An Approach to Conserve Gaza Architectural Heritage through Digital Technology

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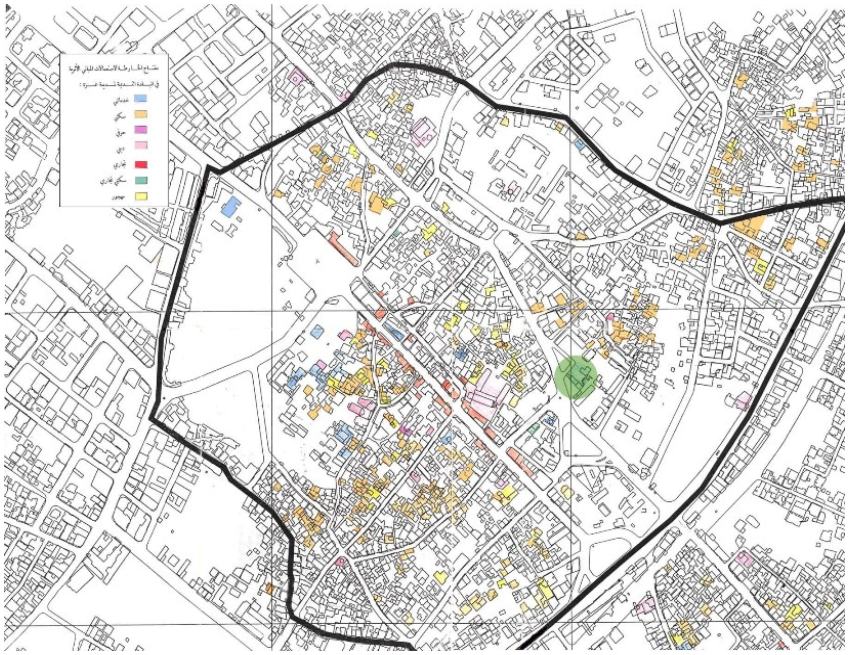
1. Introduction

Heritage is considered as one of the constituents that preserve culture and national identity of any community. This is because heritage is a witness of accumulating experiences of that community. During recent years, architectural styles have changed dramatically in our country. Modern and western styles of housing prevailed so much that the Palestinian heritage touches nearly disappeared. In addition, many of the historic buildings in Gaza City have been destroyed due to the lack of public awareness about the importance of this heritage. This situation created the need for restoring the inveterate Palestinian culture and heritage through 3D Visualizing of Architectural Heritage.



1. The boundary of the Old City of Gaza with the most prominent historic buildings.

Awareness of cultural heritage through publicizing the digitized simulation of this heritage by using virtual reality and 3D modelling and animation techni-ques would help in preserving it and achieving balanced environment which reflects both originality of past and modernity of contemporaneity.
In the next few years it will be a common practice for archaeologists to commission highly accurate 3D computer models of their sites as it is for them to order radiocarbon dating of their organic finds or other tests. The Project can take advance of the recent developments in computer technologies which are now available on a personal computer.
Today the challenge is not so much to gather the data needed for a virtual reality model, but to integrate the information and computer resources already available in a

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a scientifically accurate and coherent way. This Project is intended to develop three Dimensional models for historic buildings in order to give a virtual idea about the characteristics of these buildings in ancient Gaza. The Project will attempt to instruct the participants on being aware of the multimedia systems and tools which can operate a digital documentation and reconstruction of the historic buildings in Gaza City.

2. Summary of the Project

Center for Architectural Heritage (CAH) at the Islamic University of Gaza (IUG) proposes to support training students of the Architectural Department and fresh graduate architects in acquiring the information required for digitized 3D visualization of the Old City of Gaza. It is a scientific and technical system that links the social sciences with information technologies. Such a Project is to help in increasing the awareness of the Palestinian community towards cultural heritage as a major step in the efforts to conserve this heritage. In the first instance, the outcome of this Project will target the group of people and institutions who are more concerned with our cultural heritage. The inhabitants of the Old City are an important factor who can significantly contribute towards preserving histrionic buildings and properties, as they are in immediate contact with this heritage. Another benefit of this project is building capacity through improving the skills of those who are considered as good candidates for designing and awareness products professionals. The Project will also overcome the current shortage in the public awareness which is mainly focusing on a sector of the society mostly pedagogic and intellectual. This sector of the society does not necessarily have the adequate influence on the architectural conservation.
Upon the completion of this program, the participants will be prepared to be familiar and qualified to deal with advanced computer software, GIS techniques and management facilities, public awareness, and cultural heritage skills. The paper identifies the objectives of supporting this program that would improve the capabilities of the large number of architects that missed the chance to enhance their knowledge about the values of protecting our cultural identity. The 3D digitized visualization program will lead to full acquaintance and mastering of heritage values and reconstructing and documenting the architectural heritage of Gaza City by computer techniques.

3. Project justifications

Traditionally, reconstructing and documenting of historic buildings have been executed as 2D drawings or as simplified three-dimensional models, while with recent computer technology, the recreated buildings are not only constructed in 3D but are

also created in 4-dimensional aspects. Viewers can move through the urban structure in real time or browse the collected information of the case-study allowing for penetrating through several historic periods. The goal of the Project is to develop standards for the collected data from archaeologists, topology, geography, etc. and by presenting different kinds of multimedia in one format. Based on historical 3D models of Gaza City, the participants will restore the urban structures of the Old City in different historical periods to facilitate the understanding and analysis of the evolution of the City identity. The intention is also to enable the students to reveal the weaknesses and strengths of each computer technique applied in the program. The practical outcome of the Project is to boost the respect for historical places and ancient buildings via understanding the specifics and characteristics of the studied culture. In addition, it can represent positive cultural exchanges; which may support cooperation and dialogue between ethnics.
Historic buildings in Palestine suffer generally from ignorance, destruction, and violations. During the last years, Gaza City lost many historic buildings due to lack of awareness among people who did not simply recognize the value of such buildings.

The importance of the proposed program comes from the following ideas:

- Most of historic buildings are located in the Old City of Gaza which means that inhabitants there are in immediate contact with historic places. This situation raises the need for public awareness among those inhabitants by using visually approachable tools.
- Through field visits to the Old City of Gaza, destruction and improper use of historic buildings were clear. Public awareness by using advanced digitized reconstruction of historic places has to target inhabitants of the Old City in order to prevent such remaining historic buildings from vanishing.
- Cultural heritage (i.e., monuments, ancient sites and complexes, etc.) has proved to be a fundamental economic resource for a national economy when properly preserved, promoted and managed . Reviving some important missing architectural elements by virtual reality techniques and presenting them in proper historic places will boost the attractiveness of these locations.
- The program will highlight the importance of having a sustainable promotion of cultural heritage and to build up a policy for cultural heritage preservation and enhancement.
- Human is one of the most important factors in preserving cultural heritage which stresses on the need for public awareness in community.

Economic and social promotion of cultural heritage (through tourism) serves also as the basic ground of interactions with the outside world, for intercultural dialogue

2-3. Destruction and improper use of Gaza historic buildings.

4. Project's Objectives

The main aim of this Project is to apply recent computer techniques such as, modelling programs, animation software, and web applications to provide users with a navigable format to simulate and document the cultural heritage in Gaza. Because of Political complications and financial resources difficulties, it is much easer to achieve a virtual reservation of these buildings than reconstructing them in reality. Moreover, employing new technology features to conserve and detect historic buildings is not the only issue in this program; but also it will facilitate developing standards and guidelines for data collections and creating of three dimensional models, as well. These created guidelines and standards will enhance the collaboration between 3D modellers, on one hand, and the archaeologists and architectural historians, on the other.

4. Old City of Gaza. Al-Omary Mosque.

Hence, the opportunity will be given to discover two main sectors; the technical aspect and the theoretical side. As regards the first aspect, it will apply different formats of computer implementations such as, modelling systems, web applications, 3D-browsers, virtual reality, and multimedia programs; in order to produce an efficient navigable format of data and models solutions, and representing the collected data and simulations in advanced and creative way. Regarding the theoretical base, it will elaborate defining data

resources such as historic documents, archaeology reports, and architectural studies; which may provide the participants with integral historic description for building styles, landscape, people habits, etc. Recording and protecting primary documentation resources can be considered as conservation activities.

5. Old City of Gaza. Al-Sayed Hashem Mosque.

This project aims at:

[1] Increasing public awareness towards cultural heritage among inhabitants of the Old City in Gaza;
[2] Building a professional team of trainers who will be responsible for training students and other sectors of the Palestinian community in the field of digitized conservation of cultural heritage;
[3] Establishing cultural heritage values amongst all sectors of community;
[4] Building a strong cadre of male and female engineers in order to help them find job opportunities and/or launch viable handicraft businesses and improving their chances of employability;
[5] Producing digitized heritage awareness material that can be used in public institutions (e.g. schools, universities, ministries, etc.) in order to empower cultural heritage of Palestine. It will also help in restoration of cultural heritage styles as an important component of building design;

Supporting the work of CAH towards public awareness and further development of its cadre of officers.

5. Background

Bonfigli[1] pointed out that "the integration between information technologies and cultural heritage can impact on everyday life, both from the point of view of institutions and of users". Pieraccini[2] also asserted that 3D digitizing technologies are sufficiently developed for extensive application in the field of cultural and architectural heritage.

[1] Bonfigli *et alii* 2004.
[2] Pieraccini *et alii* 2001.

Museums, exhibitions and cultural institutions can now supply new services to access cultural information. The application is based on an infrastructure exploiting innovative technologies. This digital reconstruction will help to preserve part of the city's architectural and cultural heritage, giving life to a distant past as the visualization will be based on archaeological evidence from excavations and accurate historical documents. users can experience what life was like in different historic periods, and it can provide a new perspective for historians. A way to get people interested in the past is highlighting the link of the past with the present by comparing virtual reconstruction of an archaeological site with images of the site as it exists today. Therefore, the virtual conservation of heritage requires technology and knowledge transfer also from areas other than computer science. The integration of such transfers suggests a flexible, modular approach that contradicts the holistic, integral principles of computer-aided architectural design. Recent developments in three-dimensional technologies combined with multimedia databases offer today new possibilities for the integrated and complete description of cultural heritage objects.[3] Traditionally the main application of visualization in architectural design has been the representation of built form, for communicating design ideas (including the visual / geometric specification of forms to be built). The transition form analogue to digital media has been initially restricted to two dimensional representations (line drawings) which matched the limitations of available technology and the priorities of architectural practice. The subsequent addition of the third dimension to two dimensional drawings and the production of photorealistic renderings on the basis of three dimensional models was also geared to efficiency and productivity rather than new forms of expression.[4]

6. Method and Approach

The first step was to gather and communicate as much information as possible about historic buildings for the Old City of Gaza; information, from history to town-planning maps. To do this, in alternative to traditional paper documents, the experimentation will focus on multi-media technologies, for a richest and more comprehensible communication, and on hypertextual technologies, to facilitate the user to achieve a personal opinion about expressed concepts.

The Project will be started on Network technologies based on the Internet. The first step will be the creation of a web site, which, besides giving information and on-line news about the Project, also contain a rich harvest in hyper-media form of data about the urban plan for Old City area. The material will not only be directly available on

[3] Tsirliganis *et alii* 2001.

[4] Mitchell 1992; Mitchell, McCullough 1995.

the Net from every computer connected via Internet, but it will be also possible to spread opinions about it in almost real-time. The web site will becomes in this way a "fulcrum" of discussions, which will be a first important step for interaction.
two FTP sites will be created, accessible from web pages too. The first of these will be dedicated to students and associations with IT expertise; this FTP can contain a Geographic Information system, which can be used to support the formulation of ideas and designs in the area of interest. The other FTP is freely accessible by everybody who wants to download and, eventually, upload documents concerning topics of discussions; this will extend the already active possibility to send messages and documents by electronic mail (E-mail), which will be available in the foot of every web pages. In progress will be also a system to gather and organize citizens opinions through the Net using forms and organizing information in a data-base.
Vast quantities of information lie fallow, because they are not accessible, not connected to each other and not usable because of incompatibilities and proprietary formats. The same work is done over and over again, because of lacking communication. With The CGAHDT Project we will try to collect data and make it accessible for immediate use - and reuse. The concept is an "information warehouse", a database that holds all data in various formats and points to external sources where data can be accessed directly. On the one hand this means more comfort in enquiry, on the other hand it helps to increase quality of data. The best solution is always to get the information from the original source, up to date and without loss of quality. The multitude of software packages and incompatible formats is frightening at first sight and maybe there is no general solution, despite all standardization efforts. But with the technology of the World Wide Web and its open standards there is a common basis to work with. The CGAHDT Project attempts to prove that consequent and continuous work with the digital media is possible with today's methods and resources. Current developments in database technology, like object-oriented and object-relational databases, are going towards diversity in data types and will provide content search in multi-media data. So efficient information retrieval will be possible in non-text based domains. The CGAHDT Project will make it easy to acquire information from various (digital) sources; evaluating and selecting of information and the handling of different data types. In addition, editing and presenting digital representations of architecture and structuring and organizing complex data will be available. And more important than anything else: to concentrate on essential aspects, and find the right level of abstraction. The CGAHDT Projects offers the opportunity to test new methods and new media on concrete projects more than on single exercises. In addition, the students are not working for the paper basket or some dusty archive but know that their work is published and kept accessible for further use - which obviously increases the motivation and leads to impressive results.

6.1. Objectives and Realization

The Conservation of Gaza Architectural Heritage through Digital Technology (CGAHDT) Project will be a growing virtual model of the Old City of Gaza. It will not be like its predecessors an assembly of static three-dimensional volumes but a dynamically developing network of hyperlinked information on architectural heritage in Gaza. Input, which is mostly general information about the Old City from official sources, will be provided by different governmental bodies and academic institutions on one side. On the other side students will gradually add detailed information. The restriction of the "testing area" to the Old City limits of Gaza is not just a result of local pride but allows to develop a certain "density" of information over time.
To obtain the necessary information is the starting point for each project work - and one of the most difficult ones too. Maps should be digitized, pictures should be scanned, elevation models should be built for each building. A complete and highly accurate digital version of the Old City maps of Gaza should be available, there should be digital elevation models, satellite and aerial photos, literature databases, models of already finished objects and so on. CGAHDT Project will attempt to be the starting point for the investigations: maps, models and pictures will be collected, digitized and published on the web-server in standard formats. A database will give hints on literature and hyperlinks in the World Wide Web. Background information on CGAHDT Project and basic tasks and techniques will be prepared as hypertext documents.

Videoconference: Videoconference allows communication and interaction among people in different places. Besides better video and audio links, the quality of the interaction is improved by integrating several applications in the desktop. The digital whiteboard allows several users to share drafts, drawings, sketches or photographs and interact with them by means of drawing tools. Applications can also be shared in a window across several desktops. For example, a student can open a window with a C.A.D. or a lighting simulation program and share it with the other participants in the videoconference.

Shared Virtual Reality: Virtual reality allows exploring and visiting a 3D model according to the user's defined viewpoint and paths.[5] By means of shared virtual reality it becomes possible to meet and communicate with people who are simultaneously connected to the virtual model in Internet. Real time visualization of form and space allows the student to know the design from visual experience. At the same time, virtual reality lets the student interact immediately with forms in the third dimension, that is, to rethink and modify the model of the building directly. Sharing

[5] Carrara *et alii* 1997.

the same virtual space among several students and professors offers an innovative educational medium: it is a kind of visit to a virtual building yard, to visualize and experience the on-going stages of the conception and representation of the design. The student's design can be discussed, reviewed and modified with both local and remote participation of professors and students.

The virtual reality interface tool which will allow a user to perform the following action:

- Import design from other CAD tools.
- Assemble an architecture structure from a library of pre-built blocks and geometry primitives dynamically created by user.
- Export the design interactively in VRML format back to the library for Internet browsing.

6.2. Structure

For easy navigation The CGAHDT Project will be divided into four main sections:
City. The Old City-section will contain information about the Old City of Gaza: maps, elevation and volume models including the main historic buildings and elements of the City's architectural heritage, satellite and aerial photos, facts and statistics. These information will be provided to document the contemporary urban structure of the City, as well as the urban shape of City in different prominent historic periods based on intensive historic studies and research.
Information. The Information-section collects general information for the users of CGAHDT Project: the on-line documentation of the project, its concepts, technical realization and underlying principles and access to the literature and hyperlink databases.
Projects. This is where the students' projects are - self contained units consisting of general information in a database, a file archive and a multimedia documentation. It is possible to define a hierarchical order by use of other links which contain other related documents. Usually there is also a 3d-model of the well-known buildings that can be integrated into the overall model of the city.
Service. The Service-section provides administrative access to the projects and databases, so that the students are able to publish data to the archives and maintain their projects.

6.3. Implementation Mechanisms

The emphasis on matters visual in architecture is not accidental. Human interaction with the natural and built environment is predominantly visual. A wide spectrum of human activities, from aesthetic appreciation to the planning of actions relies heavily

on visual information and makes use of visual means to analyze and formulate states and conclusions.[6] Visualization has been a significant aid to the understanding and controlling of complex processes. The significance of visualization for architectural heritage should also be viewed in the context of wider technocultural changes. Pictures are re-emerging as vehicles for the storage, manipulation and communication of information, especially in relation to the visual environment.[7]

6.3.1. Project Work

The Project will be worked on in groups of one to three students. The subjects range from the reconstruction of historic buildings and the documentation of classic architecture in Gaza to the simulation of unrealized designs and the analysis of urban structures. The objective is to bring out a certain aspect of the chosen buildings and document it in adequate form. For this work the students are provided with a broad variety of software on a heterogeneous computer pool: CAD systems, modelers, renderers and simulation software, photo- and video editing software, layout- and presentation tools and so on. Students are required to carefully set the scope of their work, so they manage to finish the project in time. They have to evaluate and select the obtained material, plan the presentation and define the right level of abstraction that fits their objectives. Co-operation between different project groups is encouraged and makes sense because all the projects are located within the Old City limits of Gaza. With the early publishing of results to the archives each group can enable others to immediately re-use their work. The CGAHDT Project will be accessible on the internet anytime and from anywhere. Communication between the students and the Project administration outside the frequent reviews mostly happens via e-mail. There will be FAQ-lists available and discussion groups will be set up. Archives and databases are administered via WWW, so that it is possible to work on the project from any internet host with a WWW browser.
The project work will be documented digitally and eventually presented on-line. The integration of all the results into a multimedia presentation of the chosen project is the final stage of the process. Finding a design language that expresses the aim of the project and allows to easily navigate within the presentation, to chose the right media for each part and to finally present their work on-line is a challenge for the students. The finished projects will be all realized in HTML with embedded animations, VRML-models, sometimes even sound and video components. Each project will form a self contained unit consisting of a record in the project database, a file archive

[6] Bradford *et alii* 1997.
[7] Lopes 1996.

and a multimedia presentation. Files can be published to the web-server and can then be accessed from the internet in the project-section. In this Project the Internet will be considered an environment for the storage and retrieval of design knowledge. The nature of the net as a medium for the representation, storage and accessing of CGAHDT knowledge. The need to develop and refine advanced historic search mechanisms is postulated as a prerequisite for web-based design knowledge bases. the project aims to demonstrate that the embedding of Project content in web-based representations will provide a powerful advantage for strengthening the processes of search and retrieval in Project knowledge bases.
As it is very difficult to discuss the design work with other people without looking at the design, no matter in what form the design is, with the Internet, people can share ideas with others miles away. Discussing and debating topics with people across the world is common in the Internet. A design group scattered around the world is now able to discuss their project, with complete layouts, sketches and computer generated 3D view, with each other. Static images can be transmitted through the Internet easily. However, sometimes it may be inadequate to discuss a design project over a static image. Real time change of the 3D model is a better way to express ideas in some cases. the project is to develop a composer, with functions mainly to enhance the 3D model of the design, to assist a design group in displaying their ideas. The composer will allow the user to dynamically modify the design. It has functions that aim at enhancing the design. It can export the design in VRML format to a specific web page where a chat area for discussion, a VRML display area to display the design, and the hierarchy of the database where the design is stored in, can be shown.
The geometry primitives include polygon, sphere, cone, cylinder and cube. The pre-built blocks consist of fundamental architecture models which have been categorized with architectural related style, physical properties and environmental attributes. The user may specify any combination of properties and attributes in the composer which will instantly bring up all matching 3-dimensional objects through the database engine. The composer can modify the design in form of constraints, materials, lighting, etc. The design created or modified by the composer can be exported at any time to a collaborative design tool. The export format is in VRML. Through this collaborative design tool, design groups can review the design through the Internet simultaneously. The composer is developed on a high-performance parallel processor-based VR platform. Advanced imaging features such as surface texturing and multiple light sources can be rendered in real-time.

6.3.2. Technical Realization

Technically, the CGAHDT Project will be based on internet technology, as the internet

technology have proved to be an effective tool in education. The Project administration will try to provide all relevant information on courses, lectures and exercises for the students on the web-server. The Project will be working with the WWW as communication platform because of its open standards, commonly available software and easy use. fairly powerful web-server will be the backbone of the CGAHDT Project, and will be hosting several hundreds of MBs of data. The students' workstations form a heterogeneous pool of Windows-NT-PCs. They will be all equipped with standard web browsers. Administration and maintenance will be possible via the WWW. HTML as a definition language for hypertext documents will be used to realize the user interface of The CGAHDT Project and most of the project presentations. Since there will be easy-to-use editors available, the students will be enabled to do even complex presentations after only a few weeks. The user interface of the CGAHDT Project will consist mostly of dynamic HTML-documents.
Three-dimensional models can be described in VRML, the Virtual Reality Modelling Language, which has a very useful feature that is of prime importance for CGAHDT Project: its ability to combine several separate and distributed models through external references. This mechanism allows to arrange specific models on users' request on the web-server. Most of the models can be exported directly from CAD systems or converted from other formats like DXF. Browsers for VRML will be available for all platforms used in the computer pool. The file-based structure of CGAHDT Project will allow to integrate virtually any type of data that could possibly be processed on the computers. This will include various graphic formats (GIF, TIFF, TARGA, JPEG), animation and video data (Quicktime), sounds (AU and WAV) and other relevant formats.

6.3.3. Integrating Different Techniques

The type of data involved in the management and presentation of building-related information takes many forms: the geometry of spatial and built-elements, drawings, photographs, videos, descriptions, text or attributes in table form, audio documents etc.[8] Computer-supported methods and media can be used to capture and edit this variety of information. Computer-supported techniques tend to be drawing-oriented (digital survey, photogrammetry...) or picture-oriented (rectification of photos, pixel pictures). The information gathered is not spatially or built-element-oriented. They exist independent of one another and are oriented around traditional methods of capture and documentation. The use of different methods of presentation parallel to one another would be an improvement. Photogrammetry (with one or more standpoints) is ideally suited to planar surveying (for example for elevations). A fur-

[8] Donath, Petzold 1997.

ther aspect is the integration of existing archive documentation. When techniques that can interpret scanned information are used, the data can be integrated directly into the digital model. The geometrical description of an object is central to a building survey. Data capture in a wide variety of forms is essential for a detailed and extensive description of Gaza architectural heritage and for the development of a building information system.

The following medium are useful for describing a built object:

- the word (in form of descriptive texts, numbers etc.)
- the picture (in form of photos, sketches etc.)
- audio (in form spoken recordings on-site)
- video (in form picture-sequences).

“Textual information” is often only on paper. This ’analogue’ information has to be first converted into digital form (for instance using scan / OCR).

“Pictorial information” can be issued in one of two forms: A pixel or vector graphic. Conventional images can be scanned to become a digital pixel image. The use of new digital camera technology provides images directly in digital form.

“Audio-recordings” are ideal for describing the situation at hand both quickly and extensively. Audio recordings can be stored in digital form for playback over the computer.

“Video” is an ideal medium for the realistic and detailed description of existing built structures. Despite advanced compression techniques, large amounts of data are involved in the digital storage of video images. As a result, only short video-sequences can be stored at present. This can be achieved by digitizing analogue videos, or through the use of a film scanner or digital video camera.

These different forms of information storage are organized in a structural ordering system.

The “geometric presentation” plays the principle role in architectural surveying. The plan-view enables the creation of 2D-plans. The model-view takes the plan into a 3-dimensional wire-frame, which can be zoomed or looked at from different aspects.

The “documentation presentation” is envisaged for detailed log-book creation, of the sort used when documenting historic monuments. It consists principally of photos, drawings and explanatory text, often with references to one another. Captured data is organized according to a strict ordering system. The documentation consists of the description of the individual room and building-elements with their specific qualities.

Two forms of documentation can be presented:

- generation of a building log (for further transfer to a word processor)
- presentation in a hypermedia based system (transfer to a HTML file)

The starting point will be attempting to achieve the maximum generalization whilst not ignoring the complexity and specifity inherent in architecture. The basic principle is a room-by-room process. Buildings are perceived as a series of different rooms, each room being a functional unit in itself. There are two primary ordering principles:

(A) Room structure - the spatial subdivision of the building: building complexes can be arranged both as entire buildings or individual rooms,

and

(B) Element structure - the hierarchy of built elements in the building: that which defines space and from which the geometry of the building is measured.

The structuring principles for both room and element structure are not independent from one another, they are connected by their surfaces (wall, floor, ceiling etc.).

6.3.4. 3D-Modelling

Traditionally architecture has always been represented through media that were 2-dimensional only, because we had no better way.[9] But with computer tools capable of 3D-modelling a revolution in design has been heralded? Though the hype and various tools supporting it are with us already for quite a while, they did not really deliver. Partly because, as yet, these tools are just not good enough, and partly because making things fit in plan first and solving the vertical connectivity later is perhaps a reductionist method of design. Then there is the 4th dimension: take 3D-modelling and the CAD-database. The representation detail as well as that of the attached data grows with the design process. The 3D-model becomes the basis for a complete description of the building, from design until actual construction and beyond.

6.3.5. 3D-Visualisation

3D-modelling is not to be confused with 3D-modelling for visualization, which is about making a graphical model that performs much the same function as the physical cardboard or wooden scale model used traditionally. Software to produce and manipulate 3D visualization models is already with us for many years but only the last couple of years it comes at bearable cost and is manageable without too much overhead. For only a few $100 AutoCAD add-ons like 3D-Studio, AutoVision, and AccuRender have become available. Other CAD-systems have similar options. They are easy to learn and provide all one needs and more: a wide choice of materials that can be stuck onto CAD-surfaces, including transparent and reflecting materials, shadowcasting, elaborate facilities to set the sun and other lightsources, standard

[9] Schijf 1997.

skies and backgrounds and additional libraries with men, cars, aircraft and house-, office- and street-furniture are available at very reasonable prices. And the essential functions can be learned in half a day.

6.3.6. Dynamic Visualization

Visualization of real and imaginary space has been a traditional strong point of architectural education and practice. Even when architectural design is removed from the influence of the visual arts, the architect makes extensive and intensive use of visual methods and techniques in the development of a composition, the specification of a design product, the communication of more abstract concepts and the analysis of design ideas. As a result, our knowledge of world architecture stems more from published photographs and drawings than from personal experience.[10]

Dynamic visualization is often presented as the pinnacle of architectural representation, the fullest form of visual realism.[11] By including movement of one sort or another in a three dimensional representation the designer adds depth and time to the subject under controlled conditions, i.e. in the framework of a specific event or state. As a dynamic description is a sequence of static, normally photorealistic images the results can be superior to other representations for visual inspection, analysis and communication.

As with photorealism, a frequent argument for dynamic visualization is the ease by which it can be produced out of three dimensional design representations. While this is true for simple, undemanding movements of the camera or in the scene, more complex subjects and presentation techniques require knowledge and skills beyond the scope of architecture. These are best found in filming and range from camera positioning and movement to lighting and to editing, mixing and visual effects. The technical aspects are largely integrated in the digital tools, but the architect must effectively step into the film director's chair so as to coordinate, guide and manage the process.

Directing a dynamic description is a role that in principle befits the architect as the specifier and coordinator of design and construction of a project who does not necessarily have any physical involvement in the actual building. However, the fulfillment of the role necessitates substantial transfer of filming knowledge that complements the technical possibilities of digital dynamic visualization. The techniques involved in making a coherent and believable sequence of images from short takes of such fragments and illusions forms the core of the knowledge that has to be integrated

[10] Evans 1989.
[11] Koutamanis 1997.

in architectural visualization. Several techniques have already been adopted in architectural design.

7. Project management and coordination

A project manager and coordinator will be hired and selected. The manager in cooperation with coordinator will be assigned the following tasks:

- Planning and scheduling the project activities.
- Report to the Project supervisors on regular basis a technical and financial report.
- Administrative follow ups and coordination of the project's activities.
- Checking required facility availability, readiness and technical support.
- Logistic and administrative support for the instructors and participants.

7.1. Project phases

The project will be mainly constituted of few phases.

Priorities: Setting up priorities is a vital factor of success in this project. Priorities of program have to be studied and determined by the project team so that program activities will be delivered effectively.

Criterion: The selection of historic places which will be used as a demonstration tool will not be random but on the basis established by project team.

Educational outcomes: the educational outcomes of this project including CDs, brochures, leaflets, posters, booklets, etc. will be used for research purposes related to architectural heritage. It is aimed that students will use them in their research.

Practice: it is intended that selective students (based on professional evaluation by instructors) will participate in editing and publishing some educational tools (e.g. CDs, brochures, slogans, etc.). They will also present dedicated awareness programs to students in schools as a reflection of their success and to take role in the public awareness campaign. This may be helpful because students of the same age of presenting trainee will feel more familiar due to nearness of age.

Recreational activities: participants will be invited for an evening cultural activity hosted in an appropriate historic place or in a restaurant reflecting cultural heritage. It will be a stimulant for the project team out of in-class activities.

CAH will be responsible for providing a highly qualified instructors capable of delivering high quality training (technically and pedagogically) in the above mentioned fields.

7.2. Project Evaluation & Reporting

CAH will be responsible for providing the sponsor institution the required progress reports on a regular basis, and a final report no later than 20-30 calendar days after completing the program.
The program will be monitored and evaluated through the following steps:

- Follow-up during the course to solve any problem that may occur during the course.
- Taking the daily impressions of the participants about three performance indicators related to the course (training methods, performance of the trainer, and course contents).
- Exhibition will be held for the digitized visualization of the historic buildings and awareness products (e.g. signs, brochures, booklets, photographs, etc.) that was produced by participants and attendants will evaluate each item based on relative mentioned three performance indicators (e.g. presentation, reflecting Palestinian heritage, and personal touches). Three points scale will be used for the measurement.
- Questionnaires will be distributed at the end of each activity to evaluate the instructor, content, methods and the provided services.
- Finally, the granting institution will be provided with a Final Report including all details about the program events.

8. Expected deliverables

- Increased awareness of cultural heritage will help in the conservation of heritage and historic places found in Gaza.
- It will also decrease burden on relative institutions that work on conservation of cultural heritage.
- Digitized awareness materials produced through Project activities will be exhibited for public to demonstrate Palestinian heritage so that larger sector of the community can be targeted.
- Professional cadre of engineers who will be able to continue documenting Gaza architectural heritage through several historic periods and to train other interested people.
- Public awareness products such as booklets, brochures, workshops and seminars.
- Printed manuals and training materials on digitized simulation of architectural heritage and virtual reality techniques which will be reference in the future for practitioners.

- A module of training in 3D visualization of cultural heritage which can lead to a certificate program delivered in a regular base.

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