judges on comfort and image, because they tend to be more discriminating about the public spaces they use.<sup>1</sup>

- Good lighting and security
- Night lights
- Restrooms
- Landscaping - formal flower displays
- Comfortable seating, Benches
- Seating oriented not just to the water but towards the city too
- Art works and plantings
- Place for signage - directional etc
- Interactive water feature
- Paving treatment
- Continuity of design elements
- Quality of construction, materials, maintenance
- Variety
- Provide a high standard of maintenance, management and safety.
- Create a wide variety of environments.
- Coordinate interagency management of park resources.

#### **Flower gardens**

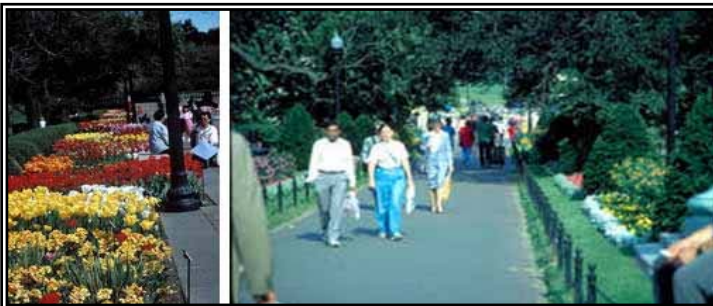


Figure (6-42)  
left- Brooklyn,  
right- Boston.  
Source  
(<http://www.pps.org/wfplace/>)

---

<sup>1</sup> Anthony A. (2003), P.13

**A range of seating options**



Figure (6-43) Paris, France. Source (<http://www.pps.org/wfplace/>)

**River elements**



Figure (6-43)  
Central Park,  
New York.  
Source  
(<http://www.pps.org/wfplace/>)

**Art**



Figure (6-44)  
left- Portland,  
right- Central  
Park, New York.  
Source  
(<http://www.pps.org/wfplace/>)

**6.6.3 Uses & Activities**

Uses & Activities are the basic building blocks of a riverfront's space. Having something to do give people a reason to come to a place and return. When there is nothing to do, a riverfront's space will be empty and that generally means that something is wrong.

---

---

## Chapter 6

---

---



Figure (6-45) Different uses on East riverfront. Source (www.nyc.gov)

Common Uses and activities along riverfront can be summarized as:

Sitting, Walking, strolling, eating, fishing, swimming, boating, pedaling, jet skiing, diving, swinging and sliding, motor biking, jogging, enjoying the scenes, relaxing, Festivals, cultural events, community events, concerts, movies, theater, playgrounds, café, restaurants, activities for kids, and pedestrian area, etc.....

Also it can be categorized as: <sup>1</sup>

- Passive water related.
- Active water related.
- Non water related.

Uses and activities along riverfront have to:

- Provide diverse recreational opportunities while balancing regional and local recreational uses.

---

<sup>1</sup> Abou El-Ela, M., et al., (2007), p.10

---

---

## Chapter 6

---

---

- Integrate the River-walk with wetland, habitat and river edge improvements, as well as with public art, heritage themes, educational programming and signage.
- Build upon the local cultural heritage and existing uses.
- Incorporate more river-oriented transit and recreation.
- Create settings for events and celebrations.
- Encourage the development of cultural attractions such as museums.

### Interesting uses & destinations



Figure (6-46)  
left- Fort Worth,  
right- Pioneer  
Courthouse  
Square,  
Portland.  
Source  
([www.pps.org/  
wfplace/](http://www.pps.org/wfplace/))

### Uses are for tourists and residents



Figure (6-47)  
left- Swan  
Boats, Boston,  
right Battery  
Park City, New  
York.  
Source  
([www.pps.org/  
wfplace/](http://www.pps.org/wfplace/))

### Uses on river



Figure (6-48)  
left- Riverplace,  
Portland, right  
Ottawa,  
Ontario.  
Source  
([www.pps.org/  
wfplace/](http://www.pps.org/wfplace/))

---

---

## Chapter 6

---

---

### Commercial & non-commercial uses



Figure (6-49)  
left- Albert  
Park, San  
Rafael, right  
Boat House,  
Central Park,  
New York.  
Source  
([www.pps.org/  
wfplace/](http://www.pps.org/wfplace/))

### Programs occur at river's edge



Figure (6-50)  
left- riverfront  
Amphitheatre,  
Zurich, right  
Lake Como,  
Italy.  
Source  
([www.pps.org/  
wfplace/](http://www.pps.org/wfplace/))



Figure (6-51) uses and activities proposed for New Orleans riverfront's regeneration.  
Source ([www.neworiverfront.org](http://www.neworiverfront.org))

### 6.6.4 Sociability

This is a difficult quality for a place to achieve, but once attained it becomes an unmistakable feature. When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place that fosters these types of social activities. The main sub-aspects are:

- Welcoming
- Interactive
- Neighborliness
- Pride
- Diversity
- Stewardship



Figure (6-52) above Tuileries, Paris, France, below- New Orleans.  
Source (<http://www.pps.org/wfplace/>)

### **6.7 Summary & Conclusion**

This chapter analyzed the previous riverfronts' landscape regeneration projects and determined new riverfront's landscape types, then this chapter supposed the elements of riverfronts' landscape and tried to put them in design references with their aspects and design indicators and variables.

In the second part this chapter tried to find the evaluations aspects of riverfronts' landscape which can be used as public user's evaluation criteria.

Both of design references of riverfront's landscape and evaluation aspects of riverfront's landscape are the approach parameters, which will be used in chapter eight which will discuss the research approach.





**PART  
TWO**

**Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape**

**Chapter  
5**

**Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn**

**Chapter  
6**

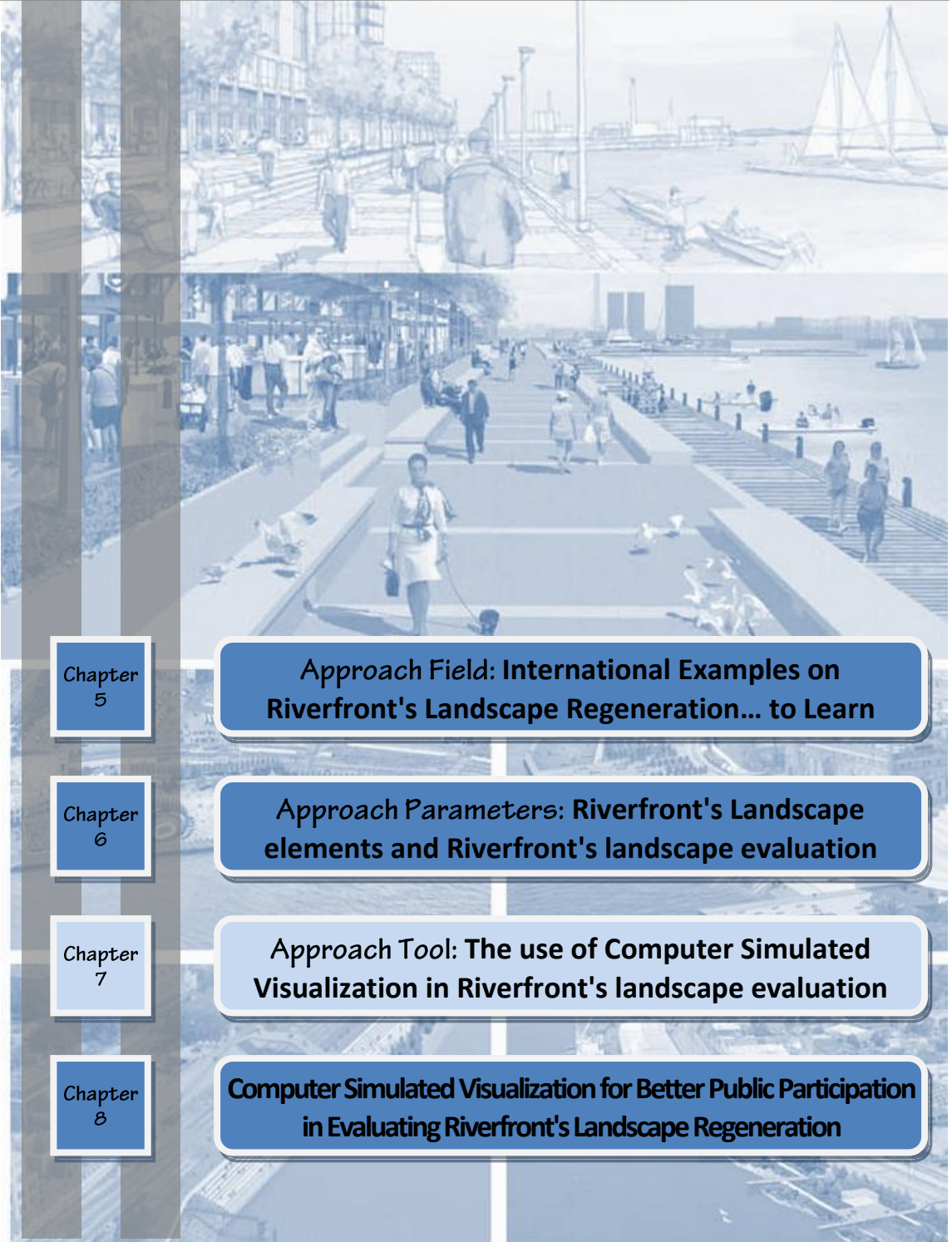
**Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation**

**Chapter  
7**

**Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation**

**Chapter  
8**

**Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration**





**Introduction**

**Computer Simulated visualization of Riverfront's  
landscape regeneration**

**Landscape's Computer simulated Visualization  
software**

**Selecting the approach tool**

**Virtual reality as a riverfront's landscape  
visualization tool**

**The components of virtual reality system for the  
approach**

**Summary & conclusions**



*"A computerized visualization method offer planners and architects some new ways to support and facilitate democratic decision-making. However, the uses of this technology in public participation are just beginning to be explored". (AL-Kodmany, K., 2001)*

## **7.1 Introduction**

Members of communities may find it difficult to engage with technical information presented using typical landscape visualization media, such as maps and reports. One technique that has been successful in public consultation in other fields is the use of computer simulated visualizations or realistic three-dimensional (3D) visualizations of the future of riverfront landscape under different scenarios.

At the same time as three dimensional computer visualization technologies has advanced the opportunity for visualization, public interest has increased the need of participation.<sup>1</sup>

Virtual Reality (VR) models add interactivity and immersion to landscape visualizations but require appropriate technical input and management.<sup>2</sup>

This chapter will review computer visualizations techniques to select one of them to use as an approach tool for testing public's evaluation of riverfront's landscape alternatives, then this chapter by comparison between different techniques will select the most suitable tool to be used in the approach.

## **7.2 Computer Simulated visualization of Riverfront's landscape regeneration**

To simulate is to give the appearance of something.<sup>3</sup> There is a need to differentiate between realism and computer simulation. The acceptance of a simulation is often greater if the audience is aware of the fact that it is only a limited simulation and that there is a model involved, there is

---

<sup>1</sup> Bishop, I. & E. Lange (2005a), p. 25

<sup>2</sup> Podevyn, M., et al. (2008), p.173

<sup>3</sup> "Cambridge international dictionary of English"

always a reduction, even though it may include non-visual information such as acoustic input.<sup>1</sup>

The simulation of riverfront's landscape regeneration the same as the simulation of natural and man-made environment, can be represented in three phases:

- Pre construction simulation.
- Post construction simulation.
- Direct presentation

For this research, the approach suggested that the first phase is the most important phase, in order to make the public users participate; we have to give them the opportunity to share the designers the ideas which meet their needs and meet their preferences.



Figure (7-1) computer simulated visualization of regeneration of New Orleans Riverfront. Source ([www.neworiverfront.com](http://www.neworiverfront.com)).

### **7.2.1 Perceived realism of computer simulations of landscapes**

Perceived realism may not necessarily vary directly with image quality; image quality may be very high in technical terms, while perceived realism is not. Although image quality will affect perceived realism, so will the content of the image, the viewpoint of the image and the receptivity of the viewer. Some basic understanding of the factors that

---

<sup>1</sup> Ball J., Capanni N., & Watt S.(2007), p. 79

influence the perception of image quality is therefore needed to increase the 'fit' between computer-generated images and real world conditions.<sup>1</sup>

Advances in computer capabilities and graphic software have substantially improved and facilitated the creation of precise and accurate environmental visualizations. Electronic communications and computer networks enable efficient and economical distribution of visualizations to rapidly expanding audiences.

### **7.2.2 Reasons for choosing computer simulated visualization**

There are five reasons that computer visualization can be widely applied in landscape filed<sup>2</sup>, so it can be effective way if it be used in the research methodology to help in evaluating riverfront's landscape regeneration by participating the public users as in show in figure (7-1):

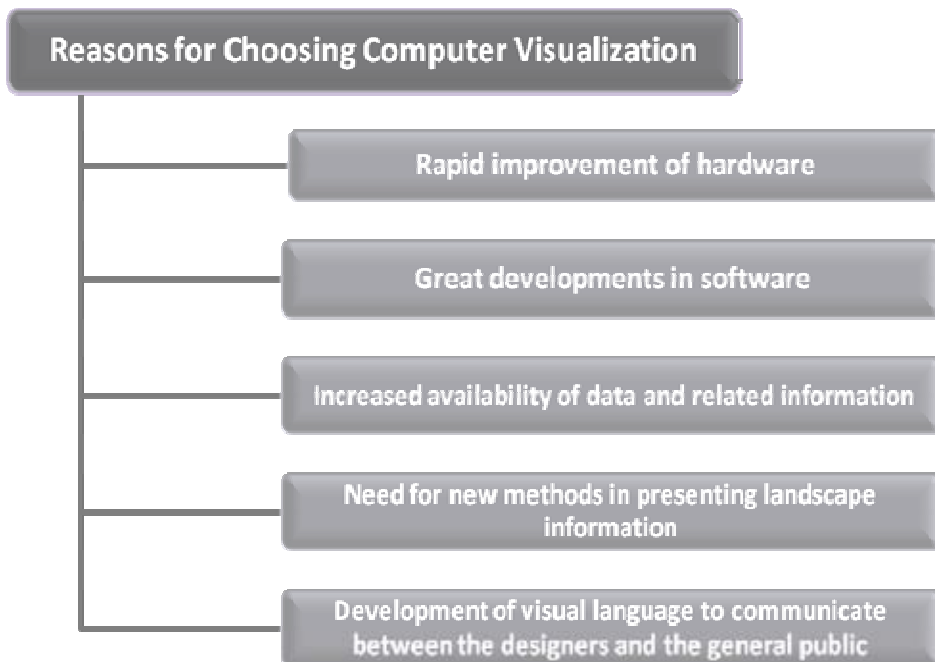


Figure (7-2) reasons fro choosing computer visualization to contribute the public in riverfront's landscape regeneration, by researcher.

---

<sup>1</sup> Wherrett, R. (2000), P.79

<sup>2</sup> Huang, H.(2004), p.5

**First**, the rapid improvement of hardware has made it possible to effectively handle huge data. Increased hard drive capacity, more powerful Central Processing Unit (CPU, processor) and graphic cards make it easier to store, calculate, and display huge landscape information.

**Second**, the great developments in software give; landscape architects more opportunities to visualize related landscape information. 3D visualization software, like 3ds max, and Maya, has powerful functions in texture, lighting, and animation. The widespread use of this software helps designers, decision makers and the general public to “see” their urban environments' modifications.

**Third**, there is increased availability of data and related information. Advanced Remote Sense technologies provide satellite images, with resolution as fine as one meter, for experts to interpret land information.

**Fourth**, To present landscape information to the general public and decision makers, designers are not limited to use 2D maps to present planning information. Because computer visualization can exactly present design concepts, designers may like to use visualization as a tool in riverfront's landscape process.

**Fifth**, Visualization can serves as a common visual language in the communication between the designers and the general public. This language is easily understandable and attractive for the general public.

### **7.2.3 Measuring the quality of computer simulated visualization**

The quality of visualization can vary considerably and it is hard to find the tool which meets one’s needs precisely. It depends on the objectives of the project. Some general demands on computer simulated visualization might be described as shown in the next table:



---

---

**Chapter 7**

---

---

<b>Representation of geometry</b>	There must be no polygon reduction; if this is unavoidable, it has to remain controllable.
<b>Integration of large textures</b>	These are aerial pictures or other textures compressed without loss.
<b>LOD Level of Detail</b>	Elements beyond a defined distance from the camera are simplified.
<b>Velocity</b>	Fast and easy navigation within the VE (Virtual Environment).
<b>Actions /Behavior</b>	The option to include links and special behavior like collision or intersection detection.
<b>Operation /Navigation</b>	Easy use of navigation elements.
<b>Platform /Presentation</b>	Platform independence.
<b>Data transfer</b>	Data interface for the most commonly used programs.

Table (7-1) The quality of computer simulated visualization. Source (adapted from Bishop, I & Lange, E. 2005a)

### **7.2.4 Public Participation & computer simulated landscape visualization**

The difficulties in communication between general public and most decision makers lead to uncertainty and lack of consistency in landscape processes. Designers need a tool to improve communication efficiency in the landscape process and engage the general public involvement in landscape process. Computer Simulated Visualization can be that tool.<sup>1</sup>

---

<sup>1</sup> Huang, H.(2004), p.5

Public participation is increasingly seen as the key for improved public satisfaction with the management of the changing urban environments. For that participation to occur in a meaningful and deep manner, digital visualization is considered the key in engaging and involving people from diverse educational and language backgrounds. That greater involvement is considered to lead to the perception of ownership or the users generally over the process, better decision-making and a greater acceptance of its outcomes. The use of computer-simulated or digital visualization can increase confidence and certainty in the design process, demystifying how policy translates into built form.<sup>1</sup>

In all these types of involvements designers refer to some sort of a visual aid in order to disseminate their ideas and engage public in the development. Lange (2005)<sup>2</sup> believes that so far, computer visualizations in landscape are mainly seen as a tool that allows visualizing a certain pre-defined proposal.

Computerized simulated visualization methods offer landscape architects some new ways to support and facilitate democratic decision-making. However, the uses of this technology in public participation are just beginning to be explored<sup>3</sup>

Al-Kodmany (2001)<sup>4</sup> suggests that visualization through digital technology provided a common language for the participants and computer-based visualization techniques could be an important contribution to the evolution of the participatory landscape design. In another example Bishop (2005)<sup>5</sup> goes further and suggests that real-time Visualization is important for certain public participation objectives but either not possible or not important for others. Further more Schroth, O. & Schmid, W. (2006) put forward that 3D landscape visualizations applied as tools for participatory workshops do benefit from interactive features.<sup>6</sup>

---

<sup>1</sup> Pietsch, S. et al. (2005), p. 4

<sup>2</sup> Lange, E. (2005), p. 18

<sup>3</sup> AL-Kodmany, K., (2002), p.191

<sup>4</sup> Previous, p.332

<sup>5</sup> Bishop, I. (2005c),p.4

<sup>6</sup> Schroth, O. & Schmid, W. (2006), p.180

### **7.2.5 Computer simulated landscape visualization among user and non-user groups**

In a survey about landscape visualization in Germany, both among user and non-user groups of visualization tools. Some respondents cited insufficient computer equipment, lack of technical expertise of planners and cost-related aspects as reasons for not yet having adopted the technology. ‘Ease of learning’ and ‘interoperability’ are deemed to be the most important features of 3D simulation software, whereas factors such as ‘high interactivity’, ‘represent-ability of ecological processes’ and ‘photo-realism’ are, surprisingly, regarded as much less important.

Computer simulated visualization is a tool that can translate complex quantitative information into a format accessible by non-experts.<sup>1</sup>

### **7.2.6 Interactive features of Computer simulated landscape visualization**

Public users interaction with computer visualizations of landscape can be summarized in 5 features, they are:<sup>2</sup>

- Walk-through movement.
- Viewing different options.
- Time travel.
- Photo-realistic images.
- Inclusion of non-visual information.

### **7.3Landscape's Computer simulated Visualization software**

Autodesk Maya, 3D Studio Max, software are the world's most powerfully integrated 3D modeling, animation, effects and rendering solution. Autodesk Maya combines an industry-leading suite of 3D visual effects with computer graphics and character animation tools, enables to realize creative vision for design projects. 3D Studio Max is a professional 3D animation rendering and modeling software package used mostly by game developers, design visualization specialists. Learn tips to create rich, complex design virtualizations or 3D film effects. Arc-GIS by

---

<sup>1</sup> Sheppard, R. & Lewis, J. (2006), p.292

<sup>2</sup> Schroth, O. & Schmid, W. (2006), 125

ESRI is an integrated collection of GIS software products for building a complete GIS.<sup>1</sup>

### **7.3.1 Requirements of computer landscape visualization software**

In an experts' survey<sup>2</sup> about which features they would like to see incorporated into computer simulated visualization software, respondents cited in particular: ease of learning; integration into the respective software environment (interoperability); and a large 3D object library, Low investment costs, realistic representation of plants and habitats, and navigation tools were also considered important.

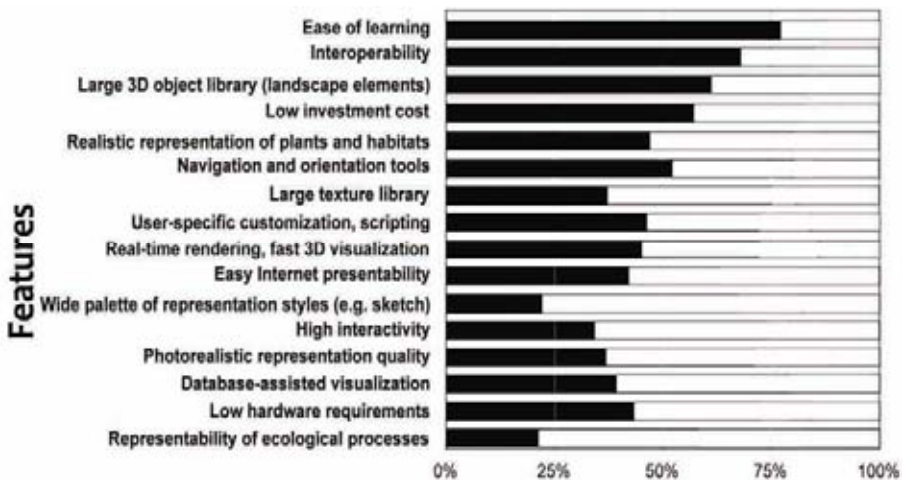


Figure (7-3) Requirements for features of 3D landscape visualization software.

Source (Paar, P., 2006)

Database-assisted visualization and low hardware requirements were considered more important by environmental authorities than by private consultancies. Private consultancies, on the other hand, were more concerned with user specific customization and a wide palette of representation styles than were the environmental authorities. Other features such as real-time rendering, represent-ability of ecological processes or photo-realistic representation were not considered to be particularly important.

---

<sup>1</sup> Veide, Z. et al. (2007), pp.83-84

<sup>2</sup> Paar, P. (2006), pp.826-826

### **7.3.2 Problems of computer simulated visualization Software**

Although the rapid advances in digital technology, there are still some problems face users of computer simulated visualization software.

Due to (Paar, 2006)<sup>1</sup> the problems of the software used in computer simulated visualization can be summarized as shown in figure (7-16).

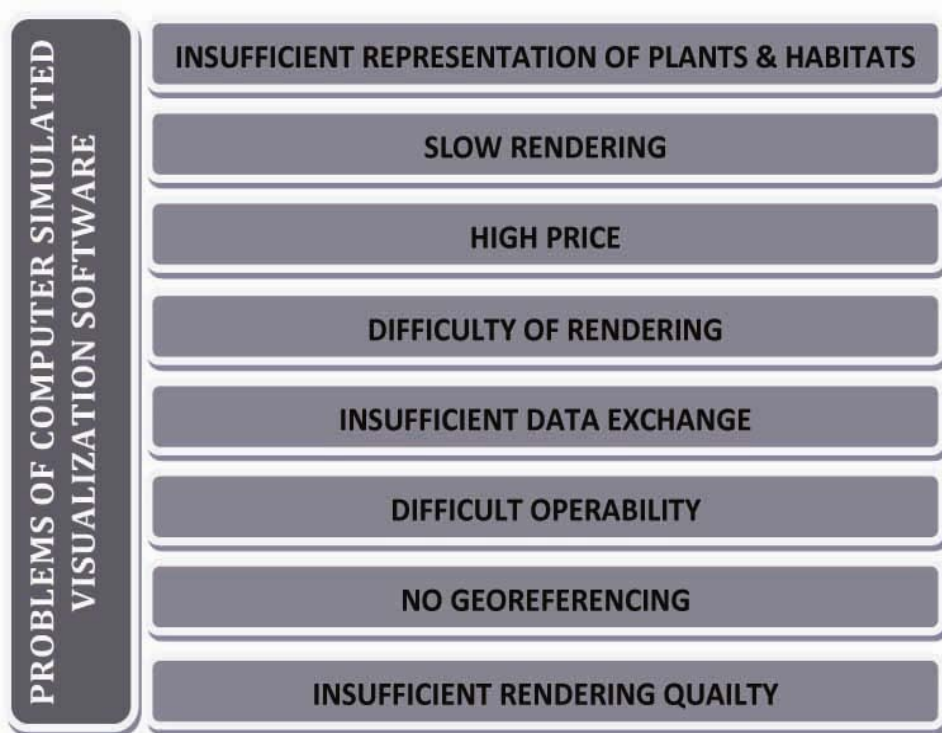


Table (7-2) Problems of computer simulated visualization software, by researcher.

### **7.4 Selecting the approach tool**

Recent developments in computer technology and the availability of digital databases have made it much easier to generate landscape visualizations that can be used to support decision making on environmental issues.<sup>2</sup>

---

<sup>1</sup> Paar, P. (2006), p. 825

<sup>2</sup> Appleton, K et al. (2002), p.145



Figure (7-4) some types of computer visualization techniques used to support landscape design. Source (Warren, B. & Tiedtke, S. 2006)

### **7.4.1 Criteria of Selecting the Right computer visualization tool**

The selection of right computer visualization tool for landscape process is very important issue, especially in riverfront's landscape regeneration process; the selection has to depend on some principles, so the right visualization tool must be<sup>1</sup>

- Accessibility of the tool both to experts or lay public, also how it can be accessed, and is the tool capable of presenting the design alternative.
- Adaptable: how compatible is the tool, how its software has potential to become mainstream in time? Is the tool convertible from one format to other?
- Interactive: how much interactivity the visualization tool produces between experts and lay public. Is the tool understandable to the participants?
- Affordable: what is the range of costs for software and hardware, not only costs but the time the tool need.

---

<sup>1</sup> Lim, E., & Honjo, T. (2003), p.177

- Portability across platforms and operating systems.
- Import/export capabilities with data and programs. How seamless is the connection?
- Links to models and datasets. Are direct links feasible?
- User friendliness of the system. Is it user friendly at the skilled-programmer level or average PC-user level?
- Quality of documentation. Are the manuals well written and informed by extensive user feedback?
- Availability of image libraries, texture palettes, etc. How much work do users have to do to create visual surfaces with a particular look?
- Scale of objects or areas that can be rendered (e.g., stand level forest visualizations vs. landscape, regional or global levels of forest rendering).
- Speed (time to render high-end visualizations) and memory requirements.
- Reliability of software support.

### **7.4.2 Recent computer visualization techniques**

Here the research will introduce some of the recent computer visualization techniques which can be used in landscape process.

#### **7.4.2.1 Electronic Sketching**

The computerized version of pen-and-paper sketching is drawing on an electronic sketchboard. This tool can overcome some of the limitations of pen and paper.

Through question and response, the participants suggested planting, seats, buildings, and other environmental features. At each suggestion, the artist glanced at the eyes of the participants to check for agreement that the image was developing as it should.

The capabilities of these electronic boards may revolutionize charrette and sketch planning because they enable the development of conceptual

plans on top of GIS layers and data. For example, a bubble diagram can be overlaid on top of GIS layers to delineate geographic elements and show spatial relationships. Connecting arrows, lines, and shading in overlapping areas can quickly define the interactions and hierarchical or parallel relationships between elements.<sup>1</sup>

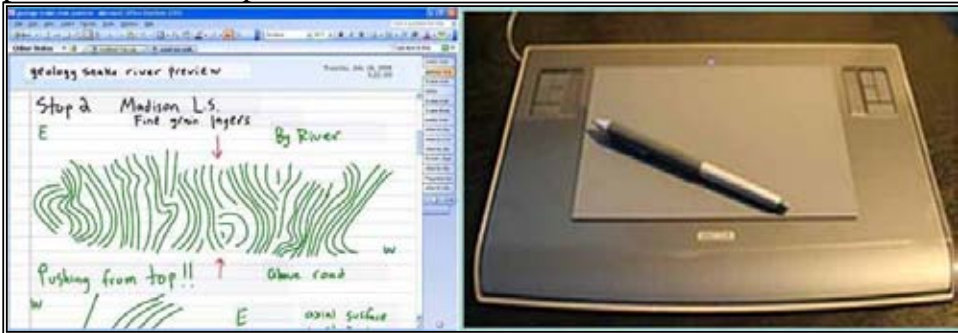


Figure (7-5) Electronic sketching and sketchpad. Source ([www.google.co.uk](http://www.google.co.uk)).

#### 7.4.2.2 2D Map Animations

2D GIS maps that have been captured over a number of time periods can be combined to create a 2D map animation. This technique is effective in showing temporal changes looking at past, present and future trends. Figure 6 provides a snapshot from a 9 day animation (October 4th to 13th 1993), depicting a flood plain management scenario for the Goulburn Broken Catchment Management Authority (GBCMA) in Victoria.<sup>2</sup>

The move from a paper map to digital mapping technology, as indicated in the conceptual diagram, transforms the way in which maps are used and constructed.

The earlier versions of computerized mapping included automated mapping and facilities management (AM/FM) systems, computer-aided design (CAD), Land Information Systems (LIS), computer aided mapping (CAM), and Mapping Information Management Systems (MIMS). However, with the advent of GIS, paper maps have evolved even further.

---

<sup>1</sup> Bishop, I. & E. Lange (2005a), p.37

<sup>2</sup> Christopher, P. (2007), p.3



GIS maps are associated with data; they can be manipulated, edited, updated, and easily viewed at different scales. GIS can be used in multiple ways in a community design context. GIS mapping makes public information more accessible and can facilitate a more complete understanding of local issues.

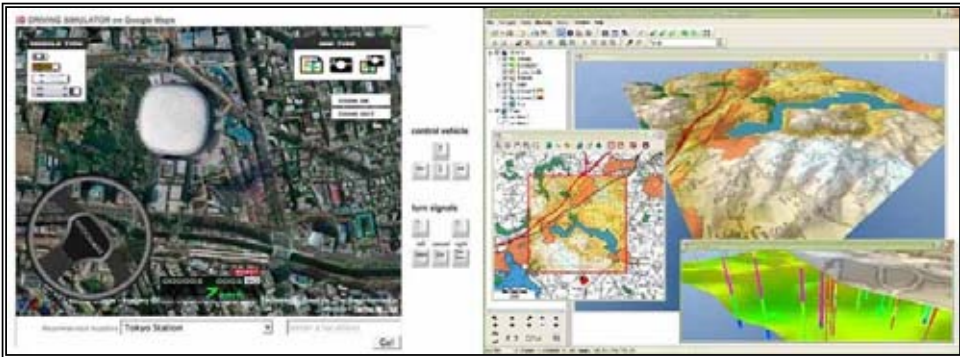


Figure (7-6) 2D map animation. Source (www.google.co.uk).

#### **7.4.2.3 Computer photo imaging and photo-montage**

Just as maps take on new dimensions and capabilities when they are digitized, photographs become more multidimensional in the computerized environment.

The ability to manipulate photos digitally opens the door to new ways of representing physical space and visualizing changes to this space. The usefulness of this tool is based on the technique of layering. Photo-imaging programs provide sophisticated techniques for composing and decomposing images. There is virtually no limit to the number of ways to alter images, including using millions of colors, cutting and pasting selected elements of images, light control and contrast, drawing, using masks, and repositioning elements on a layer without disturbing any other layers in the image. The computer user can place images into multiple layers, channels, and paths, which allows the separation of elements while retaining visual integration. Layers can be merged, flattened, flipped, copied, clipped, and linked together.<sup>1</sup>

---

<sup>1</sup> Al-Kodmany, K. (2002), p.199



Figure (7-7) Computer photo imaging of photo montage for New Orleans Riverfront' landscape regeneration. Source ([www.neworiverfront.org](http://www.neworiverfront.org)).

#### 7.4.2.4 2D and 3D panoramic views

Both 2D (180 degree) and 3D (360 degree) panoramic views can be created using software that stitches a number of overlapping still photographs together. 360 degree panoramic views are a useful technique for showing the existing landscape from designated viewpoints.<sup>1</sup>



Figure (7-8) Panorama views. Source ([www.google.co.uk](http://www.google.co.uk))

---

<sup>1</sup> Christopher, P. (2007), p.4

### 7.4.2.5 CAD and 3D animation

Occasionally one may also find CAAD (Computer Aided Architectural Design) and CADD (Computer Aided Design and Drafting) in documentation. All of these terms describe the same technology, which allows for the drafting of industrial and architectural design using computer equipment. Drawings are represented in the computer by point coordinates and vertices. Advanced CAD applications will allow for the construction of 3D models of nearly any object. One advantage that CAD has over the traditional manual techniques of drafting and model construction is that changes can be easily made, which can not be easily done using manual techniques. A basic understanding of the purpose and use of CAD is important for the eventual utilization of computer technology in collaborative design, which requires a degree of CAD proficiency to assemble an accurate model of the development environment.<sup>1</sup>

3D animation software is initially developed for the film industry and for high-tech industries. While architectural use of CAD software started around 1980, the use of 3D animation software started ten years later around 1990. Now many landscape architecture offices use CAD and 3D animation software, but they have not the criteria of interaction with users, these technique is called 3d computer visualization.

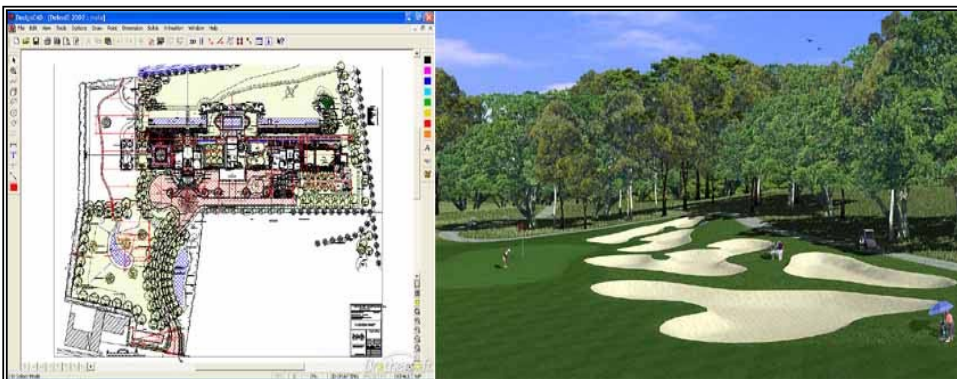


Figure (7-9) CAD and 3D animation. Source (www.google.co.uk)

---

<sup>1</sup> Dazhong, Y. (2006), p.399

### 7.4.2.6 3D-digital models

Physical models allow participants a degree of freedom in creating and moving proposed structures, but these relatively new technologies provide planners, architects, and community participants with the ability to almost “experience” a proposed structure or site plan before it is built. 3D digital modeling, simply allows users to view but not to interact with 3D models on-screen.<sup>1</sup>

Computer-generated 3-D images are a relatively recent phenomenon used in landscape & urban planning. Low platform costs, higher performance, and better software applications have brought the technology within the reach of many planning organizations.



Figure (7-10) 3D-digital models for Chicago riverfront. Source (Richard, M. 2005).

### 7.4.2.7 Integrated GIS and Game Engines

Integrating GIS and game engine technologies results in a visualization environment which tightly couples scenario modeling, 3D visualization and impact analysis. Changes made within the GIS modeling environment are updated within the 3D view accordingly. An example of an integrated GIS and Game Engine product is Community Viz, which enables planners, decision-makers, and citizens to collaboratively formulate and explore existing land use conditions and likely what-if?

Game engines such as Torque, Unreal and Far Cry offer a high end level of detail and exploration of landscapes. Game engines can be customized using scripting languages to enable developers to create

---

<sup>1</sup> Al-Kodmany, K. (2002), p.201

---

---

## Chapter 7

---

---

highly detailed and sophisticated exploratory and interactive virtual environments.

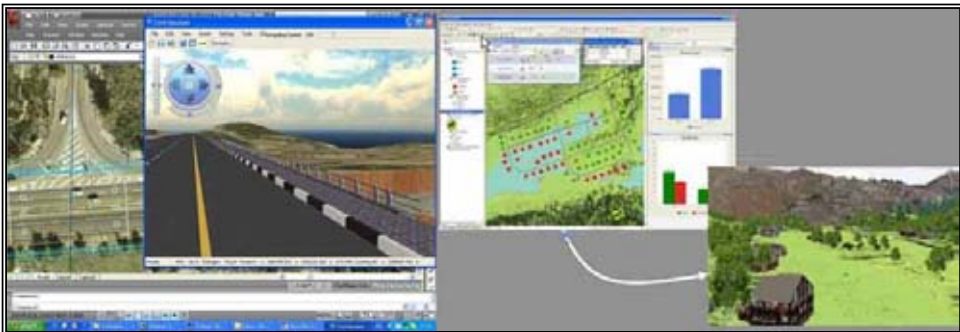


Figure (7-11) Integrated GIS and Game Engine (Community Viz). Source (<http://www.communityviz.com>)

### 7.4.2.8 Internet communication

Not really a visualization technique, more of a medium for disseminating visualizations created by other means. The Internet can be used in conjunction with VR and GIS, allows ease of access to information by members of the wider public by placing, models, plans and documentation on the web.<sup>1</sup>

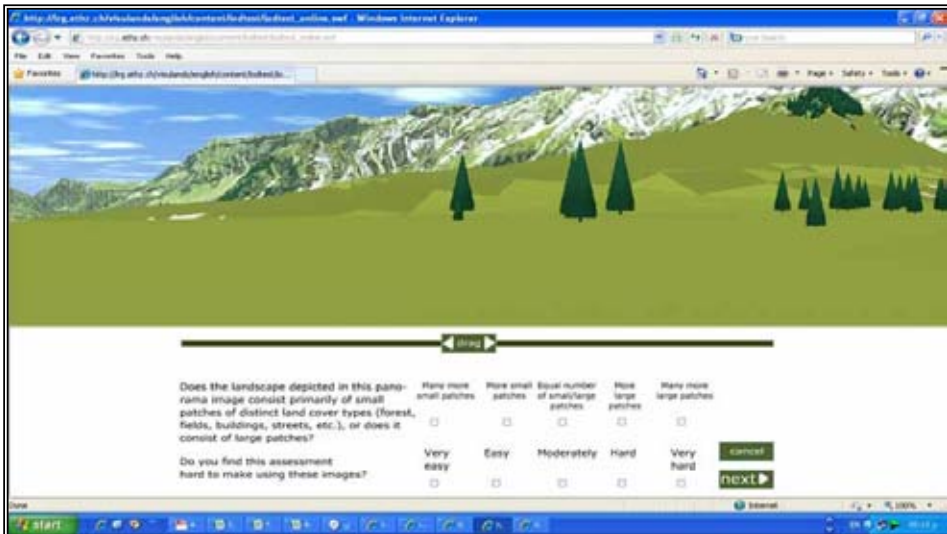


Figure (7-12) Online survey through the Internet. Source ([http://lrg.ethz.ch/visulands/english/content/lotest/lotest\\_online.swf](http://lrg.ethz.ch/visulands/english/content/lotest/lotest_online.swf))

---

<sup>1</sup> Tweed, C. (2003), p.19

The Internet has already proven to be valuable on its own as a low-cost mode of communication for participatory planning through Web sites, email, surveys, and online conferencing.<sup>1</sup>

#### **7.4.2.9 Virtual Reality**

Virtual reality, which is defined as an artificial environment where a user feels that it is a real situation, is considered as one of the important advances in landscape visualization.<sup>2</sup> In other words Virtual Reality is a virtual environment, an environment in Cyberspace, a place entered via the computer screen and navigated with standard input devices, the mouse and keyboard.<sup>3</sup>

The term Virtual Reality (VR) is used in many different contexts and the meaning of the term is often very subjectively interpreted. There have been many attempts to create a definition, but the common conditions are that a VR-system must contain computer generated visualizations of complex data. A virtual environment is displayed, and the spectator can move around freely in, and interact with the environment. A virtual environment can be defined as “an environment created by the computer in which the user feels present”.<sup>4</sup>



Figure (7-13) Application Virtual Reality visualization techniques in landscape.

Source (Walz, A. et al. 2008).

It is essential to distinguish between VR and other three-dimensional computer-generated simulations. It is believed that simply representation

---

<sup>1</sup> Al-Kodmany, K. (2002), p.205

<sup>2</sup> Honjo, T., et al., (2006), pp.80-81

<sup>3</sup> Danahy, J. & Lindquest, M. 2006

<sup>4</sup> Heldal, I., (2007), p.148

data in three-dimensional format does not render the display as a "virtual reality".<sup>1</sup> An essential constraint to the description of VR is that the simulation should enable the user to interact with the displayed data. At the simplest level, this may be through real-time control of the viewpoint and at a more complex level; the VR might facilitate active manipulation of the system parameters.

Virtual Reality as a real-time virtual 3D landscapes represent communication tools that allow experts as well as non-experts to use, explore, analyze, and understand landscape information.<sup>2</sup>

With Virtual Reality, the viewer is projected into a computer-generated three-dimensional space that creates the illusion of reality. Virtual reality can be applied to two types of simulations—real environments, such as the interior of a building or a streetscape, and imagined environments that can incorporate proposed development changes.<sup>3</sup>

### **7.4.3 Comparison between computers simulated visualization techniques**

Here the study will make a comparative analysis between computer visualization techniques which had been discussed in the previous part, using the criteria which were mentioned in point (7.4.1- Criteria of Selecting the Right computer visualization tool).

Every point in the comparison was ranked into three levels, from high, medium to low.

From this comparative analysis as shown in table (7-3) it is clear that Virtual Reality is the most suitable technique for the research approach, especially in the navigation mode.

---

<sup>1</sup> Muramoto, K., (2002), p.1

<sup>2</sup> Paar, P. & Clasen, M. (2007), p.209

<sup>3</sup> Mahbubur,R. (2006), p.3

Evaluation Criteria	Computer Simulated Visualization Techniques									
	Electronic Sketching	2D Map Animations	Computer photo imaging	2D and 3D panoramic views	CAD and 3D animation	3D-digital models	Integrated GIS & Game Engines	Internet communication	Virtual Reality	
Accessibility										
Adaptable										
Interactive										
Navigation possibility										
Affordable										
Portability										
Import/export capabilities										
Links to models and datasets										
User Friendliness										
Quality of documentation										
Availability of texture palettes										
Scale of rendered objects										
Speed & memory requirements										
Reliability										

Table (7-3) comparative analysis between computer simulated visualization techniques to choose the most suitable a for the public to participate in evaluating riverfront's landscape regeneration, by researcher



## **7.5 Virtual reality as a riverfront's landscape visualization tool**

### **7.5.1 Virtual Reality, the selected tool for the approach**

The main Virtual Reality adds the dimensions of immersion and interactivity to three-dimensional computer generated models.<sup>1</sup> VR or virtual reality is a way for humans to visualize, manipulate and interact with computers and complex data. The exploration of virtual reality (VR) and the Internet for urban and environmental applications have received increasing attention in the past decade.<sup>2</sup>

The term "virtual reality" has become used to describe applications in which people can interact with spatial data in real-time. It is a buzzword around which communications of industrial users, suppliers, governments, funding bodies and academics have gathered. Other words describe the same or overlapping groups of technologies. These include: "virtual environments", "visualization", "interactive 3D (i3D)", "digital prototypes", "simulation", "urban simulation", "visual simulation" and "4D-CAD".<sup>3</sup>

### **7.5.2 Characteristics of Virtual Reality system**

The use of Virtual Reality (VR) within the design process has not only enabled the designer to store more information than with the use of the traditional media and to check the design solutions more efficiently but furthermore it has enhanced the level of simulation providing some essential characteristics, they are:<sup>4</sup>

- **Illustrative:** Virtual Reality offers information in a clear, descriptive and illuminating way.
- **Immersive:** Virtual Reality should deeply involve or absorb the user.
- **Interactive:** In Virtual Reality, user and computer act reciprocally through the interface.

---

<sup>1</sup> Mark, P. (2008), p.166

<sup>2</sup> Huang, B. & Claramunt, C.(2004), p.73

<sup>3</sup> Whyte, J., (2002), p.7.

<sup>4</sup> Petric, J., et al.(2002), p.2

- **Intuitive:** Virtual information is easily perceived. Virtual tools are used in a "human" way.
- **Intensive:** In Virtual Reality the user encounters complex information, and responds.
- **Networked environments:** in which several people can enter a virtual world at the same time;
- **Presence:** in which the user feels present in a virtual world while robotic machines affect the user's agency at the remote location in the actual primary world.

Feature	Definition
Immersion	Immersion describes the sensation of 'being in' the environment (Heim 1998 and MacEachren <i>et al.</i> 2001) VR should deeply involve or absorb the user (Sherman and Judkins 1992)
Interaction	Enables a participant in a virtual experience to change their viewpoint on the environment and to change the relative position of their body (or body parts—hands) in relation to that of other objects (Heim 1998) Enables manipulation of the characteristics of environment components (MacEachren <i>et al.</i> 2001) In VR, user and computer act reciprocally through the interface (Sherman and Judkins 1992)
Intensity (realism)	The detail with which objects and features of the environment are represented (Heim 1998 and MacEachren <i>et al.</i> 2001) In VR the user encounters complex information and responds (Sherman and Judkins 1992)
Intelligence	The extent to which components of the environment exhibit context-sensitive 'behaviours' that can be characterized as exhibiting 'intelligence' (MacEachren <i>et al.</i> 2001)
Illustration	VR offers information in a clear, descriptive and illuminating way (Sherman and Judkins 1992)
Intuition	Virtual information is easily perceived. Virtual tools are used in a 'human' way (Sherman and Judkins 1992)

Table (7-4) characteristic of VR system which make it valuable for landscape visualization. Source (Bishop, I. & E. Lange, 2005a)

### **7.5.3 Components of Virtual Reality system**

Components of VR systems are hardware and software, the input and output devices, the data and the users.<sup>1</sup>

---

<sup>1</sup> Whyte, J. (2002),

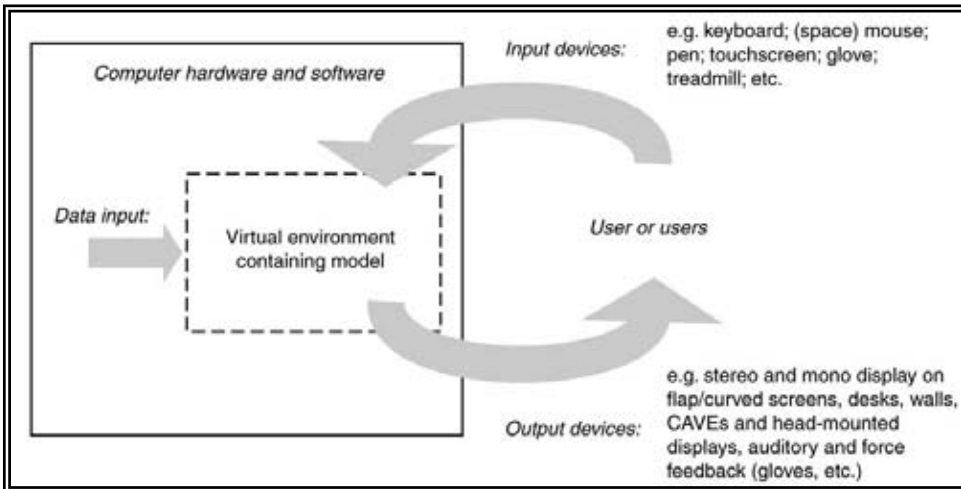


Figure (7-14) Components of VR systems, hardware and software, the input and output devices, the data and the users. Source (Whyte, J. 2002).

Components of a VR system in details include effectors, reality simulator, application, and geometry.<sup>1</sup>

- **Effectors:** Is any type of interface device that provides access to a virtual environment, examples including: "Head-Mounted Display" devices, "Data-Gloves" devices, two-dimensional or three-dimensional mice, two-dimensional computer monitors, and headphones.
- **Reality Simulator:** is the hardware that supplies the effectors with the necessary sensory (visual or acoustic) information depending on degree of immersion needed. For example "Silicon Graphics Reality Engine" workstation.
- **Application:** is the software that describes the context of the simulation. There is a variety of software depending on the system.
- **Platform:** "Intel PC", "Silicon Graphics" (SGI), and "Sun Microsystems". An example of Intel based PC software is: "Division" (from Autodesk).
- **Geometry:** is the information (normally in three-dimensional format) that describes the physical attributes of objects in the virtual environment. Geometry is usually built by CAD software, or by MAX software, or with any other modeling software.

---

<sup>1</sup> Ramasubramanian, L. (2005), p.7



Figure (7-15) Examples of VR hardware components.  
Source (<http://www.vrealities.com/hmd.html>)



Figure (7-16) Interaction devices: Spacemouse, Stylus, holobench set-up, Stylus, HMD set-up, Hornet and data glove. Source (Honjo T., et al., 2006)

### **7.5.4 Problems of using VR**

In particular, in landscape architecture it is difficult to create high-end VR-projects for average desktop-computers because of landscape structures like vegetation and complex terrains which need thousands of polygons to be displayed in a realistic way. This fact can drastically reduce the usability of VRML/X3D for landscape visualizations. By this way, it is necessary to find and to use optimization techniques to reduce the scene to a meaningful size, but to retain an acceptable quality.<sup>1</sup>

This process of reduction is necessary to guarantee usable scenes, but means also, that the designer needs to work on two different models, one detailed model for the construction and building process as well as for high-end renderings, and one file-size-optimized model for the internet.

### **7.5.5 Classification of Virtual Reality due to immersion of users**

There are basically three different kinds of virtual reality classified by the type of immersion that is being provided. These are desktop, semi-immersive and fully immersive virtual realities. These classifications can also be based on hardware and interface capabilities. These classifications of virtual reality can also be regarded as a continuum based on the levels of interactions and the real world used to facilitate transformation. These classifications are as follows:<sup>2</sup>

---

<sup>1</sup> Ball J., et al. (2007), p.80

<sup>2</sup> Whyte, J. (2002), p.21

- Desktop Virtual Reality (DVR), which is by far the most common and least expensive form of virtual reality. It typically consists of a standard desktop computer.
- Semi-Immersive Virtual Reality, which attempts to give the user a feeling of being at least slightly immersed by the virtual environment. This is often achieved by workbenches and reach-in displays.
- Fully Immersive Virtual Reality, which consists of head mounted visual display units that allow users to be completely isolated from the physical world, which makes it more expensive and time-consuming to construct. Aside this setback, it fully filters out interference from outside world as well as allowing oneself to focus entirely on the virtual environment.

Level of VR	Description	
Fully immersive	Head-mounted display (HMD) units (isolated from the real world)	Fully immersive VR is arguably the most beneficial, but the content is also the most costly and time-consuming to develop
Semi-immersive	Work benches; reach-in displays and virtual theatre	
Non-immersive, but still interactive	Desktop VR computers, the least expensive platform	

Table (7-5) VR users' immersion levels. Source (Whyte, J. 2002).

The third level (fully immersive) is the highest cost, and the highest hardware requirements among the other levels, Lange (2006) has mentioned to two new types of Virtual Reality levels, they are:

### **Augmented Reality and Mixed Reality**

Augmented reality (AR) is a term for a live direct or indirect view of a physical real-world environment whose elements are augmented by virtual computer-generated imagery. It is related to a more general concept called mediated reality in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality.<sup>1</sup>

---

<sup>1</sup> Davison, J. (2007), p.5

---

---

## Chapter 7

---

---

Augmented reality provides an overlay of digital data over a photographic depiction or actual view of the landscape. Augmented reality allows the user to interact with digital data while in the field. It can be delivered in wearable or hand held computing and is a powerful tool for superimposing descriptive information or future scenarios over the existing landscape. Figure (7-17) illustrates what a user of wearable computing could see when navigating a water way system, with superimposed route direction and impediments (mine fields).



Figure (7-17) Left, Augmented Reality, Right, Mixed Reality.  
Source (Bishop, I., et al. C., 2005, Costanza, E., et al., 2009)

Mixed Reality (MR) Refers to the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time. A mix of reality, augmented reality, augmented virtuality and virtual reality.

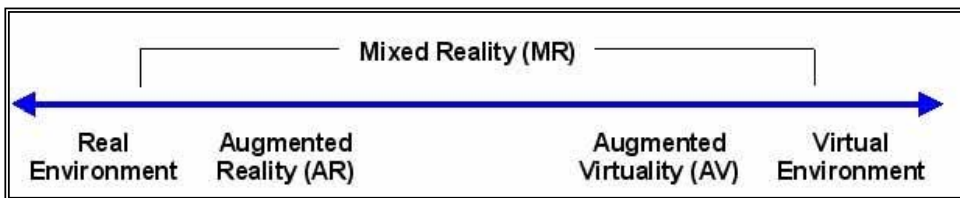


Figure (7-18) Mixed Reality. Source (Costanza, E., et al., 2009).

"The conventionally held view of a Virtual Reality (VR) environment is one in which the participant-observer is totally immersed in, and able to interact with, a completely synthetic world. Such a world may mimic the properties of some real-world environments, either existing or fictional; however, it can also exceed the bounds of physical reality by creating a world in which the physical laws ordinarily governing space, time,

mechanics, material properties, etc. no longer hold. What may be overlooked in this view, however, is that the VR label is also frequently used in association with a variety of other environments, to which total immersion and complete synthesis do not necessarily pertain, but which fall somewhere along a virtuality continuum. In this paper we focus on a particular subclass of VR related technologies that involve the merging of real and virtual worlds, which we refer to generically as Mixed Reality (MR)."<sup>1</sup>

Whereas Virtual Environments completely replace the real world, users in Augmented Reality (AR) see the real environment e.g. through a head-mounted transparent display and combine the virtual with the real. As it just blends the real and virtual, in the real environment, it is real time-interactive, registered in 3D and applies to all senses by enhancing what we see, hear, feel and smell. Landscape architects should also make use of Mixed Reality, as such new forms of data visualization across environment landscapes allow client's multi modal interactivity and mobile AR interfaces are becoming possible through emerging technologies such as outdoor systems with GPS.<sup>2</sup>

### **7.5.6 Data structure of riverfronts' landscape VR Modeling**

The VR modeling of riverfront's landscape needs different kinds of data to be built. Any landscape architect has to know these data, which varies from ecological, social and aesthetic values, to the components of real environment, and visual and non-visual inputs.<sup>3</sup>

---

<sup>1</sup> Costanza, E., et al., (2009), p.50

<sup>2</sup> Buhmann, E., et al. (2001), p.5

<sup>3</sup> Thompson, E. (2006), p.131



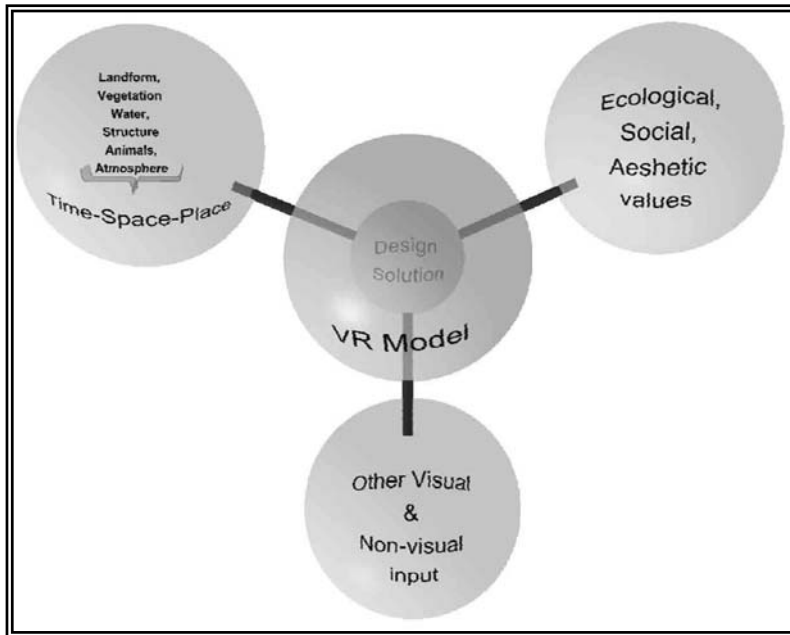


Figure (7-19) The complex data structure of Landscape VR Modeling and diverse issues that Landscape models and modelers need to address. Source (Thompson, E.2006)

Real landscapes are highly complex structures often covering very large areas. For VR visualization this is an extremely challenging task. Only within the last few years have sophisticated computer-based technological innovations allowed landscape architects to work with, and in, three and four dimensions. Looking at the real landscape, from the point-of-view of visualization, the most important variables determining the visual appearance of a landscape are.<sup>1</sup>

#### **7.5.6.1 Terrain**

Recent important developments have included very realistic and also efficient representation of terrain. As a prerequisite, digital elevation of models are needed. In many countries this data is nowadays readily available. Aerial orthophotos, which are now available at a resolution of as little as 10cm, provide the basis for highly realistic visualizations. Furthermore, satellite-based sensors are constantly improving and are already achieving resolutions of 61cm. in small areas, especially when the

---

<sup>1</sup> Ervin, S., & Hasbrouck, H., (2001), p.13

camera is close to ground level, even very high-resolution imagery can produce unrealistic foreground effects and individual elements, such as vegetation, may need to be modeled.

### **7.5.6.2Vegetation**

Because of its richness in geometry, vegetation is perhaps the most challenging landscape element real vegetation is very complex, as it consists of a large number of objects. Even more challenging is the diversity of vegetation elements in the landscape.

Vegetation is typically represented by either applying texture maps on simple rectangular polygons, so called billboards, or by detailed polygon based modeling of the geometry of the vegetation. The problem with the later approach is that even one single tree with leaves or needles can consists of thousands or even millions of polygons. Consequently, this has a considerable impact on the time it takes the computer to draw (render) the picture. This can undermine the utility of the whole simulation process.

### **7.5.6.3 Human beings**

From a broader ecological view, humans need to be included as they are an important factor influencing human visual perception and shaping the landscape. The presence or absence of them in the real landscape can greatly influence an evaluation.

In contrast to essentially static landscape elements such as vegetation, what is especially complicating in the representation of animals and human is their inevitable movement through space. The simulated people-often called avatars- can be placed in a simulated environment and can then determine their own actions as independent agents.

### **7.5.6.4Water**

Water is a very dynamic landscape element. It takes many forms-rushing streams, waterfalls, waves-which interact in complex ways with the terrain over which they are moving.

### **7.5.6.5 Structures**

In our cultural landscape, built structures play a significant role in creating a sense of place. Recent software developments make it easier to

build simple three-dimensional models which may be sufficient for many visualization needs. These programs use a library of common structural types and can model in a photorealistic way from digital photographs quickly and without extensive three dimensional skills.

#### **7.5.6.5 Atmosphere and light**

The appearance of all these landscape elements can vary greatly under different atmospheric conditions. Influences, including the position and the related intensity of the sun, objects obscuring the light source and general atmospheric or weather conditions, affect the hue, saturation and lightness of all surfaces. Simple fog models reduce the saturation of image pixels based on depth. Clouds can be texture mapped onto a sky dome. However, the atmosphere is often more complex than these simple approaches can effectively portray.

### **7.5.7 Virtual Reality software packages**

Construction of VR proceeds through three main phases: modeling, rendering, and real-time interactive presentation using system effectors.

So the use of the selected computer simulated visualization technique (Virtual reality) in simulated riverfront's landscape alternatives; have to pass through three main steps:

- 1) Modeling the riverfront's landscape alternative using 2D drawing & 3D modeling package, not only landscape elements, but with the surrounding environment, and with fully rendering.
- 2) Converting the 3D rendered model to Virtual reality modeling language format (VRML/X3D)
- 3) Browsing the Virtual reality format (VRML/X3D) by using Virtual reality browser software in order to visualize the model and navigate (not animate) through it.

With the rapid technology, now there is a variety of software that can be used with each step, so the next section will

#### **7.5.7.1 2D drawing & 3D modeling software**

With the rapid advances in technology, now there are much available software which enhances 2D drawing and other enhance 3D modeling, but

---

---

## *Chapter 7*

---

---

here we try to select a package combine by 2D drawing and 3D modeling, for example:

- Revit
- ArchiCAD
- AutoCAD Architectural Desktop
- 3DMAX
- Maya
- True Space
- Google Sketch Up

Autodesk company's (AutoCAD & 3DMAX) is the most powerful package that supports the availability of drawing in 2D and modeling in 3D also rendering the models. This package also supports working in the virtual reality mode through many powerful advantages:

- High level of accuracy.
- Powerful drawing & modeling tools.
- Wide range of materials for rendering.
- Realistic lighting features which can simulate ant light status.
- Ability to work in both high level of details and low level of details, hence reducing the file size.
- Ability to export 3D models as Virtual Reality format(VRML/X3D), with helpers for controlling navigation speed, navigation type, background, atmospheric change, day and night simulation, sound, etc....

All the previous advantages make (AutoCAD & 3DMAX) the most powerful and appropriate drawing and modeling software that can be used in the applied study approach.

In VR model, there is the need to mention the scene components as they combine to give the final 3D scene. Interestingly, the readability or legibility of the scene depends on the components used to render the model or part of it on the screen. The components necessary to achieve the readable 3D landscape scene are shown in figure (7-20).

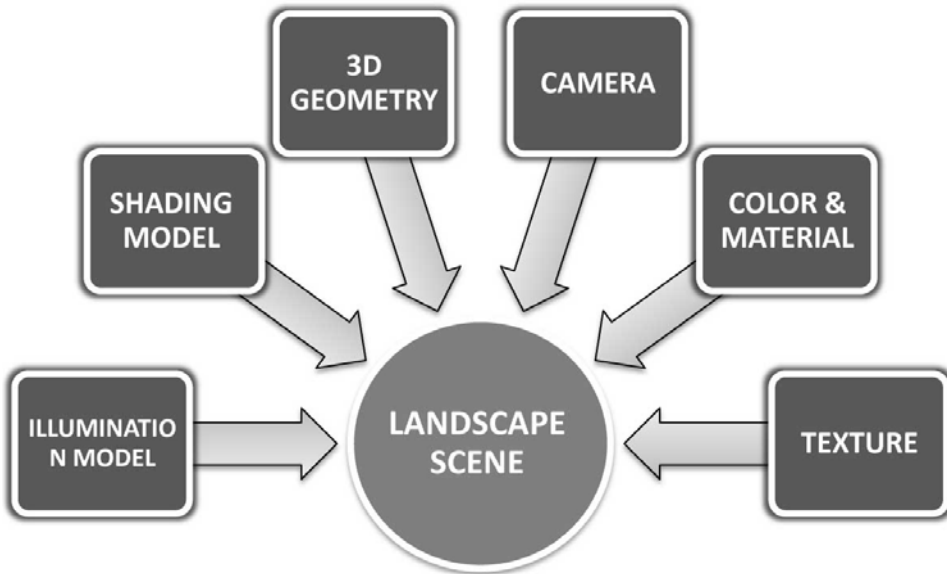


Figure (7-20) Components of the need 3D landscape scene for VR model, by researcher

### **7.5.7.2 Transforming 3D model to Virtual Reality Model**

Virtual Reality Modeling Language (VRML) has been in existence since 1995 and has become the most popular tool for providing interactive 3D models on the Web. VRML is now being replaced by X3D (Bullard, 2003) based on the extensible Markup Language (XML). The Web3D Consortium and the World Wide Web.<sup>1</sup>

Consortium (W3C) have established X3D as an XML-compliant ISO standard for interactive 3D on the web. X3D uses XML to express the geometry and behavior capabilities of 3d models, yet as it is extensible, metadata may be embedded in the file and linked to any other spatial or non-spatial dataset. The power of this technology is that it permits a user to interact with the embedded datasets in the 3D model in real time over the Internet.<sup>2</sup>

X3D combines both geometry and runtime behavior into a single XML file. X3D can be displayed in a native X3D browser or a web browser that has an X3D plug-in. X3D content can be created using purpose built X3D

---

<sup>1</sup> Barton, J. et al., (2005), p. 640

<sup>2</sup> Previous, p.640

authoring tools, text editors, transformed from XML, and converted or exported from third party applications.<sup>1</sup>

#### **7.5.7.2.a Octaga Exporter**

Octaga export from 3D Studio Max directly into Octaga's viewing software. Octaga Exporter is a very useful tool for users of Autodesk 3D Studio Max. It helps to ease the process from design of 3D models to real-time 3D presentation. It directly exports visual effects created in 3ds max into VRML and X3D which can then be viewed in Octaga Player.<sup>2</sup>

Octaga Exporter is an extended version of the standard VR exporter in 3DS max. This plug-in enables export of VRML encoded X3D nodes for use with Octaga Player. By using standard features in 3ds Max it is now possible to export content such as multi-textures, bump maps, reflection maps, shell materials, spray particle systems, animated transparencies and animated diffuse colors.

#### **7.5.7.2.b Octaga exporter Features**

Octaga Exporter has many features distinguish it from other methods to used to export VRML and X3D format, these features are:<sup>3</sup>

- **Multi-texture:** Use the features Mix and RGB Multiply materials in 3ds max to create real-time multi-texture effects. A very useful feature which lets the designer blend multiple textures applied to a model.
- **Bump and Reflection:** The bump and reflection options in the maps roll out works to add bitmaps as bump and reflection maps.
- **Shell material:** Use shell materials in 3ds max to ease the use of advanced texturing effects such as "Render to texture" and export for use in real-time.
- **Shadow node:** Add shadow effects by using a shadow helper node. Pick a light source, occluders and shadow receivers.
- **Spray particle systems:** Add textured particle systems to create new effects in a real-time model.

---

<sup>1</sup> Anslow, C., et al., (2006)

<sup>2</sup> [www.octage.com](http://www.octage.com)

<sup>3</sup> previous

- Triangle strips: The Octaga Exporter can optimize models by converting geometry into triangle strips, which are more efficient for real-time rendering.
- Animated transparency and color: Use the extended possibilities for exporting animations to create effects with color and transparency.
- Animated normals for coordinate interpolators: Create animations of mesh modifications while preserving the smoothing properties of the object.
- Octaga playback framework: The exported model will be embedded in a playback framework which is useful for testing animations. Octaga Professional only.
- Octaga sun simulator: The exported model will be embedded in a sun simulator framework which simulates the sunlight at a given location at a given date and time. Useful together with a shadow node to observe sun/shadow behavior.

### **7.5.7.3 Choosing of Virtual Reality navigation Browser**

A choice of VRML/X3D was made for this research because; with this tool it is possible to explore the virtual environment in a flexible and an interactive manner. With this tool, it is possible to define specific viewpoints using the predefined tools on the control panel interface. Also, this tool has the capabilities of ease of viewing with a standard World Wide Web (www) browser, limited software costs and potential for dissemination through the www.

#### **7.5.7.3.a Virtual Reality language browsers:**

X3D/VRML browsers are essential software for browsing X3D/VRML files in a users' friendly interface. Most of Virtual Reality browsers interface contain a control panel supporting the navigation process. The most powerful Virtual Reality browsers are:

- Instant player
- Flux player
- Cortona player
- Sony player
- Octage player

---

---

## Chapter 7

---

---

- BS Contact player
- Cosmo player, as shown in next figures.

Then in table(7-6) these browsers will be compared to select the suitable one for the approach.



Figure (7-21) Screen shot of Instant Player interface. Source (original software by researcher).

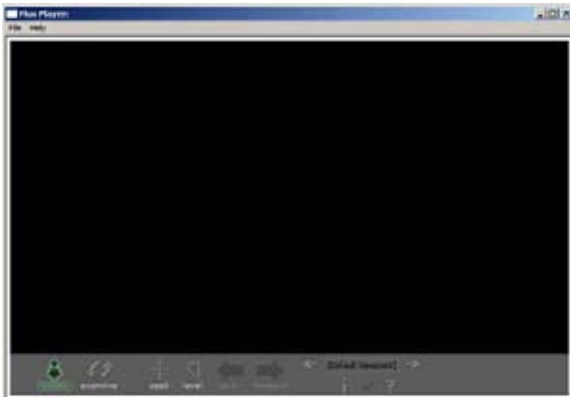


Figure (7-22) Screen shot of Flus Player interface. Source (original software by researcher).



Figure (7-23) Screen shot of Cortona Player interface. Source (original software by researcher).



---

## Chapter 7

---



Figure (7-24) Screen shot of Sony Player interface. Source (original software by researcher).



Figure (7-25) Screen shot of Octaga Player interface. Source (original software by researcher).

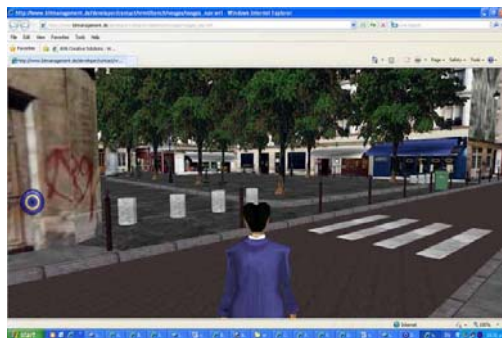


Figure (7-26) Screen shot of BS Contact Player interface. Source (<http://www.bitmanagement.de>)

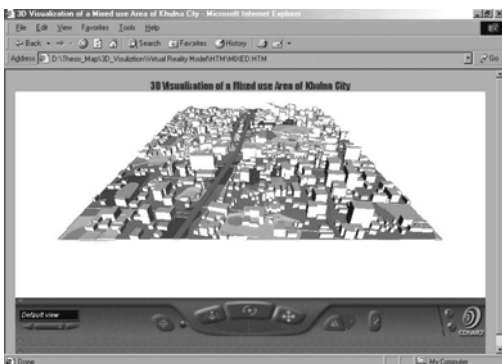


Figure (7-27) Screen shot of Cosmo Player interface. Source (Billah, M. 2005)

VRML/X3D Browsers	BS Contact	sony	Cortona Player	Flux Player	Octaga	X3D	Cosmo Player	Instant-Player
Plug-in/standalone	P/S	P	P	P/S	P/S	P	P	p
VRML support	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
X3D support	Yes	Yes	No	Yes	Yes	Yes	No	Yes
avatar	yes	No	No	No	No	No	No	No
Rendering	yes	No	yes	No	yes	No	No	No
Exporter from 3D/MAX	yes	No	No	No	yes	No	No	No
Easy to Navigate	yes	No	yes	No	yes	No	yes	No
Control Panel	yes	yes	yes	yes	yes	yes	yes	yes
Support large size file	yes	No	No	No	yes	No	No	No

Table (7-6) Comparison of Virtual Reality Browsers to select suitable one for the research Approach by researcher

Because Octaga is distinguished from other VRML/X3D browsers, by its characteristics, and has its exporter and player. It is found that Octaga is the most suitable browser for the approach.

#### **7.5.7.3.b Octaga player**

Octaga Player is a high performance, feature-rich, real-time 3D player utilizing modern graphics hardware to display advanced interactive 3D scenes. With this viewer you can easily distribute your data to users that do not have the full Octaga Enterprise suite installed. Octaga Player has been benchmarked against other popular 3D players. The results show that Octaga is overall faster than all the tested players. In some test cases Octaga Player was more than 100% faster than any other players.<sup>1</sup>

The newest version of the Player features major improvements:

- Greatly improved rendering performance
- The viewer supports and is fully compliant with X3D and VRML, the ISO standards for interactive 3D graphics
- High performance on animations
- Collision detection
- Advanced shaders using "render to texture" and multiple render buffers using the new Render Buffer node
- New scripting methods for improved interactivity

Functionality

- Distribute X3D content to partners and customers
- Provides an inexpensive viewing solution
- Works on all major operating systems
- Integrates in all major web browsers
- Multiple deployment channels: stand alone, web or integrated in documents

Octaga Player can display:

- Octaga Visual Solutions presentations
- 3D scenes exported from Octaga Enterprise
- 3D scenes export from CAD or 3D design tools
- X3D model files

---

<sup>1</sup> [http://sobisvn.softarchive.net/octaga\\_player.28345.html](http://sobisvn.softarchive.net/octaga_player.28345.html)

---

---

## Chapter 7

---

---

Octaga Player is the world's first and best 3D player for both VRML and X3D. It supports the whole profile of X3D which gives users a multitude of visual effects such as pixel shading and multi-texturing. Octaga Player is a high-performance, standards-compliant 3D player that can run as a stand alone application or be a plug-in to any Internet browser.



Figure (7-28) Octaga player interface. Source (<http://www.octaga.com/index.php>)



Figure (7-29) Octaga player & Octaga exporter. Source (<http://www.octaga.com/index.php>)

## **7.6 The components of virtual reality system for the approach**

The selected Virtual Reality system as a computer simulated visualization tool consists of:

- **Photoshop** (for editing the images and maps used in the riverfront landscape model).
- **AutoCAD** (for sketching the base maps for the riverfront landscape alternatives).
- **3DS Max** (for modeling and rendering the riverfront space and modeling landscape elements).
- **Tree Storm& Onyx** (for modeling trees and vegetation).
- **Octaga Exporter** (for exporting the 3D model generated by -3DS Max- and transforms it to format (
- **Octaga player** (as a VRML/X3D browser for the file exported from -3DS Max-).

## **7.7 Summary & Conclusion**

VR can generally be defined as 3-D computer generated environment or structure that gives the user a sense of being immersed in a real world.

Computer generated technologies such as virtual reality can help landscape architects as well as clients to overcome the gap between the public and the expert landscape architects, between the virtual and the real world, hoping to augment also the intellect and creativity of landscape architects through the development and use of virtual technologies.

In this chapter VR was selected as computer simulated visualization technique which is suitable to be used as the tool of the research approach to enhance public participation in evaluating riverfront's landscape alternatives.



**PART  
TWO**

**Computer Simulated Visualization for Better Public Participation in Evaluating the Regeneration of Riverfront's Landscape**

**Chapter  
5**

**Approach Field: International Examples on Riverfront's Landscape Regeneration... to Learn**

**Chapter  
6**

**Approach Parameters: Riverfront's Landscape elements and Riverfront's landscape evaluation**

**Chapter  
7**

**Approach Tool: The use of Computer Simulated Visualization in Riverfront's landscape evaluation**

**Chapter  
8**

**Computer Simulated Visualization for Better Public Participation in Evaluating Riverfront's Landscape Regeneration**





**Introduction**

**Approach methodology**

**Towards a comprehensive approach**



*"Planners are increasingly recognizing the potential of computer-based participation as a key element in developing appropriate and effective solutions to community design and planning problems. As computer and Internet technology becomes more mainstream, planners should develop ways to harness these technologies to work more effectively with the public. Computerized tools represent a paradigm shift in the planning and design process that my fundamentally change the way planners communicate ideas to the public." (American Planning Association 2006).*

## 8.1 Introduction

This chapter will collect previous conclusions in order to reach the proposed approach for using computer simulated visualization to evaluate regeneration of riverfront's landscape alternatives, through public users' evaluation according to their preferences.

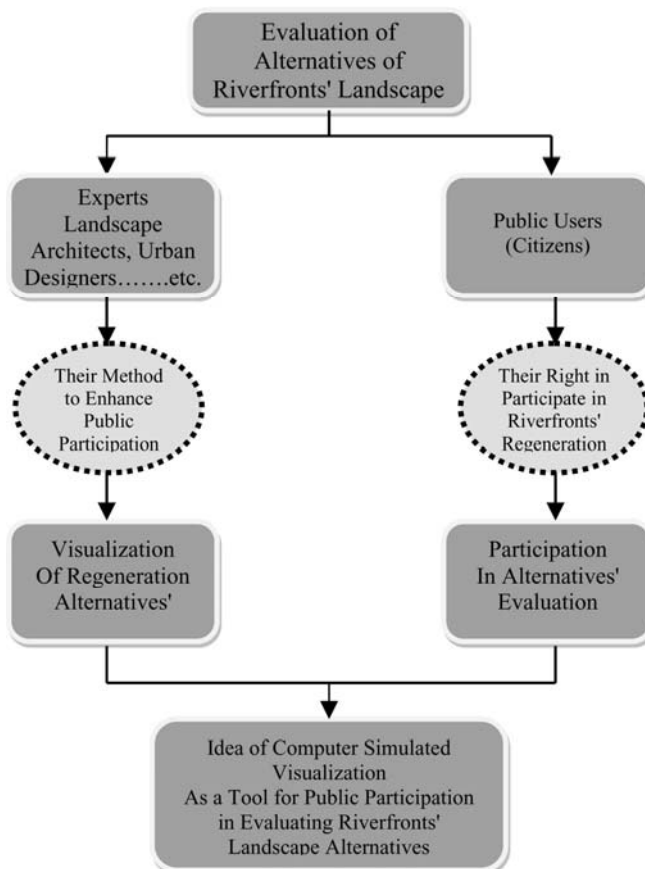


Figure (8-1)  
Schematic design of the approach, by researcher.

## **8.2 Approach methodology**

After studying the approach objectives, limitations, field study, and selecting the tool, this part comes to develop the approach theoretical base. It is important first to mention the process of riverfront landscape regeneration alternatives, and analyze this process into stages, in order to determine the appropriate stages for public participation.

### **8.2.1 Approach objectives**

The approach main objective is to use outputs of public participation through users' evaluation of computer simulated visualization of the design alternatives of riverfronts' landscape regeneration as feedback which can help landscape architects in decision making to optimize the design decisions. To achieve this goal some research tasks were discussed in the three previous chapters:

- Determining and studying the approach field study (in chapter 5).
- Studying and analyzing riverfronts' landscape elements and their design aspects, their indicators and their design variables (in chapter 6).
- Studying and determining riverfronts' landscape evaluation criteria and sub criteria, in order to prepare evaluation criteria which can help in public participation process (in chapter 6).
- Studying computer simulated visualization techniques to select the most suitable technique to be used in the applied experiment (chapter 7).

This chapter also will discuss other tasks:

- Determining different stages of public participation in the regeneration of riverfronts' landscape process.
- Establishing a factor set for evaluation criteria and sub criteria concerning riverfront's landscape elements, by small survey between some experts.
- Establishing a matrix between evaluation criteria, sub criteria and riverfront's landscape elements and their indicators.

### **8.2.2 Approach Assumption**

Members of communities may find it difficult to engage with technical information presented using typical landscape visualization media, such as maps and reports. One technique that has been successful in public consultation in other fields is the use of computer simulated visualizations or realistic three-dimensional visualizations of the future of riverfront landscape under different scenarios.

### **8.2.3 Understanding Riverfront landscape in urban regeneration projects**

- This process means to redesign the riverfront's landscape to enhance the design, to meet public needs and preferences, to design alternative solutions for the problems appeared within the existing landscape.
- This process begins with determining problems by observation or pilot study or some types of questionnaires, and determine if the whole design should be regenerated or some elements only.
- The next step is site analysis, which is followed with master plan, which the landscape architects prepare.
- Next, is a design philosophy and design goals.
- Then landscape architects have to determine design criteria which meet users' needs and preferences.
- They have to determine relative weight for each criterion and sub criteria to make evaluation for the riverfront's landscape designs.
- The landscape architect should put some design alternative to regenerate the riverfront's landscape.
- Public participation role should be involved in this stage also stakeholders can be involved.
- To make public participation effective the next stage has to be modeling the design alternative then convert these models to interactive computer simulated visualization to help participant to navigate through the virtual models for better judgments
- The participants have to participate in determining their preference for each evaluation criterion fro each alternative, after navigation in these virtual reality models to visualize the modifications.

- Landscape architects should know that the evaluation criteria can vary from landscape element to other element and from riverfront's space to other riverfront's space.

### **8.2.4 Determining of evaluation criteria of riverfront's landscape**

In this stage the research from chapter 5 and chapter 6 determine the main aspects of evaluation of riverfront's landscape which can be used through public participation. The main criteria were four, they are access and linkage, second is comfort and image, third is uses and activities, and fourth sociability aspect. Each of these four criteria can be divided into six sub criteria, as shown in figure (8-2).

### **8.2.5 Establish an evaluation factor set for design criteria of riverfront's landscape elements**

In this stage the main four criteria and the twenty four sub-criteria were put in small survey between 10 selected experts between landscape architects and urban designers, and each of them gave each criteria and sub-criteria evaluation from 1-5 means poor to excellent then the results was collected and analyzed to give each criteria and sub-criteria a relative weight, as shown in table (8-1).

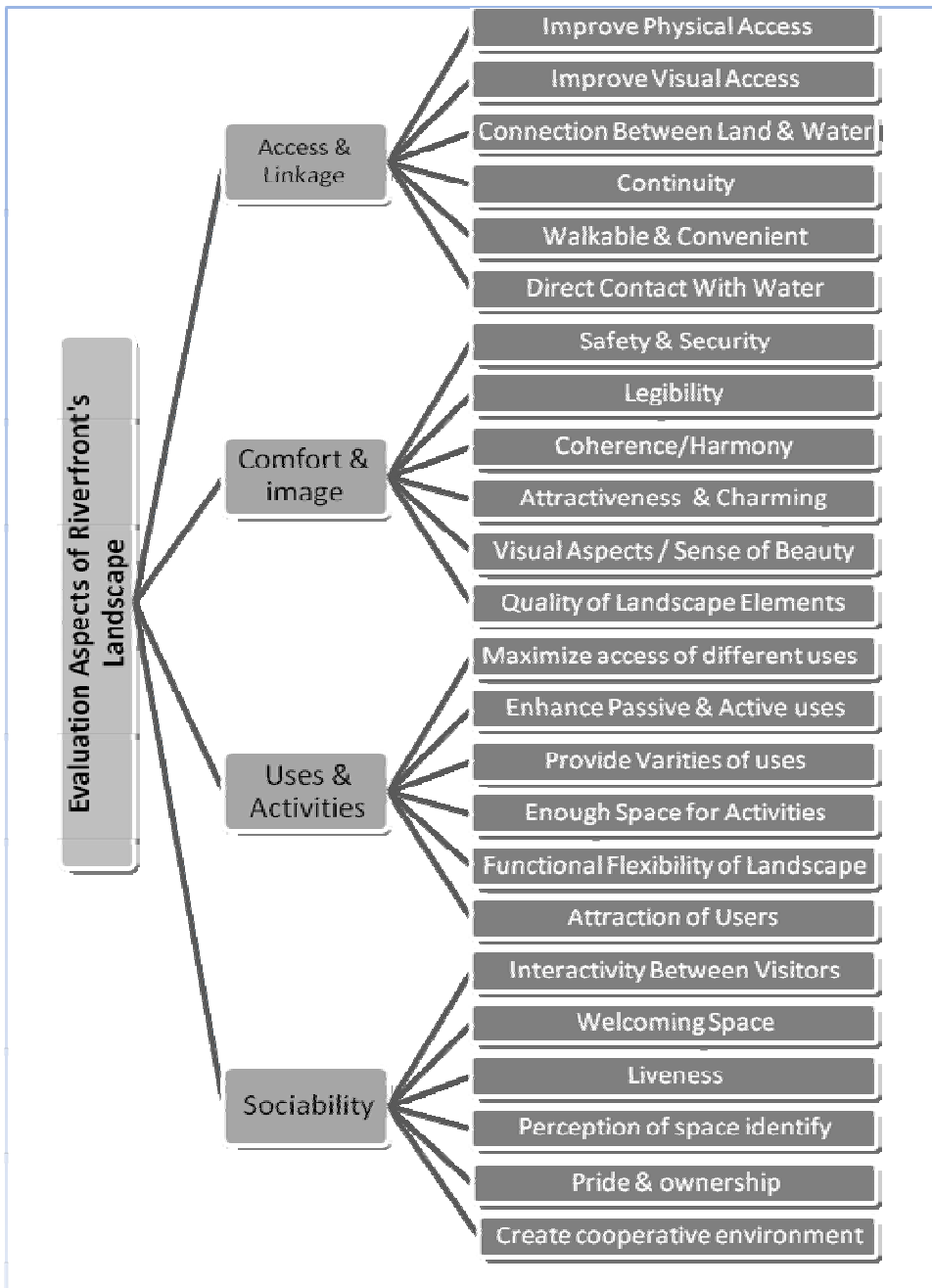


Figure (8-2) Evaluation criteria (aspects) and sub-criteria of Riverfront's Landscape, by researcher.

## Chapter 8

Target	Main Criteria		Sub Criteria		Experts' Evaluation Factors
<b>Criteria for Evaluation of Riverfront's landscape regeneration alternatives</b>	<b>Access &amp; Linkage</b>	<b>(25.2%)</b>	<b>Improve Physical Access</b>	<b>(22%)</b>	<b>5.54%</b>
			<b>Improve Visual Access</b>	<b>(21.5%)</b>	<b>5.42%</b>
			<b>Connection Between Land &amp; Water</b>	<b>(13.5%)</b>	<b>3.50%</b>
			<b>Continuity</b>	<b>(13.9%)</b>	<b>3.50%</b>
			<b>Walkable &amp; Convenient</b>	<b>(15.7%)</b>	<b>3.96%</b>
			<b>Direct Contact With Water</b>	<b>(13.5%)</b>	<b>3.40%</b>
	<b>Comfort &amp; image</b>	<b>(28.3%)</b>	<b>Safety</b>	<b>(18.9%)</b>	<b>5.35%</b>
			<b>Legibility</b>	<b>(13.8%)</b>	<b>3.91%</b>
			<b>Coherence/Harmony</b>	<b>(14.2%)</b>	<b>4.02%</b>
			<b>Attractiveness &amp; Charming</b>	<b>(16.5%)</b>	<b>4.67%</b>
			<b>Visual Aspects / Sense of Beauty</b>	<b>(18.9%)</b>	<b>5.35%</b>
			<b>Quality of Landscape Elements</b>	<b>(17.7%)</b>	<b>5.01%</b>
	<b>Uses &amp; Activities</b>	<b>(27%)</b>	<b>Maximize access of different uses</b>	<b>(17%)</b>	<b>4.59%</b>
			<b>Enhance Passive &amp; Active uses</b>	<b>(17%)</b>	<b>4.59%</b>
			<b>Provide Varieties of uses</b>	<b>(17.9%)</b>	<b>4.83%</b>
			<b>Enough Space for Activities</b>	<b>(17.4%)</b>	<b>4.70%</b>
			<b>Functional Flexibility of Landscape</b>	<b>(15.3%)</b>	<b>4.13%</b>
			<b>Attraction of Users</b>	<b>(15.3%)</b>	<b>4.13%</b>
	<b>Sociability</b>	<b>(19.5%)</b>	<b>Interactivity Between Visitors</b>	<b>(15%)</b>	<b>2.93%</b>
			<b>Welcoming Space</b>	<b>(20.3%)</b>	<b>3.96%</b>
			<b>Liveness</b>	<b>(19.3%)</b>	<b>3.76%</b>
			<b>Perception of space identify</b>	<b>(18.4%)</b>	<b>3.59%</b>
			<b>Pride &amp; ownership</b>	<b>(13.5%)</b>	<b>2.63%</b>
			<b>Create cooperative environment</b>	<b>(13.5%)</b>	<b>2.36%</b>

Table (8-1) Evaluation Factors of criteria and sub-criteria of riverfront's landscape regeneration, by researcher.



### **8.2.6 Establishing a checklist between riverfronts' landscape elements and design criteria**

From previous findings riverfront's landscape elements were determined (as shown in chapter 6) with their aspects, indicators and variables, also the design criteria were determined, so the checklist in table (8-2) shows a matrix between design criteria and sub-criteria (columns) and riverfronts' landscape elements and their indicators (rows).

This checklist can help landscape architect in assessment and evaluate riverfronts' landscape.

But when analyzing landscape elements, it can be noticed that not all elements have the same criteria or it is not important to discuss some criteria with specific elements as shown in table (8-3).

# Chapter 8

riverfronts' Landscape Elements	Criteria	Access & Linkage		Comfort & image				Uses & Activities			Sociability															
	Indicators	Improve Physical Access	Improve Visual Access	Connection Between Land & Water	Continuity	Walkable & Convenient	Direct Contact With Water	Safety & Security	Legibility	Coherence/Harmony	Attractiveness & Charming	Visual Aspects / Sense of Beauty	Quality of Landscape Elements	Maximize access of different users	Enhance Passive & Active uses	Provide Venues of uses	Enough Space for Activities	Functional Flexibility of Landscape	Attraction of Users	Interactivity Between Visitors	Welcoming Space	Leviness	Perception of space Identity	Pride & ownership	Create cooperative environment	
Riverfront Edge& Guardrails (Shoreline)	Shape																									
	Design/Type																									
	Embankment																									
	Transparency																									
Retaining Walls, Fencing, Bollards and Railing	Material																									
	Shape																									
	Design/Type																									
Side-Walk/Paving	Transparency																									
	material																									
	position																									
Stairs/Ramps	form																									
	width																									
	paving material																									
Trees	position																									
	design																									
	material																									
Ground Covers & Flowers	Spacing between																									
	Shape																									
	Purpose																									
Seating	Tree species																									
	Order																									
	Position																									
Lighting	Spacing between																									
	Design/Type																									
	Variety																									
Signage	Spacing between																									
	Design/Type																									
	Content																									
Water Features	Self Illumination																									
	Variety																									
	Position																									
Objects of art/ Landmarks/ Flags& Banners	Design/Type																									
	purpose																									
	Position																									
Structures & Gates and other amenities	shape/proportions																									
	material																									
	Variety																									
Cars/Vehicles Parking	position																									
	Design/Type																									
	material																									
Trash Receptacles	position																									
	Design/Type																									
Flood Plain	Material																									
	Design/Type																									
	material																									

Table (8-2) checklist between riverfront's landscape elements and design criteria, by researcher

# Chapter 8

Landscape Elements	Criteria	Access & Linkage				Comfort & image				Uses & Activities				Sociability												
		Indicators	Improve Physical Access	Improve Visual Access	Connection Between Land & Water	Continuity	Walkable & Convenient	Direct Contact With Water	Safety & Security	Legibility	Coherence/Harmony	Attractiveness & Charming	Visual Aspects / Sense of Beauty	Quality of Landscape Elements	Maximize access of different uses	Enhance Passive & Active uses	Provide Varities of uses	Enough Space for Activities	Functional Flexibility of Landscape	Attraction of Users	Interactivity Between Visitors	Welcoming Space	Liveness	Perception of space identify	Pride & ownership	Create cooperative environment
Riverfront Edge & Guardrails (Shoreline)	Shape																									
	Design/Type																									
Retaining Walls, Fencing, Bollards and Railing	Embankment																									
	Transparency																									
Side-Walk/Paving	Material																									
	Shape																									
Stairs/Ramps	Design/Type																									
	Transparency																									
Trees	material																									
	position																									
Ground Covers & Flowers	form																									
	width																									
Seating	paving material																									
	position																									
Lighting	design																									
	material																									
Signage	Spacing between																									
	Layout																									
Water Features	Position																									
	Design/Type																									
Objects of art/ Landmarks/ Flags & Banners	Shape																									
	Purpose																									
Structures & Gates and other amenities	Variety																									
	Order																									
Cars/Vehicles Parking	Position																									
	Spacing between																									
Trash Receptacles	Shape																									
	Purpose																									
Flood Plain	Tree species																									
	Order																									

Table (8-3) checklist between riverfront's landscape elements and design criteria, points not highlighted are not important for related landscape elements, by researcher

### 8.2.7 Establishing a Radar format to represent public's evaluation for riverfront's landscape

The four design criteria and their sub-criteria are represented in a radar format as shown in figure (8-3) and a scale from 1 to 5 (represents the evaluation mean of each sub-criterion) so the results of any evaluated alternative can be represented in this format and can be easily analyzed and the strengths and weakness of each alternative can be noticed clearly.

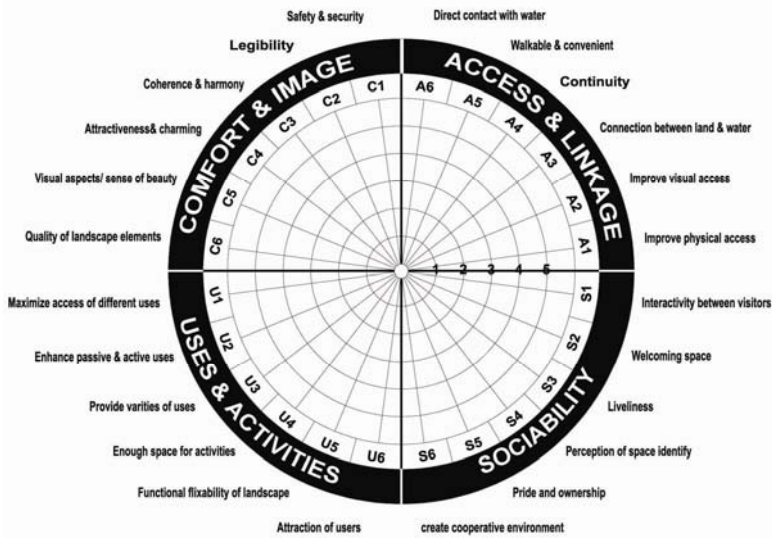


Figure (8-3) Radar format of public's Evaluation criteria of riverfront's landscape, by researcher.

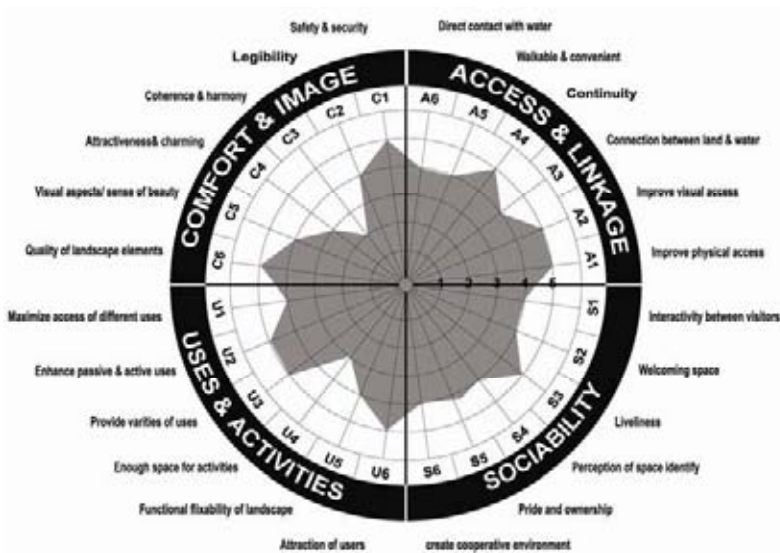


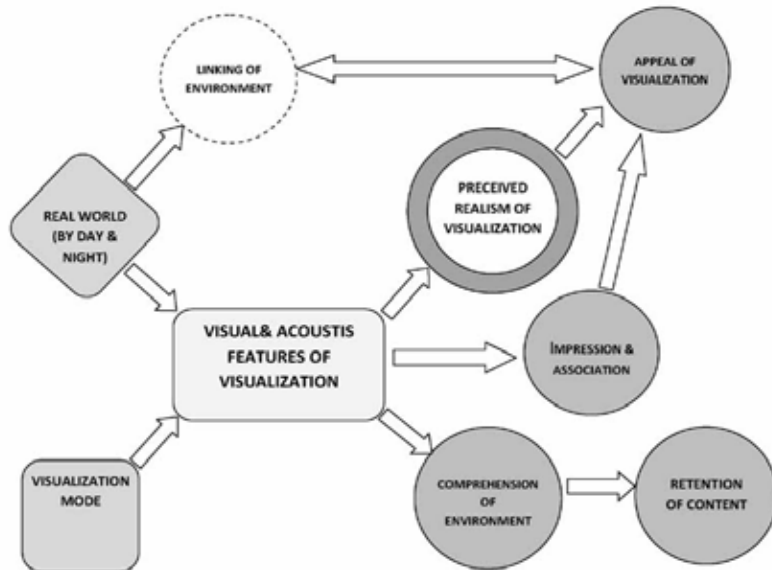
Figure (8-4) An example of representing evaluation mean on Radar format landscape, by researcher.

### 8.2.8 Determining Public responses towards proposed computer simulated visualization

Fig (8-5) shows the conceptual main framework for using computer simulated technique to enhance public participation is adapted from previous studies such as (Bishop, I 2003).

What respondents see in a visualization results from a combination of the characteristics of the objective environment (the box labeled “real world”) and the chosen visualization means (the box labeled “mode”), various forms of experience of the environment, which is computer simulations. These in combination determine the “features of the visualization”

Figure (8-5) framework for using computer simulated technique to enhance public participation, by researcher.



In fig (8-5), all variables to be measured as viewer’s responses are shown as circles (dotted: appraisal of the represented environment; solid: reactions to the presentation). The core variable, perceived realism (double-circled) refers to an evaluating judgment in which the simulation, in relation to the viewer’s beliefs about the reality, is assessed. The figure also makes clear that judgment about the environment itself and about its depiction—which is dependent on the available visualization means—are likely to interact (double-headed arrow, indicating mutual causality). Real environments as well as simulated ones are always experienced within a subjective context of cognitive and evaluative factors.

### 8.2.9 Determining proposed computer simulated visualization stages and components

As described in chapter (7) the proposed simulated visualization technique (Virtual Reality) consists of 4 stages, the first stage is database collection, determining design goals, and determining of design alternatives, then stage two is 2D drawing and 3D modeling, the third stage is to generate Virtual Reality model or convert 3D modeling to VRML/X3D format (the selected tool is Octaga exporter), the fourth stage is navigation through virtual model using Virtual Reality browser (the selected one is Octaga player).

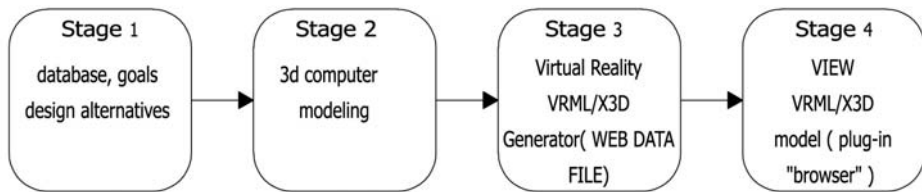


Figure (8-6) The four stages of virtual riverfront's landscape modeling. By researcher

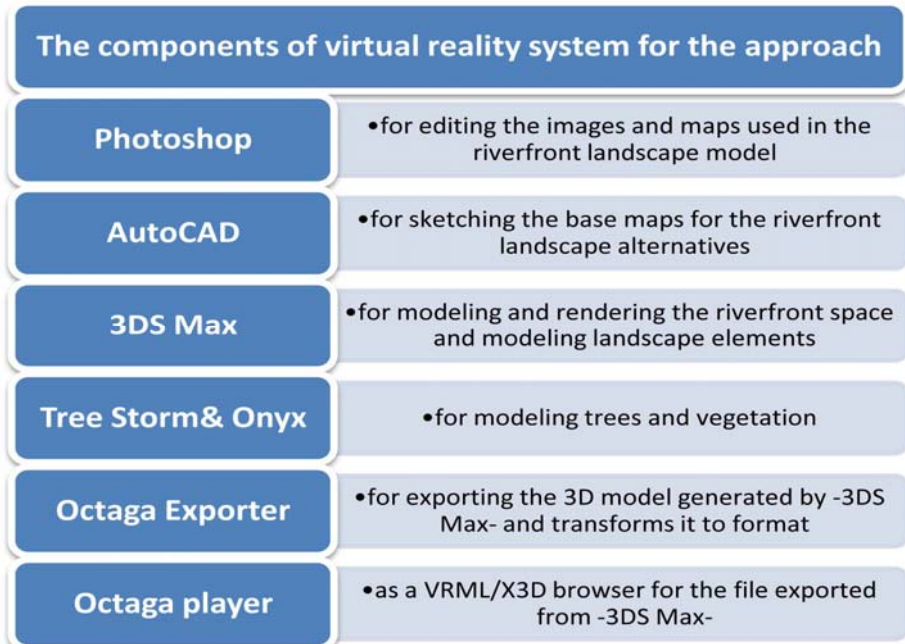


Figure (8-7) The components of Virtual Reality system for the approach, by researcher

### **8.2.10 Participative riverfront's landscape regeneration using the tool of computer visualization**

This part assumes that sharing the virtual experience can improve the participation among designers, especially landscape architects and other stakeholders in a riverfront's landscape project such as applicants, architects, engineers and the public, as shown in figure (8-8)

The approach intends to increase public participation and achieve more transparency in the regeneration process. It is assumed that the quality of the decision-making process can also be improved by virtue of the technology's ability to support participation and thus reduce misunderstandings in the negotiation of a proposed development. Better informed decisions will also increase the confidence that the public has in the riverfront's landscape regeneration process.

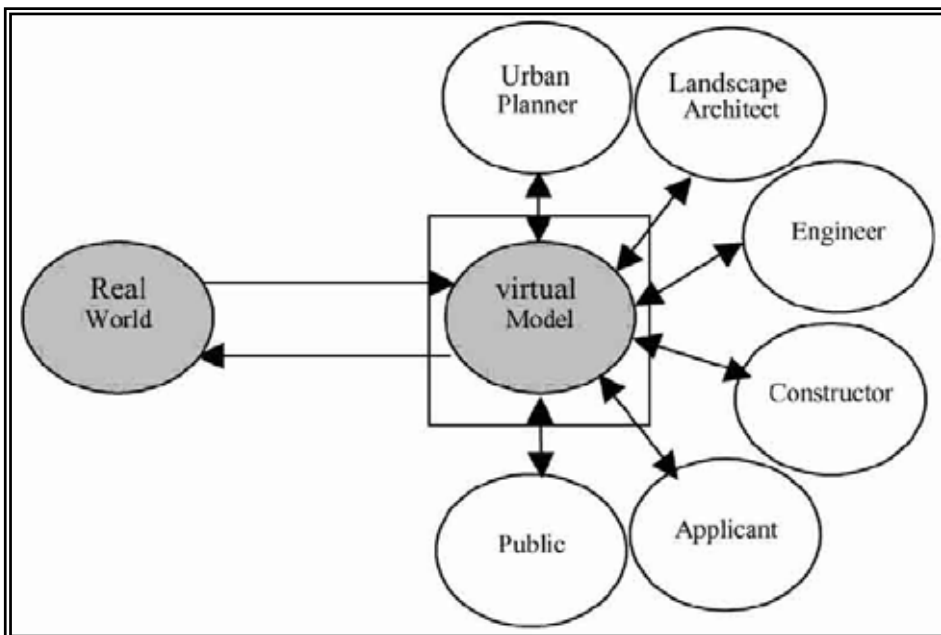


Figure (8-8) participative riverfront's landscape regeneration in real world via shared virtual world, by researcher

### **8.2.11 Participative riverfront's landscape regeneration cycle**

This part assumes the initial steps of participative riverfront's landscape cycle, in which the regeneration process can be achieved within, these steps can be defined as: survey of the site, then establishing existing conditions, followed by initial design of proposed regeneration, then considering the regeneration alternatives, followed by the evaluation of the alternatives, finally select the final design. This cycle is shown in figure (8-9).

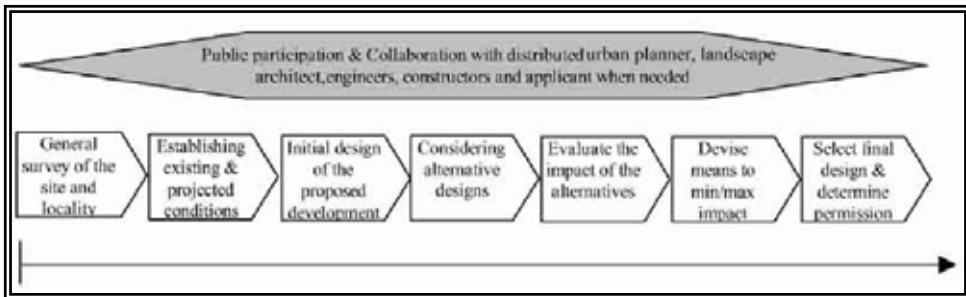


Figure (8-9) participative riverfront's landscape cycle, by researcher.

### **8.2.12 Public participation in different stages of the regeneration of riverfront's landscape process**

This part defines different stages of the regeneration of riverfront's landscape process, starting from the stage of determining the regeneration reasons, second stage is collecting data and baseline conditions, third stage is to confirm alternatives concepts or determine ideas of problems' solutions, fourth stage is to evaluate alternatives concepts, fifth is to identify alternatives designs, sixth is to evaluate alternative designs, finally the selection of optimum alternative then preparing of its document. In figure (8-10) these seven stages are shown in relations to the need of public participation. In figure (8-11) we highlight the stages which the proposed approach of using computer simulated visualization can be used.



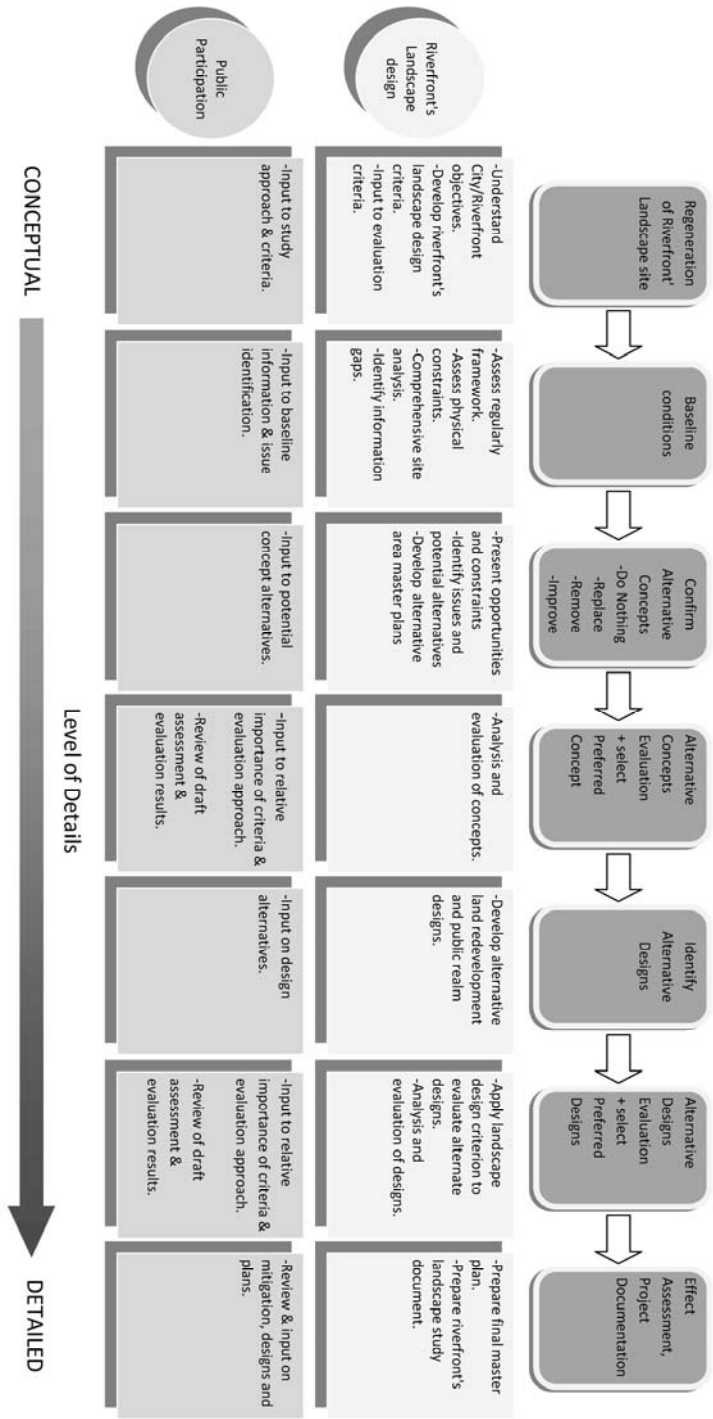


Figure (8-10) public participation in different stages of the regeneration of riverfront's landscape process, by researcher

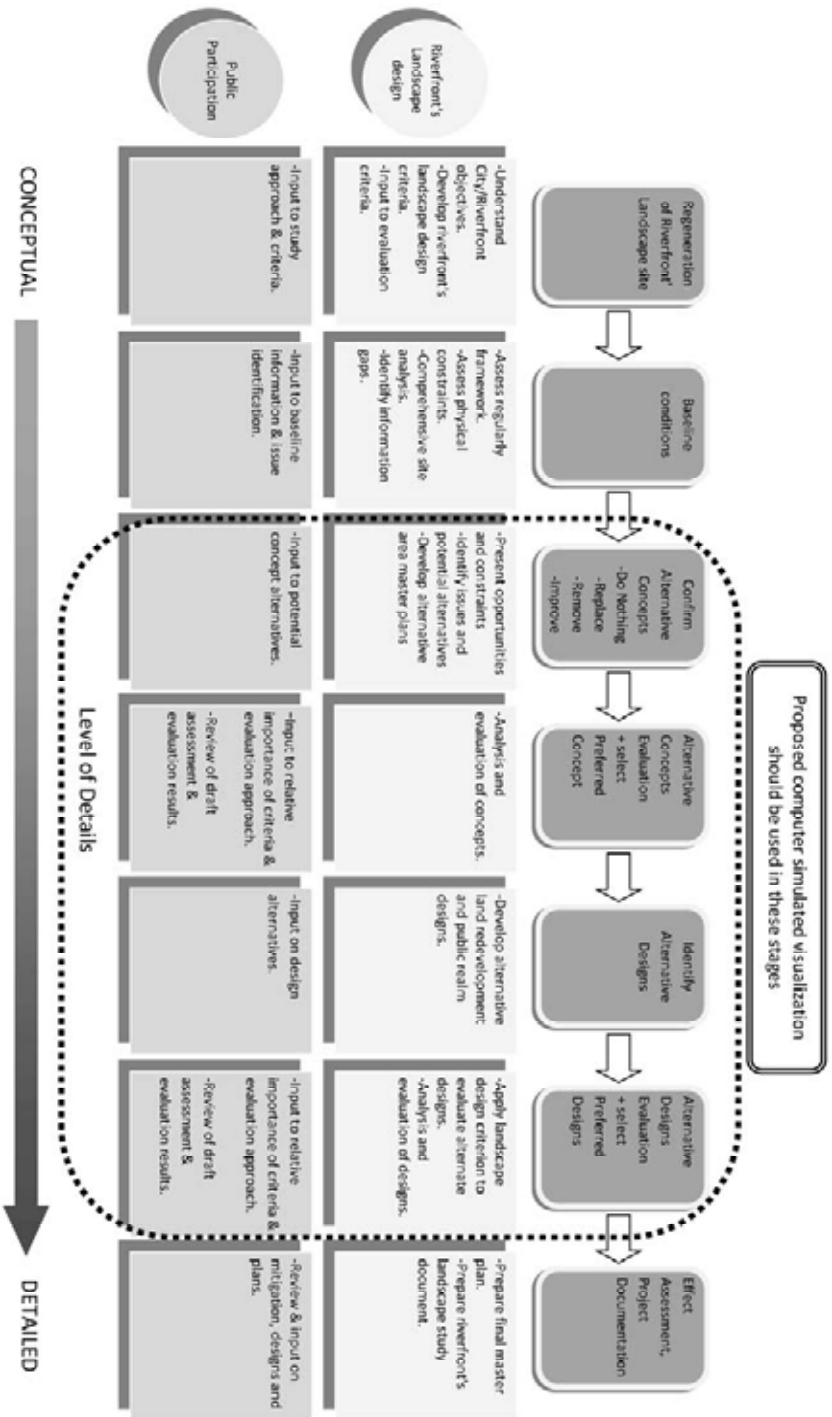


Figure (8-11) public participation in different stages of the regeneration of riverfront's landscape process, using proposed computer simulated visualization, showing the stages which need this proposal urgently, by researcher

### **8.3 Towards a comprehensive approach**

General public can participate in riverfront's landscape regeneration process through evaluating the alternatives of virtual riverfront landscape scenes; they can ever participate in the later stages till reaching the optimum design alternative, and can also continue participating in the implementation.

After determining the stage of general public participation in riverfronts' landscape regeneration process, it is important to focus on and develop the approach of participation through in-depth studying of the stages, inputs and outputs.

The suggested approach develops the communication mean between landscape architects (experts) and public users (non-experts) from traditional means to interactive 4D computer simulated visualization or navigation (not animation) using Virtual Reality models.

The detailed stages of the suggested public participation approach are shown in figure (8- ), this figure shows:

- Evaluation criteria stage which depends on four main criteria represents users needs and preferences in any riverfront's landscape design, they are: access & linkage, comfort & image, uses & activities, and sociability, each of them is sub divided into six sub-criteria, and each of them has a relative weight according to survey with number of experts and designers.
- 3D modeling stage which the alternatives are built to be exported to virtual reality browser.
- Computer simulated visualization which the main approach tool (Virtual Reality format VrmI/X3D), to be applied to design alternatives, then introduces to participants to navigate into each alternative then evaluate it according to evaluation criteria through a questionnaire.
- Participants can also participate in adjusting the optimum design alternative which is modified from the selected alternative.
- All the previous process can be repeated in closed loop.
- Participants can also can evaluate the implemented optimum alternative or post implementation evaluation.

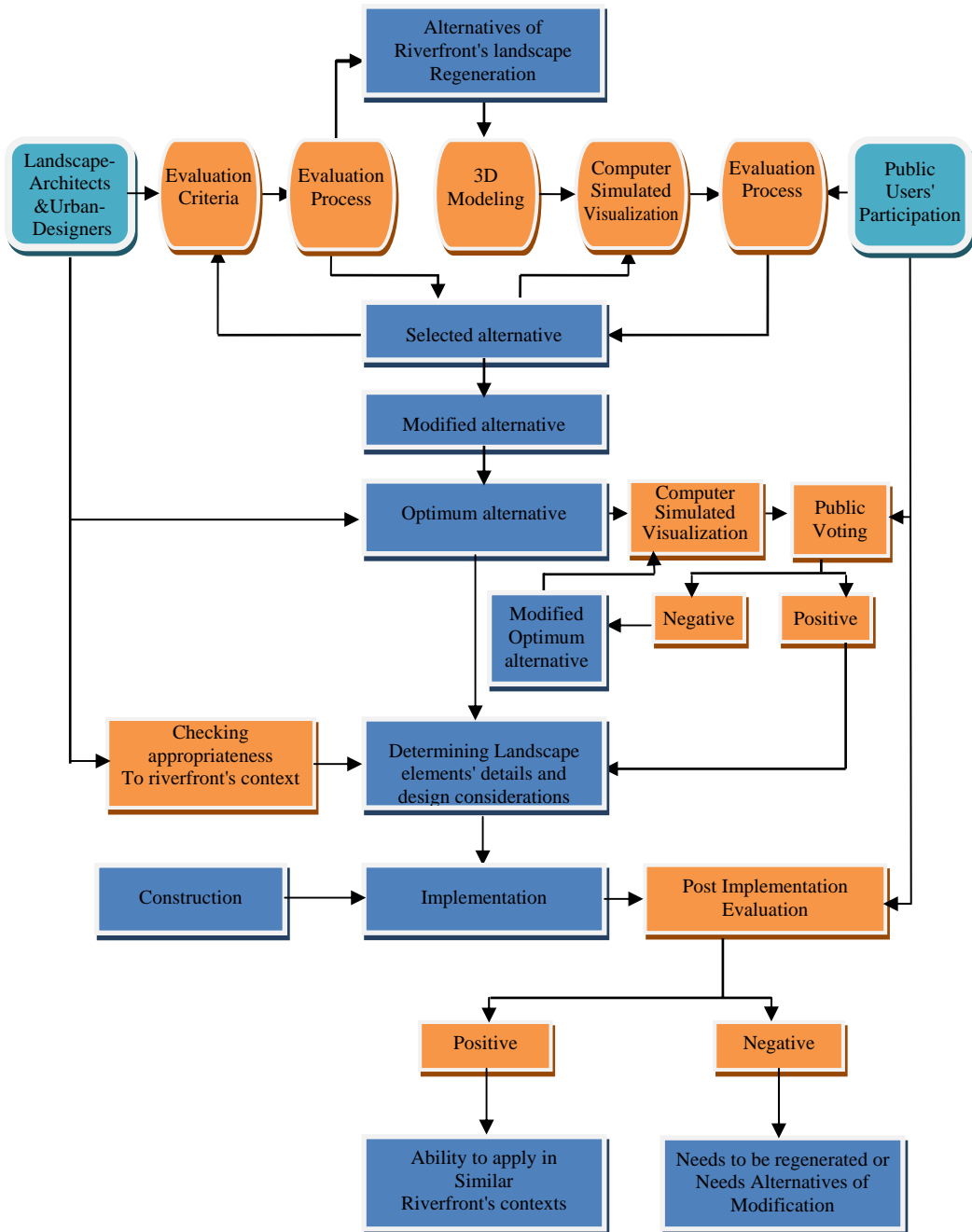


Figure (8-12) Approach to using computer simulated visualization to enhance Public participation in the process of alternatives' evaluation of riverfront's regeneration.

**PART  
THREE**

**Applying the Approach in Evaluating Nile Riverfront's  
Landscape Regeneration**





**PART  
THREE**

**Applying the Approach in Evaluating Nile Riverfront's  
Landscape Regeneration**



**Chapter  
9**

**The Reliability of Computer–Simulated- Visualization as a Tool  
for Public Participation in evaluating the Regeneration of Nile  
Riverfront's Landscape**

**Chapter  
10**

**Conclusions & Recommendations**







**Introduction**

**Applied study and the reliability of the approach**

**Nile riverfront in Egypt**

**Nile's riverfront landscape regeneration goals**

**Applied study case (Al-Gazeera Garden)**

**Experiment design**

**Statistical analysis**

**Reliability study findings**



## **9.1 Introduction**

In this chapter, the research will try to test the reliability of the approach, through an applied study to give the public users the opportunity to evaluate three proposed design alternatives of a specific zone of Nile riverfront, in order to make better riverfront's landscape regeneration or modifications for this zone.

This chapter will begin by highlighting on the applied study goals, Hypothesis, limitations, and methodology. Then the chapter will review Nile River in Egypt especially in great Cairo.

The chapter will choose a case study of Al-Gazeera River Park as an existing riverfront landscape project for the public rarely found along the river Nile in Cairo, and it is considered one of the few examples in great Cairo, the research will try to regenerate the landscape of this space through three design alternatives and then model them and transforms the models using the research tool to make 3 computer simulated visualizations which will introduce to selected group of public users to evaluate these alternatives, in order to test the research approach, then analyzing their opinions to choose the optimum alternative.

## **9.2 Applied study and the reliability of the approach**

Here this chapter will talk about applied study goals, Hypothesis, limitations, and methodology.

### **9.2.1 Applied study goals**

The main goal of the applied study is to test the reliability of the suggested approach (Computer-Simulated-Visualization as a tool for Public Participation in the Riverfront's Landscape Regeneration) through a limited demonstration experiment that is applied on the landscape regeneration of River Nile banks.

The chapter also goes through some points to reach this goal, which are:

- Nile riverfront's history and current situation.
- Reading the Nile riverfront's landscape elements of selected zone of Al-Gazerah park.

- Determine the problems which face public users in Nile riverfront.
- Establish some goals for Nile riverfront's landscape regeneration.

### **9.2.2 Applied study Hypothesis**

- The ideological Hypothesis is that the general public should have undeniable access to the river edge in Egypt similar to situations in many riverfront cities around the world. However, understanding people's perception of the design interventions should shed light upon desirable types of changes to be made along the river edge.
- General public's participation through evaluation of kinds of digital visualization tools such as simulation for alternatives of landscape elements is an effective tool for landscape architects or landscape designers.
- Computer simulated visualizations of the built environments, are an effective means of improving the user's participation in the landscape design processes, balancing the user's preferences and efficient use of landscape elements.

### **9.2.3 Applied study limitations**

- This project is about returning the Riverfront to the people of great Cairo only; also the case study will be on an existing designed riverfront's space.
- The applied study will not examine general public participation in all riverfront's landscape stages, but it will test public evaluation of three design alternatives for riverfront's landscape regeneration.
- The applied study will be limited to design alternatives for regeneration or modifications of existing designed riverfront's landscape.
- The applied study will not test public evaluation for all riverfront's landscape elements (which are described in chapter 6) but will make modifications for two selected elements which are: river edge and side river-walk, then other elements will be consistent or fixed in all three alternatives.

- When designing the computer simulated visualization, the accuracy of details will be limited to those giving a certain sense of presence, so there will be no unnecessary exaggeration of details.
- The effect of surrounding environment will be limited to famous icons or landmarks of the space such as Qasr El-Nile bridge and 6 October bridge and some building distinguished the riverfront's space.
- The environmental cues in the models will be limited to those affecting vision senses only.
- The public users contributing the study will be able to navigate through virtual reality models using keyboard and mouse on a laptop which called non-immersive virtual reality system.

#### **9.2.4 Applied study methodology**

The applied study will be based on the following criteria:

- First, information related to the landscape design and management in Nile riverfront was collected from public media, such as newspapers and journals.
- Site observation and general interviews with users of case study location were conducted to make analysis of riverfront's landscape problems, opportunities, and other SWOT analysis.
- Putting some principles for Nile riverfront's regeneration.
- Designing some landscape parameters to make proposed solutions for existing landscape which is in need to be regenerated.
- Generating multiple Nile riverfront's landscape alternatives.
- Model these alternatives by using computer techniques.
- Export these models to the selected computer simulated visualization tool( X3D/VRML).
- Testing public users' preference and evaluation of the simulated alternatives.
- Make modifications or another parameters alternatives for the selected alternative in order to regenerate optimum alternative.

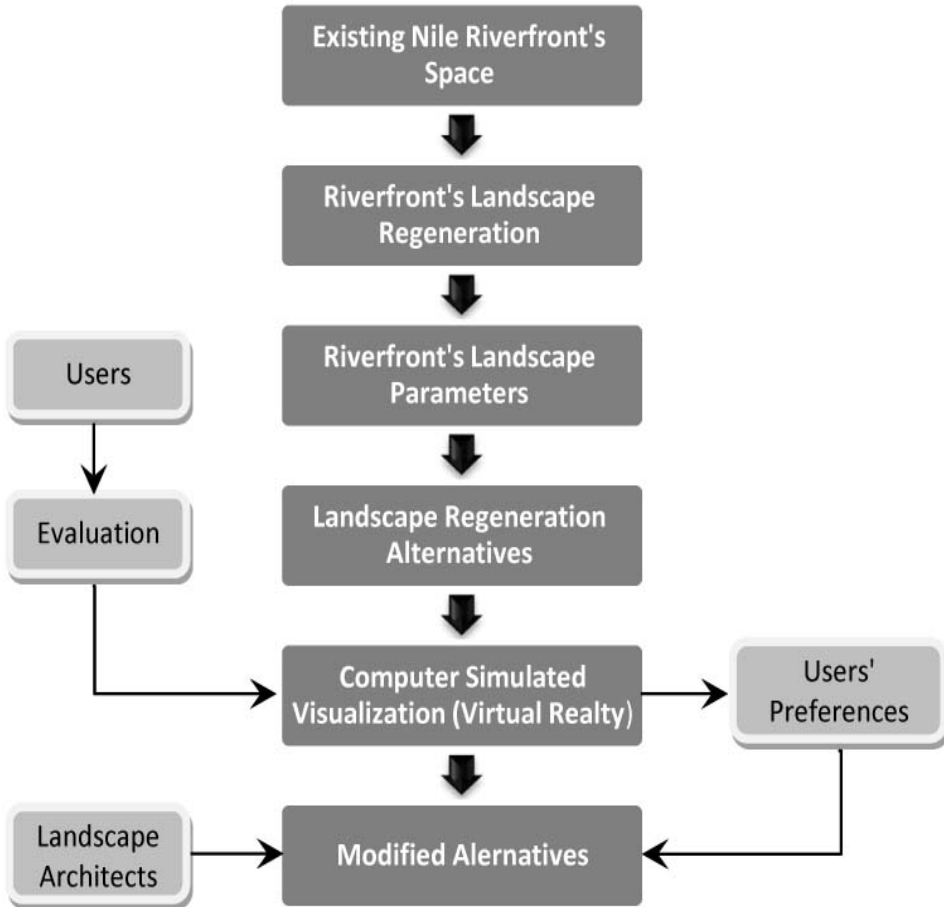


Figure (9-1) applied study methodology diagram, by researcher

### 9.3 Nile riverfront in Egypt

In Egypt, the River Nile creates a fertile green valley across the desert. It was by the banks of the river that one of the oldest civilizations in the world began. The ancient Egyptians lived and farmed along the Nile, using the soil to produce food for themselves and their animals.<sup>1</sup>

---

<sup>1</sup> <http://www.woodlands-junior.kent.sch.uk/Homework/egypt/nile.htm>.

### **9.3.1 Nile River in human history**

The Nile River Valley has played a unique role in human history. Because of its special ecology, featuring the annual overflow of rich soil from the Great Lakes regions of Central Africa, the banks of the Nile were able to support intensive agricultural development. Food surpluses and the concentration of populations migrating from parts of African and Asia laid the foundations of the Nile Valley civilization of the ancient world. The enormous impact of this high culture of the Nile Valley spread to various parts of Africa and the world.<sup>1</sup>

The Nile is one of the city's main destinations for city dwellers seeking brief recreation time. The Nile riverfront in Cairo has always been regarded as a respite, a refuge or a retreat for those in search of better air or relaxed lei-sure time away from the hustle and bustle of the city's everyday life.<sup>2</sup>

### **9.3.2 Nile River among World Rivers**

Nile River is considered one of the greatest rivers in world, and it is considered the longest river of World Rivers with 6671 km length. Nile river width is nearly 700m, in comparison with Seine River in Paris which width is nearly 110m which is equal to the width of Ibrahimya canal, but River Nile in Asuit is 8 times Seine River. While Okinawa River in Japan is 200m width, the Tiber River in Rome width is approximately 60-80m, Manzanares River in Madrid is 40m width.<sup>3</sup>



Figure (9-2) Nile River in great Cairo. Source (Google earth)

---

<sup>1</sup> Jeffries, L. (2008), p.7

<sup>2</sup> Gabr, H. (2004b), p.1

<sup>3</sup> <http://en.wikipedia.org>

---

---

## Chapter 9



Figure (9-3) Left Nile in Asuit , Right Ibrahimya Canal. Source (Google earth)



Figure (9-4) Seine River in paris. Source (Google earth)



Figure (9-5) Okinawa River in Japan. Source (Google earth)



Figure (9-6) Left Manzanares River, Madrid- Right Tiber River, Rome. Source (Google earth)



### **9.3.3 Current situation of Nile's riverfront**

Over the past few decades, much of the Nile's riverfront has been systematically occupied by an assortment of private projects. Co-operatives or syndicates of various kinds, private owners and some govern-mental agencies have occupied parts of the riverbank and constructed private clubs, cafeterias, restaurants or the like, where only members of the co-operatives or agencies, or people who can afford private locations are allowed inside. This unplanned privatization of the riverfront has physically, visually and symbolically separated the Nile from the general public, the majority of city dwellers and visitors who once owned the river, and adversely affected the aesthetic features of the city.<sup>1</sup>

The Nile riverfront in the city of Cairo, Egypt, has experienced numerous changes in the form of designed projects to take advantage of the river's potential for attracting visitors and users by accommodating their various leisure and recreational needs.

Design interventions along the river edge differ greatly, varying from public and private, nature dominant and built, serviceable and unserviceable, and water accessible(physically or visually) and inaccessible. Generally, many of the changes along the Nile riverfront were private projects that have been directed for selected group of individuals such as engineers or police officers, so the uses along Nile riverfront can be divided into three types:

**The first type (private):** is the general public or nonmembers of the social or professional group are denied access to these private projects.

**The second type (semi public):** is the form of privately owned or leased projects that are accessible to the general public, such as cafeterias where guests are expected to pay for their leisure time.

**The third type (public):** of changes are the publicly owned and fully accessible places where visitors are free to wander along the riverfront without having to worry about spending money.

---

<sup>1</sup> Gabr, H. (2004a), p.156

Recently, there have been rising concerns over the increasing number of publicly inaccessible projects along the Nile riverfront (the third type), because of the negative social consequences of denying the general public access to a supposed vital public domain. Other visual implications result from the visual blockage made by insensitive design of structures blocking the view of the Nile from the main street and sidewalk.



Figure (9-7) Current situation of Nile's riverfront in Cairo, by researcher.

### **9.3.4 Disconnect from Nile's riverfront**

There are a lot of features make a disconnection between the public and Nile's riverfront accessibility, such as fences, private projects, boats...etc.

#### **9.3.4.1 Fences prevent the public from access the riverfront**

One of the main factors of preventing the public of access the riverfront is the high fences which blocked the visual and physical access to the riverfronts. This blockage is due to concrete fences or metal fences or even high density tree line, this can be seen in figure (9-8).

#### **9.3.4.2 Private projects prevent public access to the riverfront**

The private projects such as clubs for professional group of society. That means the general public or nonmembers of the social or professional group are denied access to these private projects. There are

also a number of river gardens also preventing the public from accessing the riverfront without paying a lot of money; as seen in figure (9-9).



Figure (9-8) Fences prevent the public from Nile riverfront access, by researcher.



Figure (9-9) The drift boats and bulk constructions prevent the public from Nile riverfront access, by researcher.

### **9.3.5 Existing Riverbank Conditions**

The riverbank design concepts assume that an urban river that has been straightened (and thus shortened), deepened, and structurally simplified, and whose edges have been armored and floodplain eliminated or isolated. These designs attempt to install a greater diversity of physical and biotic conditions in order to provide a more multi-dimensional environment for plants and animals.

#### **9.3.5.1 Natural bank**

Natural banks appear to be composed of rock outcrop or in-situ native earth materials and to be relatively undisturbed by humans. They may be

---

---

## Chapter 9

---

---

variably eroded. Vegetative cover varies; native, exotic, living, and dead vegetation may be present.



Figure (9-10) Nile river edge as Natural bank, by researcher.

### 9.3.5.2 Rip rap

Rip rap banks have been intentionally armored with rock of various sizes up to at least ordinary high water. They are generally devoid of vegetation.



Figure (9-11) Nile river edge as Rip rap, by researcher.

### 9.3.5.3 River garden- man made landscape

This is a shallow shelving shoreline usually 5:1 or flatter, that consists of sand, silt, fine gravel or other sedimentary deposits, so it can be modified to be gardens or passive lawn.



Figure (9-12) Nile river edge as man made landscape, by researcher.

#### 9.3.5.4 River wall

These are constructed, impervious vertical or steeply walls, generally composed of concrete, timber or sheet pile, that extend below ordinary low water.



Figure (9-13) Nile river edge as a wall, by researcher.

#### 9.3.5.5 Structures

Included in this category are piers, wharves, supported docks, buildings and other structures that cover portions of the riverbank.



Figure (9-14) Nile river edge dominated by structures, by researcher.

#### 9.3.5.6 Bio-technical and bio-engineered banks

Bio-technically engineered banks incorporate vegetation as a visible component of the bank, but inert and man-made materials provide the physical structure that ensures bank stability. Bio-engineered banks rely on vegetation and natural fabric materials for bank stability.



Figure (9-15) Nile river edge as bio engineered banks, by researcher.

### 9.3.5.7 Unclassified fill

These areas appear to have been filled over time with miscellaneous unconsolidated materials. The surfaces of banks composed of unclassified fill have not been covered with engineered rip rap or structures.



Figure (9-16) Unclassified Nile river edge, by researcher.

## 9.4 Nile's riverfront landscape regeneration goals

The value of a riverfront regeneration plan is determined by how well it meets its underlying goals, and how pertinent these goals are to a city's broader civic objectives. The riverfront landscape regeneration is thus an "If-Then" proposition: If this plan is implemented, then the goals of economic growth and civic pride will be realized.

There are three goals for Riverfront landscape regeneration, these three goals deal with altering the traditional relationship between city and river by making the river edge more publicly accessible, more attractive and offering a broader array of activities and uses along it, as shown in figure(9-17).

Nile River parks can contain a range of destinations such as wetlands, sun decks, amphitheaters, tennis courts and cafes. Urban plazas are strategically located at major intersections to celebrate the river city's cultural history while also creating energetic new spaces amidst new development. Native batture can expand to create naturalized edges where wharves have been removed.

Sustainable streetscapes and paths provide efficient circulation and also shady, green corridors passing through the city. Even the small amount of new architecture within the project contains potential green space; extensive green roofs will contribute to the sustainability of these new developments.

Finally, a series of pedestrian piers and bridges will carry people over floodwalls and train tracks to ultimately gaze over the Nile River itself.

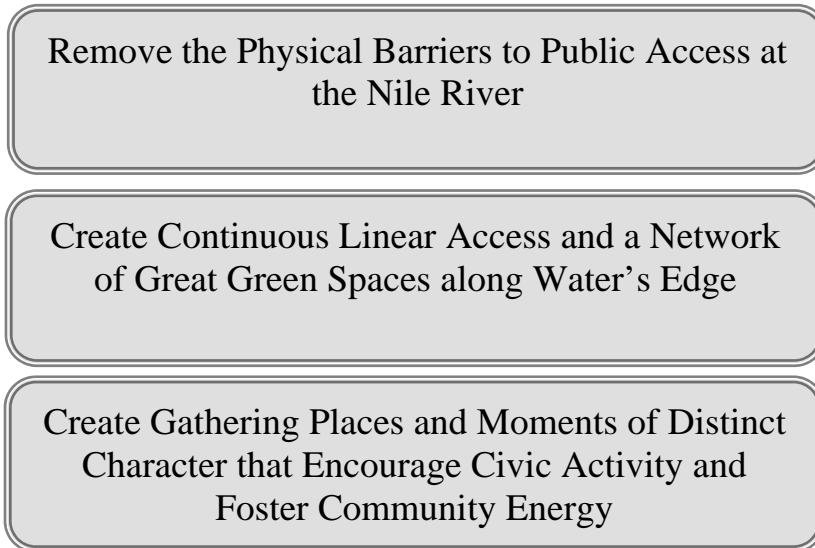


Figure (9-17) River Nile landscape regeneration goals, by researcher.

### **9.4.1 Remove the Physical Barriers to the River Nile**

The physical barriers along the river Nile separate land and water, so Nile edges stays “out of sight and out of mind” for many citizens. This undesirable separation may have long been the dominant condition along the Nile riverfront for many citizens. The broader the zone of overlap between land and river-edge, the more successfully a city captures the benefits of its water assets. The successful design is which increases connectivity (and the zone of overlap) between city and river, by both establishing great points of destination along the river’s edge and by emphasizing strong perpendicular connectors from the city street network to the river environment.

In short words strengthen visual and physical connections to the Nile River by removing the physical barriers that restrict public access to the river

### **9.4.2 Create Continuous Linear Access**

In many cities the public increasingly desires-and expects-access both to and along its river's edge. So Nile's riverfront needs to be continuous to make it accessible for all the public.

### **9.4.3 Create gathering places on river banks**

Create gathering places & moments of distinct character that encourage civic activity & community energy. Here is an enduring, even eternal, dimension to urban riverfronts, as they bear witness to the ebbs and flows of economic prosperity in the cities and regions they serve. Until recently, many cities that thrived during the industrial age relied on the use of land at water's edge for predominantly industrial operations. A more varied set of urban functions—living, recreating, celebrating, governing, socializing, touring, experiencing culture, entertaining visitors, and communing with nature—were of secondary concern and took place elsewhere, although today they are naturally migrating closer to the edges of great waterfronts worldwide.



Figure (9-18) some ideas for Nile's riverfront regeneration.



## Chapter 9

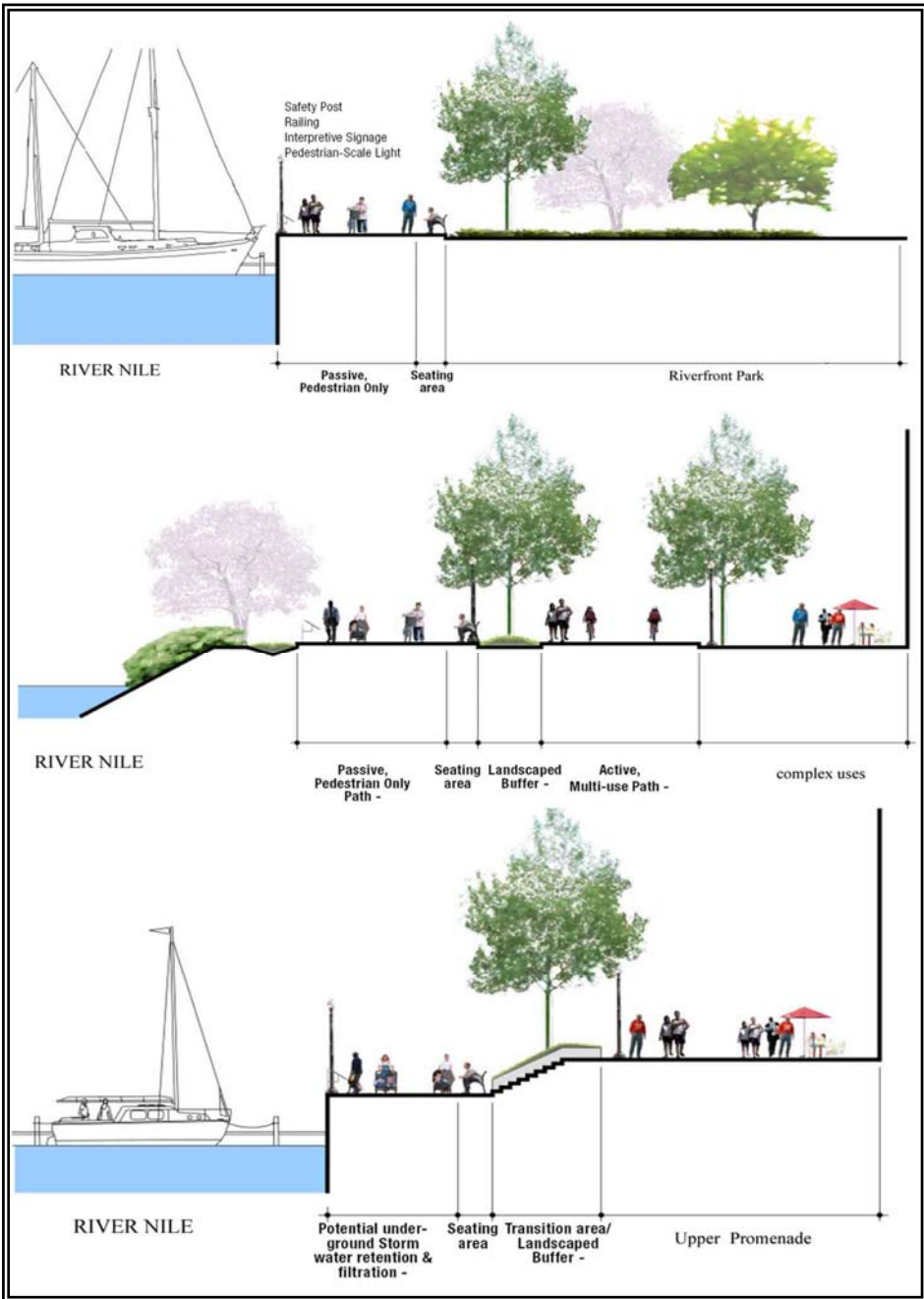


Figure (9-19) Some proposals for riverfront landscape for River Nile, by researcher.

### 9.5 Applied study case (Al-Gazeera Garden)

One of the newer projects along the Nile riverfront intended for public access was the redesign of the western edge of the Nile branch separating downtown Cairo and the island of Zamalek an upper class residential neighborhood separating Cairo from Giza between Kasr El Nile Bridge in the south to Fifteenth May Bridge in the north, passing with 6-October Bridge.

The project included drilling in the Nile, strengthening the embankment, designing stepped terraces and incorporating soft and hard landscape. This area is to function as open space with no buildings of any sort. The other areas north of the park consist basically of one level platform at river level, covered with lawn, some plants and trees adjacent to the retaining wall, and a walking promenade.



Figure (9-20) two shots of map of the case study location at River Nile. Source (Google Earth).



Figure (9-21) focus on the case study area. Source (Google earth).



Figure (9-22) Shots from Qasr El-Nile Bridge for the case study area, by researcher.

### **9.5.1 The architecture of riverfront's park**

The architecture of the park is very simple. Three stepped levels are constructed to connect the water level with the street level. The upper and middle platforms are about 8m wide, while the lower platform ranges from 20 to 25m wide. The retaining walls are vertical between middle and upper levels and between upper and street levels. However, it is sloping between the lower and middle levels.

The park has two entrances through iron gates, one in the north side and one in the south. One big ramp directly connects the upper and lower levels in the middle of the park but can only be accessed when entering from the north gate, as the upper level is further divided by steps into two levels, one closer to the north gate and the other to the south.

There is a beautiful mix of trees, probably many of which were left in their original locations, and there are other plants at the separation area between every two levels, at the back of each level adjacent to the retaining wall. Otherwise, hardscape elements are used. Flooring material is interlocking bricks. The original seating was in the form of fixed benches made from brick, covered with rough stone veneer, with a marble or terrazzo finish for the seat top. Later, other movable seating was added in the form of metal benches. In the lower level, the seating is distributed along the perimeter of rectangular-shaped clusters, which in some areas are further defined by a one-step raised floor.

### **9.5.2 Case study features**

- The park offers some opportunities for leisure and recreation activities that are important to alleviate the stress of life in the city.
- The riverfront park doesn't provide completely physical and visual accessibility for public use and enjoyment of the riverfront.
- The riverfront park is successful in attracting a relatively large number of visitors aiming to be closer to the riverfront, evidenced by the full seating capacity.
- Design features of the park are supportive of certain activities or uses and constraining of other activities or uses. For example, the seating design and arrangement are less than successful because they do not fully accommodate different patterns of activities.
- Families and extended families are the prime clientele of the park.
- The relationship between visitors and the water is a passive rather than an active one.
- The stepped design idea of the park is successful in providing more frontages to the river and a variety of spaces for different uses.

### **9.5.3 Usage and users of the park**

Although the park opens from 9am till midnight, it is usually packed with visitors in the evening starting around sunset when the hot summer weather starts to cool off into the night. Very few people visit the park during the day. The park's clientele is primarily the extended domestic family, composed of father, mother, at least two children, and often a family member such as a sister-in-law and her children.

This group makes up the majority of visitors particularly during the evenings. Young and middle-aged couples seem to make up the majority of midday visitors. Groups of friends of young to middle-age make up another user type. Older couples were also observed during the evenings, often without children or grand children, while others were accompanied by their extended family.



Figure (9-23) Varies categories of park's users, by researcher.

### **9.5.4 Activities in the riverfront park**

Motivations of visits to the park were interpreted from the observed activities. Visitors seemed to engage in leisure and recreational type activities, such as relaxing, chatting and conversing eating, playing with their children or just sitting. Some visitors celebrated birth-days or other celebrations in groups; these users had brought party food and disposable utensils for picnics. Few visitors were observed strolling. Those were often in groups of two to three individuals and walked closest to the water's edge. Children were observed running, shouting and playing games such as informal football using a soft ball, hide-and-seek or other games. During the peak time in the evening, the seating capacity of the park is completely full with visitors. Many others sit on the low fences along the back edge of the stepped levels or along the river edge that are designed in a similar way to the fixed seating units.



Figure (9-24) Some types of activities in the riverfront's park, by researcher.

### **9.5.5 Unresolved accessibility problems**

The entire portion of the riverfront, of which Aljazeera Garden is a part, is accessed through seven doors with steps leading to the riverbank. However, only doors one and two leading to Aljazeera Garden are regularly opened. A third door is opened during feasts when larger crowds flock to the riverfront. When asked about the reasons for closing the other doors, the on-site manager of the park mentioned lack of enough security people to supervise the entire riverfront, which he thought was necessary to protect against indecent behavior or vandalism. Because this stretch of riverfront is physically connected, an Aljazeera Garden visitor can walk along the narrow promenade adjacent to the river edge at will but cannot get to the street except from the park's entrance. Ironically, the park management puts a couple of moveable benches to block the promenade from the Aljazeera Garden side to discourage visitors from strolling away from the park. However, if someone were to move around the benches blocking the promenade they would usually be allowed to walk, according to what was mentioned by the park's manager and observed by the researcher. Apparently those who particularly like to walk large expanses of the promenade are foreign tourists who would normally use it during the daytime.

Seven large private ships stand at the river edge along the larger park. The ships are privately owned and offer a variety of catering services and restaurants. They are accessed by private bridges directly from the street's level, thereby completely separated physically from the park below. Three problems arise from these private ships. First, they partially obscure the view of the water. Second, they claim they had rented the parking space along the street in front of each boat for their customers, leaving little or no parking space for park users. Third, they have a potentially adverse environmental effect on the river.



Figure (9-25) disconnect between users and river, by researcher.

### **9.5.6 Problems of riverfront's landscape elements**

There are several defects in Nile's riverfront landscape elements, there are appeared by observing the space or by gathering the users opinions. These problems can be summarized as:

- Water edge as a barrier not as an accessible mean, by its height, vegetation, width, opaque material.
- There are not multi level terraces to give all users to access the water from any level or river depth.
- There are much passive green spaces.
- A lot of seating is in opposite direction from the river, that the users bring their backs to river.
- The side walk doesn't serve all activities.
- There are not any ramps, and stairs are not enough.
- There is not any signage, art objects, water features.
- All seats are without sheds, and a majority is uncomfortable.

---

---

## Chapter 9

---

---



- The upper shaded terrace doesn't have any seats.






Figure (9-26) Examples of the park problems, by researcher.





**9.5.7 Analysis of the landscape elements of the case study**

Nile riverfront's landscape element	Features	Indicator	Description
<p><b>Riverfront Edge &amp; Guardrails (Shoreline)</b></p>		Shape	zigzagging; High.
		Design/ Type	artificial, compatible, Vegetated; Variety of retaining wall types.
		Embankment	stone embankment, concrete embankment, shrubs and grasses,
		Transparency	Opaque
		Material	Stone, Concrete.
<p><b>Retaining Walls, Fencing, Bollards and Railing</b></p>		Shape	Straight-line form, High.
		Design/ Type	Artificial, compatible.
		Transparency	Opaque
		material	Stone, Concrete.
		position	Meets safety requirements.



## Chapter 9

Nile riverfront's landscape element	Features	Indicator	Description
Side-Walk/ Paving		form	Bending curve.
		width	Not wide enough.
		paving material	Durable, no harm, no color theme, not suitable with different activities.
Stairs/ Ramps		position	Successful, not enough
		design	In harmony with other elements.
		material	Durable, no harm.
		Spacing between	Far.
Trees		Layout	Wide, Random, informal.
		Position	meets safety requirements,
		Shape	not Suitable for their function
		Purpose	not successful
		Variety	Not in harmony.

## Chapter 9

Nile riverfront's landscape element	Features	Indicator	Description
<p><b>Ground Covers &amp; Flowers</b></p>		Order	Random, informal
		Position	Meets safety requirements.
		Spacing between	Enough.
		Shape	No harmony.
		Purpose	Unsuitable.
<p><b>Seating</b></p>		Order	Random.
		Position	Doesn't facing water, far from river edge.
		Design/ Type	With seatback, Without seatback, not shaded, without tables.
		Move-ability	Fixed,.
		Material	Durable, meets safety requirements.
		Variety	Harmony.
		Spacing between	Not enough.

## Chapter 9

Nile riverfront's landscape element	Features	Indicator	Description
<b>Lighting</b>		Position	Formal order.
		Design/ Type	Not decorative.
		Variety	No harmony.
		Spacing between	Not enough.
		Lighting Levels	Comfort
		Lighting features	meets safety requirements,
<b>Signage</b>	Doesn't exist,		
<b>Objects of art/ Landmark/ flags &amp; banners</b>	Doesn't exist,		
<b>Water Features</b>	Doesn't exist,		
<b>Structures Gates and other amenities</b>		position	Not enough facilities,
		Design/ Type	incompatible
		material	Incompatible with other elements.
<b>Cars/ Vehicles Parking</b>	Doesn't exist,		



Nile riverfront's landscape element	Features	Indicator	Description
Trash Receptacle		position	Accessible, Near from seats, easy for maintenance.
		Design/ Type	Not Beautiful, incompatible.
		Material	Metal, harmful.
Flood plain		Design/ Type	Not integrated with allover design.
		material	Stone, concrete, ugly.

Table (9-1) Nile Riverfront's landscape elements, by researcher.

## 9.6 Experiment design

The main objective of the experiment is to apply the theoretical approach of the idea of using computer simulated visualization, if used appropriately, can revolutionize the process of public participation in the evaluation of riverfront's landscape regeneration alternatives, then landscape architect can reach an optimum design.

### 9.6.1 Parameters design

The current status of Nile's riverfront at Al-Gazeera park as discussed before in this chapter, shows some problems in the design of the river's edge or the shoreline that prevents the users from fully access the river, also the design of the side walk and the paving has also some problems that it can't meet the public's needs and uses, also the nearest seats to the river edge is in the opposite direction from the river view, so the users

can't set faced to the river but they are in position to give the river their backs so they can't see the river.

- The experiment suggests making some modifications in the two major elements of riverfront's landscape (as shown before in chapter 6) which they are river' edge and side-walk, as follows:
- The experiment will be on three riverfront's landscape regeneration alternatives; each of them is an idea to redesign the existing Al-Gazeera garden landscape.
- In the three alternatives all the existing landscape elements will be fixed except the two modified elements (river' edge and side-walk), because the experiment aim to test the reliability of the research approach and to test all elements, it will need a lot of time.
- To make the sample feel reality, we will model the iconic building and the famous bridges around the site.
- To reduce the size of the model's file we will abstract the tree, seats and lighting features.
- The experiment will be repeated three times; each time the sample will navigate each alternative and then answer the designed questionnaire.
- The samples' answers will be analyzed to select the selected alternatives
- Finally, the output of users' selection analysis will be used as indicators to landscape architects to take in consideration in regenerating this riverfront' landscape, and also similar space, also it be approved that this approach is important to be applied later on any other regeneration project with public participation, because the public are the users of designed riverfronts, so the have to participated earlier in pre implementation riverfront's landscape projects.

### **9.6.2 Proposed regeneration alternatives of Al-Gazeera riverfront's landscape**

Because of the previous discussed problems of Al-Gazeera riverfront's landscape(which may be because its designers ignored the public users opinions and need when they designed this landscape) the alternatives will try to solve these problems and make the public participate in the evaluation of these alternatives, as describes below:

**Alternative (1): Serrated edge or wavy edge**

This alternative will modify the opaque edge to wavy edge consists of mix of green and paving material, which can be used as seats and it ends by no guardrail to make fully accessible river view.

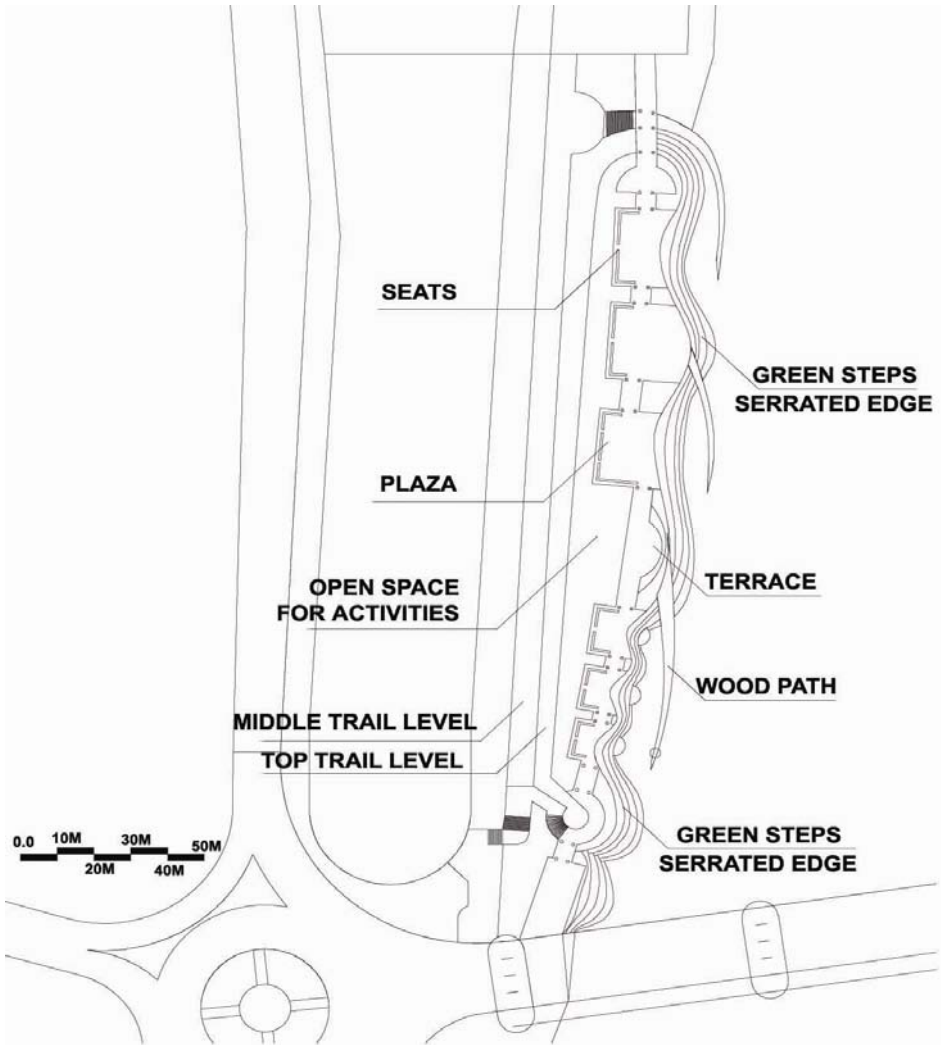


Figure (9-27) Alternative (1) for Nile's riverfront landscape regeneration (Serrated edge or wavy edge), by researcher.

**Alternative (2): Tiered continuous promenade**

A tiered promenade will allow for a protected promenade zone at the lower level, ample landscaping and seating, and a flexible upper tier to support different activities.

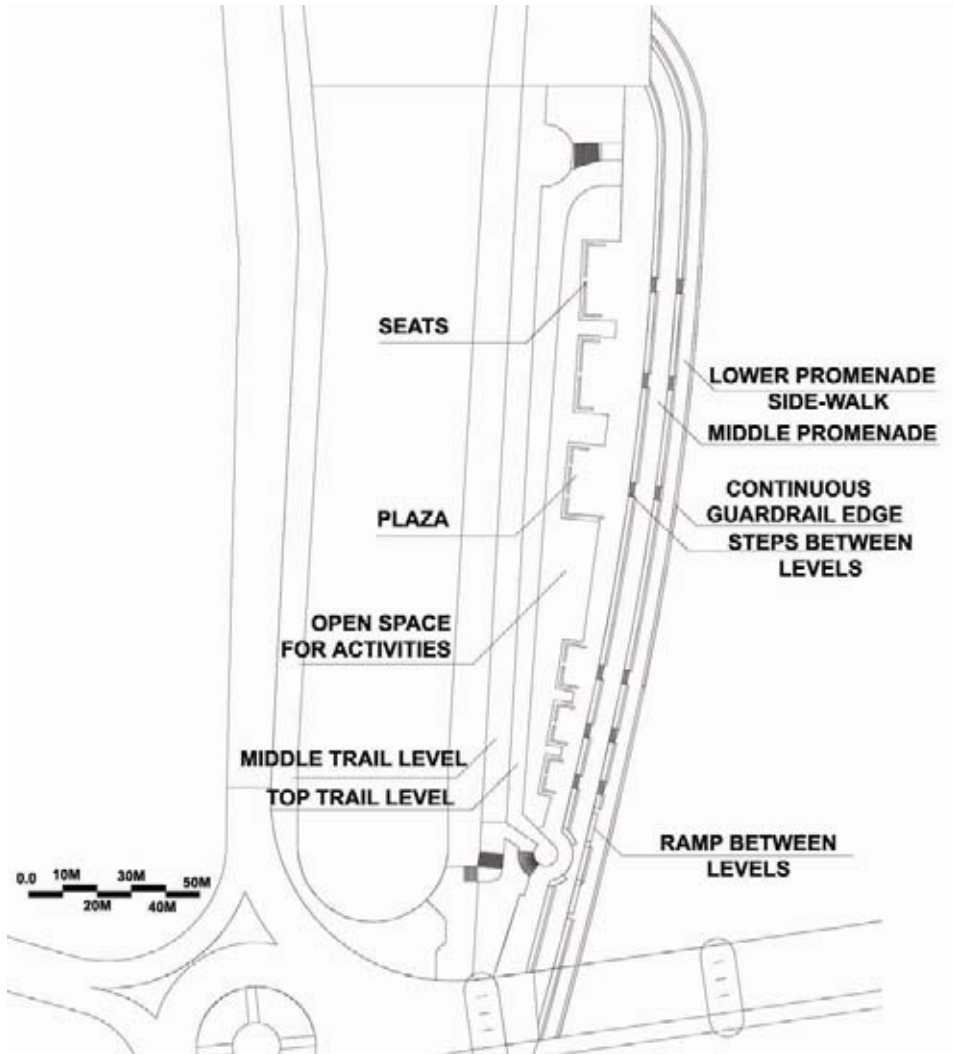


Figure (9-28) Alternative (2) for Nile's riverfront landscape regeneration (Tiered continuous promenade), by researcher.



**Alternative (3): Terraces and Zigzag edge**

This alternative will return the existing opaque riverfront's edge to a semi transparent edge, also will design some terraces to make wide range of seats can visually access the river view, without interrupted the main plaza with its activities.

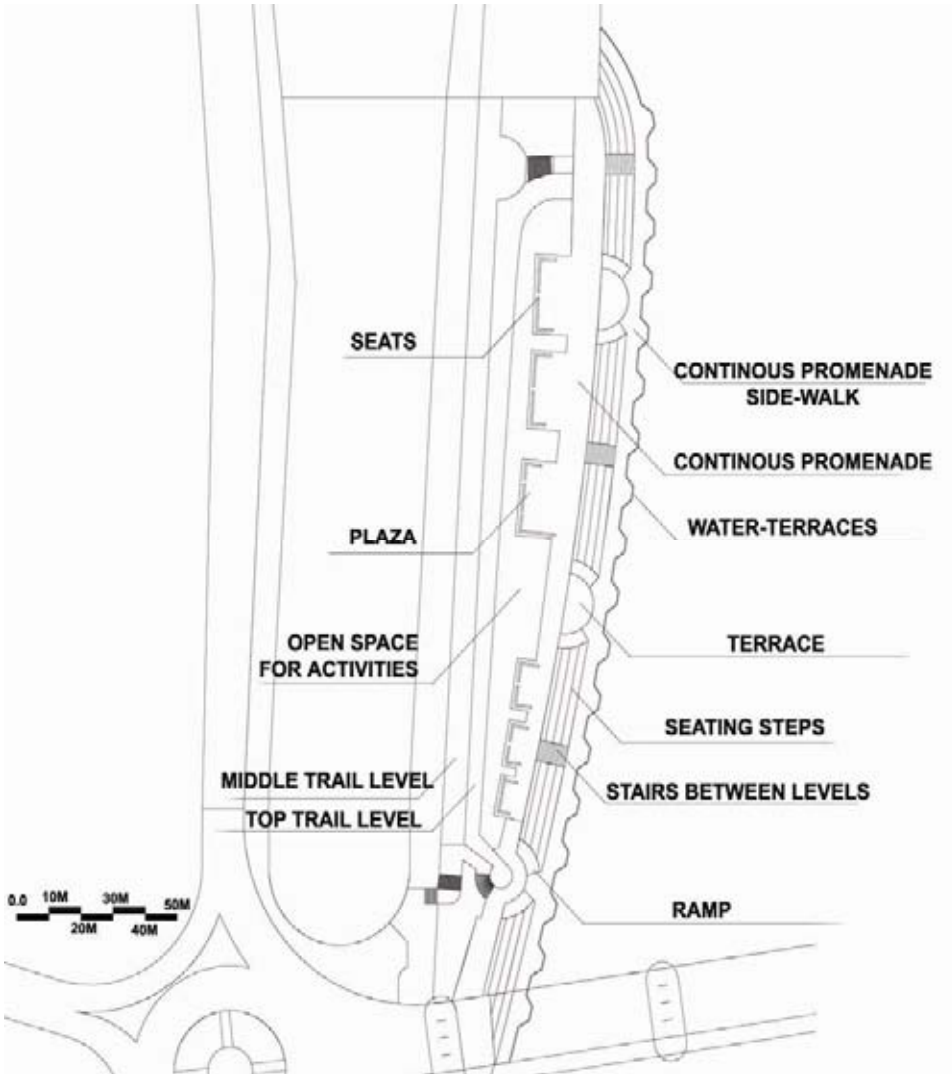


Figure (9-29) Alternative (3) for Nile's riverfront landscape regeneration (Terraces and Zigzag edge), by researcher.

## Chapter 9

Nile riverfront's landscape element	Indicator	Alternative (1)	Alternative (2)	Alternative (3)
Riverfront Edge & Guardrails (Shoreline)	Shape	Wavy & Curved	Linear	zigzagging
	Design/ Type	Vegetated and serrated edge as steps without guardrails	Tiered Continuous guardrails	Terraces and zigzag guardrails
	Embankment	Grass and concrete	Metal guardrails on concrete base	Metal guardrails on concrete base
	Transparency	Transparent	Semi transparent	Semi transparent
	Material	Grass and concrete	metal	metal
Sidewalk/ Paving	form	Bending curve	Linear, terraced	Bending curve.
	Design	Steps towards the water as a mix between green cover and concrete edges. The upper side walk is also wavy walk	Tiered continuous promenade divided horizontally to three terraces and built in stone seats	Lower and upper terraces in between there are stepped seats from grass and wood linked with stairs and ramps
	width	Wide	Narrow	Very Narrow
	paving material	Green steps in terraces and concrete tiles in upper sidewalk	Wood in lower terrace and concrete tiles in all terraces	Wood in lower terrace and concrete tiles in the middle and upper terraces

Table (9-2) Comparison between proposed regenerated landscape elements in the three alternatives, by researcher.

### 9.6.3 Virtual Reality model design

Desktop virtual reality is a low-cost solution, usually non-immersive, with a conventional computer monitor as the output device for a rendered three-dimensional environment, will be the computer simulated visualization technique.

To provide a maximum sense of reality, the package of interactive software (which was selected in chapter seven) is used in models simulation. The general features of the model are drawn first by AutoCAD program (software produced by Autodesk), then modeled and built using 3DS MAX (A 3D modeling software produced by Autodesk), then export by Octaga Plug-in (3DS MAX Plug-in as real-time 3D software or 3D Visualization software produced by Octaga producers) to a format of X3D/VRML which can used by Octaga player as a tool of navigation or computer simulated visualization.

#### 9.6.3.1 Current status modeling

First we got a scaled satellite image from Google earth, and then it was imported to AutoCAD program to be traced to draw the main boundaries of the riverfront's garden, figure (9-30)

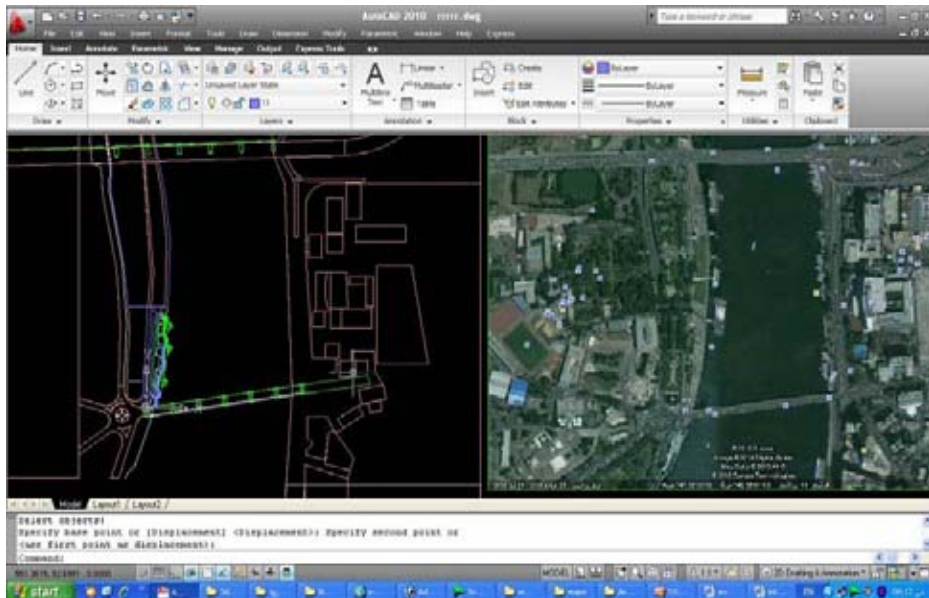


Figure (9-30) Shots from AutoCAD program using to trace satellite image to draw the existing situation, by researcher.

---

---

## Chapter 9

---

---

The surrounding building, Qasr El-Nile Bridge and 6October Bridge will be modeled as simple geometry with drag and drop maps or photos which were taken by researcher to give the participant the reality and the real image of the surrounding environment.



Figure (9-31) Shots for iconic building to help modeling the context, by researcher.

All landscape elements which are fixed in the three models are built using simple primitives with simple maps, such as the tree was created as chamfered boxes and cylinders, also the lighting poles were created with simple primitives....etc.

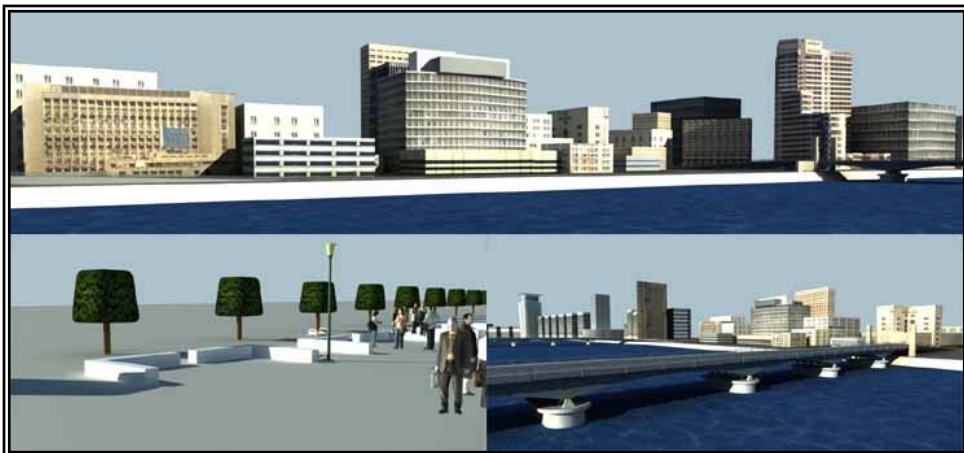


Figure (9-32) Modeling existing status, by researcher.

**9.6.3.2 Proposed regeneration alternatives modeling**

The proposed regeneration alternatives were designed and drawn first in AutoCAD program, and then they were imported to 3DS-MAX program to be 3d modeled, and rendered by putting real maps and materials on varies surfaces, and insert additional landscape elements.

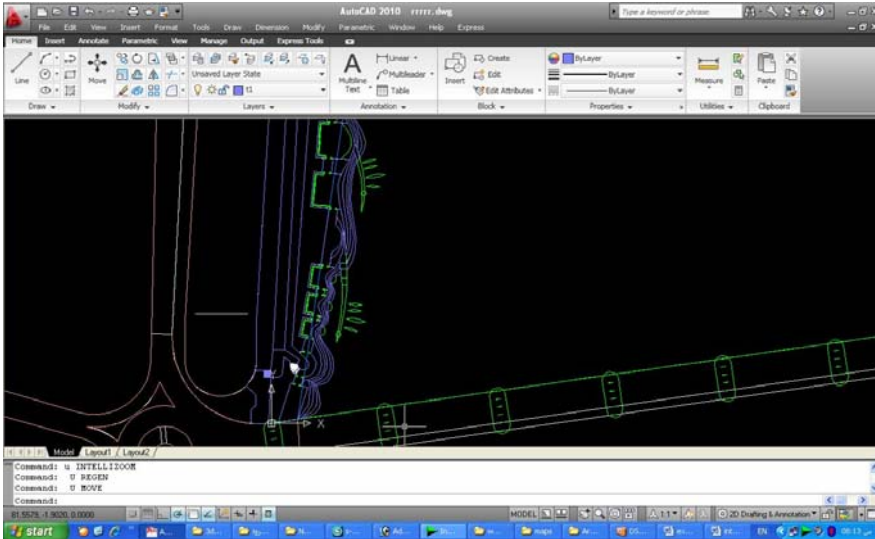


Figure (9-33) Shot from AutoCAD program, in which the alternatives have been designed and drawn in 2d format as a base map for the 3d model, by researcher.

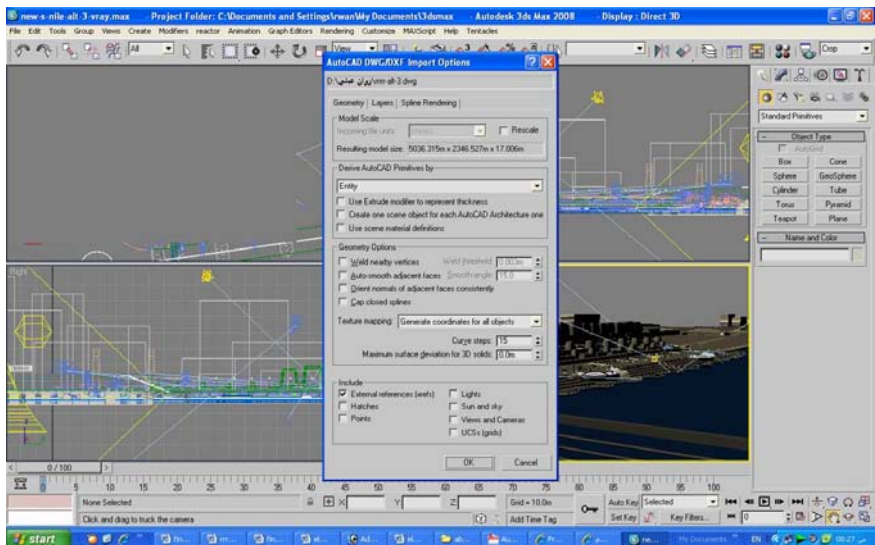


Figure (9-34) Import from AutoCAD to 3DSMAX, by researcher.

## Chapter 9

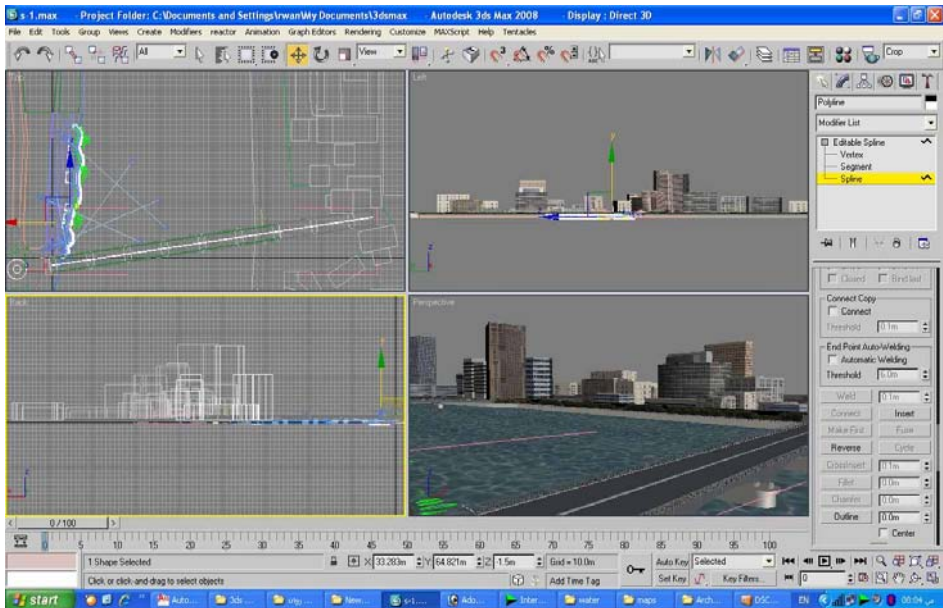


Figure (9-35) Shots from 3DSMAX program, in which the textured model was created.

When each model was finishes, it was exported from 3DS MAX to Virtual Reality (as X3D/VRML format) with plug-in Octaga.

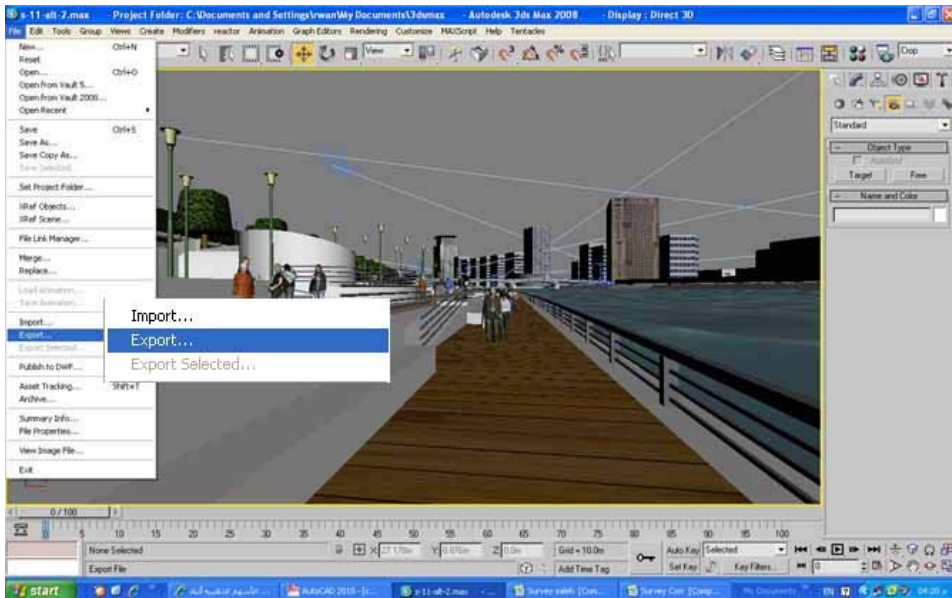


Figure (9-36) Export models by using Octaga plug-in, by researcher.

## Chapter 9

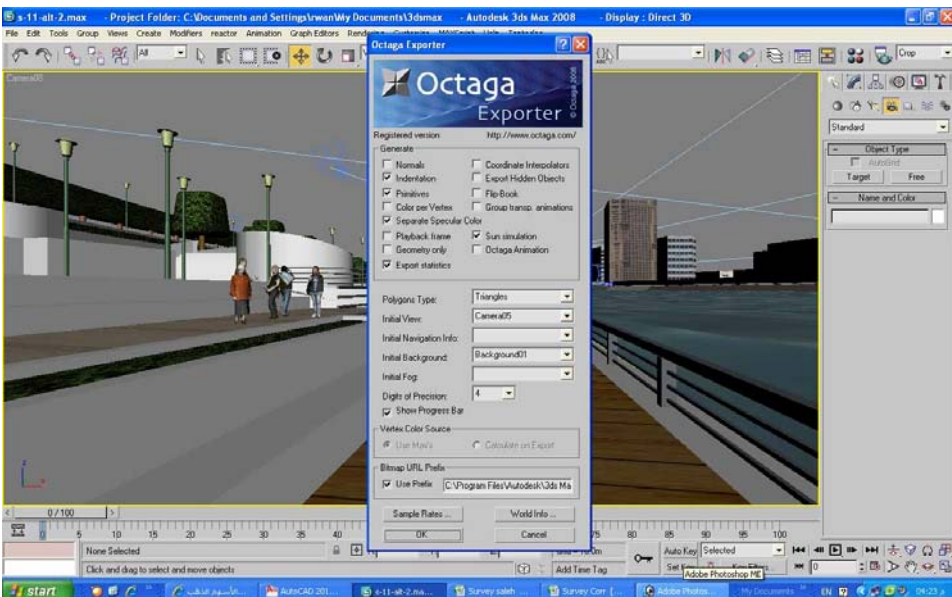
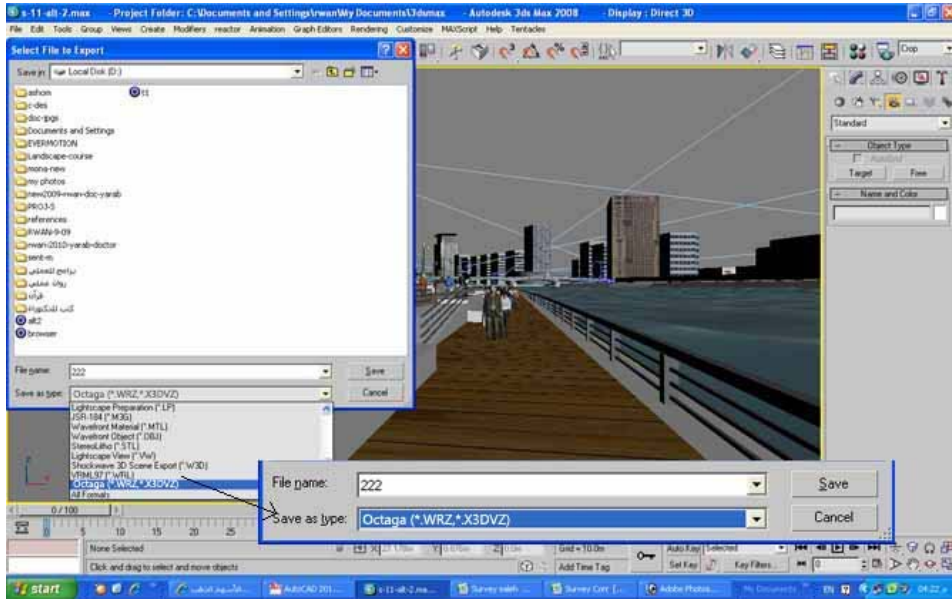


Figure (9-37) Sequence of Exporting models by using Octaga plug-in to be navigated or visualized by Octaga player , by researcher.

---

---

## Chapter 9

---

---

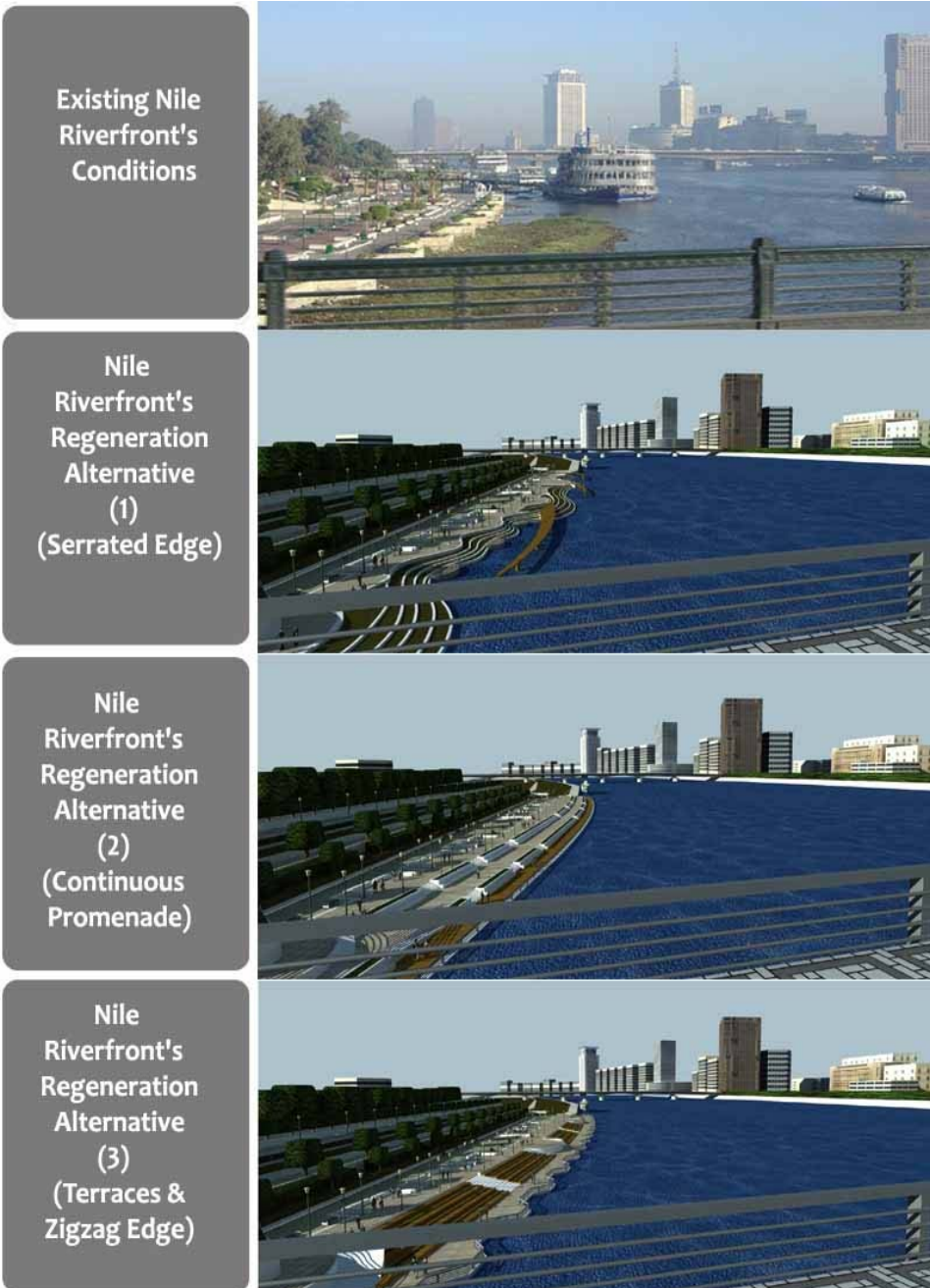


Figure (9-38) Nile riverfront's from existing view to three regeneration alternatives, by researcher.



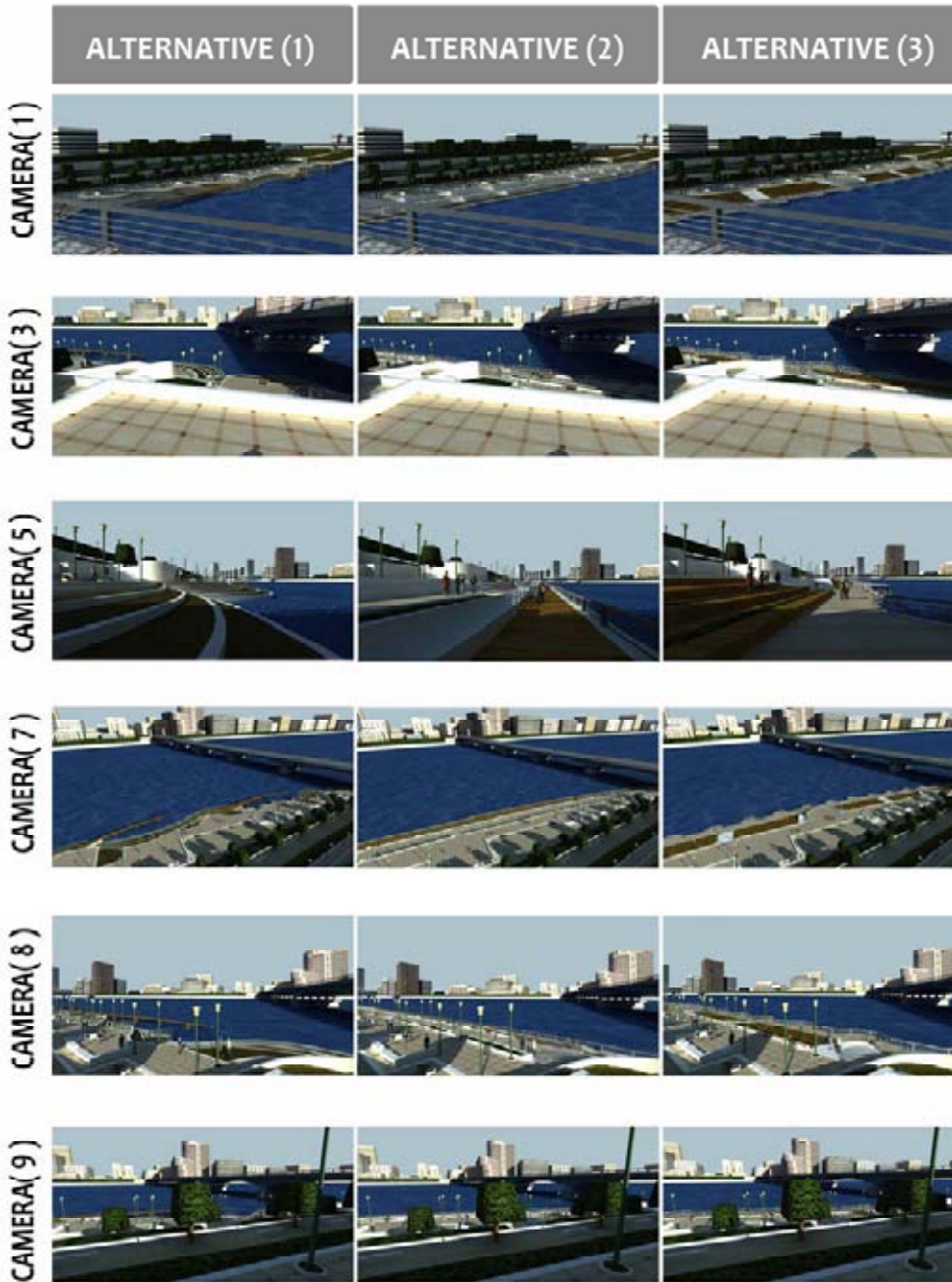
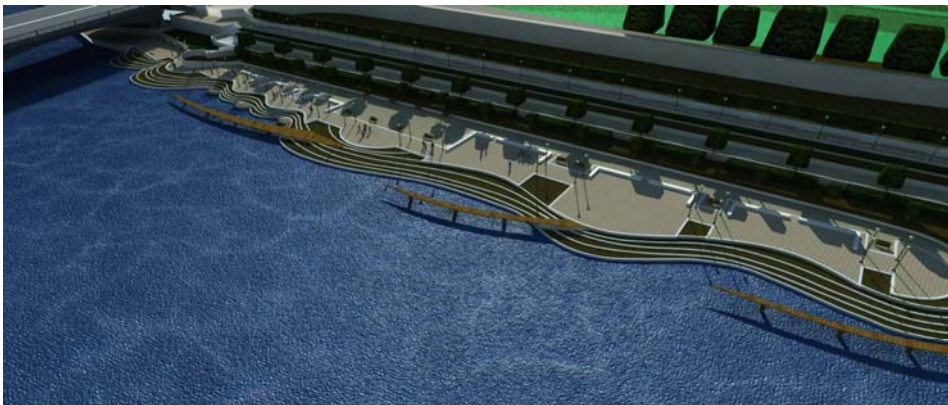
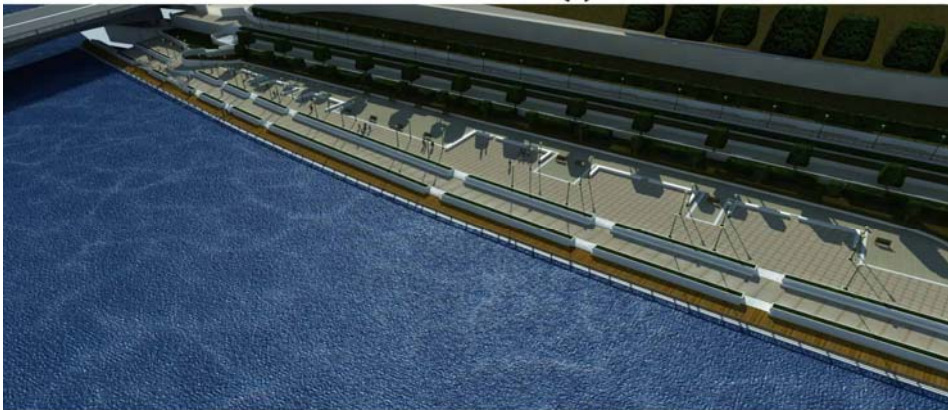


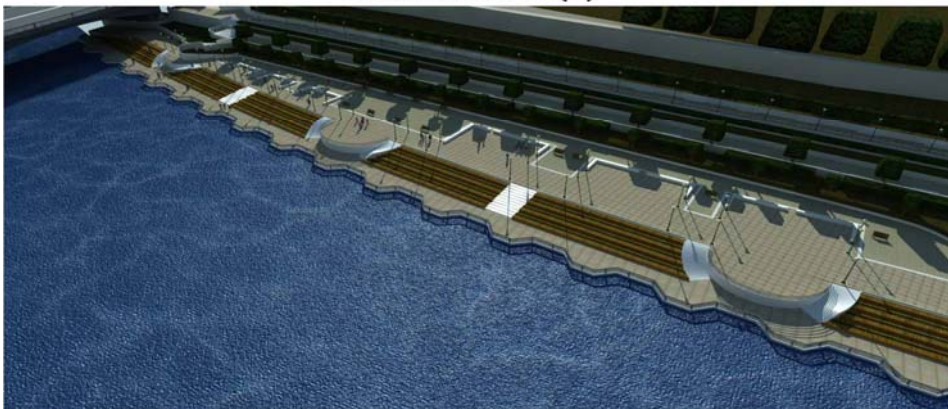
Figure (9-39) Rendered shots from the three alternatives, by researcher



**ALTERNATIVE(1)**



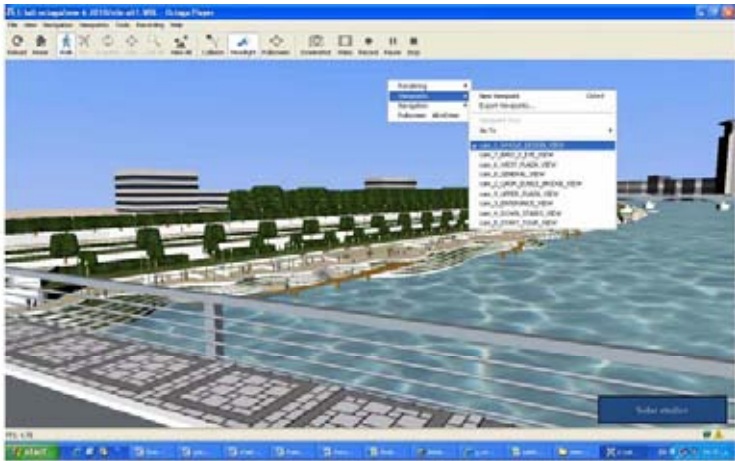
**ALTERNATIVE(2)**



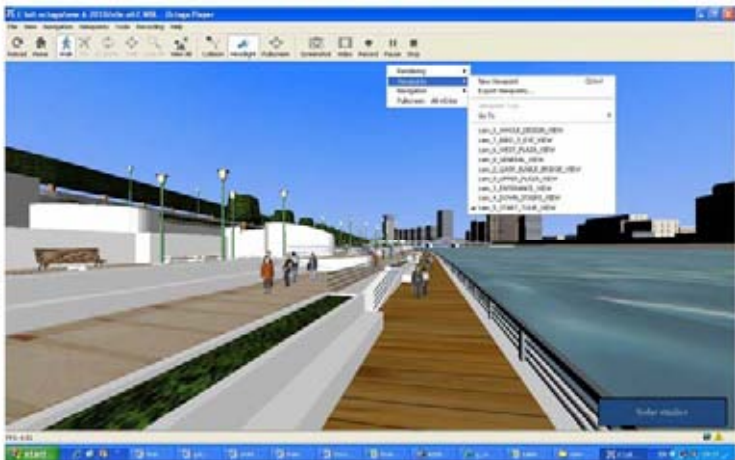
**ALTERNATIVE(3)**

Figure (9-40) Bird's eye views for the three alternatives, by researcher

**Alt.(1)  
in Octaga  
Browser**



**Alt.(2)  
in Octaga  
Browser**



**Alt.(3)  
in Octaga  
Browser**

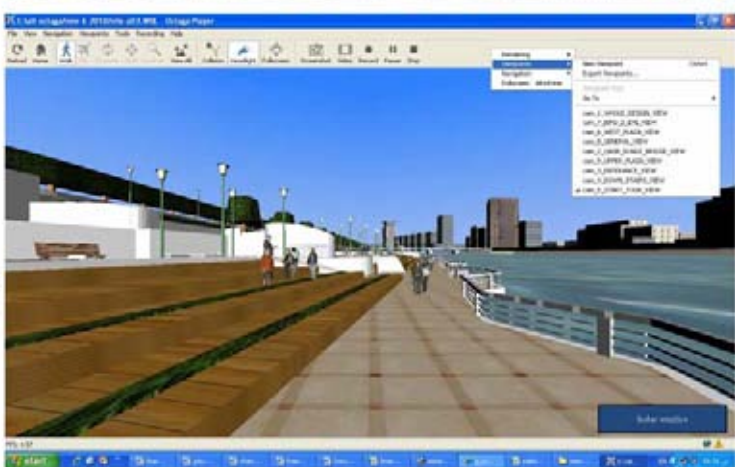


Figure (9-41) The three virtual reality models in Octaga Browser, by researcher

### **9.6.4 Sample design**

Due to the nature of the experiment, there must be a minimum level of cultural and technical background that enables sample members to use the computer and interact with the computer simulated visualization (virtual reality model).

The sample was composed of 50 Cairo residents with a variety of socioeconomic and demographical characteristics. The sample consists of 31 male (62%) and 19 female (38%) participants. Nineteen (38%) of the participants were between the age of (15-25), Nineteen (38%) were between (25-45) and Twelve (24%) were between (45-65).

### **9.6.5 Questionnaire design**

The Questionnaire sheet is designed to ask the sample some questions after completing the navigation through every model from the three virtual reality models, so the questionnaire sheet will be applied three times.

Before the navigation the questionnaire begins by a simple introduction informing the sample about the main goal of the experiment, and asks the sample some demographical questions about name, age, gender and job title.

The next step is to explain the steps of navigation through the three models as a simple tutorial.

The next part presents a typical questionnaire sheet, which consists of questions related to four main evaluation criteria which are: questions related to access & linkage, questions related to comfort & image, questions related to uses & activities and questions related to sociability, each point will contain evaluation of two riverfront's landscape elements (river' edge (shoreline) and river's sidewalk). The evaluation ranked from excellent which equals 5 points to

These questions will be repeated three times once or every alternative.

The next section show the format of questionnaire



## **Questionnaire**

(for users of Al-Gazeerah riverfront's park)

### **Goal**

Give the users in Al-Gazeerah riverfront's Park the opportunity to participate in the process of evaluation of three design alternatives of riverfront's landscape regeneration with modifications in river's edge and river's sidewalk using 3 simulated virtual reality models to help users to imagine what are the proposed modifications, in order to select optimum alternative which meets the users' needs and preferences.

### **Researcher**

**Eng. Ahmed Mohamed Saleh Khadr**

**Assistant Lecture**

**Department of Architecture**

---

---

**Chapter 9**

---

---

<b>Participant No.</b>		<b>Date</b>	
		<b>Time</b>	

**Personal Data:**

- **Name** (optional): .....
- **Age:**     15-25             25-45             45-65
- **Gender:**  Male             Female
- **Job Title:** .....



**Welcome to Nile Riverfront's Landscape Regeneration Survey**

Welcome to our Virtual Reality tour. This computer simulated visualization of three alternatives of Al-Gazeera Riverfront's park landscape regeneration. Your participation in the evaluation of these three alternatives will help us to redesign the landscape of this park according to your preferences and will meet your needs.

First, look at the comparison between existing situation of Al-Gazeera riverfront's park, and the three regenerated alternatives, in two forms, one in layout view, and the other in bird's eye view (shots from the Virtual reality models).

It is required from you to navigate through each computer simulation model, and try to evaluate the modifications in its Al-Gazeera landscape modified element, through some questions.

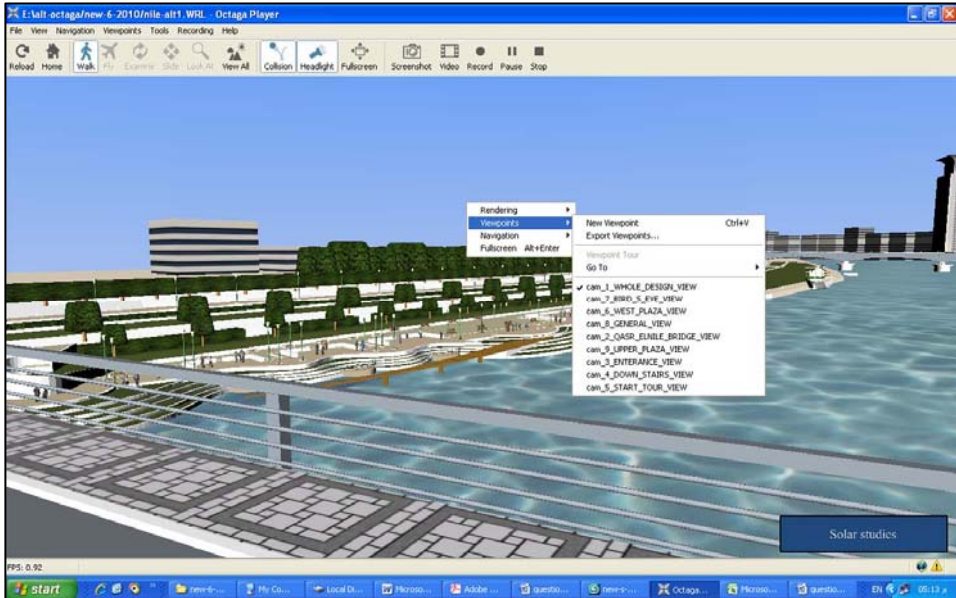
**Navigation Instructions:**

- Navigation period is 5 minutes for each alternative.
- Use the mouse or arrow keys to move into the models.
- To move forward or backward press (Left mouse button) you will see  or  you may be able to navigate through models, instead you can use the keyboard arrow keys to move in four directions.

---

## Chapter 9

---



- If you want to select any view, first (Right click), second (Choose Viewports), then select the viewport you want to view.



- You have to be in (Walk) mode in order to navigate.
- If you want to lighten the scene (Headlight) button should be on.
- If you want to restart the navigation press (Home) button.
- (Fullscreen) button hide any menus.

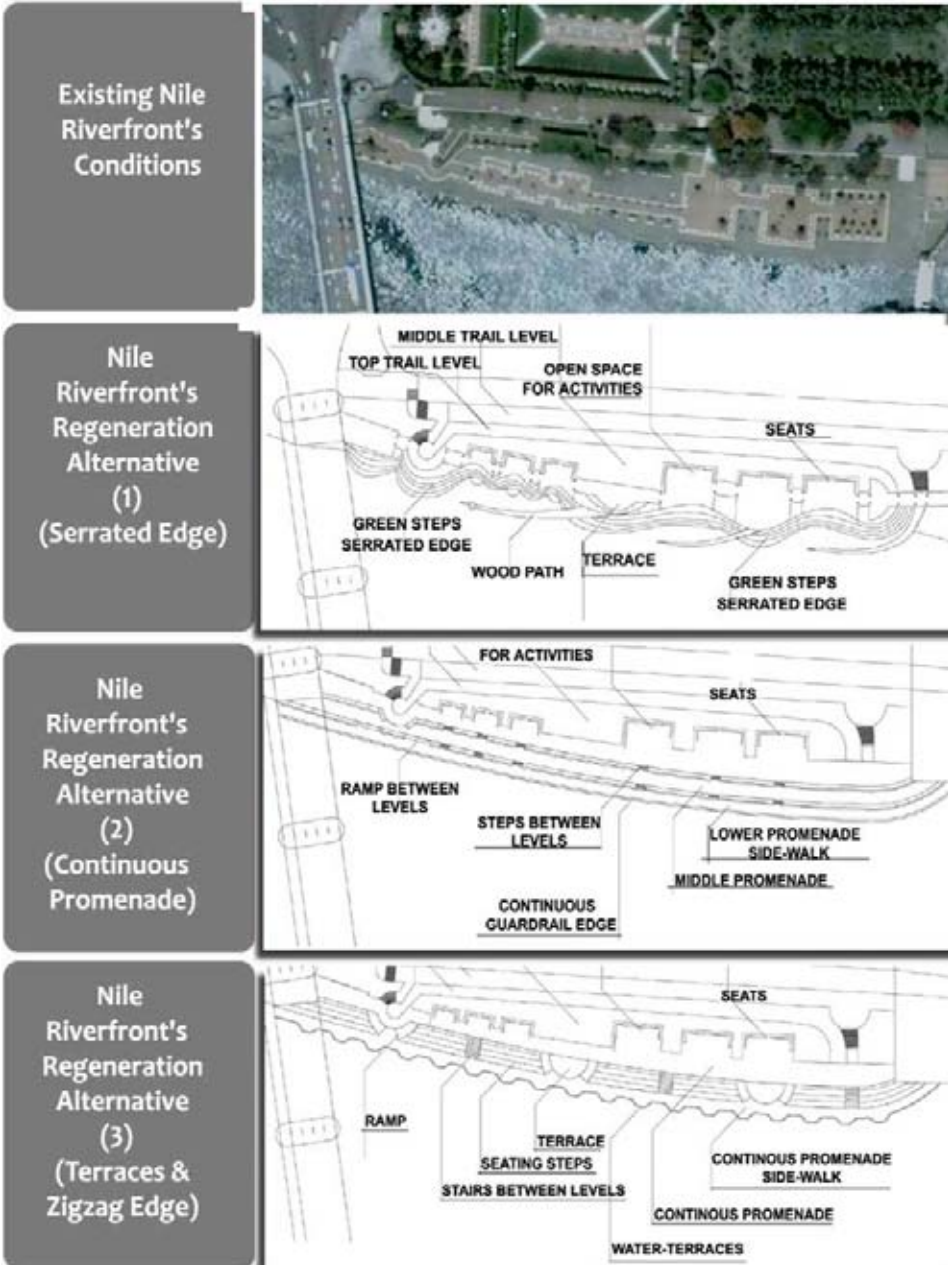
---

---

## Chapter 9

---

---



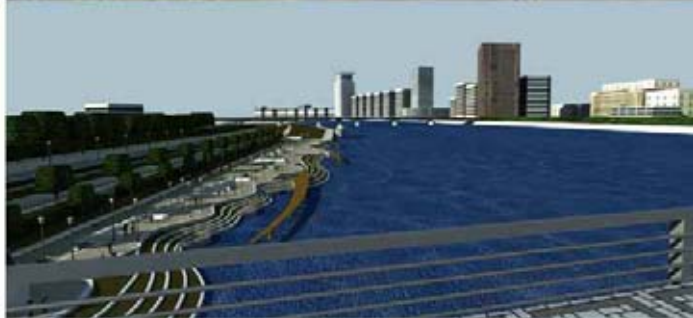
Comparison between existing situation and three alternatives.



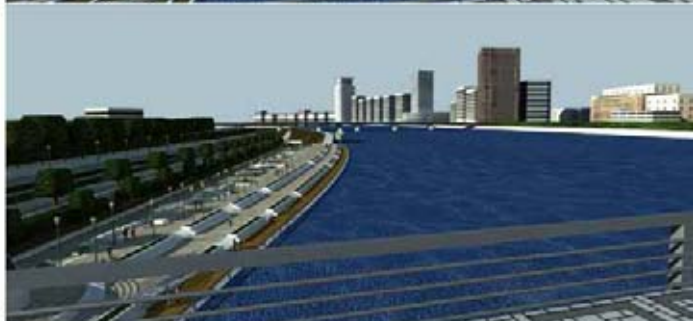
Existing Nile  
Riverfront's  
Conditions



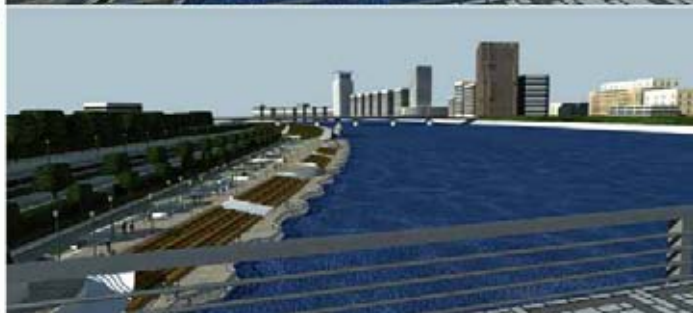
Nile  
Riverfront's  
Regeneration  
Alternative  
(1)  
(Serrated Edge)



Nile  
Riverfront's  
Regeneration  
Alternative  
(2)  
(Continuous  
Promenade)



Nile  
Riverfront's  
Regeneration  
Alternative  
(3)  
(Terraces &  
Zigzag Edge)



Comparison between existing situation and three alternatives (screen shots from Virtual Reality models)

## Chapter 9

<b>Participant No.</b>	
<b>Alternative No.</b>	

<b>Date</b>	
<b>Time</b>	

### A) POINTS RELATED TO ACCESS & LINKAGE

	Excellent 5	Good 4	Neutral 3	Fair 2	Poor 1
<b>A.1) Quality of physical access to river</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A.2) Quality of visual access to river</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A.3) Connection between land and water</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A.4) Continuity of whole landscape design</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A.5) How can this element make the space walkable and convenient?</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A.6) How can this element create direct contact with water?</b>					
A.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Chapter 9

<b>Participant No.</b>	
<b>Alternative No.</b>	

<b>Date</b>	
<b>Time</b>	

### B) POINTS RELATED TO COMFORT & IMAGE

	Excellent 5	Good 4	Neutral 3	Fair 2	Poor 1
<b>B.1) Quality of feeling of safety</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.2) Quality of legibility within riverfront space</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.3) Coherence &amp; harmony between this element and other landscape elements</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.4) Quality of attractiveness and charming</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.5) Sense of beauty of this element within other landscape elements</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B.6) Quality of landscape elements</b>					
B.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Chapter 9

<b>Participant No.</b>	
<b>Alternative No.</b>	

<b>Date</b>	
<b>Time</b>	

### C) POINTS RELATED TO USES & ACTIVITIES

	Excellent 5	Good 4	Neutral 3	Fair 2	Poor 1
<b>C.1) How can this element maximize access to different uses?</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C.2) How can this element enhance passive and active uses?</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C.3) How can this element provide varieties of uses?</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C.4) How can this element provide enough space for activities?</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C.5) Evaluate functional flexibility with this element</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C.6) Evaluate attraction of uses with this element</b>					
C.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Chapter 9

<b>Participant No.</b>		<b>Date</b>	
<b>Alternative No.</b>		<b>Time</b>	

### D) POINTS RELATED TO SOCIABILITY

	Excellent 5	Good 4	Neutral 3	Fair 2	Poor 1
<b>D.1) How can this element make Interactivity between space visitors?</b>					
D.1.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.1.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D.2) How can this element make the space more welcoming?</b>					
D.2.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.2.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D.3) How can this element make the space lively?</b>					
D.3.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.3.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D.4) How can this element give the space its own Identify?</b>					
D.4.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.4.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D.5) How can this modification increase the sense of pride and ownership?</b>					
D.5.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.5.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D.6) How can this modification create cooperative environment?</b>					
D.6.1) Riverfront's Edge (shoreline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.6.2) Riverfront's Sidewalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## **9.7 Statistical analysis**

The sample preferences concerning modifications of the two riverfront's landscape elements( riverfront's edge or shoreline and riverfront's sidewalk were analyzed, in order to choose the highest preferred regeneration alternative, and to explore public users preferences of riverfront's landscape.

Each evaluation sub-criteria determines users' preferences towards specific design indicator of landscape element, these preferences the landscape architects have to put them in consideration to when redesign or regenerate riverfront's landscape to meet people needs and preferences.

### **9.7.1 The used methods of Statistical analysis**

The collected data were first been emptying manually in data tables, then the data were been entered to the computer, first in Excel program to be entered next to (SPSS) which is shortcut to (Statistical Package for Social Sciences), with version 16.0.2.

This program is considered one of the strongest programs which have the ability of analyzing large data, and this program relies on the probability theory which we can predict from its results with the relations of different variables.

Statistics included in the base software are:<sup>1</sup>

- Descriptive statistics: Cross tabulation, Frequencies, Descriptive, Explore, Descriptive Ratio Statistics.
- Bivariate statistics: Means, t-test, ANOVA, Correlation (bivariate, partial, distances), nonparametric tests.
- Prediction for numerical outcomes: Linear regression
- Prediction for identifying groups: Factor analysis, cluster analysis (two-step, K-means, hierarchical), discriminate.

### **9.7.2 The outputs of Statistical analysis**

After analyzing the data with (SPSS) program, the outputs of the statistical analysis were be put in tables and charts in order to:

---

<sup>1</sup> <http://en.wikipedia.org/wiki/Spss>

- a) Determining the mean factor and standard deviation of each sub-criterion.
- b) Determining the selected alternative.
- c) Comparing between the selections' percentages of each alternative, by getting the sum of the mean of each sub evaluation criterion, and on the other hand with consideration of the expert's evaluation factor.
- d) Analysis of the strengths and weakness of each alternative to get the optimum alternative.
- e) Using comparative mean values to understand public users' preferences
- f) Comparative analysis of public users' preferences between alternatives, according to gender and age.

**a) Determining the mean factor and standard deviation of each sub-criterion.**

In table (9-3), we put all the evaluation criteria and sub-criteria then the mean factor of each of them as all sub-criteria has the same weight.

The next column is the mean factor of each sub-criterion multiplied by experts' evaluation factors, which were determined in the previous chapter from the short experts' survey about evaluating the importance of riverfront's landscape criteria.

The third column is about standard deviation of each sub-criterion.

Each alternative has two surveyed landscape elements (river edge or shoreline, and river sidewalk) each of them has analyzed according to four main criteria (access & linkage, comfort & image, uses & activities, and sociability) each of them contains six sub-criteria.

At the end of this table the mean factors were be summed to get the evaluation percentage of each element in each alternative.





**b) Determining the selected alternative.**

From table (9-3) it is clear that alternative (1) with its two landscape elements (river edge or shoreline and river sidewalk) has the highest percentage among the three alternatives, so alternative (1) is the public users' selected landscape regeneration alternative.

Alternative (1) has evaluation percentage 89.5% in River edge, while 87.1% in sidewalk according to the mean of each sub-criterion as all sub-criteria have the same weight.

Alternative (2) has evaluation percentage 45.3% in River edge, while 46.7% in sidewalk according to the mean of each sub-criterion as all sub-criteria have the same weight.

Alternative (3) has evaluation percentage 70.4% in River edge, while 70% in sidewalk according to the mean of each sub-criterion as all sub-criteria have the same weight.

So alternative (1) has the highest evaluation percentage, this mean public users have selected this alternative, while they may refused alternative (2) because it has percentage less than 50%, alternative (3) was ranked as the second alternative.

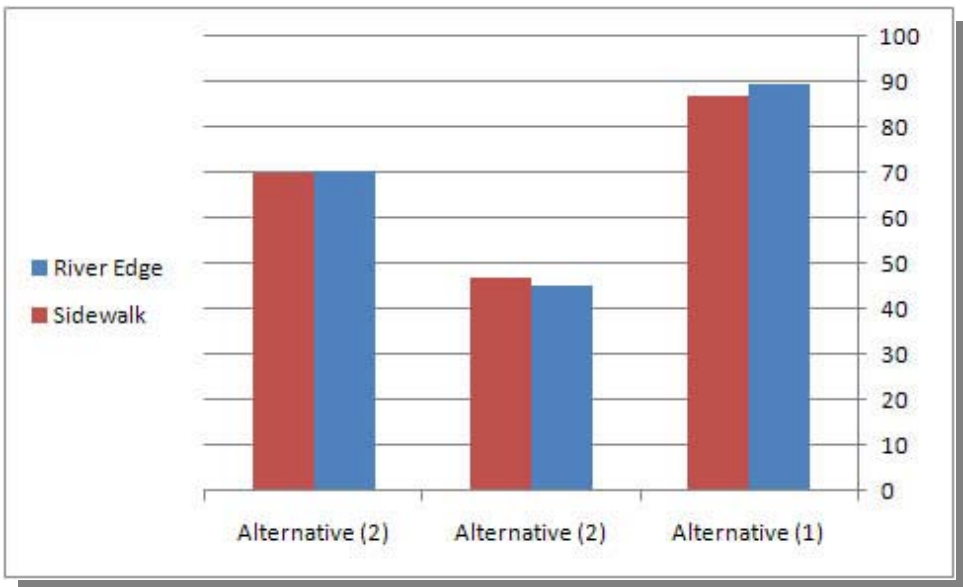


Figure (9-42) Alternatives' evaluation by public users, the selected alternative is alternative (1)

- c) Comparing between the selections' percentages of each alternative, by getting the sum of the mean of each sub evaluation criterion, and on the other hand with consideration of the expert's evaluation factor.

As shown in figure (9-43) to figure (9-45) there are differences in value between the mean of each evaluation sub-criterion if all twenty four sub-criteria have the same weight, and if the mean of each was multiplied by the experts' evaluation factor.

These differences have no effective changes on the accumulative percentage of each alternative (such alternative (1) has 89.5% with equal sub- criterion weight, and has 88.9% with taking in account the experts' evaluation factor.

But these differences are important when we compare individual sub-criteria together.

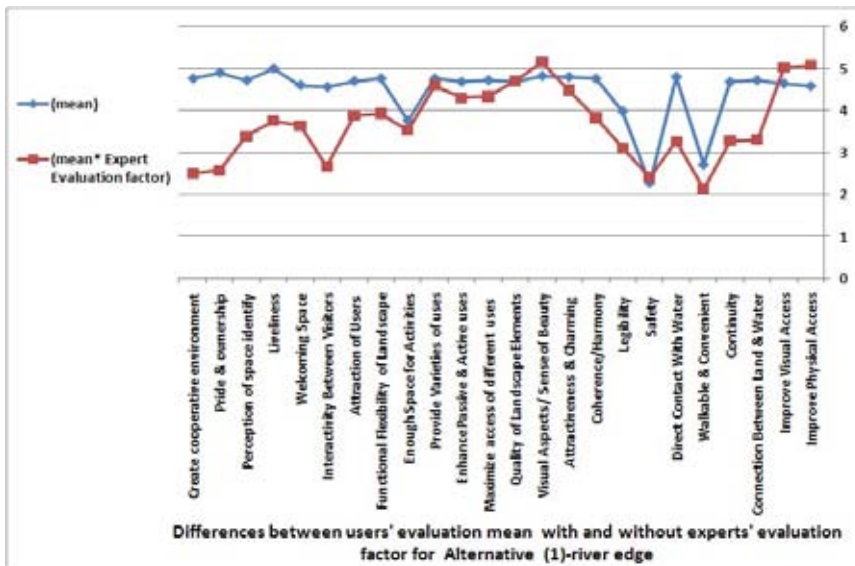


Figure (9-43) Alternative (1) differences between users' evaluation mean, once as all criteria have the same weight, the other with consideration of experts' evaluation factor

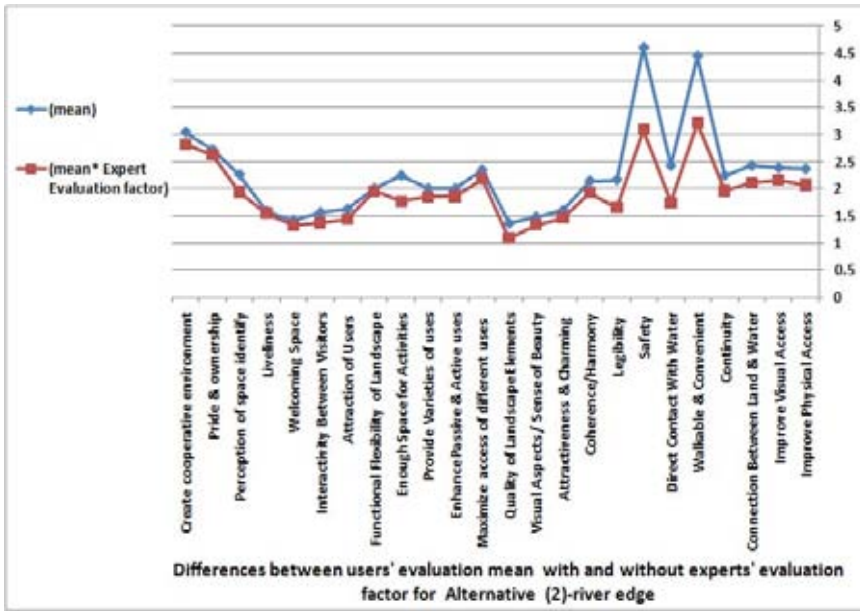


Figure (9-44) Alternative (2) differences between users' evaluation mean, once as all criteria have the same weight, the other with consideration of experts' evaluation factor

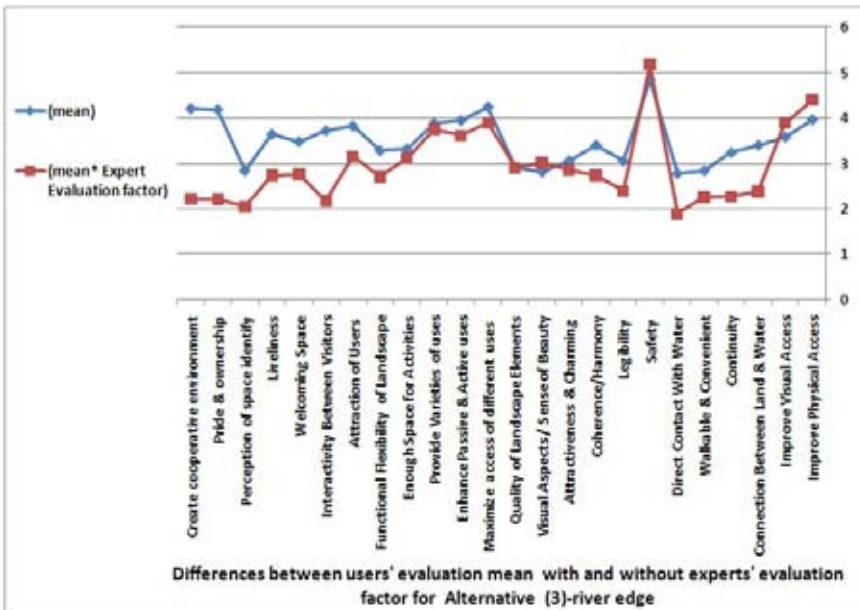


Figure (9-45) Alternative (3) differences between users' evaluation mean, once as all criteria have the same weight, the other with consideration of experts' evaluation factor

**d) Analysis of the strengths and weakness of each alternative to get the optimum alternative.**

Here the mean of each sub-criterion was determined in the Radar technique which was proposed in chapter eight to easily determine the strengths and weakness of each alternative in order to get the optimum alternative, such as although alternative (1) is the selected alternative by users' participation, this alternative is very recommended for example because its high character of direct contact with water, it is welcoming space, it enhances physical and visual access to river and so on , but on the other hand the participant think that it is not safe enough due it has not no guardrail in the relation between river edge and the river itself. Another point such sub-criterion of walk-ability because the shoreline is consists of a lot of green space and the public users may need much space suitable in paving and material for walking.

In alternative (2) although it was not selected by the participants, safety and walk-ability have high score, this mean that we can learn from these suitable and high ranked design consideration to enhance the selected alternative in order to get the optimum alternative.

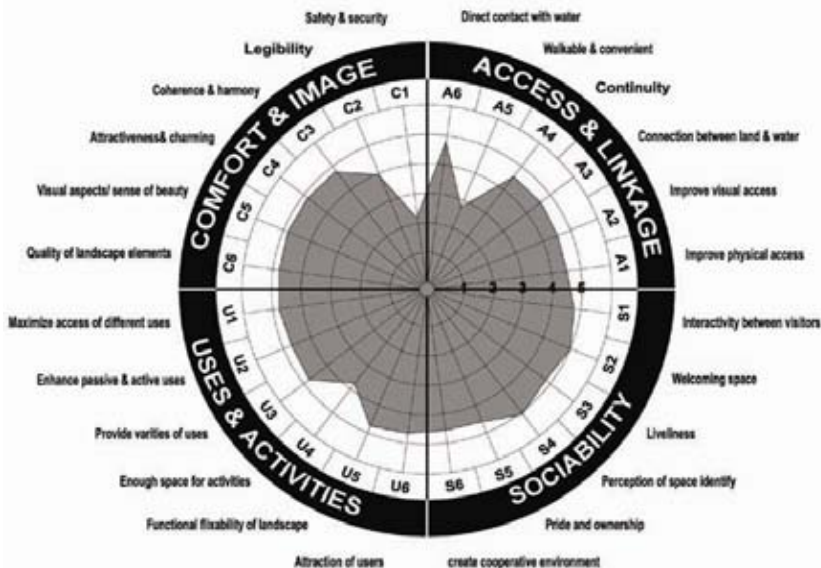


Figure (9-46) suggested format (Radar technique) for displaying how alternative (1) was evaluated by public users in the participation process in each sub-criterion (river edge).

---

---

## Chapter 9

---

---

Here it is clear the weakness of the evaluation rates of alternative (2) in all evaluation criteria except the safety factor and walk-ability factor. In alternative (3) its rates are almost medium between alternative (1) and (2) but safety has a high rate than the selected alternative (1).



Figure (9-47) suggested format (Radar technique) for displaying how alternative (2) was evaluated by public users in the participation process in each sub-criterion (river edge).



Figure (9-48) suggested format (Radar technique) for displaying how alternative (3) was evaluated by public users in the participation process in each sub-criterion (river edge).

In the next Radar format the three alternatives are represented to compare between their rates for different sub-criteria.

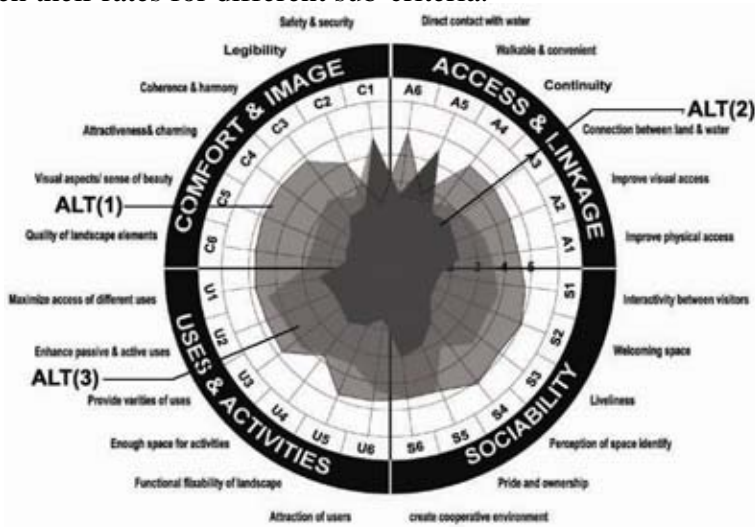


Figure (9-49) comparison between the three alternatives using the suggested format (Radar technique) for displaying how public users in the participation process evaluated in details the criteria of the landscape element of river edge.

In the next Radar format the sidewalk evolution will be represented:



Figure (9-50) suggested format (Radar technique) for displaying how alternative (1) was evaluated by public users in the participation process in each sub-criterion (sidewalk).

## Chapter 9

From figure(9-50) it is clear the success of alternative (1) of sidewalk in gathering high rates in all sub-criteria, in opposite alternative (2) gained low rates in all sub-criteria else the points related to safety and walk-ability.



Figure (9-51) suggested format (Radar technique) for displaying how alternative (2) was evaluated by public users in the participation process in each sub-criterion (sidewalk).

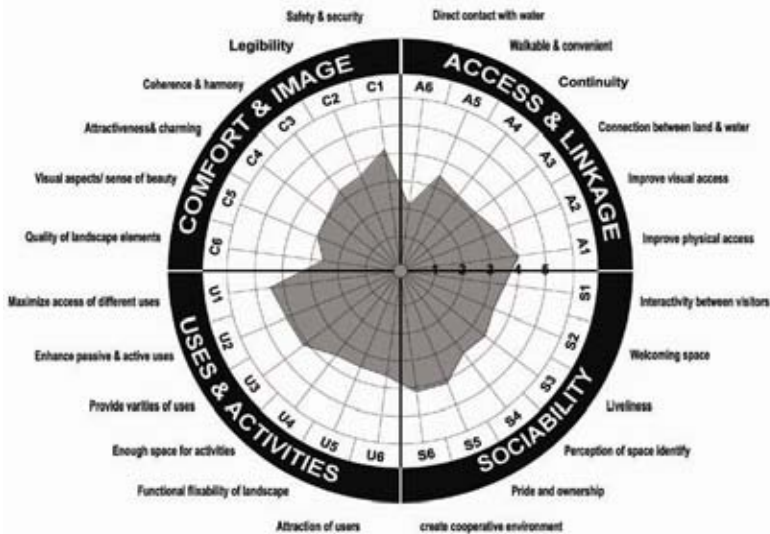


Figure (9-52) suggested format (Radar technique) for displaying how alternative (3) was evaluated by public users in the participation process in each sub-criterion (sidewalk).

---



---

## Chapter 9

---



---

In table (9-4) it is noticed that participants although they selected alternative (1) and gave it highest score in improving physical access they gave it a low score in safety consideration, especially in river edge evaluation, in opposite to alternatives (2), (3) which participant gave them high score in safety however they gave them low score in physical access, this mean that designers have to rethink in alternative (1) to solve the safety needs problem which public users have mentioned.

	alt(1) river edge	alt(1) sidewalk	alt(2) river edge	alt(2) sidewalk	alt(3) river edge	alt(3) sidewalk	
Improve Physical Access	4.58	4.38	2.36	2.36	3.96	3.96	Mean
Safety	2.26	3.36	4.6	4.56	4.84	4.14	

Table (9-4) comparison between mean of evaluation of two criteria, improving physical access and safety in the three alternatives

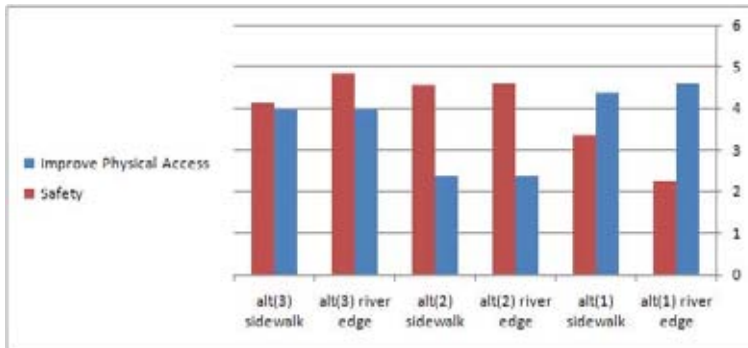


Figure (9-53) chart representing results of table (9-4)

Also in table (9-5) it is noticed that although alternative (1) it the selected one by users, but it got the lowest rate in the evaluation of the point related to safety in contrast with the rate of the evaluation of the point related to the sense of beauty of river edge and sidewalk, in comparing with other two alternatives, which gained a higher rate in the evaluation of the point related to safety in contrast with the rate of the evaluation of the point related to the sense of beauty of river edge and sidewalk.

This means that alternative (1) has to be modified to solve the safety problem to make it the optimum alternative.



## Chapter 9

	alt(1) river edge	alt(1) sidewalk	alt(2) river edge	alt(2) sidewalk	alt(3) river edge	alt(3) sidewalk	Mean
Safety	2.26	3.36	4.6	4.56	4.84	4.14	
Visual Aspects / Sense of Beauty	4.82	4.5	1.48	1.54	2.82	2.94	

Table (9-5) comparison between mean of evaluation of two criteria, safety and visual aspects or sense of beauty in the three alternatives.

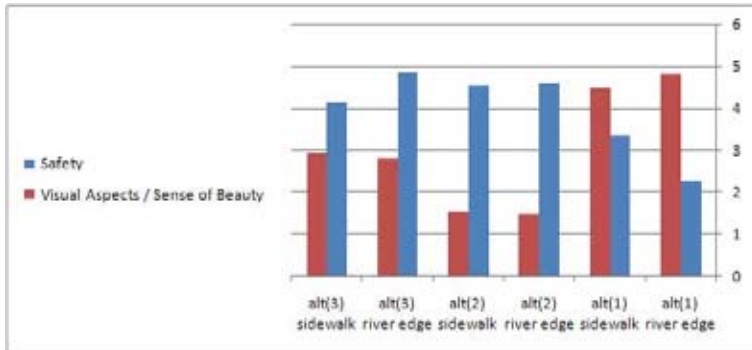


Figure (9-54) chart representing results of table (9-5)

Table (9-6) shows the strong relation between physical access and visual access, that the selected alternative (1) got the highest rate in both physical and visual access

	alt(1) river edge	alt(1) sidewalk	alt(2) river edge	alt(2) sidewalk	alt(3) river edge	alt(3) sidewalk	Mean
Improve Physical Access	4.58	4.38	2.36	2.36	3.96	3.96	
Improve Visual Access	4.64	4.54	2.38	2.4	3.58	3.54	

Table (9-6) comparison between mean of evaluation of two criteria, physical and visual access in the three alternatives.

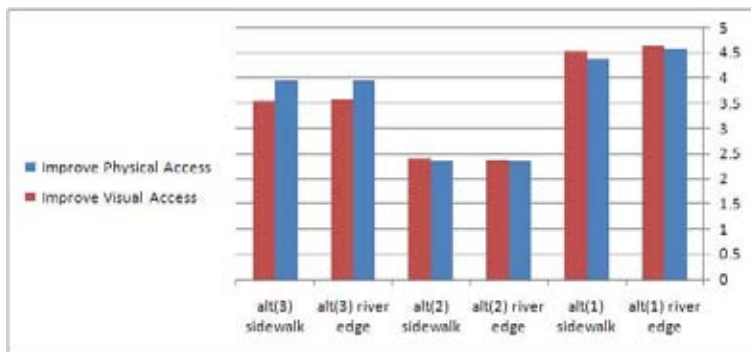


Figure (9-55) chart representing results of table (9-6)

---



---

## Chapter 9

---



---

Table (9-7) shows the strong relation between physical access and walk-ability, that the selected alternative (1) got the highest rate in physical access while got the lowest rate in walk-ability, rather than the other two alternatives.

	alt(1) river edge	alt(1) sidewalk	alt(2) river edge	alt(2) sidewalk	alt(3) river edge	alt(3) sidewalk	
Improve Physical Access	4.58	4.38	2.36	2.36	3.96	3.96	Mean
Walkable & Convenient	2.7	3.62	4.44	4.5	2.84	3.38	

Table (9-7) comparison between mean of evaluation of two criteria, improving physical access, walk-ability and convenient in the three alternatives.

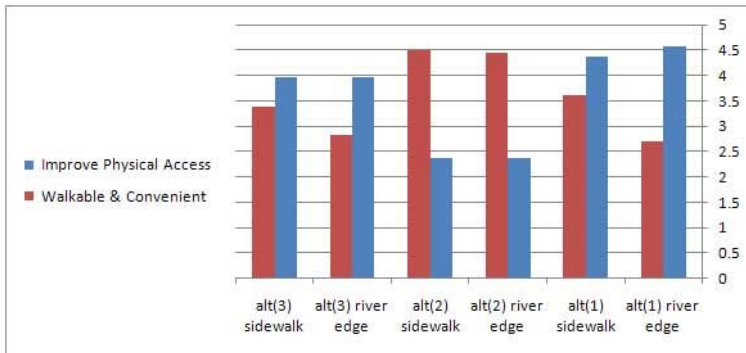


Figure (9-56) chart representing results of table (9-7)

**e) Using comparative mean values to understand public users' preferences and needs.**

By comparing the mean values of different criteria for the three alternatives we can understand public users' preferences of riverfront's landscape also we can understand their needs which landscape elements can enhance.

From the analysis of user's evaluation of design criteria for the two selected landscape elements- river edge (shoreline) and sidewalk, we can understand their preferences and their needs, according to table (9-2) which describes the indicators of the two modified landscape elements in the three riverfront's regeneration alternatives.

**1) Users' preferences of access and linkage**

**- Users' preferences and physical access to river**

The first evaluated point was the role of the modified landscape elements in improving the physical access to river, the findings showed that users preferred the river edge of alternative(1) which is wavy and

curvy, vegetated and serrated edge as steps which makes direct access to river and removes any barriers between users and river, while alternative (2) was the lowest rate because the continuous guardrails which represents a barrier to river, also alternative (3) which is similar of the existing situation else the guardrail is semi-transparent but the zigzagging edge provides a good place to be in direct contact with water, figure (9-57).

Also the same for sidewalk which is the preferred in alternative(1) because its bending curve, while alternative(2) is the refused because its boring linear terraces, while alternative(3) gained the second evaluation rate due to its bending curve but its terraces may not be preferred by users

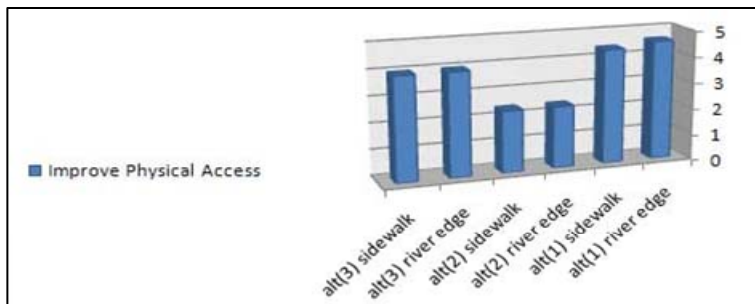


Figure (9-57) chart representing users' evaluation of river edge and sidewalk in improving physical access

**- Users' preferences and visual access to river**

Users preferred alternative (1) as improving visual access to river because the river edge is transparent and sidewalk consists of serrated edge provides good visual access.

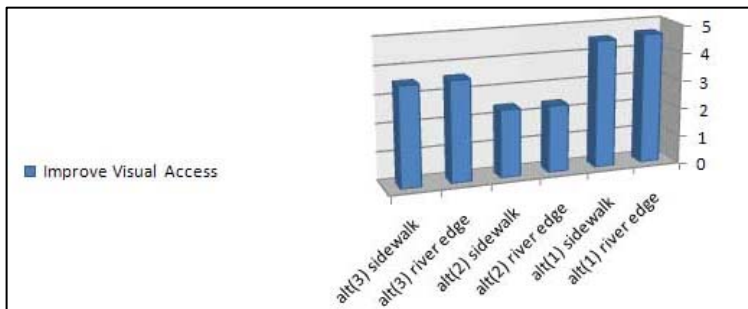


Figure (9-58) chart representing users' evaluation of river edge and sidewalk in improving visual access

While both alternative (2), (3) have semi transparent edge which interrupts visual access, the same preference with sidewalk.

**- Users' preferences and effect of landscape element on walk-ability and convenient**

Users gave alternative (1) the lowest rate in this point that means the river sidewalk because it is very curvy and consists of vegetated and serrated edge is not suitable enough for walking, although this alternative is the selected one. However alternative (2) was not selected but its sidewalk was appreciated from users because it linear and continuous.

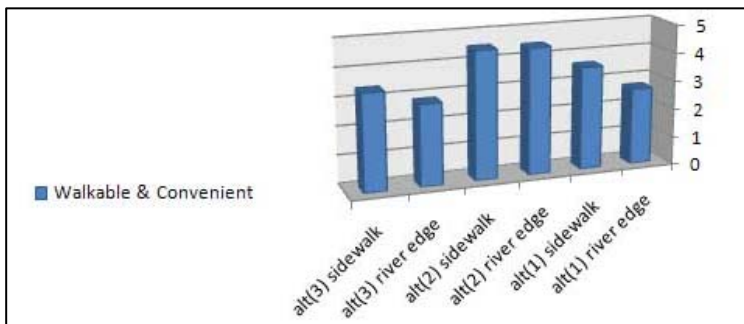


Figure (9-59) chart representing users' evaluation of river edge and sidewalk and effect on walk-ability and convenient

**2) Users' preferences of comfort & image**

**- Users' preferences and safety**

However users selected alternative (1), they thought that the river edge does not give them enough feeling of safety because it has not guardrail and connects directly to water.

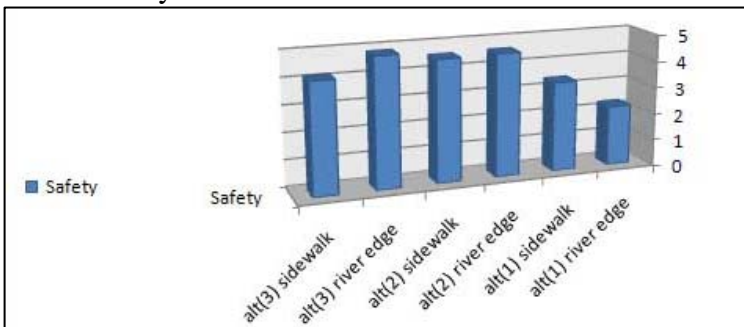


Figure (9-60) chart representing users' evaluation of effect of river edge and sidewalk on feeling of safety

But users thought that alternatives (2), (3) is more safety than alternative (1).

- **Users' preferences and Visual Aspects / Sense of Beauty**

Users preferred alternative (1) because its wavy and curved shape, also because the mixture between green and paving in the sidewalk, while they didn't prefer alternative (2) because its narrow and poring sidewalk

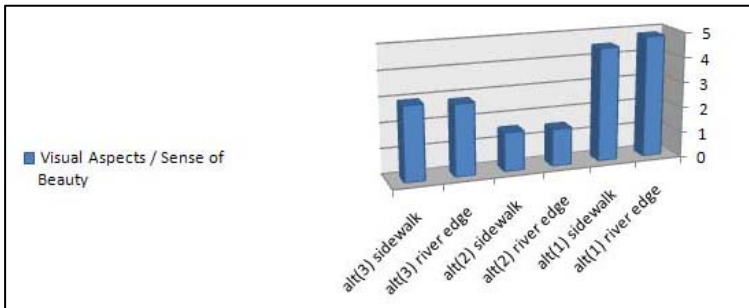


Figure (9-61) chart representing users' evaluation of effect of river edge and sidewalk on visual aspects and sense of beauty

**3) Users' preferences of uses & activities**

Users preferred alternative (1) because they think that the sidewalk can give them variety of uses, enhance both passive and active uses, and maximize access to different uses and also its shape which makes attraction of uses.

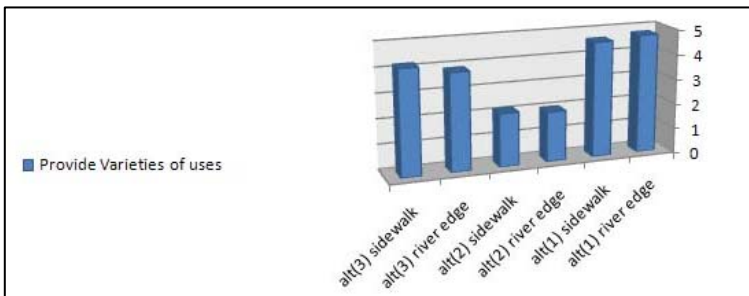


Figure (9-62) chart representing users' evaluation of effect of river edge and sidewalk on providing varieties of uses as an example users' preferences of uses and activities

**f) Comparative analysis of public users' preferences between alternatives, according to gender and age.**

In the next section the research will analyze the output data of (SPSS) program using the correlations between items, to make a comparative analysis of public users' preferences between the three alternatives.

It was clear that age and gender have great influences on the judgment of the chosen alternative, as will be noticed from the next tables and charts.

**1) Points related to access and linkage**

The correlation between gender and evaluation of access & linkage, also between age and evaluation of access & linkage, shows that:

**-Quality of physical access**

As shown in table (9-8) the correlation between gender and physical access shows that there is a significant relation between both male and female towards river edge modification in alt.(1), also the male may prefer sidewalk in alternative (3) rather than other alternatives.

As shown in table (9-9) the correlation between age and physical access shows that there is a significant relation between age range (15-25) and alt. (1) which has a wavy & curvy edge and sidewalk rather than the rather than linear shape and the zigzagging shape of alt.(2), (3).

The age range (45-65) may not prefer the curvy edge and sidewalk.

**-Quality of visual access**

As shown in table (9-10) the correlation between gender and physical access shows that there is a significant relation between both male and female towards river edge modification in alt. (1).

As shown in table (9-11) the correlation between age and physical access shows that there is a significant relation between age range (15-25) and alt. (1) which has a wavy & curvy edge and sidewalk rather than the rather than linear shape and the zigzagging shape of alt.(2), (3).

The age range (45-65) may not prefer the curvy edge and sidewalk.

**-Connection between land and water**

As shown in table (9-12) the correlation between gender and connection between land and water shows that there is a significant relation between male and type of river edge modification in alt. (2), that mean they may prefer continuous and semi transparent type of connection between land and water, in contrast with female.

As shown in table (9-13) the correlation between age and connection between land and water, shows that there is a significant relation between age range (15-25) and alt.(1) which has a wavy & curvy edge and sidewalk rather than the rather than linear shape and the zigzagging shape of al.(2), (3).

But the age range (25-45) has a significant relation with alt (3) sidewalk.

**-continuity of whole landscape design**

As shown in table (9-14) the correlation between gender and continuity of whole landscape design shows that there is a significant relation between male and alt.(2) in contrast with female, that mean the continuous river edge and continuous side walk may be preferred from male rather than female.

As shown in table (9-15) the correlation between age and connection between land and water, shows that there is a significant relation between age range (15-25) and alt. (1)

**-Walk-ability & convenient**

As shown in table (9-16) the correlation between gender and continuity of whole landscape design shows that there is a significant relation between female and alt.(2) in contrast with male.

As shown in table (9-17) the correlation between age and walk-ability and convenient, shows that there is a significant relation between age range (15-25) and alt. (1) in contrast with age range (45-65).

**-Creation of direct contact with water**

As shown in table (9-18) the correlation between gender and continuity of whole landscape design shows that there is a significant relation between male and alt. (1) higher than alt. (2), (3), in contrast with female.

## Chapter 9

As shown in table (9-19) the correlation between age and walk-ability and convenient, shows that there is a significant relation between age range (25-45) and alt. (1) in contrast with age range (15-25).

		A.1 Quality of physical access to river					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.295	-0.106	0.125	0.221	0.089	<b>0.255</b>
	female	0.200	0.070	-0.268	-0.247	-0.091	-0.260

Table (9-8) Correlation between gender and evaluation of quality of physical access to river.

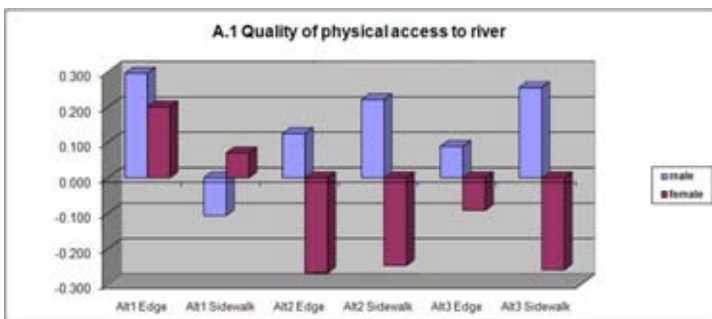


Figure (9-63) 3D chart representing results of table (9-8)

		A.1 Quality of physical access to river					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	<b>0.231</b>	<b>0.226</b>	0.041	0.006	-0.129	-0.109
	25-45	-0.002	-0.133	-0.030	-0.032	0.030	0.086
	45-65	-0.260	-0.106	-0.013	0.029	0.112	0.027

Table (9-9) Correlation between age and evaluation of quality of physical access to river.

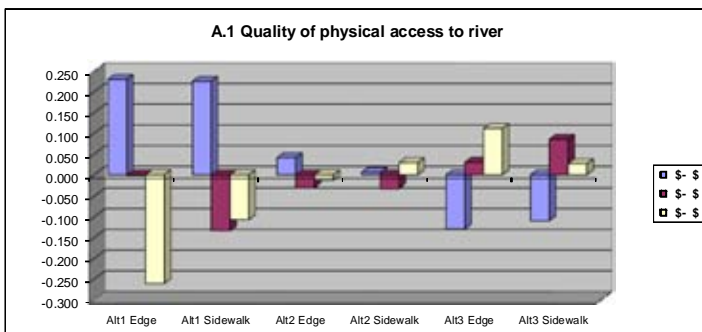


Figure (9-64) 3D chart representing results of table (9-9)



## Chapter 9

		A.2 Quality of visual access to river					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.253	0.081	0.008	0.022	-0.060	0.151
	female	0.195	-0.112	-0.030	-0.044	0.048	-0.087

Table (9-10) Correlation between gender and evaluation of quality of visual access to river.

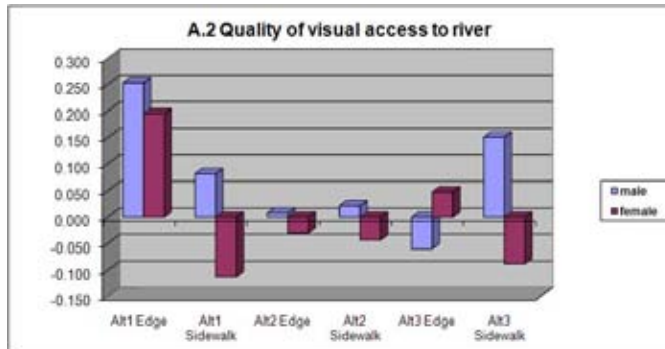


Figure (9-65) 3D chart representing results of table (9-10)

		A.2 Quality of visual access to river					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	0.225	0.306	-0.043	-0.022	-0.183	-0.135
	25-45	-0.013	-0.081	-0.008	-0.022	0.181	0.214
	45-65	-0.241	-0.255	0.058	0.049	0.001	-0.089

Table (9-11) Correlation between age and evaluation of quality of visual access to river.

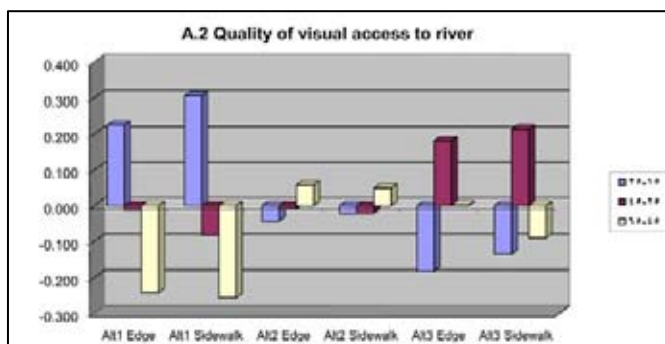


Figure (9-66) 3D chart representing results of table (9-11)

**Chapter 9**

		A.3 Connection between land and water					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.029	0.107	<b>0.256</b>	<b>0.328</b>	-0.072	-0.019
	female	0.004	-0.137	-0.278	-0.360	0.055	0.025

Table (9-12) Correlation between gender and evaluation of the connection between land and water

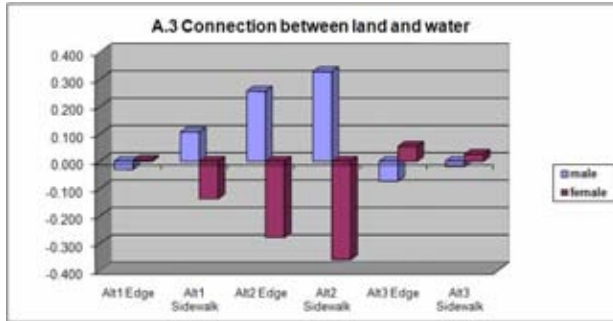


Figure (9-67) 3D chart representing results of table (9-12)

		A.3 Connection between land and water					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	<b>0.213</b>	0.153	-0.096	-0.114	-0.198	-0.112
	25-45	-0.154	-0.020	0.033	0.065	0.192	<b>0.215</b>
	45-65	-0.067	-0.152	0.072	0.055	0.007	-0.117

Table (9-13) Correlation between age and evaluation of the connection between land and water

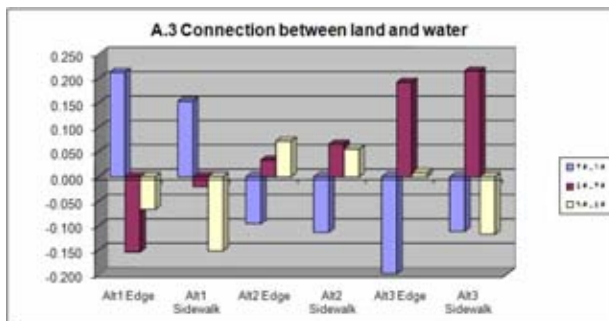


Figure (9-68) 3D chart representing results of table (9-13)

## Chapter 9

		A.4 Continuity of whole landscape design					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.082	-0.082	<b>0.139</b>	<b>0.136</b>	-0.013	0.001
	female	0.058	0.054	-0.226	-0.226	0.077	0.064

Table (9-14) Correlation between gender and evaluation of the continuity of whole landscape design

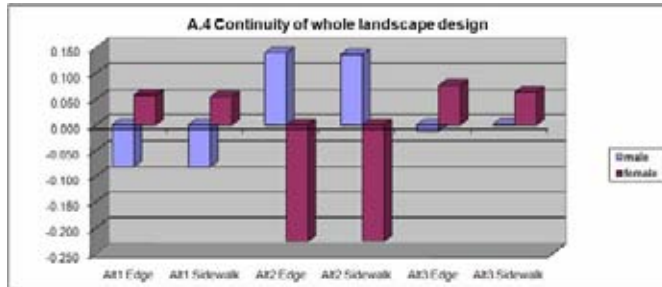


Figure (9-69) 3D chart representing results of table (9-14)

		A.4 Continuity of whole landscape design					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	<b>0.233</b>	<b>0.313</b>	0.013	0.049	-0.186	-0.149
	25-45	-0.145	-0.149	0.013	0.018	0.155	0.177
	45-65	-0.100	-0.187	-0.031	-0.076	0.036	-0.031

Table (9-15) Correlation between age and evaluation of the continuity of whole landscape design

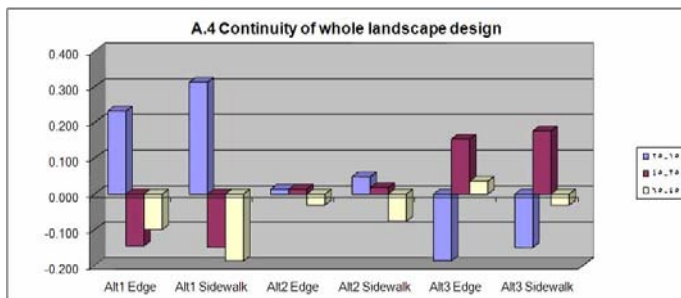


Figure (9-70) 3D chart representing results of table (9-15)

## Chapter 9

		A.5 How can this element make the space walkable and convenient?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.028	-0.013	-0.171	-0.102	0.035	0.041
	female	-0.024	-0.010	<b>0.201</b>	0.137	-0.004	0.005

Table (9-16) Correlation between gender and evaluation of walk-ability and convenient

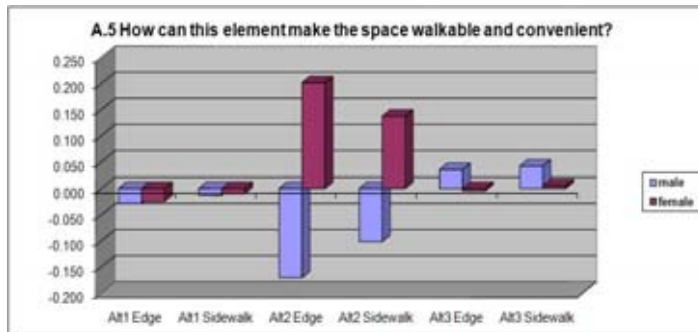


Figure (9-71) 3D chart representing results of table (9-16)

		A.5 How can this element make the space walkable and convenient?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	<b>0.310</b>	0.013	0.041	0.034	0.074	-0.041
	25-45	-0.092	0.013	-0.088	0.034	0.110	0.094
	45-65	-0.247	-0.030	0.053	-0.077	-0.209	-0.060

Table (9-17) Correlation between age and evaluation of walk-ability and convenient

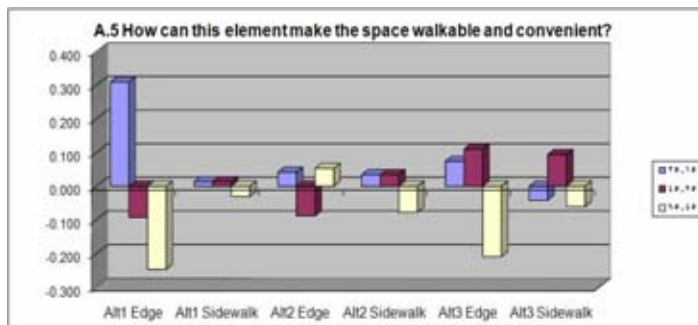


Figure (9-72) 3D chart representing results of table (9-17)

## Chapter 9

		A.6 How can this element create direct contact with water?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.224	0.042	<b>0.172</b>	0.143	<b>0.148</b>	0.077
	female	-0.146	-0.084	-0.133	-0.118	-0.104	-0.044

Table (9-18) Correlation between gender and evaluation of how can the landscape elements (river edge, and sidewalk) create direct contact with water

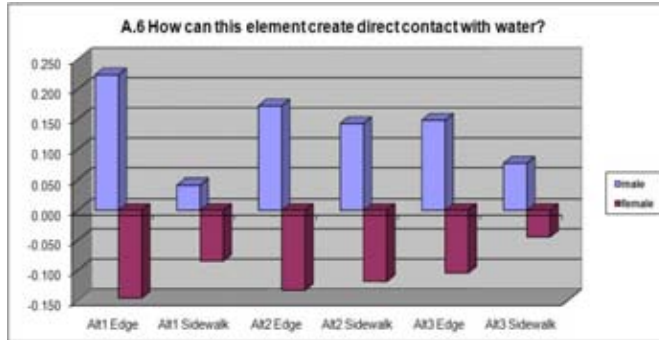


Figure (9-73) 3D chart representing results of table (9-18)

		A.6 How can this element create direct contact with water?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.330	-0.012	0.087	0.006	0.081	0.075
	25-45	<b>0.391</b>	0.048	-0.086	0.006	-0.123	-0.168
	45-65	-0.070	-0.041	-0.001	-0.014	0.048	<b>0.105</b>

Table (9-19) Correlation between age and evaluation of how can the landscape elements (river edge, and sidewalk) create direct contact with water

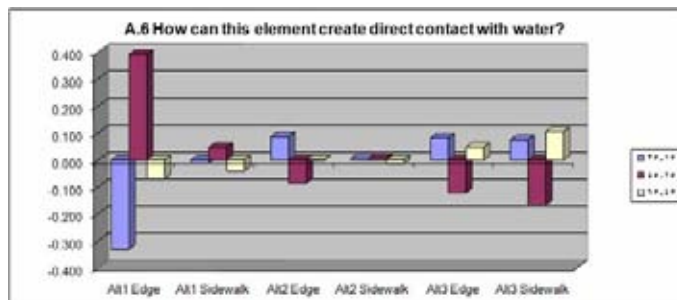


Figure (9-74) 3D chart representing results of table (9-19)

## **2) Points related to comfort and image**

The correlation between gender and evaluation of comfort and image, also between age and evaluation of comfort and image, shows that:

### **-Quality of feeling safety**

As shown in table (9-20) the correlation between gender and feeling of safety shows that there is a significant relation between male towards river edge modification in alt.(2), (3) this means they think that existing of guardrail provides feeling of safety.

As shown in table (9-21) the correlation between age and feeling of safety shows that there is a significant relation between age range (45-65) and alt. (2), (3) that means old people prefer feeling of safety.

### **-Quality of legibility within riverfront's space**

As shown in table (9-22) the correlation between gender and legibility shows that there is a significant relation between female towards river edge modification in alt. (1).

As shown in table (9-23) the correlation between age and legibility shows that there is a significant relation between age range (15-25) and alt. (3), while the age range (45-65) shows significant relation with alt.(1).

### **-Coherence and harmony**

As shown in table (9-24) the correlation between gender and Coherence and harmony shows that there is a significant relation between male and type of river edge modification in alt. (2).

As shown in table (9-25) the correlation between age and Coherence and harmony shows that there is a significant relation between age range (45-65) and alt.(1).

### **-Attractiveness and charming**

As shown in table (9-26) the correlation between gender and Attractiveness and charming shows that there is a significant relation between male and alt.(2) in contrast with female, that mean the continuous river edge and continuous side walk may be preferred from male rather than female.

As shown in table (9-27) the correlation between age and Attractiveness and charming shows that there is a significant relation between age range (25-45) , (45-65) and alt. (1).

## Chapter 9

### - Sense of beauty

As shown in table (9-28) the correlation between gender and Sense of beauty shows that there is a significant relation between female and alt.(1) in contrast with male.

As shown in table (9-29) the correlation between age and Sense of beauty shows that there is a significant relation between age range (15-25) and alt. (1) in contrast with age range (45-65).

		B.1 Quality of feeling of safety					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.089	-0.035	0.201	0.044	<b>0.220</b>	0.077
	female	-0.250	0.016	0.083	0.063	-0.109	-0.103

Table (9-20) Correlation between gender and evaluation of feeling of safety



Figure (9-75) 3D chart representing results of table (9-20)

		B.1 Quality of feeling of safety					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.084	-0.086	-0.096	-0.044	-0.108	-0.048
	25-45	-0.084	0.157	-0.027	-0.044	0.117	0.039
	45-65	<b>0.140</b>	-0.080	<b>0.190</b>	0.099	0.250	0.250

Table (9-21) Correlation between age and evaluation of feeling of safety

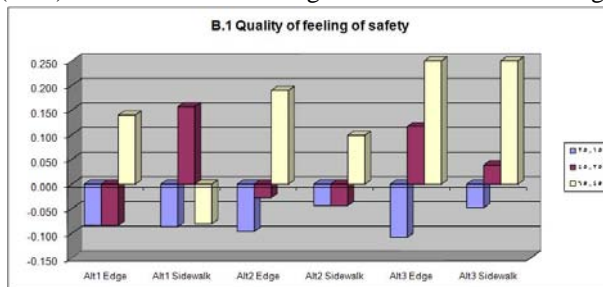


Figure (9-76) 3D chart representing results of table (9-21)

**Chapter 9**

		B.2 Quality of legibility within riverfront space					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.043	-0.013	<b>0.109</b>	0.055	-0.044	0.027
	female	<b>0.105</b>	0.071	-0.188	-0.129	0.095	0.041

Table (9-22) Correlation between gender and evaluation of the modified landscape elements and legibility within riverfront space

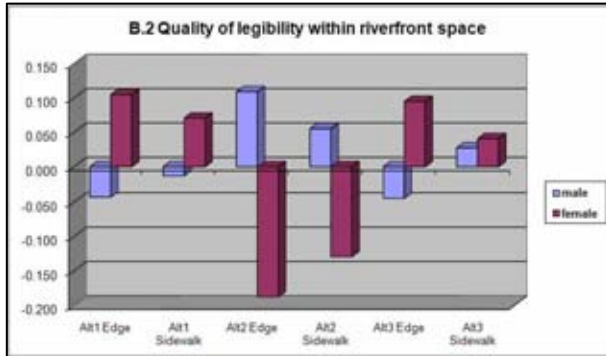


Figure (9-77) 3D chart representing results of table (9-22)

		B.2 Quality of legibility within riverfront space					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.174	-0.143	0.134	0.121	<b>0.212</b>	0.169
	25-45	0.012	-0.018	0.161	0.121	-0.123	-0.111
	45-65	<b>0.184</b>	0.183	-0.335	-0.275	-0.101	-0.065

Table (9-23) Correlation between age and evaluation of the modified landscape elements and legibility within riverfront space

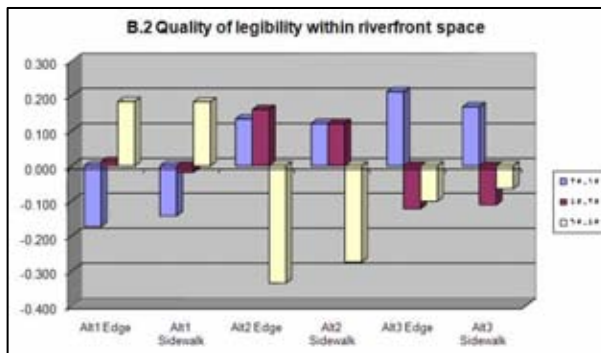


Figure (9-78) 3D chart representing results of table (9-23)



## Chapter 9

		B.3 Coherence & harmony between this element and other landscape elements					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.033	0.124	<b>0.167</b>	0.151	-0.095	-0.029
	female	-0.052	-0.150	-0.194	-0.173	0.136	0.072

Table (9-24) Correlation between gender and evaluation of coherence and harmony between modified landscape elements and other landscape elements

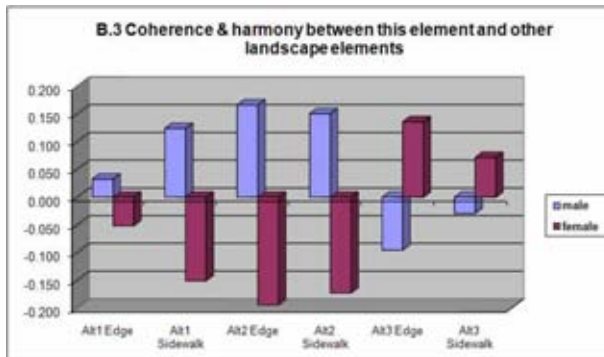


Figure (9-79) 3D chart representing results of table (9-24)

		B.3 Coherence & harmony between this element and other landscape elements					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.258	-0.124	0.069	0.036	-0.045	0.092
	25-45	0.117	0.124	0.098	0.067	0.067	-0.003
	45-65	<b>0.160</b>	0.000	-0.190	-0.118	-0.025	-0.102

Table (9-25) Correlation between age and evaluation of coherence and harmony between modified landscape elements and other landscape elements

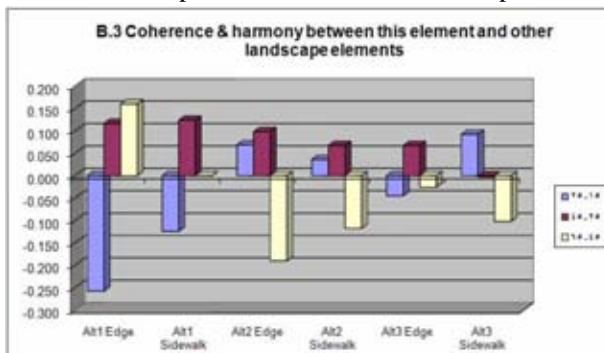


Figure (9-80) 3D chart representing results of table (9-25)

## Chapter 9

		B.4 Quality of attractiveness and charming					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.185	0.167	0.161	0.230	0.095	0.099
	female	0.167	-0.189	-0.229	-0.257	-0.033	-0.040

Table (9-26) Correlation between gender and evaluation of attractiveness and charming with the modified landscape elements.

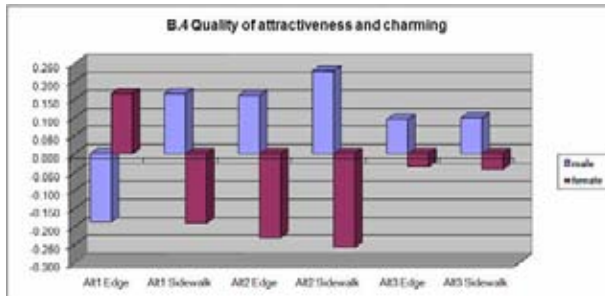


Figure (9-81) 3D chart representing results of table (9-26)

		B.4 Quality of attractiveness and charming					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.124	0.062	-0.161	0.035	0.177	0.165
	25-45	-0.021	<b>0.200</b>	0.170	0.167	-0.307	-0.304
	45-65	<b>0.164</b>	-0.298	-0.011	-0.230	0.147	0.158

Table (9-27) Correlation between age and evaluation of attractiveness and charming with the modified landscape elements.

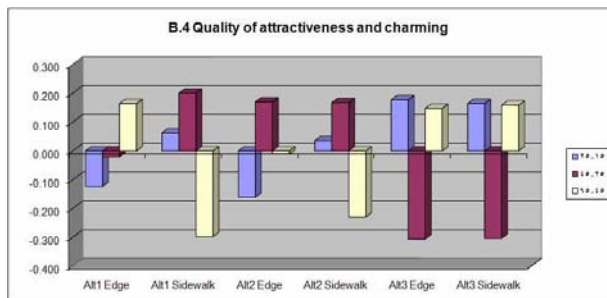


Figure (9-82) 3D chart representing results of table (9-27)

## Chapter 9

		B.5 Sense of beauty of this element within other landscape elements					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.152	-0.223	-0.052	0.015	-0.017	-0.043
	female	0.134	<b>0.201</b>	0.021	-0.043	0.051	0.080

Table (9-28) Correlation between gender and evaluation of sense of beauty of the modified elements within other landscape elements

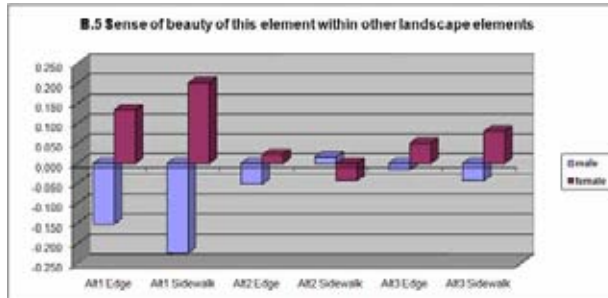


Figure (9-83) 3D chart representing results of table (9-28)

		B.5 Sense of beauty of this element within other landscape elements					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.169	0.124	-0.007	-0.015	0.017	-0.071
	25-45	0.045	-0.174	-0.066	-0.133	-0.146	0.005
	45-65	0.141	0.056	0.083	<b>0.169</b>	0.146	0.074

Table (9-29) Correlation between age and evaluation of sense of beauty of the modified elements within other landscape elements

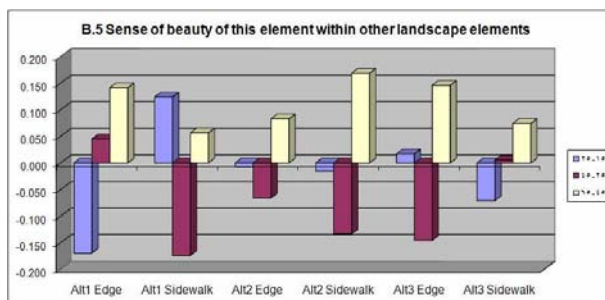


Figure (9-84) 3D chart representing results of table (9-29)

### **3) Points related to uses and activities**

The correlation between gender and evaluation of uses and activities, also between age and evaluation of uses and activities, shows that:

#### **-maximizing access to different uses**

As shown in table (9-30) the correlation between gender and maximizing access to different uses shows that there is a significant relation between male towards river edge modification in alt.(1), while female towards sidewalk in alt. (1)

As shown in table (9-31) the correlation between age and maximizing access to different uses shows that there is a significant relation between age range (15-25) and alt. (1).

#### **-Providing varieties of uses**

As shown in table (9-32) the correlation between gender and providing varieties of uses shows that there is a significant relation between male towards sidewalk modification in alt.(3).

As shown in table (9-33) the correlation between age and providing varieties of uses shows that there is a significant relation between age range (15-25) and alt. (3).

#### **-Providing enough space for activities**

As shown in table (9-34) the correlation between gender and providing enough space for activities shows that there is a significant relation between male towards modifications in alt.(2), and between female towards modifications in alt.(1), (3).

As shown in table (9-35) the correlation between age rate and providing enough space for activities shows that there is a significant relation between age range (45-65) and alt. (1).

## Chapter 9

		C.1 How can this element maximize access to different uses?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.210	-0.040	-0.016	-0.008	-0.089	0.003
	female	-0.089	0.185	-0.004	-0.009	0.099	0.010

Table (9-30) Correlation between gender and evaluation of how the modified elements can maximize access to different uses.

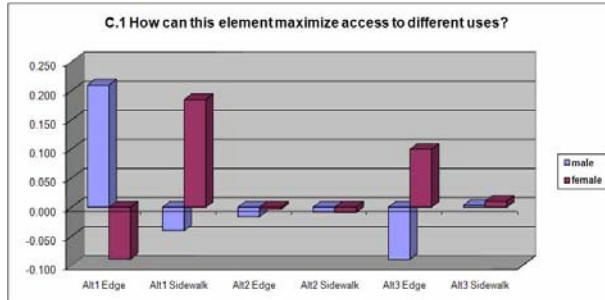


Figure (9-85) 3D chart representing results of table (9-30)

		C.1 How can this element maximize access to different uses?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	0.210	0.290	0.046	0.100	-0.094	-0.089
	25-45	0.121	0.040	0.046	0.008	0.016	0.082
	45-65	-0.171	-0.091	-0.105	-0.123	0.088	0.008

Table (9-31) Correlation between age and evaluation of how the modified elements can maximize access to different uses.

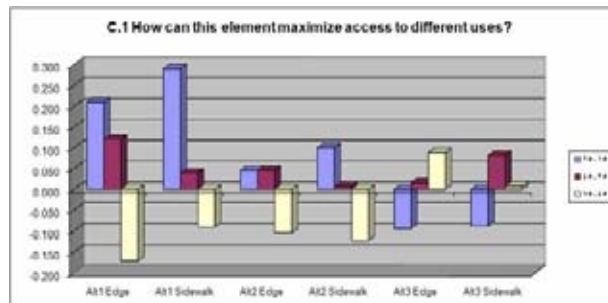


Figure (9-86) 3D chart representing results of table (9-31)

**Chapter 9**

		C.3 How can this element provide varieties of uses?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.054	-0.019	0.035	0.045	-0.049	0.159
	female	0.031	-0.014	-0.070	-0.076	0.045	-0.152

Table (9-32) Correlation between gender and evaluation of how the modified elements can provide varieties of uses.

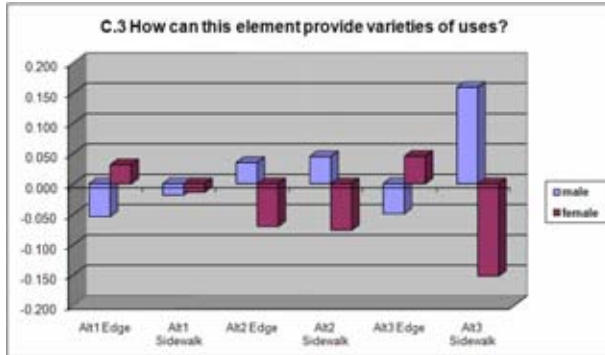


Figure (9-87) 3D chart representing results of table (9-32)

		C.3 How can this element provide varieties of uses?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.042	-0.066	-0.104	-0.045	0.165	0.120
	25-45	0.054	0.019	0.070	0.025	-0.066	-0.066
	45-65	-0.013	0.054	0.040	0.022	-0.112	-0.061

Table (9-33) Correlation between age and evaluation of how the modified elements can provide varieties of uses.

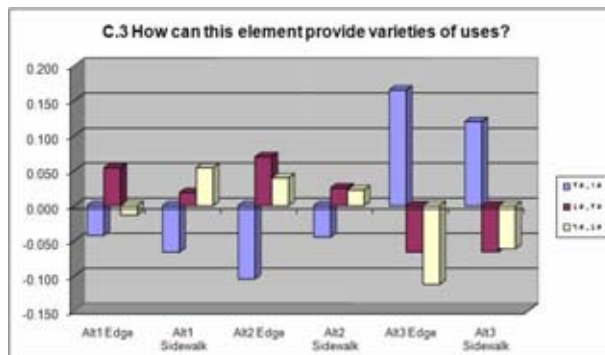


Figure (9-88) 3D chart representing results of table (9-33)

**Chapter 9**

		C.4 How can this element provide enough space for activities?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.091	-0.247	0.148	0.209	-0.197	-0.081
	female	0.060	0.353	-0.174	-0.225	0.212	0.158

Table (9-34) Correlation between gender and evaluation of how the modified elements can provide enough space for activities.

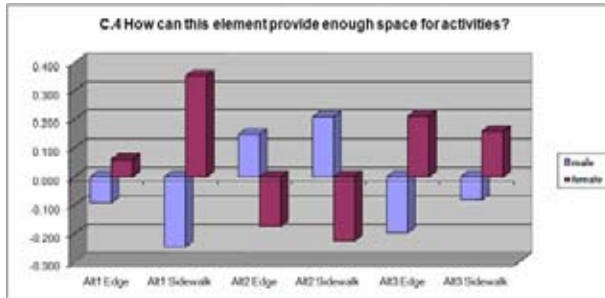


Figure (9-89) 3D chart representing results of table (9-34)

		C.4 How can this element provide enough space for activities?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.114	0.074	-0.148	0.079	-0.123	0.052
	25-45	0.091	-0.272	0.241	0.079	0.117	-0.067
	45-65	0.026	0.225	-0.106	-0.179	0.007	0.018

Table (9-35) Correlation between age and evaluation of how the modified elements can provide enough space for activities.

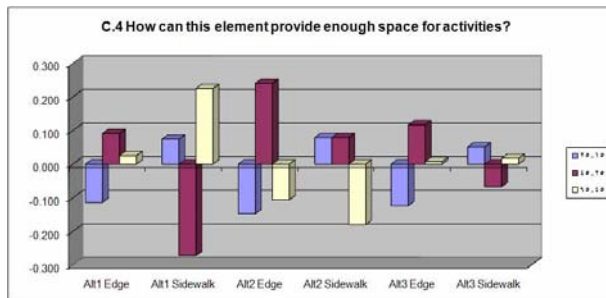


Figure (9-90) 3D chart representing results of table (9-35)

**Chapter 9**

		C.5 Evaluate functional flexibility with this element					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.054	0.091	0.198	0.230	0.199	0.198
	female	0.031	-0.108	-0.200	-0.227	-0.188	-0.184

Table (9-36) Correlation between gender and evaluation of functional flexibility with the modified elements.

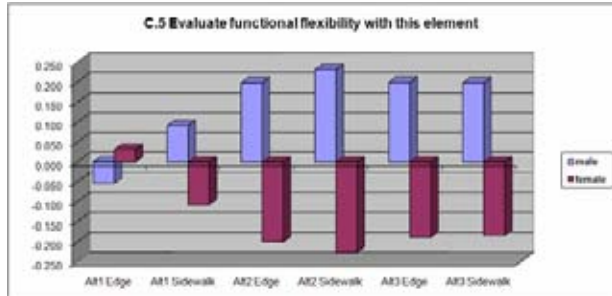


Figure (9-91) 3D chart representing results of table (9-36)

		C.5 Evaluate functional flexibility with this element					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.332	-0.218	0.132	0.146	-0.015	0.061
	25-45	0.151	0.036	0.099	0.039	-0.061	-0.087
	45-65	0.206	0.208	-0.262	-0.211	0.086	0.030

Table (9-37) Correlation between age and evaluation of functional flexibility with the modified elements.

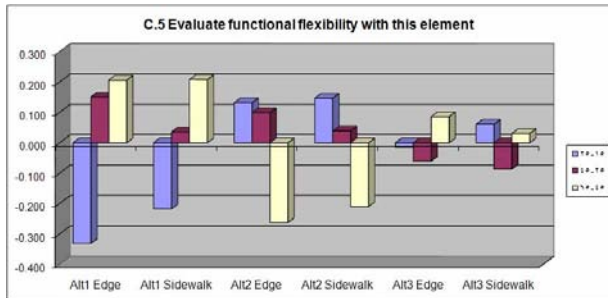


Figure (9-92) 3D chart representing results of table (9-37)



## Chapter 9

		C.6 Evaluate attraction of uses with this element					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.050	0.134	0.061	0.061	0.019	0.106
	female	0.029	-0.168	-0.040	-0.040	0.040	-0.052

Table (9-38) Correlation between gender and evaluation of attraction of uses with the modified elements.

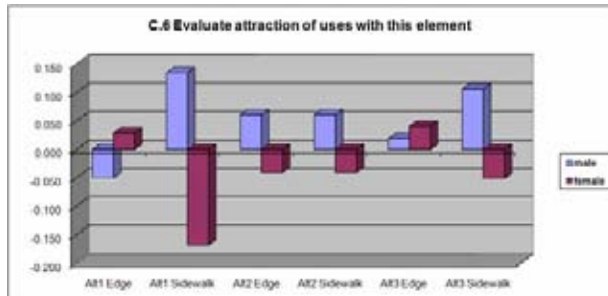


Figure (9-93) 3D chart representing results of table (9-38)

		C.6 Evaluate attraction of uses with this element					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.022	-0.077	0.076	0.076	0.078	0.028
	25-45	0.194	0.264	-0.164	-0.164	-0.019	-0.005
	45-65	-0.196	-0.212	0.100	0.100	-0.068	-0.026

Table (9-39) Correlation between age and evaluation of attraction of uses with the modified elements.

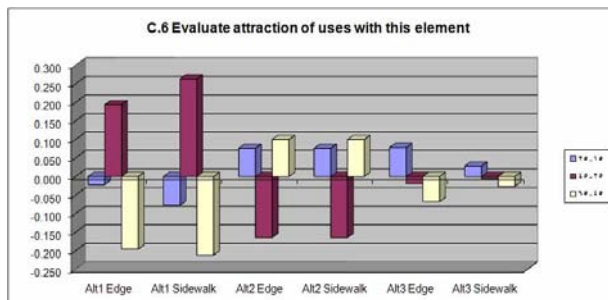


Figure (9-94) 3D chart representing results of table (9-39)

**-Points related to sociability**

		D.1 How can this element make Interactivity between space visitors?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.070	-0.165	0.062	0.001	-0.055	-0.170
	female	0.048	0.137	-0.155	-0.093	0.129	0.237

Table (9-40) Correlation between gender and evaluation of how the modified elements can make interactivity between space visitors.

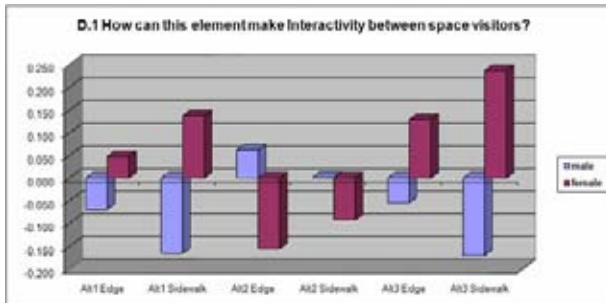


Figure (9-95) 3D chart representing results of table (9-40)

		D.1 How can this element make Interactivity between space visitors?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	-0.084	-0.175	0.089	0.074	-0.071	0.213
	25-45	-0.033	0.214	0.089	0.037	-0.113	-0.136
	45-65	0.133	-0.044	-0.201	-0.126	0.208	-0.087

Table (9-41) Correlation between age and evaluation of how the modified elements can make interactivity between space visitors.

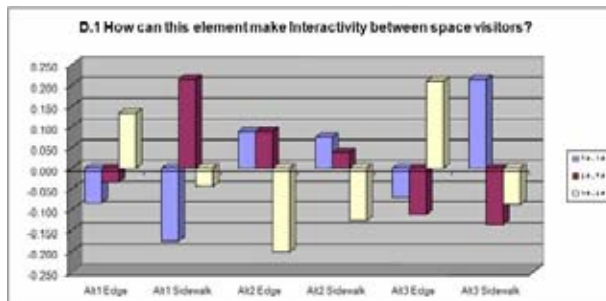


Figure (9-96) 3D chart representing results of table (9-41)

## Chapter 9

		D.2 How can this element make the space more welcoming?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	-0.125	0.038	0.067	0.154	-0.121	-0.170
	female	0.094	-0.062	-0.108	-0.186	0.227	0.281

Table (9-42) Correlation between gender and evaluation of how the modified elements can make the space more welcoming.

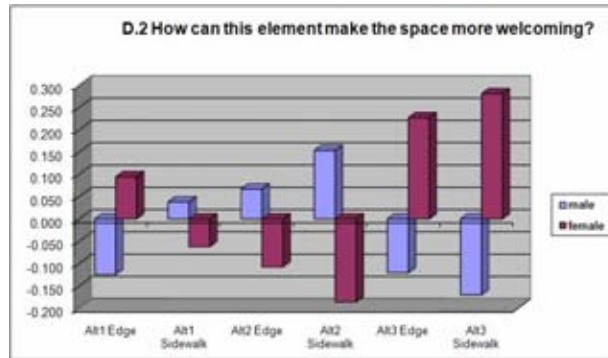


Figure (9-97) 3D chart representing results of table (9-42)

		D.2 How can this element make the space more welcoming?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	0.047	0.313	-0.067	-0.092	0.079	0.170
	25-45	-0.031	-0.038	0.138	0.215	-0.131	-0.235
	45-65	-0.018	-0.313	-0.081	-0.140	0.059	0.074

Table (9-43) Correlation between age and evaluation of how the modified elements can make the space more welcoming.

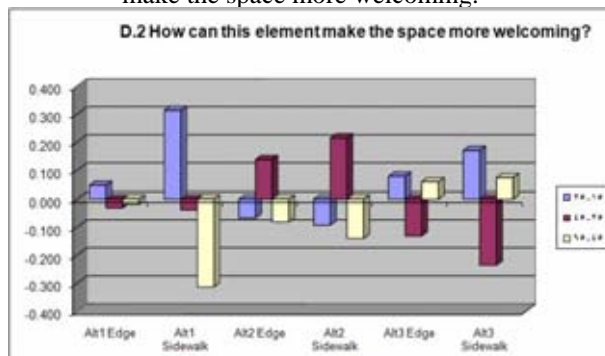


Figure (9-98) 3D chart representing results of table (9-43)

## Chapter 9

		D.3 How can this element make the space lively?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.251	0.215	-0.058	-0.088	0.150	0.166
	female	0.215	0.095	0.034	0.068	-0.092	-0.111

Table (9-44) Correlation between gender and evaluation of how the modified elements can make the space lively.

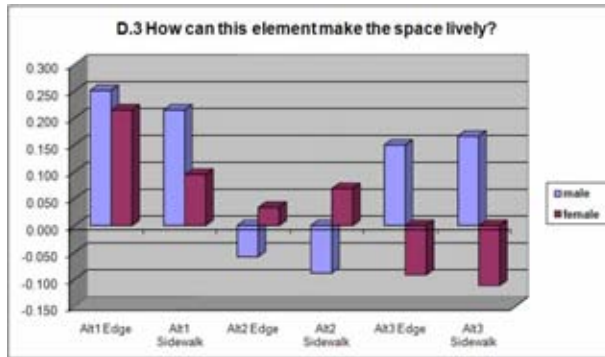


Figure (9-99) 3D chart representing results of table (9-44)

		D.3 How can this element make the space lively?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	0.223	0.124	-0.120	-0.214	-0.042	0.013
	25-45	0.252	-0.151	0.117	0.149	-0.042	-0.059
	45-65	0.195	0.031	0.003	0.074	0.095	0.052

Table (9-45) Correlation between gender and evaluation of how the modified elements can make the space lively.

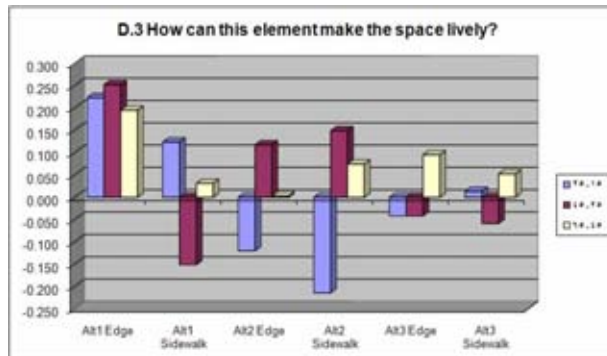


Figure (9-100) 3D chart representing results of table (9-45)

## Chapter 9

		D.5 How can this modification increase the sense of pride and ownership?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Gender	male	0.011	0.046	-0.008	-0.008	-0.084	-0.068
	female	-0.023	-0.061	0.053	0.053	0.190	0.171

Table (9-46) Correlation between gender and evaluation of how the modified elements can increase the sense of pride and ownership.

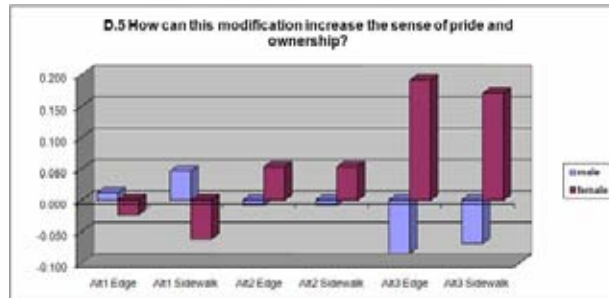


Figure (9-101) 3D chart representing results of table (9-46)

		D.5 How can this modification increase the sense of pride and ownership?					
Landscape Element		Alt1 Edge	Alt1 Sidewalk	Alt2 Edge	Alt2 Sidewalk	Alt3 Edge	Alt3 Sidewalk
Age	15-25	0.217	0.272	-0.043	-0.043	0.019	0.068
	25-45	0.103	0.033	-0.172	-0.172	-0.145	-0.159
	45-65	-0.364	-0.348	0.245	0.245	0.143	0.103

Table (9-47) Correlation between age and evaluation of how the modified elements can increase the sense of pride and ownership.

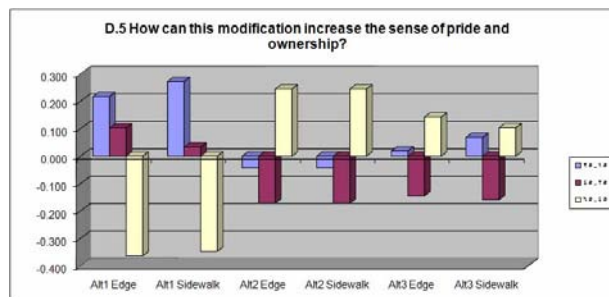


Figure (9-102) 3D chart representing results of table (9-47)

### **9.7.3 Suggested modifications of selected alternative (1) to reach the optimum alternative**

From the previous analysis of users' preferences and needs which is derived from their evaluation of the three proposed riverfronts landscape regeneration alternatives, it is clear that alt. (1) is the selected one from the majority of survey samples.

The sample while they prefer the wavy & curved shape of alt. (1), its vegetated and serrated edge, and its sidewalk design which consists of steps towards water as mix between green cover and concrete edges, and wide sidewalk, they did not appreciate the alternative edge without guardrail due to safety consideration.

So the next step in the reliability study is to regenerate the selected alternative with some modification to reach the optimum alternative, using the design criteria of the other alternatives which were appreciated by the survey sample.

Here we redesign the selected alternative with more safety consideration, in three alternatives of the guardrail or river edge as shown in figure (9-103) to (9-105).

The next step should be making new survey to test user's evaluation of the new modifications to determine the optimum alternative, but in this research we only put these modifications but they will not be tested due to much time consuming.

### 1) First suggested modification( low guardrails)

This modification is consists of low guardrail to provide feeling of safety and feeling of physical and visual access at the same time, also there is a change in paving material near to the river edge for more safety consideration.

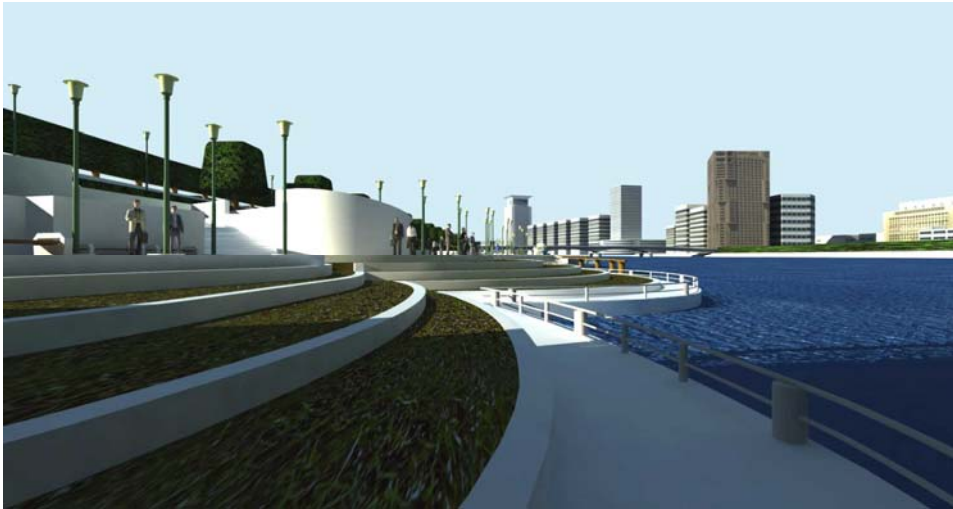


Figure (9-103) first proposed modification of selected alternative

## 2) Second suggested modification( low guardrails)

This modification is consists of just bollards to provide some type of feeling of safety and a lot of feeling of physical and visual access at the same time, also there is a change in paving material near to the river edge for more safety consideration.

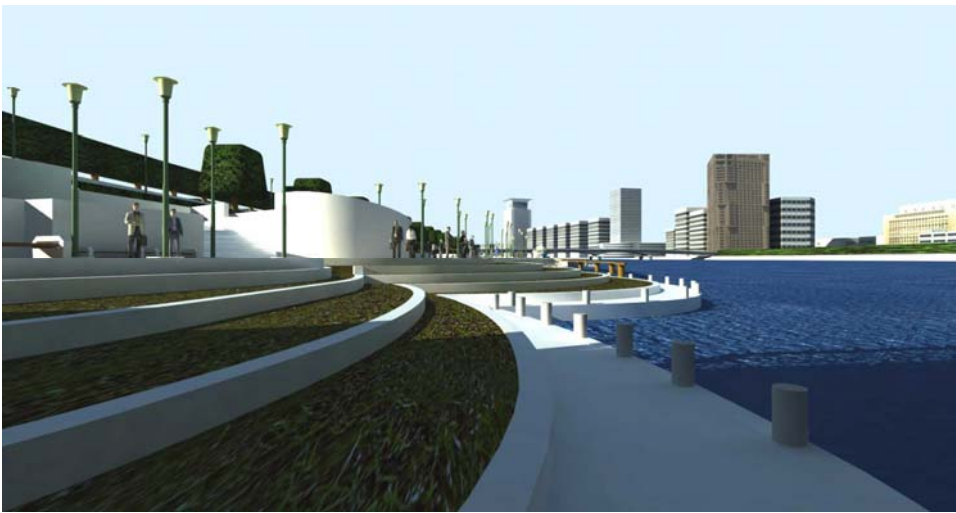


Figure (9-104) Second proposed modification of selected alternative



### **3) Third suggested modification( low guardrails)**

This modification is consists of just low solid fence provide some type of feeling of safety and feeling of physical and visual access at the same time, also there is a change in paving material near to the river edge for more safety consideration.

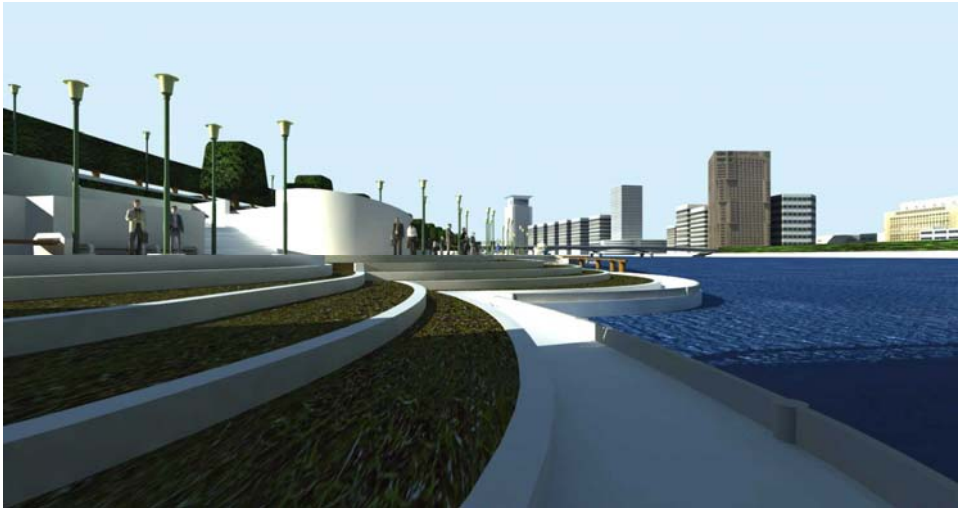


Figure (9-105) Third proposed modification of selected alternative

## **9.8 Reliability study findings**

The next points summarize the reliability study most important findings:

- There is a strong preference from users to the modifications of the riverfront's landscape which improve high quality of physical and visual access to river.
- There is a strong need from users for feeling of safety of riverfront's landscape elements especially the connection between land and water or the river shoreline, this need is important for the most of the users, without affecting physical and visual access.
- There is a strong positive correlation between female and the need of feeling of safety along riverfronts especially at river edge.
- The walk-ability along riverfront is a strong need for a wide range of users, so any modifications or regeneration of riverfronts' landscape should consider this design criterion.
- There is a strong positive correlation between younger people and dynamic or wavy shapes of river edge and sidewalk, while older people show positive correlations with preferring linear river edge.
- Users preferred riverfronts' landscape elements which is provide them of variety of uses and activities whither passive or active activities.
- Users preferred riverfronts' landscape elements which provide attractiveness have sense of beauty.
- Users preferred seats faced the riverfronts directly which can be sloped or stepped towards the river to give a lot of opportunities to be in direct access with river.
- Users preferred the riverfront's landscape elements which are not boring like river edges with terraces and walking piers to give them varies experiences along river promenade.

---

---

## *Chapter 9*

---

---

- When comparing users' evaluation of riverfront's landscape alternatives it not differ if we calculate the sum of the mean of all criteria as they all have the same weight, or we put experts' evaluation factors in consideration, it will differs only if we compare individual evaluation sub-criteria.
- Finally the reliability study finds excellent responses from public users in interaction with virtual reality models, which make their participation effective, so the reliability study proved the research hypothesis when suppose that the use of computer simulated visualization may enhance public participation in riverfront's landscape regeneration process to select the optimum design alternative.



**PART  
THREE**

**Applying the Approach in Evaluating Nile Riverfront's  
Landscape Regeneration**



**Chapter  
9**

**The Reliability of Computer-Simulated- Visualization as a Tool  
for Public Participation in evaluating the Regeneration of Nile  
Riverfront's Landscape**

**Chapter  
10**

**Conclusions & Recommendations**



## **10.1 Conclusions**

- In general, the findings of this research corroborated with the issues and concepts suggested by the literature.
- Landscape visualization, whether it is a perspective drawing, a built physical model, a photomontage or a Virtual Reality (VR) model of a proposed scheme, focuses on what the future landscape is going to be and how the proposed scheme will impact on the existing features. Within landscape visualization the most important two elements therefore are being able to understand the existing-the reality and envisage the future-the intended reality.
- Landscape visualization is proving to be a valuable tool for designers and planners. The ability to visualize potential modifications to the landscape fabric and experience these changes in their actual context allows landscape architects, planners and designers to evaluate alternatives rapidly, in more detail, and for lower cost than through more traditional analysis. It also makes the results of planning process visible, allowing the public to view the proposed changes to their environment in a realistic fashion.
- In the last few years major innovations have occurred in many areas of computer based modeling and visualization of the landscape. At the same time developments in computer technology have opened new possibilities for decision support and communication for those with landscape management responsibilities.
- The use of these technologies on the internet is considered a promising mode to reach citizens who seldom participate or are unable to attend meetings.

### **10.1.1 Conclusions about riverfront landscape regeneration**

- Riverfront regeneration focuses on improving people's ability to connect with their riverfronts and create a sense of place, by preserving or providing access, recreation, protecting historical and cultural resources, partnerships at all levels have made these projects successful, and by preserving traditional riverfront uses and activities.

- It was found that less media attention was paid to the users' view of the riverfront.
- Better management of development on river banks to safeguard public access.
- Public participation is a vital tool in riverfront landscape regeneration through evaluating designed regeneration alternatives.

### **10.1.2 Computer simulated visualization techniques**

Landscape modeling and visualization have been in use as communication means for hundreds of years. However, the greatly increased utility of new tools and the increased sense of engagement with virtual reality may be out-stripping the development of knowledge base of research we need to avoid situations where accidentally misleading virtual environments are used to make significant environmental urban and landscape decisions.

A participation process integrating visual representations can be a powerful way of engaging not only local people but also offering benefits for all stakeholders involved in planning decisions.

The combination with new visualization technologies has the potential to secure active and imaginative public participation.

### **10.1.3 General conclusions**

- To restore the historic links between the populace and the riverfronts through design and management, public values and perceptions must be taken into account.
- General public would have liked to see the development or progress of the planning measures over time. In participants had to suffice with “before and after” images of the design, but 4D visualizations that demonstrate the long-term effects of planning proposals and temporal landscape processes would offer general public an understanding of landscape processes which 3D visualizations can not.
- The choice of “where” and “what is visualized” focuses attention on specific riverfront landscape locations and issues during the participation process. Therefore, these decisions need to be transparent,



and when appropriate, public should be included in the decision process. It then becomes the task of the landscape architect to determine which visualization methods best support the participation.

- Computer simulated visualization is a vital tool in Public participation process, with using Virtual Reality techniques.
- Within a near future I think that we may see municipalities creating digital models of an riverfront's area that is about to be redesigned. In these models different designs can be implemented and the citizens of the concerned area can explore the different propositions. The technique also makes it possible to communicate over distance. Architects and clients can have meetings in digital models over the internet even if they are not in the same place geographically. This scenario seems to be in a distant future but since the same technique is used in games played over the internet with many players in the same model it is clear that it is possible even today.
- In few words, experts and non-experts with the digital technique can communicate using the same language.

### **10.2 Results of Applied study**

- Riverfront users express higher preferences when they can freely access the water. So river regeneration of the river edges is successful only if they are in harmony with nature and without denying the general public physical and visual access to the Nile.
- Involving citizens or lay public as co-producers of development proposals suggests a different set of criteria for assessing visualization techniques.
- This research reveals the need for a knowledge-based database system linking with VRML/X3D objects for powering a visualization tool to provide necessary information to assist in decision-making.
- Visualization for participation is at the heart of the urban design and landscape architecture.
- The public's enthusiasm to riverfront visits suggested the importance to enhance the accessibility of the riverfront, and the potential of involving

local communities into design, and subsequent stewardship and management.

- It seems self-evident that the future will see computer-based 3D visualizations of landscapes entering into a unified communication practice which is Internet-based.
- Involving citizens or lay public as co-producers of development proposals suggests a different set of criteria for assessing visualisation techniques.
- Through this study, advantages of visualization in riverfronts' landscape regeneration decision-making process are,
  - ❖ First, visualization gives landscape architects and designers more freedom in presenting design information. With the help of visualization, they can beyond the limits of traditional way, map, tables and reports. For example, it is difficult for traditional ways to present dynamic landscape process. However, they can easily produce design process with computer simulated visualization's aid.
  - ❖ Second, visualization can help public understand design alternatives. Visualization provides the general public more interesting and more understandable, dynamic landscape products.
  - ❖ Third, computer simulated visualization is a flexible tool in landscape decision-making process.
  - ❖ Forth, Visualization allows the public to be a part of riverfront's landscape and decision-making process. Visualization should not to be a final presentation tool. From the responses from the public, landscape architects can improve a landscape proposal. From this point, visualization gives the public more opportunities to involve the landscape process.
  - ❖ Finally, Virtual reality as computer visualization technique will encourage the public's interests in involving landscape process.

## **7.2 Recommendations**

---

---

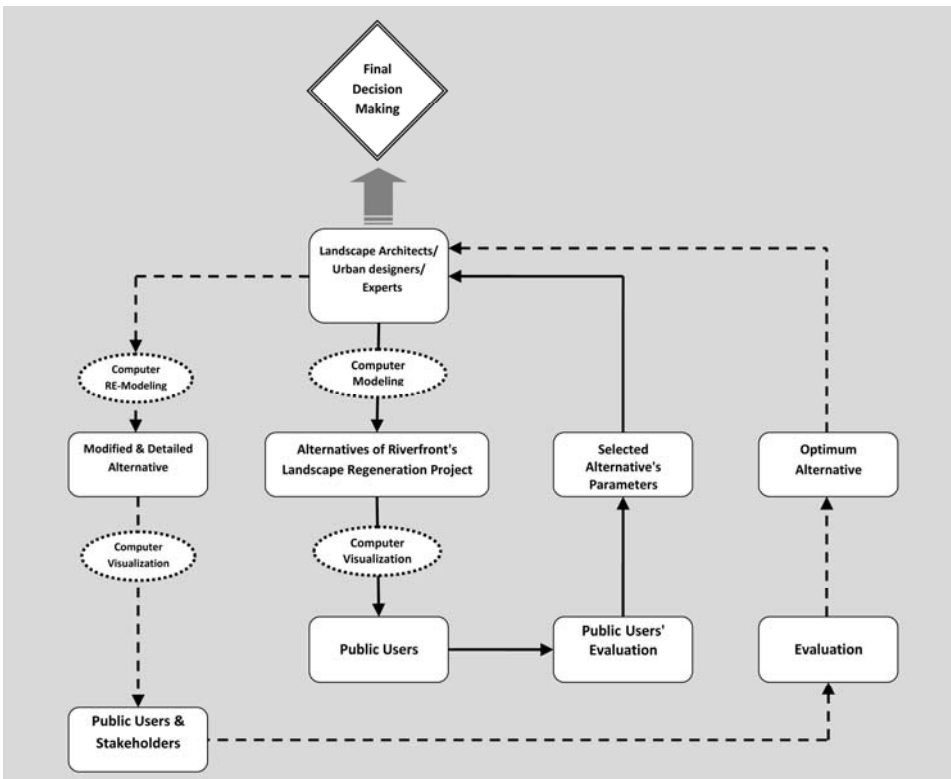
## Chapter 10

---

---

As shown in figure (10-1) the suggested approach of using Computer Simulated Visualization to enhance public participation in evaluation of alternatives of riverfront's landscape regeneration.

This approach can be a loop till choosing the final alternative which meets public's preferences and expert's designs.



Figure( 10- 1) Suggested approach of using Computer Simulated Visualization to enhance public participation in evaluation of alternatives of riverfront's landscape regeneration .

- In this suggested approach the first phase, the alternatives of any riverfront's landscape regeneration projects have to be designed according to design criteria, consists of four main criteria: access & linkage, comfort & image, uses & activities, and sociability. Each of them contains six sub-criteria.

---

---

## *Chapter 10*

---

---

- These criteria form the whole riverfront's landscape design.
- To evaluate these criteria the approach suggests participating the public users in decision making process.
- But each of these criteria has to get a relative weight.
- This relative weight for all design criteria in the final accumulative weight has to be built on scientific and practical experience, so it has to be determined by a specific tool takes in consideration the scientific and practical aspects.

These relative weights have to be determined by making questionnaire among group of experts and designers interested in this type of projects.

- ❖ So first the approach began with:
- ❖ Determining the evaluation criteria.
- ❖ Determining the relative weight (experts' evaluation factor) for each sub-criterion.
- ❖ Activating public participation by participation users and stakeholders.
- ❖ Modeling interactive models (Virtual Reality models) to represent riverfront's landscape alternatives which cover full range of design criteria.
- ❖ Participation of all concerning and interested community groups to determine preferences for each criterion using these virtual models by navigation through.
- ❖ Very important matter is the design criteria and sub-criteria can vary from project to other project.
- ❖ The approach suggested also an equation to calculate the final accumulative weight for each alternative.

Alt. weight=  $5.54(A1) + 5.41(A2) + 3.5(A3) + 3.5(A4) + 3.96(A5) + 3.4(A6) + 5.35(C1) + 3.91(C2) + 4.02(C3) + 4.67(C4) + 5.35(C5) + 5.01(C6) + 4.59(U1) + 4.59(U2) + 4.83(U3) + 4.7(U4) + 4.13(U5) + 4.13(U6) + 2.93(S1) + 3.96(S2) + 3.76(S3) + 3.59(S4) + 2.63(S5) + 2.63(S6)$

---

## Chapter 10

---

These codes and relative weight can be shown in table (10-1)

Target	Main Criteria	Sub-Criteria	Code	Experts' Evaluation Factor	
Criteria for Evaluation of Riverfront's landscape regeneration alternatives	Access & Linkage (A)	Improve Physical Access	(A1)	<b>5.54</b>	
		Improve Visual Access	(A2)	<b>5.42</b>	
		Connection Between Land & Water	(A3)	<b>3.5</b>	
		Continuity	(A4)	<b>3.5</b>	
		Walkable & Convenient	(A4)	<b>3.96</b>	
			Direct Contact With Water	(A5)	<b>3.4</b>
	Comfort & image (C)		Safety & Security	(C1)	<b>5.35</b>
			Legibility	(C2)	<b>3.91</b>
			Coherence/Harmony	(C3)	<b>4.02</b>
			Attractiveness & Charming	(C4)	<b>4.67</b>
			Visual Aspects / Sense of Beauty	(C5)	<b>5.35</b>
			Quality of Landscape Elements	(C6)	<b>5.01</b>
	Uses & Activities (U)		Maximize access of different uses	(U1)	<b>4.59</b>
			Enhance Passive & Active uses	(U2)	<b>4.59</b>
			Provide Varieties of uses	(U3)	<b>4.83</b>
			Enough Space for Activities	(U4)	<b>4.7</b>
			Functional Flexibility of Landscape	(U5)	<b>4.13</b>
			Attraction of Users	(U6)	<b>4.13</b>
	Sociability (S)		Interactivity Between Visitors	(S1)	<b>2.93</b>
			Welcoming Space	(S2)	<b>3.96</b>
		Liveliness	(S3)	<b>3.76</b>	
		Perception of space identify	(S4)	<b>3.59</b>	
		Pride & ownership	(S5)	<b>2.63</b>	
		Create cooperative environment	(S5)	<b>2.63</b>	

Table (10-1) main criteria and sub-criteria, their codes and the experts' evaluation factor for each of them.

The approach suggested a checklist between riverfront's landscape elements and their indicators, and design criteria and sub-criteria to help landscape architects to check the status of any riverfront's project, as shown in chapter eight.

All previous points were collected to design computer program to make accumulative results easily, this will be shown in next section.

### 10.2.1 Designing a computer program to help in evaluating riverfronts' landscape alternatives

To make the process of public participation in evaluating the alternatives' of any riverfront's landscape regeneration process easy, a computer program was designed using (Microsoft Office –Access) due to its high technology and its capability to store a lot of data. This program is based on the previous equation of calculating the accumulative of the evaluation mean of each sub-criterion of riverfront's landscape regeneration, which is calculated when the participant enter an evaluation value for each sub-criterion from 1-5 (poor to excellent), that there are -as shown before- maximum twenty four sub-criteria under four main criteria for each alternative of regenerated landscape element, but the participant have to navigate through a Virtual Reality model before he start evaluation.

The next section describes the steps of the program:

- 1) First the icon of the program is doubled click.
- 2) The main program's screen is appeared, then (start survey) button has to be pressed on.

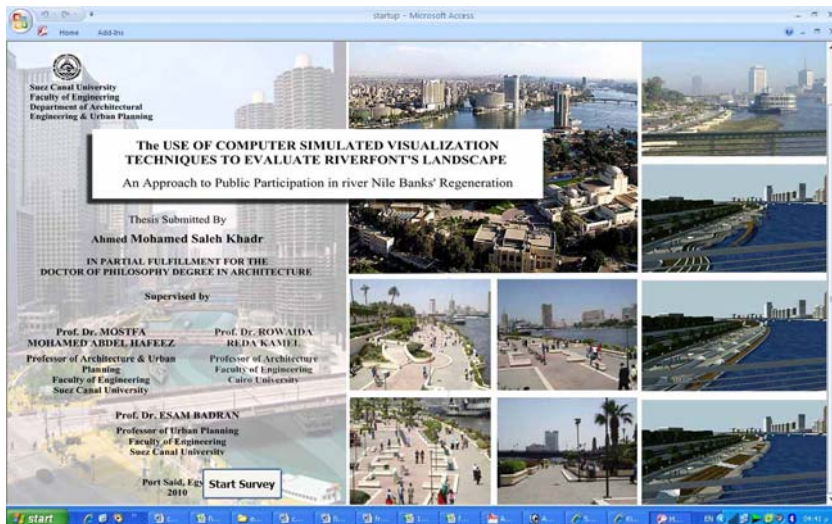


Figure (10-2) Main program's screen to evaluate riverfronts' landscape alternatives

---

---

## Chapter 10

---

---

3) the welcome screen will appear, and the participant has to fill in some demographical information about name, phones, e-mail, gender, job title, then he has to press (next) button

Welcome to Evaluation of Riverfront's Landscape Regeneration Alternatives

User ID: 8 Date: 04-01-11 05:07:2010

User Name: Rawan Ahmed Saleh

Phones: 0123957181

E-Mail: rawan\_04@yahoo.com

Gender: Female

Job Title: student

Next

Figure (10-3) screen of demographical information.

4) The project and regenerated landscape elements screen will appear, it first ask the participant to share the designers with his opinion about evaluation of riverfront's landscape regeneration, he has to select project name, number of selected alternatives (by researcher- max. 5 according to design), and select riverfront's landscape elements from drop down menu, then press (start evaluation) button to continue.

Please share us with your opinion about the evaluation of Riverfront's landscape regeneration.

Select the project name: Al-Gazeera Park RiverFront's Regeneration

Select No. of Alternatives: 1, 2, 3, 4, 5

Select Riverfront's Landscape Element

Start Evaluation

Figure (10-4) screen of selection project name, no. of alt., evaluated landscape element.

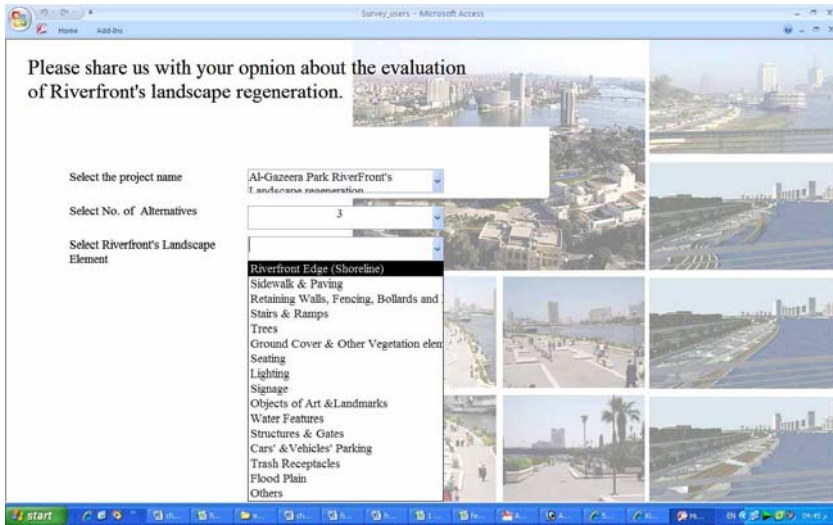


Figure (10-5) Landscape elements drop down menu.

5) In this stage the survey will start, but first the participant should click on (Navigate VR Model) to be able to continue evaluation, this button when is pressed on will move to the prepared Virtual Reality model for the alternative and the participant should navigate and interact with the model in order to understand the regenerated design alternative.

In this screen the selected landscape elements (regenerated element) is shown, also the alternative number is shown, then this screen will be repeated four times, once for each main evaluation criteria, this first time for (points related to access and linkage), second time (points related to comfort and image), third (points related to uses and activities), fourth (points related to sociability). Each point of these four points has six related points (sub-criteria).

The participant should evaluate each point with range from excellent to poor, where (excellent is 5, good is 4, neutral is 3, fair is 2, poor is 1), participant should answer all the points, if he did not do that he we not be able to move to the next page.



---

---

## Chapter 10

---

---

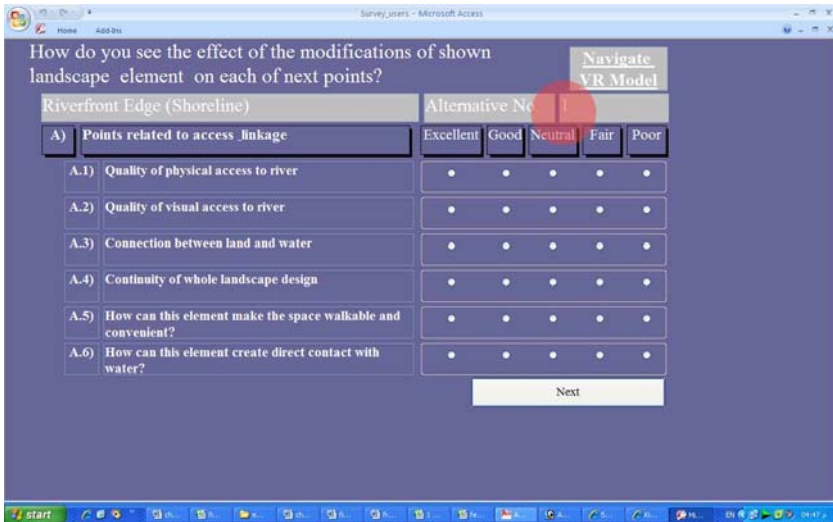


Figure (10-6) first evaluation criteria (points related to access and linkage), The alternative no. is highlighted, the regenerated landscape element appears, participant should first press (Navigate VR model) to move to prepared Virtual Reality model for the design alternative (top right).

6) After finishing the first evaluation category, warning screen appears, to inform the participant that he finish this section and will move to the next section

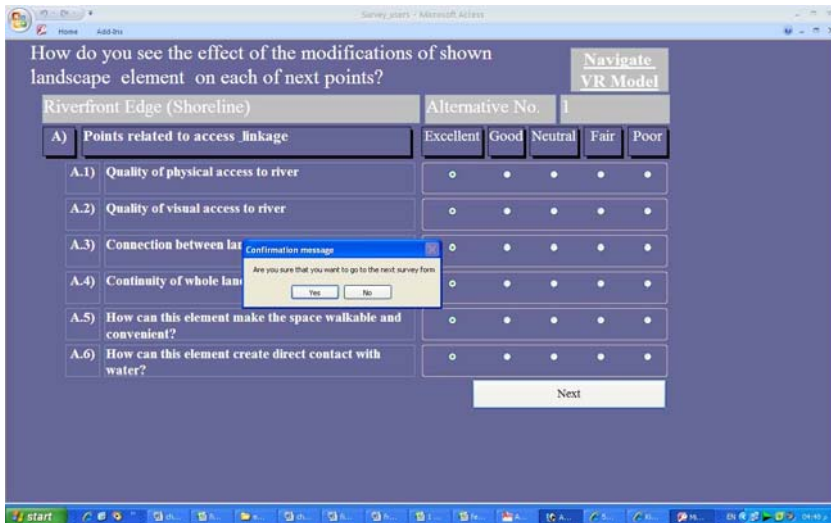


Figure (10-7) warning screen appears after the participant finishes the related point to access and linkage, to inform him that he will be transferred to the next page.

## Chapter 10

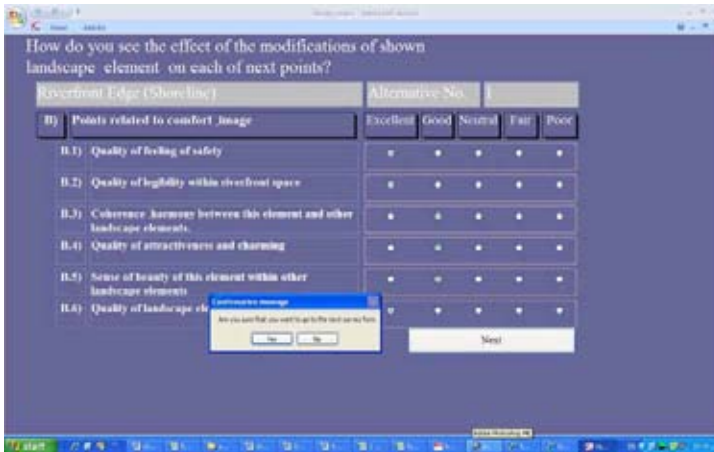


Figure (10-8) screen of the points related to comfort and image.

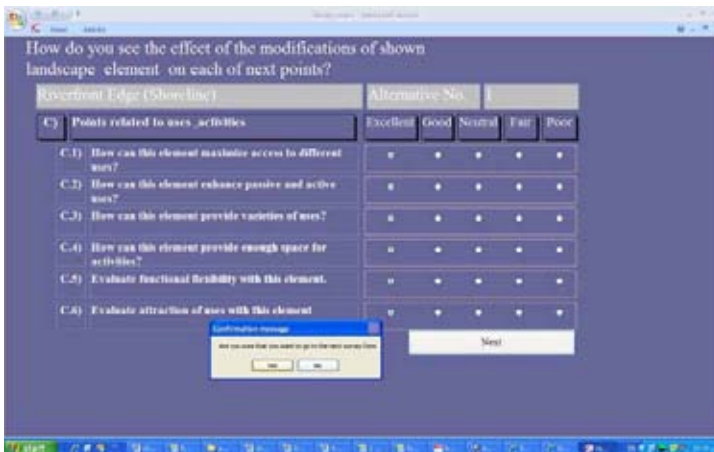


Figure (10-9) screen of the points related to uses and activities.

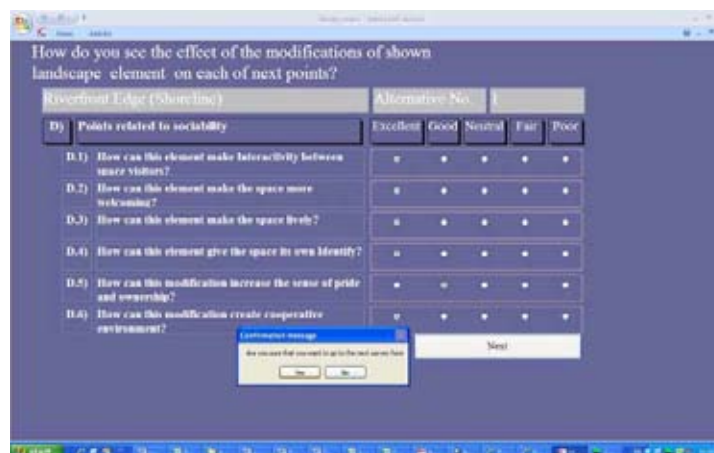


Figure (10-10) screen of the points related to sociability.

---

---

## Chapter 10

---

---

7) After finishing the evaluation of alternative (1) screen will appear to start evaluation of alternative (2), the participant also has to click on (Navigate VR Model) to be able to continue evaluation, this button when is clicked on will move to the prepared Virtual Reality model for alternative (2) and the participant should navigate and interact with the model in order to understand the regenerated design alternative.

The screenshot shows a survey application window titled 'Survey\_users - Microsoft Access'. The main text asks: 'How do you see the effect of the modifications of shown landscape element on each of next points?'. Below this is a table for evaluation. A red circle highlights a 'Navigate VR Model' button in the top right corner.

Riverfront Edge (Shoreline)		Alternative No. 2				
A)	Points related to access linkage	Excellent	Good	Neutral	Fair	Poor
A.1)	Quality of physical access to river	•	•	•	•	•
A.2)	Quality of visual access to river	•	•	•	•	•
A.3)	Connection between land and water	•	•	•	•	•
A.4)	Continuity of whole landscape design	•	•	•	•	•
A.5)	How can this element make the space walkable and convenient?	•	•	•	•	•
A.6)	How can this element create direct contact with water?	•	•	•	•	•

Next

Figure (10-11) screen of alternative (2)

8) This stage will be repeated with alternative three and so on till the participant finished all alternatives.

The screenshot shows a survey application window titled 'Survey\_users - Microsoft Access'. The main text asks: 'How do you see the effect of the modifications of shown landscape element on each of next points?'. Below this is a table for evaluation. A red circle highlights a 'Navigate VR Model' button in the top right corner.

Riverfront Edge (Shoreline)		Alternative No. 3				
A)	Points related to access linkage	Excellent	Good	Neutral	Fair	Poor
A.1)	Quality of physical access to river	•	•	•	•	•
A.2)	Quality of visual access to river	•	•	•	•	•
A.3)	Connection between land and water	•	•	•	•	•
A.4)	Continuity of whole landscape design	•	•	•	•	•
A.5)	How can this element make the space walkable and convenient?	•	•	•	•	•
A.6)	How can this element create direct contact with water?	•	•	•	•	•

Next

Figure (10-12) screen of alternative (3)

## Chapter 10

9) When the participant finished the evaluation of all alternatives (thank you for your participation) screen will appear to inform participant that he finished the survey.

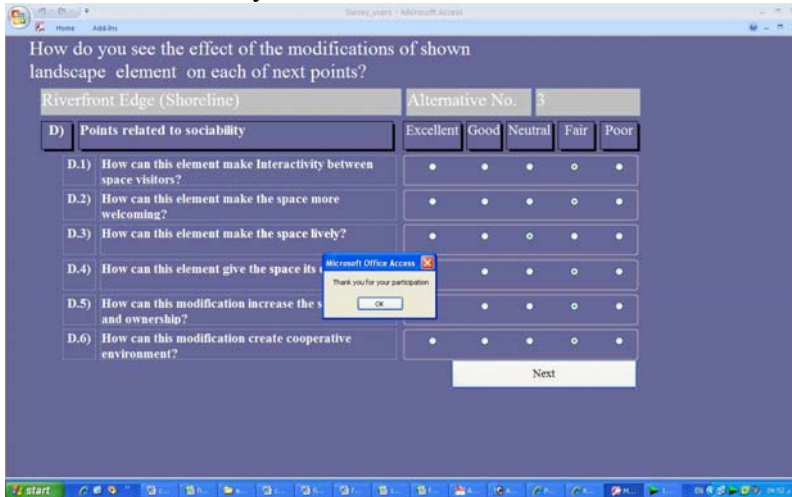


Figure (10-13) Screen tells the participant that he finished evaluation of all alternatives and thanks him for his participation

10) The program will calculate the evaluation results and a result sheet will appear to inform the participant with the percentage of each alternative.

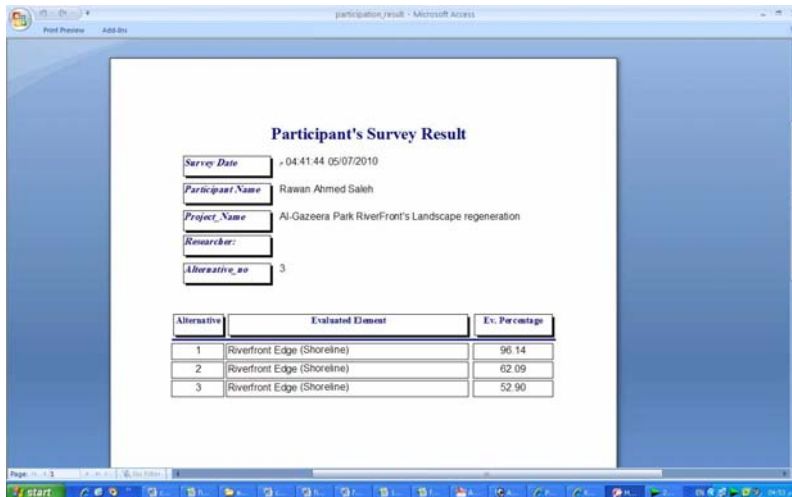


Figure (10-14) Screen of participant's survey result

---

---

## Chapter 10

---

---

In the previous section the participation in the survey using the computer program was described in details, the next section will describe how the designer or landscape architect can modify this program to prepare suitable data for each project before the participants are involved.

- 1) Landscape architect should first enter in stored data in the computer program by entering the program password.
- 2) The landscape architect should press on (project survey data preparing) button, to be able to modify the project data.



Figure (10-15) landscape architect screen, that he could prepare survey data



Figure (10-16) Screen of project data preparing

---

## Chapter 10

---

- 3) Landscape architect should type code for each project, type project name, start and end date for the project's survey period, project description, and he can type researcher name and the organization which is concerned with the project.
- 4) Then Landscape architect should prepare which landscape element (elements) will be involved in the survey according to the riverfront's regeneration design.

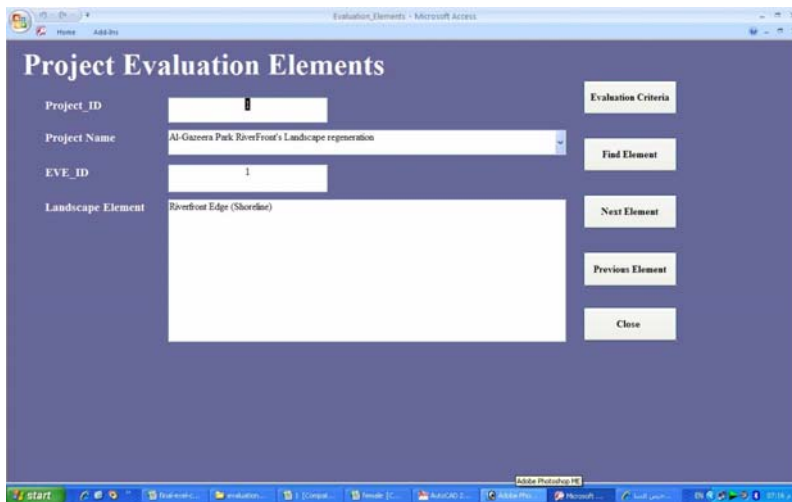


Figure (10-17) Screen of selecting regenerated landscape element (elements) which will be evaluated in the survey.

- 5) Screen of evaluation criteria data will appear, this screen is very flexible, that each main criteria will appear and its sub-criterion will appear with their relative weight which is determined before by the experts, but every projects may have its own data, so the landscape architect has the ability to change any data as number of sub-criteria, the relative weight, or put new evaluation criteria, or omit specified sub-criteria (according to landscape element characteristics).

---

## Chapter 10

---

Project ID: 1 Project Name: Al-Gazeera Park RiverFront's Landscape regeneration  
QME ID: 1 QME Element: Points related to access & linkage  
Element Weight: 0 Sequence: 1

SE ID	Evaluation Criteria Sub Element	Weight	Sequence
1	Quality of physical access to river	5.54	1
2	Quality of visual access to river	5.42	2
3	Connection between land and water	3.5	3
4	Continuity of whole landscape design	3.5	4
7	How can this element make the space walkable and convenient?	3.96	5
8	How can this element create direct contact with water?	3.4	6
(New)		0	0

Figure (10-18) Screen of modifying evaluation criteria data for each project.

Project ID: 1 Project Name: Al-Gazeera Park RiverFront's Landscape regeneration  
QME ID: 2 QME Element: Points related to comfort & image  
Element Weight: 0 Sequence: 2

SE ID	Evaluation Criteria Sub Element	Weight	Sequence
9	Quality of feeling of safety	5.35	1
10	Quality of legibility within riverfront space	3.91	2
11	Coherence & harmony between this element and other landscape elements.	4.02	3
12	Quality of attractiveness and charming	4.67	4
13	Sense of beauty of this element within other landscape elements	5.35	5
14	Quality of landscape elements	5.01	6
(New)		0	0

Figure (10-19) Another Screen of modifying evaluation criteria data for each project, the pointed related to comfort and image, for example.

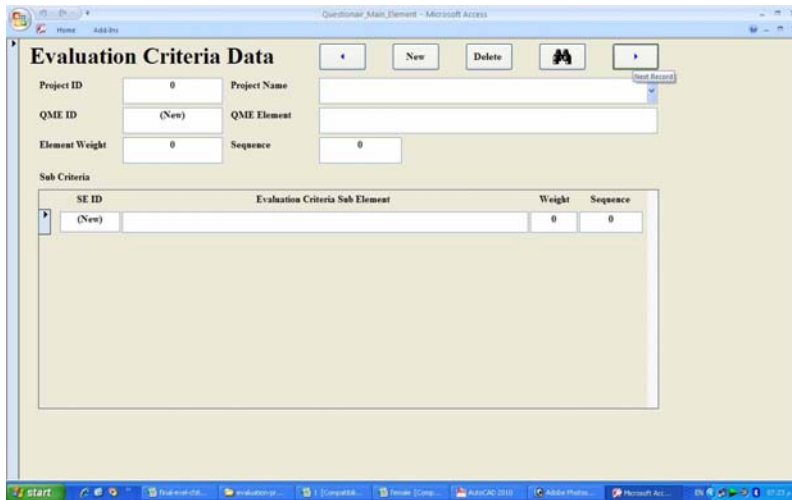


Figure (10-20) Screen for new set of evaluation criteria data for each project, here the landscape architect can add new category of evaluation criteria according to project.

- 6) Here landscape architect can press on button (show the statistical report) to get detailed sheet describe whole participants evaluation results, in two formats, first for each individual participant, second accumulative evaluation percentage for each alternative

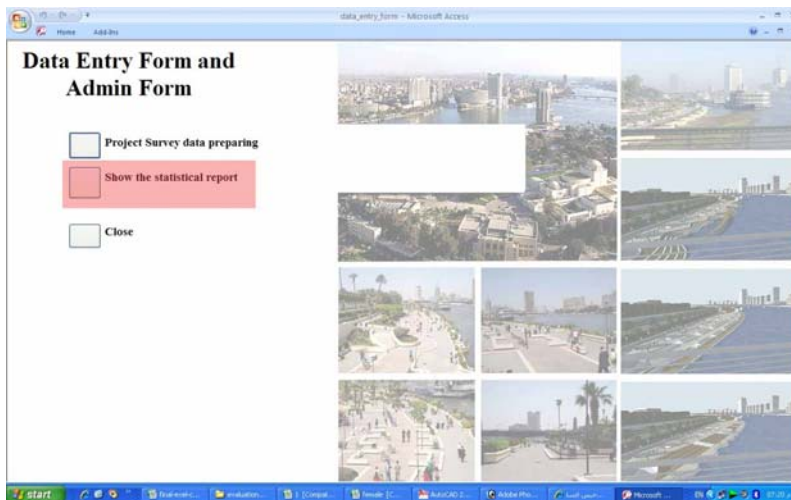


Figure (10-21) Screen shows selection of (show the statistical report) to review evaluation results for experts or landscape architects.



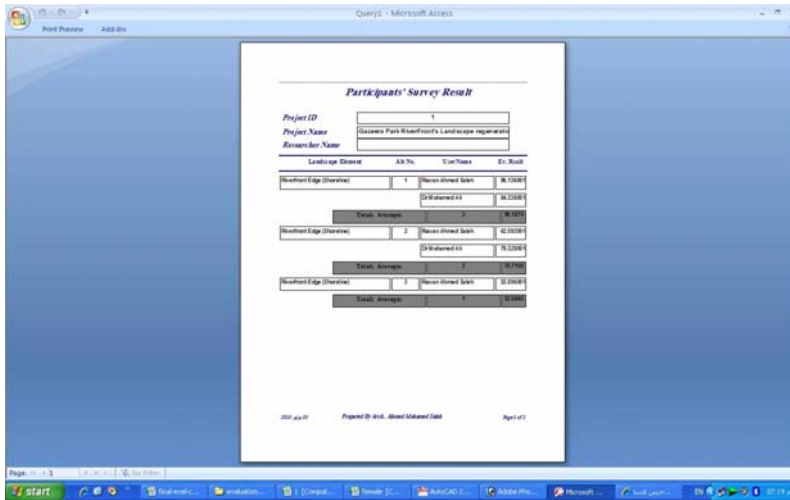


Figure (10-22) The statistical report sheet which show participants' survey results as data need for experts and landscape architects with individual participant's evaluation and accumulative evaluation for any number of participants.

### 10.3 Recommendations for further research

This study opens the road for future research in different fields

#### 10.3.1 Points to be considered in riverfront landscape regeneration field:

- Many studies should be made to the ideas and behaviors of public to riverfront environment. For example,
- The relationship between the improvement of the riverfront and public evaluation of a riverfront environments recreation,
- Analyses of factors contributing to riverfront utilization behaviors,
- The effect of the existence of a riverfront to the residential environment,
- The relationship between river utilization behaviors and the physical characteristics, and
- Evaluation of river utilization.

- Study the methods which allow the general public to access their riverfronts easily.

### **10.3.2 Recommendation to be considered in public participation field**

- Study the methods which allow public participation on the World Wide Web, more easily, and study how we can encourage the general public to share in decision making through the internet.

### **10.3.3 Recommendation to be considered in using computer simulated visualization field:**

- Concentration on the integration between different computers simulated visualization techniques, such as between virtual reality and GIS, especially in landscape regeneration process, or
- Focus on the possibility of linking virtual reality models to database and statistical software; in order to obtain ore specific analysis feed back from whom navigate in virtual reality browsers.
- Using immersive virtual reality, or augmented reality techniques to enhance public participation in large scale researches, and find the ways that make these techniques available to designers and decision makers.
- Studying the potentiality of developing platforms and interfaces of computers simulated visualization techniques, such as virtual reality browsers.
- Studying the methods which simplify the modeling of elements of landscape to be presented in virtual reality scenes.
- Studying the tool to give the public users the ability to express their ideas, or modifying the models in virtual reality to see their changes of design alternatives at the same time they navigate the models, in order to make their participation more effectively.



# REFERENCES



---

---

## References

---

---

- Abou El-Ela, M. , Soliman, M. & Amin, M. (2007).** *Urban waterfronts between cultural and physical Influences*. 43rd ISoCaRP congress, pp.1-11.
- Adair, A., et al., (2004).** *Guidelines for urban regeneration in Mediterranean region*. Priority Actions Programme, Regional Activity Centre, Split.
- Al-Kodmany, K. (2002).** *Visualization tools and methods in community planning: From freehand sketches to virtual reality*. Journal of Planning Literature, vol 17, pp 189-211.
- Al-Kodmany, K. (2001).** *Online tools for public participation*. Government Information Quarterly 18(4): 329-341.
- Al-Kodmany, K. (1999).** *Using visualization techniques for enhancing public participation in planning and design: process, implementation, and evaluation*. Landscape and Urban Planning 45: 37-45.
- Al-Kodmany, K. (1999).** *Combining Artistry and Technology in Participatory Community Planning*, Berkely Planning Journal vol.13, pp 28-36.
- Al-Sayyad, N., & Bristol, K. (1992).** *Levels of congruence: on urban form and institutional structure in different societies*. In the journal of architectural and planning research, Lock science pub., p. 194.
- Amanda M. et al., (2006).** *Transforming the East River riverfront, the city of New York*. Lower Manhattan Development Corporation.
- Amidon, J. (2005).** *Michael Van Valkenburgh/Allegheny Riverfront Park: Source Books in Landscape Architecture*. New York: Princeton Architectural Press.
- Andrew, G. (2006).** *Take Me to the River: Designing the Intimate Waterfront*. MSC of Landscape architecture, Virginia Polytechnic, Alexandria.
- Angel, V. (2008).** *Effective use of citizen participation in planning decision making process*. MSc thesis, Morgan State Univ.
- Anna, L. (2002).** *Reclaiming the Water's Edge: A Case Study of People's Landscape Perceptions on the Waterfront in Battery Park City* MSc thesis Pennstate university.
- Anne R., et al., (2008).** *Public perception as support for scenic quality regulation in a nationally treasured landscape*. Landscape and Urban Planning vol.87, pp.117–128.

---

---

## **References**

---

---

**Anslow, C., et al., (2006).** *X3D Software Visualization*. Proceedings of the International Conference on 3D Web Technology.

**Anthony A. (2003).** *Anacostia RiverParks Target Area Plan & Riverwalk Design Guidelines*.

**Antunes, P., et al., (2009).** *Participation and evaluation for sustainable river basin governance*. Ecological economics, vol. 68, pp.931-939.

**Appleton, K. & Lovett, A. (2003).** *GIS-based visualization of rural landscapes: defining 'sufficient' realism for environmental decision-making*. Landscape and Urban Planning, vol.65, issue 3, pp117-131.

**Appleton, K., et al., (2002).** *Rural landscape visualization from GIS databases: a comparison of approaches, options and problems*. Computers, Environment and Urban Systems, vol.26, pp141-162.

**Armstrong, L., et al. (2006).** *Master plan for Schuylkill River Park*. Philadelphia, Pennsylvania.

**Bailey, K. and Grossardt, T. (2004).** *Structured Public Involvement in the Design of a Transit Oriented Development*, in Stephens, R. (ed). IT Newsletter of the American Planning Association 79, pp. 13-15.

**Ball J., Capanni N., & Watt S. (2007).** *Virtual Reality for mutual understanding in landscape planning*. International journal of social sciences 2, pp.78-88.

**Ballard, P. et al., (2007).** *Nashville riverfront redevelopment master plan*. [www.civicedesigncenter.org](http://www.civicedesigncenter.org)

**Barton, J. et al., (2005).** *Public participation in a spatial decision support system for public housing*. Computers, Environment and Urban Systems, vol.29, pp.630–652

**Basset, K, et al., I (2002).** *Testing governance: partnerships, planning and conflict in waterfront regeneration*. Urban Studies 39(10), 1757–1775.

**Batista, J., et al. (2005).** *Methodology of aesthetic evaluation of rivers in urban context*. Urban river rehabilitation conference. Dresden, pp1-7

**Batty, M. et.al. (2004).** *Visualization in Spatial Modeling*. CASA working paper, pp1-12.

URL: [http://www.casa.ucl.ac.uk/working\\_papers/paper79.pdf](http://www.casa.ucl.ac.uk/working_papers/paper79.pdf).

**Beer, A. & Rigby D. (1996).** *The New Waterfront*, British Library Cataloguing in Publication Data.

---

---

## References

---

---

- Beer, A. & Rigby D. (1994).** *Waterfronts, Cities Reclaim their Edge*, McGraw-Hill, Inc.
- Beierle, T. & Cayford, J. (2002).** *Democracy in practice: Public participation in environmental decisions*. Resources for the Future, Washington, DC.
- Benson, M. & McKibbin, J. (2007).** *Waterfront citizen's advisory committee*.
- Berry, J., Buckley, D. & Ulbricht, C. (1998).** *Visualize realistic landscapes. 3-D modeling helps users envision natural resources*. GIS World 11(8): 42-27.
- Bechtel, R., et al., (1987):** *Methods in environmental and behavioral research*. Van Nostrand Reinhold co N. Y., pp. 91-96.
- Bishop, I. & E. Lange (2005a).** *Visualization in Landscape and Environmental Planning. Technology and applications*. Taylor & Francis, London, New York.
- Bishop, I. & E. Lange (2005b).** *Communication, Perception and Visualization, Visualization in Landscape and Environmental Planning Technology and Applications*, Bishop I., Lange, E., (eds), Taylor & Francis, UK.
- Bishop, I. (2005c).** *Visualization for participation: the advantages of real-time?* In: E. Buhmann, P. Paar, I. Bishop & E. Lange (eds.): *Trends in Real-Time Landscape Visualization and Participation: Proceedings at Anhalt University of Applied Sciences, Dessau, Germany*, Herbert Wichmann Verlag, pp.2-15.
- Blackbourn, D. (2006).** *The conquest of nature: water, landscape and the making of modern Germany*. London.
- Blair, W. (1986).** *Visual impact assessment in urban environment: Foundation for visual project analysis*, John Wiley & Sons: New York, pp 223–263.
- Bourdakis, V. (1997).** *Virtual Reality: A Communication Tool for Urban design*, in A. Asanowicz & A. Jakimowitz (eds) *CAAD-Towards New Design Conventions*, Technical University of Bialystok, pp.45-59.
- Boyed, S. (2002).** *Place-making, tools for community action*. Environmental simulation center.
- Bradley, G., Kearney, A. (2007).** *Public and professional responses to the visual effects of timber harvesting: different ways of seeing*. *Western Journal of Applied Forestry* vol.22 (1), 42–54.

---

---

## References

---

---

- Brkljac, N. & Counsell, J.(2007).** *Issues in use of computer visualization of large-scale urban developments as planning support tool.* REAL CORP 007. Vienna, pp. 59-67.
- Breen, A., & Rigby, D. (1993).** *Waterfronts: Cities Reclaim Their Edge.* McGraw- Hill, Inc.
- Brett A. (2003).** *Physical environmental modeling, visualization and query for supporting landscape planning decisions.* Landscape and Urban Planning, vol.65, pp. 237–251.
- Bridges, A. & D. Charitos (1996).** *On architectural design in virtual environments.* Creativity and Cognition, vol.96, pp.184-191.
- Bruttomesso, R. (2006).** *Waterfront redevelopment - a strategic choice for cities on water.* International Waterfront Speakers Luncheon IV.
- Bruttomesso, R. (2001).** *Complexity on the urban waterfront.* In R. Marshall (eds.), *Waterfronts in Post-industrial Cities*, New York: Spon Press, 39-51.
- Bruttomesso, R. (1993).** *Working on the water's edge.* In Bruttomesso, R. (eds.), *Waterfronts- A new frontier for cities on water*, Venice: International Center Cities on water.
- Bryan, B. (2003).** *Physical environmental modeling, visualization and query for supporting landscape decisions.* Landscape and Urban Planning, vol.65, pp237-259.
- Buhmann, E., et al. (2001).** *Virtuality in Landscape Architecture.* Conference Proceedings May 2001, Anhalt University of Applied Sciences, Bernburg.
- Bunce, S. & Desfor, G (2007).** *Introduction to “Political ecologies of urban waterfront transformations”.* Cities, Vol. 24, No. 4, p. 251–258.
- Burns, J. 1979.** *Connections: Ways to Discover and Realize Community Potentials.* New York: McGraw-Hill.
- Butuner, B., (2006).** *Riverfront revitalization as a challenging urban issue,* 42 ISoCaRP Congress. pp 1-12.
- Camilo, J., et al., (2004).** *Activation of the prefrontal cortex in the human visual aesthetic perception.* PNAS, vol. 101, No. 16.
- Campbell, D., & Davidson, J. (1997).** *Community and environmental design and simulations.* John Wiley & Sons. New York, pp. 201-224.
- Carver, J. et al., (2007)** *River regeneration under the national coastal zone management program.* Proceedings of Coastal Zone 07, Portland, Oregon, pp210-222.



---

---

## References

---

---

- Catherine, Q. & Purves, D. (2005).** *Perceiving Geometry: Geometrical Illusions Explained by Natural Scene Statistics*. New York, NY: Springer Publishing.
- Cervantes, O. (2008).** *Users' perception as a tool to improve urban Beach, planning and management*. *Environmental Management*, vol.42, pp.249–264.
- Chan, R. (2005).** *Urban simulation-a revolutionary tool for Participatory planning*.  
[http://www.paradigmsim.com/support/dc\\_files/Urban\\_Sim\\_White\\_Paper\\_participate.doc](http://www.paradigmsim.com/support/dc_files/Urban_Sim_White_Paper_participate.doc)
- Charlie, L et al. (2000).** *Cincinnati Central Riverfront Urban Design Master Plan*. Urban design associates.
- Charnleya,S. & Engelbert,B., (2005).** *Evaluating public participation in environmental decision-making: EPA's superfund community involvement program*. Elsevier, *journal of environmental management*, vol.77, pp.165-182.
- Chen, S & Yang Lin, J. (2007).** *Developing a simplified river landscape assessment model: Examples from the Chungkang and Touchien rivers, Taiwan*. *Environ Monit Assess* 127, pp.489–502
- Chen, X., Bishop, I. & Abdul Hamid, A. (2002).** *Community exploration of changing landscape values: the role of the virtual environment*. *Proceedings of DICTA2002 – Digital image computing techniques and applications*. Melbourne, pp. 273-278.
- Chen, y. & Knpp, S.(2006).** *VEPS – Virtual environmental planning system first steps towards a web-based 3D-planning and participation tool*. CORP 2006 & Geomultimedia06,Vienna, pp. 275-285.
- Cheng, C. (2007).** *Understanding visual preferences for landscapes: an examination of the relationship between aesthetics and emotional bonding*. PHD thesis, Texas A&M university. USA.
- Chon, J. (2004).** *Aesthetic responses to urban greenway trail corriidors: implications for sustainable development*. PHD thesis. Texas A&M University.
- Christian, S., Bishop, I., & Green, R. (2007).** *Exploring landscape changes using an envisioning system in rural community workshops*. *Landscape and urban planning*, vol. 79, pp.229–239.

---

---

## **References**

---

---

- Christoper, P. (2007).** *Visualization techniques for envisioning landscape futures.* Landscape Systems, Department of Primary Industries Victoria, University of Vienna.
- Coeterier, J. (2002).** *Lay people's evaluation of historic sites.* Landscape and urban planning , vol. 59, pp. 111-123 .
- Conford, j., (2003).** *New media as social facts, researching as shaping the digital landscape.* Irish communication review, vol. 9 pp1-10.
- Costanza, E., et al., (2009).** *Mixed Reality: A Survey.* In *Human Machine interaction: Research Results of the MMI Program*, D. Lalanne and J. Kohlas (Eds.) LNCS 5440, pp. 47-68.
- Craig, W. (1998).** *The Internet aids community participation in the planning process.* Proceedings of the COST-UCE, C4 international workshop on groupware for urban planning, Lyon, Edited by R. Laurini. Computer, Environment and Urban Systems, vol. 22, pp. 393-404.
- Creighton, J.L. (1994).** *Involving citizens in community decision making: a guidebook.*
- Cullen, G. (1961).** *The concise townscape:* The architectural press, p.9
- Culvahouse, T. (2008).** *Riverfront Redevelopment.* AIA committee on design Minneapolis conference.
- Danahy, J. & Lindquest, M. (2006).** *Community initiated public participation: Altering the urban design decision making process with real-time immersive visualization.* Proceedings of CORP 2006 & Geomultimedia06, pp.293-298.
- Danahy, J. (2006).** *Community Initiated Public Participation: Altering the Urban Design Decision Making Process with Real-Time Immersive Visualization.* Proceedings of conference: CORP 2006 & Geomultimedia06, Vienna., pp.3-17
- Danahy, J. (2001).** *Technology for dynamic viewing and peripheral vision in landscape visualization.* Landscape and Urban Planning, pp54-64.
- Danial, M. (2008).** *Public participation in brown-fields cleanup and redevelopment: The role of community organizations.* Doctor of Philosophy in urban and regional planning. The University of Michigan
- Daniel, C. (2006).** *Whither scenic beauty? Visual landscape quality assessment in the 21st century.* Landscape and urban planning journal, vol. 54, p. 267-281.

---

---

## **References**

---

---

- Daniel, T. & Meitner, M. (2000).** *Representational validity of landscape visualizations*. Final report, USDA Forest Services, Forest Health Technology, Enterprise Team.
- David, J. (2010).** *Reconnecting buffalo with the water*. Master of architecture, the university at buffalo, state university of New York.
- Davison, J. (2007).** *The virtual planner, exploring public participation planning through internet-based virtual reality*. MSC thesis at University of Calgary.
- Dazhong, Y. (2007).** *Public participation in urban design based on information technology*. Design and Research Institute. Shandong Institute of Architecture & Engineering, pp.393-402.
- Debby, A. (2006).** *The Most Famous Man in America*. The Biography of Henry Ward Beecher, Doubleday.
- Dennis, Q., (2006).** *Urban waterfront development becoming national trend*, Charleston Regional Business Journal.
- Deussen, O. (2003).** *A framework for geometry generation and rendering of plants with applications in landscape architecture*. Landscape and Urban Planning, vol.64: pp.105-113.
- Di Maria, E. et al., (2000).** *E-Democracy: the participation of citizens and new forms of the decision-making process*. School for Advanced Studies in Venice Foundation.
- Discoe, B. (2005).** *Data sources for three-dimensional models*. In I.D. Bishop and E. Lange (eds) *Visualization in Landscape and Environmental Planning*, London, Taylor & Francis: pp.35-49.
- Dollner, J. et al. (2006).** *Virtual 3D city models as foundation of complex urban information spaces*. Proceedings of CORP 2006 & Geomultimedia06, pp.107-112.
- Donofrio, J. (2007).** *Preservation as a tool for waterfront revitalization: Design, management, and financing solutions from Vancouver, Boston, and London*. Master of historic preservation. University of Pennsylvania.
- Dreiseitl, M. et al. (2001).** *Waterscapes: Planning, Building and designing with water*. Birkhauser-Verlag Publishers, Basel.
- Dykes, J. et al. (2005).** *Modeling Virtual Environments for Geo-visualization: A Focus on Representation*,. Elsevier Ltd., [http://www.plan.aau.dk/~lbo/SIM/Geoviz\\_06/19-bodum.pdf](http://www.plan.aau.dk/~lbo/SIM/Geoviz_06/19-bodum.pdf)

---

---

## References

---

---

- El-Hosseney, O. (1998).** *Sustainable developments in planning and designing urban spaces- An application of Al-Azhar space in Cairo.* Magazine of Egyptian engineers society, vol. 37, no. 4, pp. 24-35.
- Emmelin, L. & Michael, J. (1995).** *Scenarios for the visual impact of agricultural policies in two Norway landscapes.* In Schoute, J.F.Th. et al. (Eds.), *scenario studies for the rural environment.* Dordrecht: Kluwer Academic Publishers, pp. 21-45.
- Engoltz, T. (2005).** *The Hudson river waterfront walkway: providing public access and recreational opportunities along a highly developed urban waterfront.* Proceedings of the 14th Biennial Coastal Zone Conference, New Orleans, Louisiana, pp. 1-5.
- Eran, B. (2002).** *Urban simulation and the luminous planning table, bridging the gap between digital and the tangible.* Journal of planning education and research, vol21, pp. 195-202.
- Eric, w. (2004).** *Strategies for reclaiming urban postindustrial landscapes.* Msc, Massachusetts institute of technology.
- Ervin, S., & Hasbrouck, H., (2001).** *Landscape Modeling: Digital Techniques for Landscape Visualization.* McGraw-Hill, New York.
- Evren, U. (2007).** *Making livable and attractive waterfronts,* 43rd ISOCARP Congress 2007, pp 210-219.
- Fisher, Bonnie, et.al. (2004).** *Remaking the Urban Waterfront.* ULI\_the Urban Land Institute, Washington, D.C.
- Franklin,R., Felton, A. & David H.(2006).** *A Critical Review of Virtual Reality and Geographical Information Systems for Management of the Built Environment.* Tenth International Conference on Information Visualization, pp. 349-356.
- Frederick R., (2006).** *Planning and Urban Design Standards.* Wiley Inc.
- Freudenberg, R. (2005).** *Going down to the shore: enhancing coastal public access along New Jersey's shorelines.* Proceedings of the 14th Biennial Coastal Zone Conference.New Orleans, Louisiana,pp.301-319.
- Froner, B. (2003).** *Visual Perception for Visualization and VR, MSc in Internet and Distributed Systems,*University of Durham.
- Gabr, H. (2004a).** *Perception of urban waterfront aesthetics along the Nile in Cairo, Egypt.* Coastal Management 32:155–171.
- Gabr, H. (2004b).** *Use and misuse of public open space along the Nile.* Waterfront in Coastal Management, pp.1-5.

---

---

## References

---

---

- Geier, B., Egger, K., Muhar, A. (2001).** *Integrierte 3D-Visualisierungssysteme für die Landschaftsplanung: Konzepte und Marktrealität.* In: Schrenk, M. (ed.): CORP Geo-Multimedia'01, Vienna, pp.231-236
- Gelbard, E. (2008).** *Fostering vital places: public art and the revitalization of the Los Angeles River.* University of southern California, MSc thesis.
- Galindo,P. & Antonio, J. (2000).** *Environmental aesthetics and psychological wellbeing: relationship's between preference judgments for urban landscapes and other relevant affective responses.* Psychology in Spain, , vol. 4. No 1, pp.13-27
- Garrick, N. et al. (2005).** *Effective visualization techniques for the public presentation.* The New England Transportation Consortium.
- Gert J., et al., (2002).** *Visual perception in Karesansui gardesns.* 17th congress of the international association of empirical aesthetics. Takrazuka, Japan.
- Gillotti, T. (2005).** *Reclaiming the waterfront.* Center for community economic development, University of Wisconsin-Extension. Issue 109, pp.1-20
- Golding, A. (2008).** *The Los Angeles River: Reshaping the Urban Landscape.*  
URL:<http://www.urbanedpartnership.org/target/units/river/reshaping.html>
- Goud, R. (2004).** *Optimization Technique's in Interpolation for Dynamic GIS. GIS Development.*  
<http://www.gisdevelopment.net/technology/rs/mi03046.htm>
- Greenberg, K. (2007).** *A Good Time for Cities Places.* Vol. 19, No. 2, pp. 4-11.
- Green, M. (2007).** *Great Lawn overpass disputed".*The Courier-Journal.
- Haklay, M. (2002).** *Virtual reality and GIS. Applications, trends and directions.* -in: Fisher, P. & D. Unwin (Eds.), *Virtual Reality in Geography.* London, New York: Taylor & Francis, pp. 47-57.
- Hamilton, A, et al., (2001).** *Learning through visual systems to enhance the urban planning process.* Environment and planning B: planning and design, vol. 28(6) p.p 833-845
- Hanzl, M. (2007).** *Information technology as a tool for public participation in urban planning: a review of experiments and potentials.* Design Studies, vol.28 (3), pp289-307.

---

---

## References

---

---

- Harken, B. (2006).** *Reshaping Urban Waterfronts*. Nautilus International Development Consulting, Inc.
- Harris S., (2007).** *10 steps to good urban design*. <http://www.philly.com/>
- Hassan, A. (2000).** *An investigation into the validity and efficiency of web-based desktop virtual reality in environmental representation and design visualization*. Phd thesis, Sheffield university.
- Heldal, I. (2007).** *Supporting participation in planning new roads by using virtual reality systems*. Virtual Reality, Springer, London, vol., 11, pp.145–159
- Henry, P. (2006).** *Levees and Other Raised Ground*, vol.94, American Scientist, pp. 7–11.
- Henry, D. & Furness, T. (1993).** *Spatial Perception in Virtual Environments*. Evaluating and Architectural Application, In IEEE. Vol.41, pp45-58.
- Herwig A. & Paar, P. (2002).** *Game Engines: Tools for Landscape Visualization and Planning?* In: E Buhmann, U Nothelfer, M Pietsch (eds.): Trends in GIS and virtualization in environmental planning and Design. Proc. At Anhalt University of applied sciences, Wichmann, Heidelberg: 162-171.
- Hofschreuder, J. (2004).** *Correlation between the required levels of detail of 3D-landscape visualizations and the readability of visual criteria, thesis land use planning*. Wageningen University, the Netherlands, [http://lrg.ethz.ch/visulands/english/content/d5/Thesis\\_final.pdf](http://lrg.ethz.ch/visulands/english/content/d5/Thesis_final.pdf)
- Homero, M. (2004).** *The river in the urban river landscape. Landscape ecological principles for the design of riverfronts*. Master of landscape architecture. The University of Guelph.
- Honjo T., et al., (2006).** *The validity of VRML images as a stimulus for landscape assessment*. Landscape and Urban Planning, vol.77, pp.80–93
- Honjo T. & Lim, E. (2005).** *Visualization of landscape by VRML system*. National Center for Supercomputing Applications. Landscape and Urban Planning, vol. 55, pp.175-183.
- Horne, M. & Hamza, N. (2006).** *Integration of virtual reality within the built environment curriculum*. ITcon Vol. 11, PP.311-324
- Howard, D., (1998).** *Geographic Information Technologies and Community Planning*. Spatial Empowerment and Public Participation. Pp.301-320

---

---

## References

---

---

- Huang, B. & Claramunt, C. (2004).** *Environmental simulation within a virtual environment.* ISPRS Journal of Photogrammetry & Remote Sensing, vol. 59, pp.73– 84.
- Huang, H. (2004).** *Application of Visualization in Urban Planning decision-making process.* Masters of Urban Planning. University of Cincinnati.
- Hudson, A. (2007).** *Digitally distributed urban environments: The prospects for online planning.* Bartlett School of Architecture and Planning, University College London.
- Hudson-Smith, A., Evans, S., & Batty, M. (2005).** *Building the Virtual City: Public Participation Through e-Democracy.* Knowledge Technology and Policy, vol.18, pp62-85.
- Hurwitz, J.G. (1975).** *Participatory Planning in an Urban Neighborhood. Soulard, St. Louis, MO: A Case Study.* DMG Journal 9, no. 4, pp.348-357.
- Hyeong, N. & Hyang, K. (2009).** *The Aesthetic Evaluation of Coastal Landscape.* Journal of Civil Engineering, vol.13, pp. 65-74.
- Irvin, R. & Stansbury, J. (2004).** *Citizen participation in decision making: is it worth the effort?* Public Administration Review, 64 (1), 55-65.
- James, F. (2004).** *Using spatial metrics to predict scenic perception in a changing landscape.* Landscape and urban planning, vol.69, pp.201-218.
- James R. (2006).** *The Role of Citizens in the Planning Process.* International federation of landscape architects. World urban forum III - Vancouver.
- Jan, S. (2005).** *Applying the Public Trust Doctrine to River Protection.* California Water Plan. Confluence of Science.
- Jeffries, L. (2008).** *Reclaiming Nile Valley Civilization.*  
[http://www.africawithin.com/jeffries/reclaiming\\_nile\\_valley.htm](http://www.africawithin.com/jeffries/reclaiming_nile_valley.htm)
- Jinnai, H. (2007).** *Urban Regeneration in Tokyo.* The Future Metropolitan Landscape: Ecological Structure of City Regions, PP.62-67.
- Johansson, T. (2000).** *Visualization in Cyberspace Geography. Paper 17.* Center for Advanced Spatial Analysis.  
University College London. <http://www.casa.ucl.ac.uk/cyberviz.pdf>
- Julieta, V. & Silvio, M. (2007).** *Public cyberspace the virtualization of public space in digital city projects.* 3rd Int'l ASCAAD Conference on

---

---

## References

---

---

Em'body'ing Virtual Architecture [ASCAAD-07, Alexandria, Egypt] pp.112-126.

**Junker, B. & Buchecker, M. (2008).** *Aesthetic preferences versus ecological objectives in river restorations*, Landscape and Urban Planning 85, pp.141–154.

**Kamel O. et al. (2005).** *People's perception and behavior patterns in Amman's public parks and plazas*. Alexandria Engineering Journal, Vol. 44, pp237-241

**Kamel, S. (1990).** *Activities and behaviors in public urban spaces- an approach to documentation*. M. Sc., Faculty of engineering, Cairo University, p. 14.

**Kaplan, S. (1995).** *The restorative benefits of nature: Toward an Integrative Framework*. Journal of Environmental Psychology, vol.15, pp.169-182.

**Kaplan, S. & Kaplan, R. (1989).** *The Experience of Nature: A Psychological Perspective*. New York: Cambridge University Press.

**Karjalainen, E. (2006).** *The visual preferences for forest regeneration and field a forestation – four case studies in Finland*. Phd thesis, University of Helsinki.

**Kashef, M. (2008).** *Reclaiming urban riverfronts- Creative urban Design Intervention*, PhD. East Carolina University.

**Katie T. (2008).** *The Redevelopment of Working Waterfronts: How Lessons signated Port Areas*. Msc Tufts university p25-27.

**Keim, D.A. (2002).** *Information visualization and visual data mining*. IEEE transactions on visualization and computer graphics, vol.8, pp.1-8.

**Kenyon, W. (2005).** *Evaluating trust in participatory processes*. Socio-economic research programme, Macaulay institute, Scotland, pp.330-349

**Kim, K., et al., (2005).** *Toronto waterfront: East Bayfront Precinct Plan*. Urban Design Consultant. Phillips, Farevaag.

**Kingston, R., Evans, A., & Carver, S. (2002).** *Public participation via on-line democracy*. In Geertman, S. and Stillwell, J. (eds) *Planning Support Systems in Practice*. Springer-Valer. Pp75-94.

**Kingston, R., et.al. (2000).** *Web-based public participation geographical information systems: an aid to local environmental Decision-Making*. Computers, Environment and Urban Systems. 24(2) 109-125.



---

---

## References

---

---

- Koenderink, J., Van Doorn, A. & Kappers, A.(1992).** *Surface perception in pictures, Perception & Psychophysics*, vol. 52(5), pp. 487-496.
- Kostof, S., (1992).** *The city shaped: Urban patterns and meanings through history*. Thames and Hudson Ltd., London.
- Kurbat, E., (1985).** *People in cities*. Cambridge series, in environmental and behavior, Cambridge university press, pp.162-164.
- Kwartler, M. (2005).** *Visualization in Support of Public Participation*. In: I. Bishop & E. Lange (eds.): *Visualization in Landscape and Environmental Planning. Technology and applications*. Taylor & Francis, London.
- Lafortezz, R. (2008).** *Visual preference and ecological assessments for designed alternative Brownfield rehabilitations*. *Journal of Environmental Management*, vol.89, pp. 257–269.
- Laing, R., Davies, A. & Scott, S. (2005).** *Combining visualization with choice experimentation in the built environment*, in I.D. Bishop and Elange (eds) *Visualization for Landscape and Environmental Planning: technology and applications*, Oxford, Taylor and Francis pp212-291.
- Lange, E. & Hehl-Lange, S. (2006).** *Integrating 3D Visualization in Landscape Design and Environmental Planning*. *GAIA*, vol.15, pp.195–199.
- Lange, E. (2006).** *Issues and questions for research in communicating with public through visualizations*. In: Buhmann E, Paar P, Bishop I, Lange E, Eds. *Proceedings at Anhalt University of Applied Sciences Trends in Real-Time Landscape Visualization and Participation*. Wichmann Verlag, Heidelberg.  
[www.masterla.de/conf/pdf/conf20/11lange\\_c.pdf](http://www.masterla.de/conf/pdf/conf20/11lange_c.pdf)2006.
- Lange, E. (2005).** *Reality and computerized visual simulation: An empirical study on the degree of realism of virtual landscape representations*, pp.1-7.  
<http://survive.sli.unimelb.edu.au/~ianb/Public/ascona/Lange.doc>.
- Lange, E. & S. Hehl-Lange (2005).** *Combining a Participatory Planning Approach with a Virtual Landscape Model for the Sitting of Wind Turbines*. *Journal of Environmental Planning and Management* 48 (6), pp831-850.
- Lange, E. (2003).***Reality and Computerized Visual Simulation: An Empirical Study on the Degree of Realism of Virtual Landscape*

---

---

## References

---

---

### *Representations.*

<http://survive.sli.unimelb.edu.au/~ianb/Public/ascona/Lange.doc>

**Lange, E. (2001a).** *The evolution of visualization techniques in landscape architecture and planning, Virtuality in landscape architecture.* International Conference, Anhalt University of Applied Sciences.

**Lange, E. (2001b).** *The limits of realism: perceptions of virtual landscapes.* Landscape and Urban Planning, vol54, pp163-182.

**Lange, E. 1994.** *Integration of computerized visual simulation and visual assessment in Environmental Planning.* Landscape Urban Plann. vol30, 99-112.

**Langendorf, R. (2001).** *Computer-aided visualization: possibilities for urban design, planning and management.* Planning Support Systems: integrating geographic information systems, models and visualization tools. R.K.Brail and R.E.Klosterman (eds), Redlands, CA :ESRI Press, pp.309–359.

**Laurini, R. (2004).** *Computer systems for public participation.* Laboratoire d'Ingénierie des Systèmes d'Information, University of Lyon, pp.1-19.

**Lawrence, M. (2006).** *Spicket river greenway design guidelines.* Boston.

**Lehmkuhler, S. (2001).** *Landscape planning and visualization.* World construction @ Frankfurt -. In: Schrenk, M. (ed.): CORP Geo-Multimedia'01, Vienna, pp237-244.

**Levy, R. (1995).** *Visualization of urban alternatives.* *Environment and Planning.* Planning and Design vol.22, 3: pp.343-358.

**Lifang, Q. (2009).** *Evaluation of urban river landscape design rationality based on AHP.* Water Science and Engineering, vol. 1, pp.75-81.

**Lim, E., & Honjo, T. (2003).** *There-dimensional visualization of forest landscapes by VMRL.* Landscape and Urban Planning. 63, 175-186.

**Liu, Y. and Bai, J. (2001).** *A Computerized Procedure for Visual Impact Analysis and Assessment: The Hsinchu Experience.* Automation in Construction, vol.10, pp.337-343.

**Löffelmann, H. (1998).** *Visualising local properties and characteristics structures of dynamical systems.* PhD Thesis Vienna University of Technology, Vienna, Austria.

**Long, E., (2008).** *The paradox of participation: citizen participation in urban planning in Colon.* PhD thesis, Tulane univ.

---

---

## References

---

---

- Lothian, A. (1999).** *Landscape and the philosophy of aesthetics: is landscape quality inherent in the landscape or in the eye of the beholder.* Landscape and Urban Planning, vol.44, pp. 177-198.
- Lovett, A., et al. (2002).** *Visualizing sustainable agricultural landscapes.* In: P. Fisher and D. Unwin (eds) *Virtual Reality in Geography.* Taylor & Francis, London, pp.102-130.
- Lovett, A., G. Sünnerberg & T. Dockerty (2002).** *Landscape Change in the NALMI Area: Construction of a GIS Database.* Jackson Environment Institute Working Paper 15, University of East Anglia, Norwich.
- MacEachren M., et al., (1999).** *Virtual environments for geographic visualization: Potentials and Challenges.*
- Mahmoud, A. (1998).** *Can Virtual Reality Simulation Techniques Reshape the Future of Environmental Simulations?*, PHD thesis University of Sheffield.
- Mahbubur, R. (2006).** *Three-Dimensional Models Encourage Public Participation.* <http://www.esri.com/news/arcuser/0506/spring2006.html>
- Mann, R. (1988).** *Ten trends in the continuing renaissance of urban riverfronts.* Landscape Urban Planning, 16: 277-299.  
<http://www.geovista.psu.edu/publications/NPIVM99/ammNPIVM.pdf>
- Manuel, P. (2002).** *New Information technologies in public participation: A challenge to old decision-making institutional frameworks.* Doctor of philosophy, Massachusetts institute of technology.
- Mark, P. (2008).** *Do virtual worlds create better real worlds?.* Virtual Reality, vol. 12, pp.163–179.
- Marshall, R. (2001a).** *Waterfronts in post-industrial cities,* Taylor & Francis.
- Marshall, R. (2001b).** *Contemporary urban space-making at the water's edge.* in R. Marshall (eds.), *Waterfronts in Post-industrial Cities,* New York: Spon Press, 3-15.
- McCrea, B. (2005).** *Public access design guidelines for the San Francisco bay.* San Francisco bay conservation and development commission.
- McCarthy, J. (1998).** *The regeneration of urban waterfronts.* European spatial research and policy. Vol. 5. No. 2, pp 115-127.

---

---

## **References**

---

---

- Meitner, M.J. (2004).** *Scenic beauty of river views in the Grand Canyon: relating perceptual judgments to locations.* Landscape and Urban Planning, vol.68, pp.3–13.
- Metla, J. (2008).** *Participation technologies: a framework for the development of an online interactive GIS application.* Master thesis, Iowa State University, Ames, Iowa.
- Michelson, W. (1975).** *Behavioral research methods in environmental design.* Dowden, Hutchinson & Ross, Inc., Pennsylvania, U.S.A..
- Minagawa, H., & Shimatant, H., (2002).** *Residents' Evaluation of River Landscape and Influence of the Information for Restoration of the Gravel Bar at Nagata Area on the Tama River.* Journal of Environmental Systems and Engineering, No.713, pp.115-129.
- Moffat, D. (2002).** *Review of award to Allegheny Riverfront Park.* Pittsburgh, Places, vol. 15, No. 1, pp. 10-13.
- Moir, M. (2008).** *Toronto's changing waterfront: Society and Nature in Urban Transformations,* Changing Urban Waterfront Seminar Series Report. University of Toronto Cities Centre.
- Moretti, M. (2008).** *Cities on Water and Waterfront Regeneration: the role of culture and events.* Grundtvig, III meeting Rivers of Change - River//Cities Wien, Austria.
- Moore, C. & Davis, D., (1997).** *Participation Tools for Better Land-Use Planning: Techniques and Case Studies.* 2nd ed. Sacramento: Center for Livable Communities.
- Mostert, E. (2003).** *Public participation and the European water framework directive.* Report of the HarmoniCOP project – harmonizing collaborative planning.
- Moughtin, C. (1992).** *Urban design- streets and squares.* Butterworth Heinemann Ltd., Britain, p. 12.
- Muhar, A & Wergles, N. (2009).** *The role of computer visualization in the communication of urban design—A comparison of viewer responses to visualizations versus on-site visits.* Landscape and Urban Plan
- Muhar, A. (2001).** *Three-dimensional modelling and visualisation of vegetation for landscape simulation.* Landscape and Urban Planning, vol.54, pp. 5-18.
- Mulvaney, T. (2007).** *New Jersey's proposed public access regulations and the public trust doctrine: balancing public rights of access and use*

---

---

## References

---

---

*with private waterfront development.* Urban Harbors Institute of the University of Massachusetts Boston.

URL:<http://www.wateraccessus.com/docs/day1/papers/Mulvaney.pdf>

**Nasar, J. (1997).** *New developments in aesthetics for urban design.* In G.T. Moore & R.W. Marans (Eds.), *Advances in environment, behavior, and design.* New York: Plenum Press, pp.149- 194

**Nasar, J. (1990).** *The evaluative image of the city.* A.P.A. journal, winter.

**Nasar, J. (1988).** *Environmental aesthetics: theory, research and applications.* Cambridge: Cambridge University Press.

**Nielsen, R., (2002).** *Collaborative spaces: inhabited virtual 3D worlds.* In: Qvortrup, L., (ed.), *Virtual Space – Spatiality in Virtual Inhabited 3D Worlds.* London: Springer-Verlag, pp. 171-189.

**Newby, B. (1993).** *Virtual Reality.* In *Annual Review of Information Science and Technology* 28. Williams, Martha E., ed. Medford, NJ: Learned Information, pp.187-229.

**Nevis, E. (1983).** *Using an American perspective in understanding another Culture: Toward a hierarchy of needs for the People's Republic of China.* The Journal of Applied Behavioral Science vol.19, pp. 249-264.

**Nishina, D., Murakami, S., & Daichi, K. (1999).** *Analysis on the properties of recreational uses of inhabitants in urban river spaces.* Japan architecture planning and environmental engineering, NO.525, pp.75-82.

**Okabe, A., et al, (1988).** *An experimental analysis of the perception of the area of an open space using 3-D stereo dynamic graphics.* E. & B., No. 2, Sage periodical press.

**Oppewall, H. & Timmermans, H. (1999).** *Modeling consumer perception of public space in shopping centers.* Environment and behavior, vol.31, no. 1, Sage periodical press.

**Orland, B., Budthimedhee, K. & Uusitalo, J. (2001).** *Considering virtual worlds as representations of landscape realities and as tools for landscape planning.* Landscape and Urban Planning, vol.54, pp. 139-148.

**Orland, B., et al. (1997).** *Human Response-based evaluation of environmental data visualization systems: visualization of forest composition datasets.*

URL: <http://www.imlab.uiuc.edu/papers/vizariz/index.html>

**Otto, B., McCormick, K, & Leccese, M. (2004).** *Ecological riverfront design: restoring rivers,* Connecting Communities American planning association.

---

---

## References

---

---

- Otto G., et al. (2003).** *The VR-desktop: an accessible approach to VR environments in teaching and research.* International journal of architectural computing, Issues 02, Vol. 01, pp 233-246
- Owen, J. (1993).** *The Water's Edge: The Space between Buildings and Water.* In: White, K.N. et al. (eds.): Urban Waterside Regeneration – Problems and Prospects. New York, London: Ellis Horwood Ltd. 1993, p. 15-21.
- Paar, P. & Clasen, M. (2007).** *Earth, landscape, biotope, plant. interactive visualization with biosphere3D.* REAL CORP 007 Proceedings / Tagungsband, Vienna, pp. 207-214
- Paar, P. (2006).** *Landscape visualizations: Applications and requirements of 3D visualization software for environmental planning.* Computers, environment and urban systems, Elsevier, vol.30, pp. 815-839.
- Paar, P., et al., (2005).** *Real-time virtual landscapes in landscape and urban planning.* Second International Conference and Exhibition on Geographic Information, Estoril Congress.
- Paar, P. (2005).** *Lenné3D – The making of a new landscape visualization system: from requirements analysis and feasibility survey towards prototyping.* In: E. Buhmann & S. Ervin (Eds.): Trends in landscape modeling, Wichmann, Heidelberg: 78-84.
- Pasaogullari, N. (2004).** *Measuring accessibility and utilization of public spaces in Famagusta.* Cities, Vol. 21, No. 3, pp. 225–232.
- Patricia, L.(2007).** *Riverlife Task Force profile. Story by Pittsburgh Post-Gazette.*
- Pedro, N. (2006).** *Public Perception in Contemporary Portugal: The Digital Representation of Space.* Journal of Urban Design, Routledge, part of the Taylor & Francis Group, vol.11, pp.73-98
- Perkins, N. & Barnhart, S. (2005).** *Visualization and participatory decision-making,* in I.D. Bishop and E. Lange (eds) Visualization for Landscape and Environmental Planning: technology and applications, Oxford, Taylor and Francis, pp.241-250.
- Petric, J., et al.(2002).** *Virtual Reality in the service of user participation.* International council for research and innovation in building and construction.
- Petts, G., Heathcote, J., & Martin, D. (2002).** *Urban Rivers-Our Inheritance and Future.* IWA Publishing, London.

---

---

## References

---

---

- Petts, J., & Leach, B.(2000).** *Evaluating methods for public participation: literature review.* Environment Agency, Rio House, Waterside Drive, Bristol.
- Pietch, S. (2000).** *Computer visualization in the design control of urban environments,a literature review.* Environment and Planning: Planning and Design, vol. 21, pp 521-536.
- Pinet, C. (1997).** *Design Evaluation Based on Virtual Representation of Spaces.* In proceedings of ACADIA'97, University of Cincinnati, Cincinnati.
- Pleizier I. et al, (2004).** *Using virtual reality as information tool in spatial planning.* In: Proceed. Euro-Conference on methods to support interaction in geo-visualisation Environments, pp121-129.
- Podevyn, M., et al. (2008).** *Global Visualization engines – Issues for urban landscape planning participation processes.* proceedings at Anhalt University of Applied Sciences 2008, pp.176-188
- Porteous, D. (1996).** *Environmental aesthetics. Ideas, politics and planning.* New York: Routledge.
- Prochorskaite A. (2005).** *Public Participation in River Basin Management and Regeneration.* Urbem- best practice guidance in river restoration. <http://www.urbem.net/project-outputs-WP2.html>
- Qvortrup, L. (2002).** *Virtual Space – Spatiality in Virtual Inhabited 3D Worlds.* London: Springer-Verlag & Dodge, M., and Kitchin, R., Mapping Cyberspace. London: Routledge.
- Ramasubramanian, L. (2005).** *Visualizing Urban Futures: A Review and Critical Assessment of Visualization Applications for Transportation Planning and Research.* University of Illinois at Chicago. [http://www.uic.edu/cuppa/cityfutures/papers/webpapers/cityfuturespapers/session5\\_3/5\\_3visualizingurban.pdf](http://www.uic.edu/cuppa/cityfutures/papers/webpapers/cityfuturespapers/session5_3/5_3visualizingurban.pdf) .
- Ranon, R. (2007).** *Introduction to X3D.* HCI Lab, University of Udine, Italy. URL-<http://hcilab.uniud.it>
- Rapoport, A., (1982).** *The meaning of the built environment.* Sage pub. Inc., California.
- Rashidah. Rahman, R. & Day, A. (2006).** *A Comparative Study of Digital and Traditional Tools for Participative Design.* Proceedings of ASCAAD 2006 Conference, Sharjah, United Arab Emirates.
- Reljic, Z. et al, (2005).** *Integrating GIS and 3D Visualization for dynamic landscape representation in Canada's national parks.* Proceedings of the

---

---

## References

---

---

98th annual Canadian institute of geomatics conference, University of Ottawa, Canada.

**Richard M. (2005).** *Reviving the Waterfront: Trends and Opportunities.* ULI International Waterfront Development Conference. Singapore.

**Ricahrd, M., et al. (2005).** *Chicago River corridor design guidelines and standards.* Department of Planning and Development, pp.1-52.

**Rodney H. Matsuoka, R. & Kaplan, R. (2008).** *People needs in the urban landscape: Analysis of landscape and urban planning contributions.* Landscape and Urban Planning, vol.84, pp.7–19

**Rosner, J. (1978).** *Matching method to purpose: The challenges of planning citizen participation activities.* In citizen participation in America, edited by S. Langton. New York: Lexington Books.

**Ryckbost, P. (2005).** *Redeveloping urban riverfront property.* <http://www.umich.edu/~econdev/waterfronts/>

**Roth, M. (2006).** *Validating the use of Internet survey techniques in visual landscape assessment—An empirical study from Germany.* Landscape and Urban Planning 78 ,pp.179–192.

**Sairinen, R. & Kumpulainen, S. (2006).** *Assessing social impacts in urban waterfront regeneration.* Environmental Impact Assessment Review vol.26, pp.120– 135

**Sanoff, H. (2000).** *Community Participation Methods in Design and Planning,* John Wiley and Sons, New York.

**Schelhorn, T., et al., (1999).** *Streets: an agent-based pedestrian model.* Center for advanced spatial analysis, university college London.

*Schjetman, M. (2005).* *Water and the urban landscape: New Considerations and Experiences.* Mexico City, Mexico.

**Schroth, O. & Schmid, W. (2006).** *How Much Interactivity does the Public Want? An assessment of interactive features in virtual landscapes.* Trends in knowledge-based landscape modeling, proceedings at Anhalt University of Applied Sciences 2006, pp123-134

**Schroth, O., Lange, E. & Schmid, W. (2006).** *From information to participation – applying interactive features in landscape visualizations.* Trends in knowledge-based landscape modeling, proceedings at Anhalt University of Applied Sciences 2006, pp211-224.

**Selvakumar, S., & Varkki G., (1998).** *Visualization and communicating ideas about urban experiences.* Conference of the American Planning Association, pp.153-170.



---

---

## References

---

---

- Sieber, R. (1993).** *Public Access on the Urban Waterfront: A question of Vision*. Rotenberg, Robert; McDonogh, Gary, editors. 1993. The Cultural Meaning of Urban Space. London: Bergin & Garvey.
- Silva, J., Serdoura, B., & Pinto, P. (2006).** *Urban rivers as factors of urban disintegration*. 42nd ISoCaRP Congress conference, pp.3-14.
- Silva, J. (2005).** *Classification of the aesthetic value of the selected urban rivers*. Instituto Superior Técnico – Centro de Sistemas Urbanos e Regionais.
- Shang, h. (2006).** *Rediscover the riverfront through redevelopment- a cultural and entertainment center in Huizhou, China*. Master of Architecture, University of Maryland.
- Shen,Z. and Kawakami,M. (2007).** *Study on Visualization of Townscape Rules Using VRML for Public Involvement*. Journal of Asian Architecture and Building Engineering, Vol. 6, No. 1 pp.119-126.
- Shneiderman, B. (1996).** *The eyes have it: a task by data type taxonomy for information visualizations*. In proceedings of the IEEE symposium on visual languages (VL '96) pp. 336-343.
- Shehayeb, D. K., (1989).** *Man-Environment interrelations, socio-cultural aspects: A dimension in design*. M.sc., faculty of engineering, Cairo university.
- Sheppard, R. & Cizek, P. (2008).** *The ethics of Google Earth: Crossing thresholds from spatial data to landscape visualization*. Journal of Environmental Management, vol. 16, pp.1-16.
- Sheppard, R. & Lewis,J.(2006).** *Culture and communication: Can landscape visualization improve forest management consultation with indigenous communities?.* Landscape and Urban Planning, vol.77, pp.291–313
- Sheppard, S., et al., (2005).** *Computer-based visualization of forest management*. BC Journal of Ecosystems and Management.  
[http://www.forrex.org/jem/ISS26/vol5\\_no2\\_art2.pdf](http://www.forrex.org/jem/ISS26/vol5_no2_art2.pdf)
- Sheppard, R. & Meitner, M. (2005).** *Using multi-criteria analysis and visualization for sustainable forest management planning with stakeholder groups*. Forest Ecol. Manage, vol.207 (1–2), pp.171–187.
- Sheppard, R. (2005).** *Validity, reliability and ethics in visualization, Visualization in landscape and environmental planning*, Taylor & Francis: New York, pp. 79–97.

---

---

## References

---

---

**Sheppard, S.,(2001).** *Guidance for crystal ball gazers: Developing a code of ethics for landscape visualization.* Landscape & Urban planning (special issue), vol. 54, pp.183-199.

**Sheppard, S.R.J., (2000).** *Visualization software: bringing GIS applications to life.* GEOEurope, vol.12 (3), pp.28-30.

**Sheppard, S. (1989).** *Visual Simulation: A User's guide for architects, engineers and planners.* New York, NY: Van Nostrand Reinhold, pp. 55-58, and pp. 76-96.

**Shinozaki, M. et, al. (2007).** *Digital Platform for Collaborative Urban Landscape Design using Google Earth,* Real Corp 007 proceedings, Vienna, pp.330-345

**Silva, J., Serdoura, B., &Pinto, P. (2006).** *Urban Rivers as Factors of Urban Disintegration.* 42nd ISoCaRP Congress Conference, pp.3-14.

**Silva, J., et al. (2003).** *Classification of the aesthetic value of the selected urban rivers. Methodology.* Project Deliverable 4-2, URBEM Project, CESUR, IST, Lisbon.

**Simonič, T. (2003)** *Preference and perceived naturalness in visual perception of naturalistic landscapes.* Zb. Bioteh. fak. Univ. Ljubl., Kmet., vol.81 (2), pp369-38.

**Smith A., et al. (2002).** *Online Participation: The Woodberry Down Experiment.* Available at [http://www.casa.ucl.ac.uk/working\\_papers/paper60.pdf](http://www.casa.ucl.ac.uk/working_papers/paper60.pdf) 02.25.2007

**Smith, C. et,al., (1995).** *Recreation and tourism As a catalyst for urban waterfront development,* USA: Praeger.

**SMURF (2003).** *SMURF Project Methodology and Techniques.* Produced by the Environment Agency, King's College London, University of Birmingham & H R Wallingford.

**Steiner, F. (2008).** *RIVER+CITY+LIFE: A Guide to Renewing Toronto's Lower Don Lands.* Stoss Landscape Urbanism, pp. 18-23.

**Stellingwerff, M. (2005).** *Virtual Context - investigating the characteristics and opportunities of digital visualization media for situated approaches to architectural design in an urban environment.* PHD thesis at technische Universiteit Eindhoven. URL. [http://www.bk.tudelft.nl/users/stelling/internet/thesis/stellingwerff\\_thesis.pdf](http://www.bk.tudelft.nl/users/stelling/internet/thesis/stellingwerff_thesis.pdf).

---

---

## References

---

---

- Sten, H. & David C. (2005).** *Citizen participation and Internet.* Computers, environment and urban systems, vol.29, pp.617–629.
- Steven, H. et al., (2006).** *Comprehensive planning and citizen participation.* Board of Regents of the University of Wisconsin System.
- Stevens, Q. (2003).** *Australian waterfronts: Improving our edge.* School of geography planning and architecture. University of Queensland
- Stoltman, A., et al. (2007).** *Computer visualization of pre-settlement and current forests in Wisconsin.* Forest Ecology and Management, vol.246, pp135–143.
- Surendra N., et al.(2008).** *The latent structure of landscape perception: A mean and covariance structure modeling approach.* Journal of Environmental Psychology, vol. 28, pp.339–352.
- Sunesson, K. (2008).** *Virtual Reality as a new tool in the city planning process.* Tsinghua science and technology. Vol. 13, pp255-260.
- Swanwick, C. (2002).** *Landscape character assessment.* The Countryside Agency, John Dower House, England and Scotland, PP.1-96.
- Tessa H., & Lammeren, R. (2005).** *The need for realistic visualizations in participatory spatial planning.* Landscape and urban planning, vol. 51, pp55-77.
- Tetsushi A. (2005).** *Reclaiming urban riverfront in osaks* , MSC. of architecture, Dalhousie university canada.
- Thagard, P. (2005).** *Mind: introduction to cognitive science.* Cambridge, MA: The MIT Press.
- Thomas, R., et al. (2000).** *Cultural and developmental comparisons of landscape perceptions and preferences.* Environment and behavior vol. 32.pp323.
- Thompson, E. (2006).** *Diversity in Virtual Reality Landscape Modelling.* –In: Buhmann, E., Ervin, S. M., Jørgenson, I. & Strobl, J. (Eds.), Trends in Knowledge- Based Landscape Modeling. Proceedings at Anhalt University of Applied Sciences 2006. – Wichmann, Heidelberg: 128-137.
- Thompson E., Horne, M. & Fleming, D. (2006).** *Virtual Reality Urban Modelling – An Overview.* – CONVR2006 6th Conference of Construction Applications of Virtual Reality, Orlando, Florida, USA, pp 212-218.
- Tress, G., Tress, B., (2003).** *Scenario visualization for participatory landscape planning—a study from Denmark.* Landscape Urban Plann., vol.64, pp. 161-178.

---

---

## **References**

---

---

- Treib, M (2008).** Representing landscape architecture. Taylor & Francis.
- Tufte, E. (1997).** *Visual Explanations: Images and Quantities, Evidence and Narrative.* Cheshire, CT: Graphics Press.
- Tweed, C. (2003).** *Visualization tools to Aid public understanding of new developments in urban historical areas.* SUIT project in the EU program energy, environment and sustainable development.
- Wada, Y. et al., (2006).** *Resident evaluation of a waterside environments.* Water Practice & Technology Vol 1 No 1, pp.1-9.
- Walz, A. et al. (2008).** *Virtual Worlds—Real Decisions: Model- and Visualization-based Tools for Landscape Planning in Switzerland.* Mountain research and development Vol. 28, pp.122-127.
- Wang, Z. (2007).** *Rejuvenation of the open space of urban water front and enlightenment of our country.* Architectural Journal, (7), 15-17.
- Warburton, M. (2007).** *The Public Trust Doctrine.* The Institute for Inquiry acknowledges and encourages, pp.1-9
- Ward, L. and Russell, J. (1981).** *Cognitive set and the perception of place.* Environment and Behavior, vol.13, pp.610-632.
- Warren, B. & Tiedtke, S. (2006).** *What role does visualization play in communication with citizens?.* Proceedings at Anhalt University of Applied Sciences Trends in Real-Time Landscape Visualization and Participation. Wichmann Verlag, Heidelberg.
- Wates, N. (2000).** *The community planning handbook.* London: Earthscan Publications, Ltd.
- Webler, T. Tuler, S. & Krueger, R. (2001).** *What is a good public participation process? Five perspectives from the public.* Environmental management, vol. 27(3), pp. 435-450.
- Webler, T. et al. (1995).** *Public Participation in Impact Assessment: A Social Learning Perspective.* Environmental Impact Assessment Review vol.15(5), pp.443-463.
- Williams, M., (2004).** *Sustainable place making in waterfront revitalization,* Australian Planner, Vol. 41 No.2, pp.30.
- Whyte, J. (2002).** *Virtual reality and the built environment.* Architectural Press, Oxford.
- Whyte, H. (2000).** *How to turn a place around.* Projects for Public Space Inc.
- Wherrett, R. (2000).** *The perceptual validity of landscape visualization:*

---

---

## References

---

---

*current issues and future research*. 4th International Conference on Integrating GIS and Environmental Modeling. Banff, Alberta, Canada, PP.77-87.

**Willis, A. (2008)**. *Effective use of citizen participation in planning decision making processes*. Master thesis in city planning, Morgan State Univ., USA.

**Wissen, U. et al. (2008)**. *Approaches to integrating indicators into 3D landscape visualizations and their benefits for participative planning situations*. Journal of Environmental Management, vol.89, pp.184–196.

**Wissen, U., & LANGE, W. (2005)**. *Optimizing the visualization of 3D-Information for Participative Planning of Landscape Development Concepts*. In: E. Buhmann, P. Paar, I. Bishop & E. Lange (eds.): Trends in real-time landscape visualization and participation. Wichmann, Heidelberg, pp237-245.

**Vandewalle & Associates,(2007)**. *Jefferson Downtown & Riverfront Redevelopment Plan*.

**Yuan, L. (2005)**. *Designing an Urban Waterfront: A Case Study of the Portlands, Toronto*. Master of urban planning, Queen's University Kingston, Ontario, Canada.

**Zeisel, J. (1981)**. *Inquiry by design, tools for environmental-behavior research*. Brooks-cole publishing co., California, USA.

**Zhang, H., et al., (2008)**. *Evaluation on wetland ecosystem service in Liaoning Province*. Resources Science, 30(2), 267-273.

**Zhang, L. (2002)**. *An evaluation of an urban riverfront park Spokane, Washington experiences*. Master of science, Faculty of Washington State University, USA.

**Zube, E., et al., (1987)**. *Perceptual landscape simulations:History and prospect*. Landscape journal, Vol. 6, No. 1, pp. 62 - 80.

**Zube, E., et al., (1982)**. *Landscape perception: research, Application and theory*. Landscape planning, vol.9, pp. 1-33.

### Web references:

-[http://www.charlestonbusiness.com/pub/4\\_27](http://www.charlestonbusiness.com/pub/4_27) -accessed June 2007

-<http://www.riversaccess.org/pages/pv.asp?p=rac97&v=0&fsize=0>-accessed Mai, 2007

-<http://www.maribyrnong.vic.gov.au>

-<http://en.wikipedia.org>

---

---

## *References*

---

---

- <http://google.co.uk>
- [http://depts.washington.edu/open2100/pdf/2\\_OpenSpaceTypes/Open\\_Space\\_Types/waterfront.pdf](http://depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/waterfront.pdf)
- <http://www.macaulay.ac.uk/ccw/task-two/evaluate.html>
- <http://www.macaulay.ac.uk/ccw/task-two/preference.html>
- <http://www.macaulay.ac.uk/ccw/task-three/vtools.html>
- <http://www.neworiverfront.com>(accessed sep.2008)
- <http://www.reinventingthecrescent.org/>
- <http://www.urbanSimulation.com>
- <http://www.lafoundation.org/>
- <http://www.asla.org/>
- [http://www.hsanhalt.de/CONTENT/la/mla\\_fl/conf/pdf/conf2001/a\\_lange.pdf](http://www.hsanhalt.de/CONTENT/la/mla_fl/conf/pdf/conf2001/a_lange.pdf).
- [http://www.harmonicop.info/\\_files/\\_down/HarmoniCOPinception.pdf](http://www.harmonicop.info/_files/_down/HarmoniCOPinception.pdf)
- [http://www.agile-secretariat.org/Conference/greece2004/papers/3-2-4\\_Triantafyllos.pdf](http://www.agile-secretariat.org/Conference/greece2004/papers/3-2-4_Triantafyllos.pdf)
- [http://www.uic.edu/cuppa/cityfutures/papers/webpapers/cityfuturespapers/session5\\_3/5\\_3visualizingurban.pdf](http://www.uic.edu/cuppa/cityfutures/papers/webpapers/cityfuturespapers/session5_3/5_3visualizingurban.pdf)
- <http://www.3dnature.com/>
- Google. 2005. "Google Earth (beta): A 3D interface to the planet."  
<http://earth.google.com/>
- <http://www.nyc.gov>
- <http://en.wikipedia.org/wiki/River>
- <http://www.Nysriverfronts.org>
- <http://www.glc.org/wiconference/benefits.html>
- <http://www.theanacostiawaterfront.com>
- <http://newarksriver.files.wordpress.com>
- <http://www.civicdesigncenter.org>
- <http://www.nashville.gov/parks/riverfront>.
- <http://www.crpark.org>
- <http://www.waterfrontoronto.ca>
- <http://www.duesseldorf-tourismus.de>
- <http://www.louisvillewaterfront.com>
- <http://www.hargreaves.com>
- <http://www.nashville.gov/parks/riverfront>
- <http://dcbiz.dc.gov>
- <http://www.thefreedictionary.com>

---

---

## ***References***

---

---

- <http://www.delawareriverwaterfrontcorp.com>
  - <http://www.greatrivers.info/projects>
  - <http://accuracyandaesthetics.com/history>
  - <http://www.communityviz.com>
  - [http://lrg.ethz.ch/visulands/english/content/lodtest/lodtest\\_online.swf](http://lrg.ethz.ch/visulands/english/content/lodtest/lodtest_online.swf)
  - <http://www.vrealities.com/hmd.html>
  - <http://www.vrealities.com/hmd.html>
  - <http://www.octaga.com/index.php>
- Google Earth photos

## **Conferences**

- [www.masterla.de/conf/pdf/conf2005](http://www.masterla.de/conf/pdf/conf2005)
- Presentation of Professor Chris De Sousa at the 2005 Wisconsin riverfront revitalization conference: Benefits of riverfront Revitalization– Economic, Social and <http://www.glc.org/wiconference/benefits.html>
- [http://www.environment.sa.gov.au/mapland/sicom/pdfs/sid2005/pietsch\\_paper.pdf,2005](http://www.environment.sa.gov.au/mapland/sicom/pdfs/sid2005/pietsch_paper.pdf,2005)
- [http://www.hsanhalt.de/Content/la/mla\\_fl/conf/pdf/conf2002/06nothhpdf](http://www.hsanhalt.de/Content/la/mla_fl/conf/pdf/conf2002/06nothhpdf)







## تقديم

في بدايات القرن الواحد والعشرين اتسم علم وفن تنسيق المواقع بثلاثة اتجاهات جديدة، أولها الاتجاه نحو إعادة احياء وتجديد تنسيق واجهات الأنهار التي عانت من الإهمال لفترات طويلة بما يعيد لعامة الجمهور سهولة الوصول والتمتع بصفاف الأنهار، وثانيها الاتجاه لتطوير صناعة القرار من خلال تفعيل دور العامة من الجمهور في المشاركة في صنع القرارات التصميمية في معظم مراحل تنسيق الموقع. أما الاتجاه الثالث فهو اتساع نطاق استخدام تكنولوجيا الحاسب الآلي في عمليات تنسيق الموقع وبالأخص في عمليات محاكاة الأفكار التصميمية.

من مراجعة الاتجاهات الثلاثة السابقة ظهرت الفكرة الرئيسية للبحث، والتي تمثلت في فرضية انه اذا ما تم استخدام عمليات المحاكاة بواسطة الحاسب الآلي فانه يمكن عمل طفرة في عملية المشاركة الشعبية في تقييم البدائل التصميمية لعمليات تنسيق الموقع وبالأخص في إعادة تنسيق وتجديد واجهات ومطلات الأنهار.

## المشكلة البحثية

علي الرغم من تزايد الاتجاه في السنوات القليلة الماضية في مصر لإعادة تطوير ضفاف نهر النيل، تماشياً مع الاتجاه العالمي الحديث لإعادة تطوير ضفاف الأنهار بما يزيل العوائق التي تحول بين وصول العامة من الجمهور لصفاف الأنهار والتي هي حق أصيل لهم، وعلي الرغم من المشروعات القليلة للغاية التي تم تنفيذها في هذا الصدد، فان هناك مشروعات اخري مازالت تحت الدراسة ولكنها أغفلت وتجاهلت دور العامة من الجمهور أنفسهم في ضرورة مشاركتهم الرأي والمشورة في إعادة تطوير نهر النيل، الأمر الذي يؤدي لظهور مشاكل في تنسيق الموقع لواجهة النهر نظراً لاغفال تفضيلات واحتياجات جمهور المستعملين أنفسهم.

يرجع ذلك لأن معظم الأبحاث السلوكية والبيئية لا تعتمد بشكل مباشر وكامل علي اختبار استجابة الجمهور لعمليات تنسيق الموقع لواجهات ومطلات الانهار، أو افتقادها للوسائل المناسبة التي يمكن من خلالها مشاركة العامة من الجمهور في تقييم البدائل التصميمية لتنسيق الموقع من خلال اختبار خبراتهم وميولهم واحتياجاتهم. لذلك فيمكن القول أنه هناك فجوة بين جمهور المستخدمين وبين معماريي ومصممي تنسيق المواقع بالأخص في المناطق الحضرية في طريقة فهم الأفكار والمفاهيم التصميمية. ولهذا سوف يسعى البحث إلي وضع منهج لحل هذه المشكلة.

## الأهداف البحثية

مما سبق يمكن القول بأن إزالة الفجوة بين جمهور المستخدمين وبين المصممين يمكن ان يتم من خلال ايجاد وسيلة لتوضيح الافكار التصميمية وتوصيلها بصورة سهلة ومبسطة للعامة من غير المتخصصين لادراك المفاهيم التصميمية للمتخصصين باستخدام التقنيات الحديثة للحاسب الآلي والتي من أهمها تقنيات المحاكاة والتي يمكن من خلالها مشاركة العامة من الجمهور في تقييم الخيارات التصميمية باستخدام تقنيات الواقع الافتراضي.

ولهذا فإن الهدف الرئيسي للبحث هو:

" تعزيز مشاركة الجمهور في عملية تقييم البدائل لتجديد واعادة تنسيق ضفاف نهر النيل باستخدام التقنيات الحديثة للمحاكاة باستخدام الحاسب الآلي ثم اختبار هذا المنهج للوصول للبدائل التصميمي الأمثل".

ويعد الوصول لهذا الهدف منها لوضع تصور لمشاركة العامة في أي مشروع يختص بتطوير تنسيق الموقع لمطلات الأنهار من خلال تقييم العامة من الجمهور لمجموعة من البدائل التصميمية تبعا لمجموعة من المعايير التصميمية التي تم ترتيبها ووضع قيم نسبية لها من قبل مجموعة من المتخصصين والتي تمثل منهجية مرنة يمكن استخدامها باختلاف ظروف وطبيعة واجهات و ضفاف الأنهار.

## **محتويات البحث**

نحو تحقيق الهدف الرئيسي للبحث، تعتمد المنهجية الرئيسية علي ثلاث محاور رئيسية تشمل:

### **الجزء الأول: المدخل النظري:**

ويركز ذلك الجزء علي تعريف بواجهات الأنهار وعمليات التطوير والتجديد الخاصة بتنسيق الموقع لضفاف الأنهار، ثم دراسة علاقة الانسان بتلك العمليات من خلال ادراكه وتفضيلاته واحتياجاته، ثم دوره في عملية المشاركة في عمليات التطوير تلك واخيرا مراجعه التقنيات الي يمكن ان تسهل عملية المشاركة من خلال تقنيات التخيل او التصور المستقبلي لعمليات التصميم.

ولذا فيحتوي هذا المدخل علي أربعة فصول كما يلي:

### **الفصل الأول: تطوير واجهات الأنهار نحو سهولة وصول العامة لضفاف الأنهار:**

يناقش هذا الفصل تزايد الاهتمام العالمي بتطوير وتجديد واجهات ومطلات الأنهار خاصة بما يتعلق بعمليات تنسيق الموقع لضفاف الأنهار من خلال لقاء الضوء اولا علي الأنهار في البيئة الطبيعية والبيئة المشيدة وعلاقة الانسان بالنهر ومن ثم تعريف بواجهات الأنهار وانواعها ثم عمليات التطوير والتجديد لتنسيق مواقع مطلات الأنهار بما يحقق سهولة وصول عامة المستخدمين واستمتاعهم بفراغات الأنهار كحق اصيل لهم، كذلك استعراض الاسس والطرق المختلفة لتطوير ضفاف الأنهار وكذا عناصر تنسيق الموقع لمطلات الأنهار.

### **الفصل الثاني: رصد وتقييم استجابة العامة من المستخدمين لتفاعلهم مع تنسيق الموقع**

#### **لمطلات الأنهار:**

يناقش هذا الفصل استجابة الجمهور للبيئة العمرانية لواجهات الأنهار من خلال رصد تفاعلهم مع عناصر تنسيق الموقع لمطلات الأنهار من خلال دراسته عمليات الادراك لعناصر تنسيق الموقع، ودراسة الاطار العام للعلاقة الثلاثية بين النهر والبيئة الحضرية والانسان، وصولا لتفضيلات الجمهور للبيئة العمرانية للنهر ثم احتياجاتهم في الفراغات الملاصقة لضفاف الأنهار ، ومن ثم العناصر المؤثرة في ايه عمليات تقييم لتنسيق المواقع لمطلات النهر.

### **الفصل الثالث: مشاركة العامة في تقييم بدائل تجديد وتطوير تنسيق الموقع لمطلات الأنهار:**

يناقش هذا الفصل مفهوم المشاركة الشعبية في تطوير البيئة العمرانية وتطوير تنسيق الموقع بها ودراسة المشاركين في عمليات اتخاذ القرار في العمليات التصميمية لتنسيق الموقع مع بيان الأهمية والمميزات وأوجه القصور والمشكلات في عمليات المشاركة الشعبية، مع استعراض لبعض الوسائل الحديثة للمشاركة ومراحلها ومستوياتها وصولاً لدور المشاركة الشعبية في اتخاذ القرارات التصميمية الخاصة بتنسيق موقع مطلات الأنهار من خلال تقييم جمهور المشاركين للبدائل التصميمية واستعراض وسائل التقييم كمدخل لاختيار أسلوب التقييم المناسب

### **الفصل الرابع: التصور والتخيل المستقبلي لعمليات تجديد وتطوير تنسيق الموقع لمطلات الأنهار:**

يناقش هذا الفصل مفهوم (visualization) أو التصور والتخيل بصفة عامة وطرق وتقنيات ومستويات هذا المفهوم في عمليات تنسيق الموقع وعلاقة ادراك الانسان بالبيئة الواقعية وادراكه للبيئة الافتراضية أو التخيلية وصولاً لأهمية دور هذا المفهوم في سهولة نقل الأفكار التصميمية للمتلقي كوسيلة لتفعيل دور ومشاركة الجمهور في عمليات تنسيق الموقع خاصة في تقييم عمليات تطوير تنسيق الموقع لمطلات الأنهار.

### **الجزء الثاني: المدخل التحليلي:**

ويعني هذا الجزء بفرضية ان استخدام اسلوب المحاكاة بالحاسب الالي يمكن ان يكون من افضل الوسائل لتفعيل مشاركة العامة في تقييم عمليات تجديد وتطوير تنسيق الموقع لمطلات النهر كمدخل لوضع منهجية تحقق ذلك، من خلال أربعة فصول:

### **الفصل الخامس: مجال المنهج- مراجعة وتحليل الأمثلة العالمية لتطوير وتجديد تنسيق الموقع لمطلات الأنهار:**

في هذا الفصل يتم مراجعة وتحليل العديد من الأمثلة العالمية التي اهتمت بتطوير تنسيق الموقع لمطلات الأنهار بما يحقق إعادة فتح تلك الفراغات أمام عامة المستخدمين منها ما هو قائم ومنها ما هو تحت الدراسة بهدف استخلاص واستنباط عناصر تنسيق الموقع لمطلات الأنهار كذلك محاولة تحليل تلك الأمثلة للوصول للاعتبارات التصميمية الواجب توافرها في مثل هذه المشروعات العمرانية والتي يمكن استخدامها كمعايير تقييم للمشروعات المماثلة ولكونها تمثل معايير يمكن ان تطبق في عمليات المشاركة الشعبية في تقييم تلك المشروعات.

### **الفصل السادس: متغيرات المنهج- عناصر تنسيق الموقع لمطلات الأنهار ومعايير التقييم الخاصة بتلك العناصر:**

يأتي هذا الفصل لتحليل الأمثلة السابقة لتحديد مكونات وعناصر تنسيق الموقع الخاصة بمطلات النهر مع تحليل جوانبها واسسها التصميمية ومؤشرات تقييمها، وكذلك تحديد المعايير الرئيسية والفرعية التي يمكن من خلالها تقييم أداء مكونات وعناصر تنسيق الموقع، ومن ثم وضع مصفوفة تقييم بين المعايير وبين العناصر التصميمية لتنسيق الموقع، والتي لها دور رئيسي في المنهج المقترح.

**الفصل السابع: أداة المنهج- استخدام اساليب المحاكاة بواسطة الحاسب الآلي في تقييم عناصر تنسيق الموقع لمطلات الأنهار:**

يتم في هذا الفصل تحليل أحدث تقنيات المحاكاة بواسطة الحاسب الآلي والتي يمكن استخدامها في تقييم البدائل التصميمية لعناصر تنسيق الموقع لمطلات الأنهار مع وضع معايير اختيار التقنية المناسبة للمنهج المقترح واستعراض برامج الحاسب التي يمكن استخدامها في هذا المنهج ومن ثم عمل مقارنة للوصول للتقنية المناسبة. ومن هنا يتم شرح الأسلوب والمنهجية التي سيتم عن طريقها بناء المجسمات التي تمثل البدائل التصميمية وطريقة تحويلها لشكل مناسب يساعد عامة المشاركين في التفاعل مع تلك البيئة الافتراضية التخيلية مما يؤثر بشكل كبير علي سهولة استجاباتهم ومشاركاتهم في عمليات تقييم البدائل التصميمية لتطوير وتجديد عناصر تنسيق موقع مطلات الأنهار.

**الفصل الثامن: المنهج- استخدام تقنيات محاكاة الواقع الافتراضي لتحسين أداء ومشاركة العامة في تقييم البدائل التصميمية لتجديد وتطوير تنسيق الموقع لمطلات الأنهار.**

يجمع هذا الفصل جميع النتائج من الفصول السابقة لتطوير المنهج المقترح لتحسين أداء ومشاركة العامة في اتخاذ القرارات التصميمية من خلال تقييم البدائل التصميمية المقترحة لتطوير وتجديد عناصر تنسيق الموقع لمطلات الأنهار من خلال استخدام تقنيات محاكاة الواقع الافتراضي بواسطة الحاسب الآلي التي تعطي الامكانية للمشاركين -علي الرغم من كونهم غير متخصصين- للتفاعل القوي مع تلك النماذج الافتراضية التي تعطي المتلقي الفرصة للتجول التخيلي بنفس الاحساس مع البيئة الواقعية مما يعطيه الفرصه علي تخيل الافكار التصميمية بصورة أقرب ما تكون للواقعية.

### **الجزء الثالث: الدراسة التطبيقية:**

والتي تأتي للتحقق من مصداقية المنهج المقترح واختبار قدراته علي تحقيق هدف البحث، من خلال فصلين:

**الفصل التاسع: التحقق من مصداقية المنهج المقترح**

من خلال استخدامه كمنهج لمشاركة العامة في تقييم مجموعة من البدائل التصميمية لاعادة تطوير وتجديد بعض عناصر الموقع لفراغ حديقة الجزيرة الموجودة بفراغ نهر النيل بالقاهرة الكبرى والذي يحتوي علي بعض المشاكل التصميمية التي بتطويرها يمكن الوصول لبدل أمثل لتطوير تنسيق الموقع لتلك الحديقة.

ويبدأ ذلك الفصل بمراجعة لفراغ نهر النيل ودوره في حياة المصريين و تحليل تنسيق الموقع للبيئة العمرانية لضاف نهر النيل واختيار حديقة الجزيرة كفراغ سيتم استخدامه في التحقق من مصداقية المنهج وسيتم تحليل هذا الفراغ تبعاً للعناصر التي تم تحديدها كعناصر تنسيق موقع مطلات الأنهار من خلال المؤشرات والمعايير التصميمية التي تم تحديدها أيضاً في الفصول السابقة لبيان أوجه القصور والمشكلات في تصميم ذلك الفراغ، ومن ثم تبدأ الدراسة التطبيقية بتحديد مجموعة من الأهداف لتطوير ذلك الفراغ ووضع ثلاثة بدائل تصميمية مقترحة لعصريين من عناصر تنسيق الموقع يعان أهم العناصر وهما حافة النهر والممشي الموازي لضاف النهر، مع تثبيت باقي العناصر التصميمية في تلك البدائل.

يتم بعد ذلك بناء مجسمات لتلك البدائل وتصديرها في الصورة المقترحة للواقع الافتراضي تبعاً للمنهجية المقترحة، لاستخدامها في استطلاع رأي مجموعة مختارة من عامة المستخدمين من خلال بناء استبيان قائم على المعايير التصميمية التي تم تحديدها في المنهج المقترح وجعل المشاركين في الاستبيان يتفاعلون مع تلك النماذج التي تمثل محاكاة للواقع الافتراضي والاجابة على اسئلة من شأنها الوصول للبدائل الأمثل وكذلك الحصول على تقييمات لعناصر تنسيق الموقع التي سيتم تطويرها وتحديثها

وبعد اجراء الاستبيان سيتم جمع المعلومات وتحليلها احصائياً عن طريق برنامج (SPSS) والخروج بالنتائج مما يسهم في الوصول لبدائل مناسبة ثم الوصول منه للبدائل الأوفق أو الأمثل.

ومن هنا تثبت مصداقية المنهج المقترح.

### **الفصل العاشر: الإضافة البحثية والتوصيات:**

في هذا الفصل يتم تناول النتائج وكذلك المنهج المقترح والذي يمثل الإضافة البحثية والذي تم تأكيده بتصميم برنامج باستخدام تكنولوجيا الحاسب الآلي يمكن استخدامه لتقييم البدائل التصميمية لأي تطوير أو تجديد لأية عناصر تنسيق الموقع لمطلات الأنهار فضلاً عن مرونة ذلك البرنامج الكبيرة التي تمكنه من تقييم أي عدد من البدائل التصميمية لأي عنصر من عناصر تنسيق الموقع لمطلات الأنهار في أي مكان في العالم نظراً لإمكانية تحديد المعايير التصميمية ومعاييرها النسبي المحدد من قبل المختصين والخبراء وهذا البرنامج يعطي في نهاية التقييم احصاء نسبي لنسب تقييم البدائل لكل مشارك مع إمكانية الحصول على تقييم احصائي لجميع المشاركين ونسب تقييمهم لكل بديل.

في نهاية هذا الفصل يتم طرح بعض التوصيات المستقبلية المقترحة لأبحاث مشابهة.





وَقِيلَ يَا قَوْمِ إِيَّاكُمْ أَنِ احْكُمُوا  
بَيْنَنَا وَبَيْنَ قَوْمِكُمْ فَسُئِلُوا  
فَمَنْ حَكَمُوا بَيْنَنَا وَبَيْنَ قَوْمِكُمْ  
فَإِنَّ قَوْمَهُمْ هِيَ الْقَوْمُ الظَّالِمِينَ







جامعة بورسعيد  
كلية الهندسة ببورسعيد  
قسم الهندسة المعمارية  
والتخطيط العمراني

استخدام تقنيات المحاكاة الافتراضية بواسطة الحاسب الآلي في تقييم  
تنسيق الموقع لمطلات النهر  
كمنهجية نحو مشاركة العامة في تطوير ضفاف نهر النيل

رسالة مقدمة من  
مهندس / أحمد محمد صالح خضر

المدرس المساعد بقسم الهندسة المعمارية بالاسماعيلية- جامعة قناة السويس  
للحصول علي درجة دكتوراه الفلسفة في العمارة

يعتمد من لجنة الممتحنين:

الأستاذ الدكتور/ هشام سامح حسين سامح

أستاذ العمارة وتكنولوجيا البناء - كلية الهندسة - جامعة القاهرة

(محكم)

الأستاذ الدكتور/ أحمد رضا عابدين

أستاذ العمارة وتكنولوجيا البناء - كلية الهندسة - جامعة القاهرة

(محكم)

الأستاذ الدكتور/ مصطفى محمد عبد الحفيظ

رئيس قسم الهندسة المعمارية والتخطيط العمراني- كلية الهندسة ببورسعيد- جامعة بورسعيد

(مشرف ومحكم)

الأستاذ الدكتور/ عصام الدين بدران

أستاذ التصميم العمراني - وكيل كلية الهندسة بالاسماعيلية - جامعة قناة السويس

(مشرف ومحكم)

كلية الهندسة، جامعة بورسعيد  
بورسعيد - جمهورية مصر العربية  
يوليو، ٢٠١٠





جامعة بورسعيد  
كلية الهندسة ببورسعيد  
قسم الهندسة المعمارية  
والتخطيط العمراني

## استخدام تقنيات المحاكاة الافتراضية بواسطة الحاسب الآلي في تقييم تنسيق الموقع لمطلات النهر كمنهجية نحو مشاركة العامة في تطوير ضفاف نهر النيل

رسالة مقدمة من

مهندس / أحمد محمد صالح خضر

المدرس المساعد بقسم الهندسة المعمارية بالاسماعيلية- جامعة قناة السويس  
للحصول علي درجة دكتوراه الفلسفة في العمارة

إشراف

إ.د. رويده رضا كامل  
أستاذ بقسم الهندسة المعمارية  
كلية الهندسة - جامعة القاهرة

إ.د. مصطفى محمد عبد الحفيظ  
أستاذ ورئيس قسم الهندسة المعمارية  
كلية الهندسة ببورسعيد - جامعة بورسعيد

إ.د. عصام الدين بدران ابو العينين

أستاذ التصميم العمراني ووكيل كلية الهندسة  
كلية الهندسة بالاسماعيلية - جامعة قناة السويس

يوليو ٢٠١٠





جامعة بورسعيد  
كلية الهندسة ببورسعيد  
قسم الهندسة المعمارية  
والتخطيط العمراني

استخدام تقنيات المحاكاة الافتراضية بواسطة الحاسب الآلي في تقييم  
تنسيق الموقع لمطارات النهر  
كمنهجية نحو مشاركة العامة في تطوير ضفاف نهر النيل

رسالة مقدمة من

مهندس / أحمد محمد صالح خضر

المدرس المساعد بقسم الهندسة المعمارية بالاسماعيلية- جامعة قناة السويس  
للحصول علي درجة دكتوراه الفلسفة في العمارة

كلية الهندسة، جامعة بورسعيد  
جمهورية مصر العربية  
يوليو ٢٠١٠