# FRAMEWORK FOR THE IMPLEMENTATION OF AN ENHANCED VIRTUAL DESIGN STUDIO IN THE ARCHITECTURE EDUCATION CURRICULUM OF THE UNITED ARAB EMIRATES - THE VIRTUAL CREATIVE AND COLLABORATIVE STUDIO

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**Abstract**

Being a rapidly developing country the United Arab Emirates (UAE) has realised the need for highly qualified and properly skilled manpower to cope with the country's ambitious development plans. This has resulted in high investments in education and training in the UAE. The government facilitated high technological tools for education. These tools suffered from underutilisation and a failure to be properly integrated in the curricula. The literature review indicates that today's knowledge-driven economy demands a workforce equipped with complex skills such as creativity and collaboration. Universities must not only teach the necessary technical skills and knowledge, but also the culture of creativity and teamwork. The learning theories emphasise the importance of learning by doing and collaboration processes to achieve effective learning. Learning theories also emphasise the importance of teaching creative skills to the students. These approaches are congruent with use of technologies, such as visual design studio (VDS), for the purpose of architecture education in design courses, but such use is lacking in the UAE. The present research focuses on implementing and evaluating technologies such as the VDS in architecture education in an attempt to formulate a framework for implementing technologies combined by creative and collaborative skills in the UAE.

Since implementing a new technology into education practice is complex task, this work will formulate a framework that will help in shifting from the traditional learning to learning with technology. This work will take into consideration factors such as pedagogical issues, collaboration creative work and architecture practice and industrial needs in the UAE.

The aim of the current research is to formulate a framework for implementing VDS at the conceptual end of the architecture design education in the UAE.

This research will apply an action research method framework. The action research will be generated into three phases. Each phase will consist of three stages, the descriptive stage which will analyse the need and criteria of the method, the constructive stage which will include the process involved in constructing the framework and the evaluative stage which will include the testing and evaluation. The resulting framework should satisfy the UAE's need of advanced technological tools for enhancing design education taking in consideration the socio-cultural dimension of the UAE.

As technology is changing rapidly; future research should concentrate on adding further technological tools such as mobile learning. Also as this work provided a framework for integrating technology in architecture design education, yet it is not limited to this discipline only. Other disciplines could benefit from this emerging model and further research could be conducted.

**Acknowledgment**

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# Chapter 1: Introduction

## 1.1 Background of the Study

The aim of this study is to formulate a framework for implementing a Virtual Design Studio (VDS) in architectural design education in the United Arab Emirates (UAE). Architecture design is a fundamental part of architecture education where the students get the hands-on experience of what they learn in the theory-based lectures. The rapid development of technology shapes the way designers think and design. Technology in this instance refers almost exclusively to Information Communications Technology (ICT). It has been a necessity that future architecture designers be equipped with technological skills for better future and effectiveness in their career. Architecture design education has to respond to the requirement of the future market. It is vital to make students aware of the available technology and how to use it, but it is of great consequence to teach students how to utilise the technology to produce innovation in their design ideas. Utilising technology in design education will enhance the learning environment and support the designers to create innovative designs. The literature review revealed that there is a worldwide concern about using technology in design education. The literature[1] also indicated that there is a need to rethink design education to get the best utilisation of its tools for design purposes.

As human development is the core of the UAE's future vision, equipping UAE nationals with the latest technology in an appropriate manner is one of the UAE's priorities. The importance of utilising technology in education has also been observed to be an essential issue in the UAE. The researcher attempted this research after spending two years working as a lecturer in the Higher Colleges of Technology (HCT) in the UAE. The researcher observed the lack of appropriate utilisation of

[1] Palloff, R. M. & Pratt, K. (2007). *Building Online Learning Communities: Effective Strategies for Virtual Classroom,* 2nd ed. San Francisco: Jossey-Bass.

technology in architecture design education despite the great investment in acquiring the latest technology. This research will investigate the best practice of technology in design education worldwide. The research will also determine the UAE's need and requirement of the use of technology to support design education. This is done aiming to prepare architects that are suitable for the countries ambitious mission for the future. Based on the gathered information the research will formulate a framework for implementing the acquired technology in architectural design education taking in consideration the socio-cultural issues of the UAE society.

## 1.2 The importance of Using Technology in Education

The vast advances in information technology (IT) and the availability of computer systems encourage its application in the delivery of architectural design education. Researchers[2,3] have actively investigated the potential of using technology in the education system. Many studies[4,5,6] have documented the positive impact of technology on learning. Other studies[7,8,9] suggested that there are several factors that moderate the extent to which the use of technology influences student learning. These studies pinpointed proper technology integration into the curricula as one of the most dominating factors. O'Leary[10] states that the enormous advance in computers and Computer Aided Learning

[2] Bates, A. W. (2005). *Technology, e-learning and distance education*. New York: Routledge.

[3] Hung, D. T., Cheung, S. C., and Hu, C. (2004). 'Supporting problem solving with case stories learning scenario and video-based collaborative learning technology'. *Educational Technology and Society*. 7(2). p120-128.

[4] Krentler, K. A., & Willis-Flurry, L. A. (2005). 'Does technology enhance actual student learning: the case of online discussion boards'. *Journal of education for business*. 80. p316. 316-321.

[5] Kulik, J. A. (1994). 'Meta-analytic studies of findings on computer-based instruction'. *Technology Assessment in Education and Training.* p95, 92-103.

[6] Sivin-Kachala, J. & Bialo, E. (2000). *Research report on the effectiveness of technology in schools*. Washington, DC: Software and Information Industry Association.

[7] Wu, H. K., Hsu, Y. H., Hwang, F. K. (2008). 'Factors affecting teachers adoption of technology in classrooms: does school size matter?'. *International Journal of Science and Mathematics Education.* 6, (1). p69, 63-85

[8] Reffat, R. (2002). 'Designing with computers in a paperless design computing studio'. In Eshaq, A., Khong, C., Neo, M., Ahmad, S. (eds). *Proceedings of the 7th International Conference on Computer Aided Architectural Design Research in Asia (CAADRIA)*. New York :Prentice Hall. p347-354.

[9] Fensham, P. J. (2008). 'Science education policy-making eleven emerging issues'. *UNESCO Section for Science, Technical and Vocational Education*. p20.

[10] O'Rielly (1999). 'Introduction'. In *Architectural Knowledge and Cultural Diversity, Proceedings of the 5th Colloquium on Architecture and Behavior held between April 6-8, 1998, in Ascona, Switzerland*. p7

(CAL) influenced the architectural education in general and architecture design education in particular. Many others[11,12,13] have confirmed an enhancement of student understanding as a result of the utilisation of computer technology in architecture design education. Hence as universities realise the usefulness of using IT in education, the utilisation of IT in architectural design education has witnessed a rapid growth. Boyer et al[14] affirm that the primary goal for architecture design education is to promote learning skills that are helpful to discover, use, implement and exchange the knowledge for professional as well as everyday use. The past three decades have witnessed a fundamental transformation with the introduction of IT in architecture design education, in which computers have became available for utilisation in architectural practice and education.[15,16] Academic institutions have shown an increase in the use of IT oriented courses in architectural courses all around the world. The persistency of the use of IT in education has also resulted in a change in architecture practice. Reffat[17] asserts that architecture departments competed in the acquisition of IT resources and increased IT content in their curricula to provide students with the influential skills and useful techniques.

UNESCO[18] emphasises the importance of technological skills as a general requirement. According to UNESCO, technological skills should not distract people or detach them from the society in which they live. Technological skills should serve but not overwhelm the knowledge to

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[11] Clayton, M. J., Warden, R. B., Parker, T. W. (2002). 'Virtual construction of architecture using 3D CAD and simulations'. *Automation in Construction.* p334, 227-235.
[12] Clark, S. and Maher, M.L. (2005). Learning and designing in a virtual place: investigating the role of place in a virtual design studio. In Jose Duarte, Goncalo Ducla-Soares and A. Zita Sampaio (eds). *eCAADE 23 Digital Design: The Quest for New Paradigms, Technical University of Lisbon.* Lisbon, Portugal. p304, 303-310.
[13] Reffat, R. M. (2008). 'Planning for effective utilization of information technology in architectural design education'. In *proceedings of the 2nd Conference on Planning & Development of Education and Scientific Research in the Arab States.* King Fahad University of Petroleum and Minerals. p900, 897-907.
[14] Boyer, E. L. & Mitgang, L. D. (1996). 'Building community: a new future for architecture education and practice'. *A Special Report.* California: Princeton Fulfilment Services.
[15] Andia, A. (2002). 'Reconstructing the effects of computers on practice and education during the past three decades' *Journal of Architectural Education.* 56(2). p7-13.
[16] Maher, L. M., Simoff, S. J. & Cicognani, A. (2000). *Understanding virtual design studio.* London: Springer.
[17] Reffat R. (2002). op.cit. p347.

be learned. The UNESCO report on technology encourages the design of science and technology for education in order to meet cultural, economical and social needs. It also encourages the revision of curricula to ensure appropriate science education and technology literacy for all. Meanwhile, governments are becoming aware of the significance of advanced computer skill for the development of their economy to meet the demands of future market and globalised world.[19,20] Research[21] has also revealed that students are encouraged to acquire complex skills and necessary knowledge in addition to skills in technology. This will enable them to function effectively and professionally in the current globalised world. Nevertheless, research[22] also shows that these skills are lacking in many students in both developing and developed countries.

The worldwide economic growth has resulted in a constant change in the economic competition. This requires skilful graduates for the coming century. Technological knowledge combined with complex skills is essential to create society members that are able to take responsible decisions in their professional life as well as everyday life. Students need to develop skills such as problem-solving and critical thinking combined with technological skills. Students also need to apply these skills in a variety of situations. Thus, Mortimer[23] asserts that a strong conceptual foundation and various critical thinking skills must be the new basics outlining the key fundamentals of teaching and learning by emphasising the complexity of the teaching environment and the

[18] UNESCO. (2003). Science and technology education in the Arab world in the 21st Century. *UNESCO International Science, Technology and Environmental Education Newsletter*. 28, 3-4. p3.

[19] Jochems, W., Merriënboer, J. V. & Koper, R. (2004). *An introduction to integrated e-learning*. London: RoutledgeFalmer.

[20] O'Neill, K., Singh, G., & O'Donoghue, J. (2004). 'Implementing elearning programs for higher education: a review of the literature'. *Journal of Information Technology Education*. 3. p319. 313-323.

[21] Senyapili, B. & Basa, Y. (2006). 'The shifting tides of academe: oscillation between hand and computer in architectural education'. *International Journal of Technology and Design Education*. 16(3). p274, 273-283.

[22] ACNielsen Research Services. *(*2000). E*mployer satisfaction with graduate skill.* Australia: Evaluations and Investigations Programme Higher Education Division. p7.

[23] Mortimore, P. (1999). *Understanding pedagogy and its impact on learning*. London: Sage Publication Inc.

essentiality of the use of educational goal as the core of the educational process.

Many technological and digital tools have been introduced into architecture design education since 1990. Different forms of computer aided technologies have been initiated such as Computer Aided Architectural Design (CAAD) or Computer Aided Design (CAD). These technologies have been accordingly utilised in many architectural departments all around the world. O'Leary[24] asserts that advances in Internet and computer technologies facilitated the use of Virtual Reality Modelling Language (VRML) which in turn facilitated the simulation of processes in architectural practice. However, researchers[25] argue that the use of IT and digital media are not fully exploited to reshape architectural design education.

Computer and electronic technologies have advanced tremendously in the second half of the 20th century. The advent of Computer Automated Learning Environment (CAVE) and Collaborative Virtual Environments (CVE) in design education has been widely documented. [26] The nature and practices of architecture and architecture education have been profoundly impacted by these advances. Roy et al[27] emphasise the effectiveness of integrating the CAVE technology in the University of Illinois at Chicago where the first CAVE was initiated. Other examples for using CAVE in design education include Pennsylvania State University, Indiana University, the University College London and the University of Reading[28]. The list also includes the UAEU and King Abdualla University of science and technology in Saudi Arabia. These modern-day technologies have become an integral part of science. This integration has important implications for academic teaching of

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[24] O'Leary, T. (1997). 'On-Line learning environment in architectural and construction education'. *The Australian Society for Computers in Learning in Tertiary Education ASCILIT.* Australia.
[25] Senyapili, B. & Basa, Y. (2006). op.cit. p275
[26] Abbot L. el al, (1996). *Breaking educational and research barriers with 3D visualisation CAVE technology.* The Virginia Tech Research Division.
[27] Roy, T. M., Cruz-Niera, C., DeFanti, T. A., (1994). 'Cosmic worm in the CAVE: steering a high performance computing application from a virtual environment' especial issue on Networks and Virtual Environments of Presence: Teleoperators and Virtual Environments. MIT Press.
[28] Ibid. p23.

architecture within universities.[29]   Architectural departments in Western countries facilitated IT to challenge the role of computers in architectural practice and within academic institutes. These challenges produce CAD visualisations and digital records and facilitate sharing of drawings and documents.  Andia[30] conducted a survey that examined the effects of using computers on architectural practice and education in the United States, Europe and Japan, throughout the past three decades. He identified five trends that have developed in the architectural academic community; namely design methods, CAD visualisation, paperless architecture, information architecture and virtual design studio (VDS). VDS, the fifth and fashionable trend, according to Andia explores the potential of communication in the digital era and facilitates the enormous cultural exchange in these traditionally protected environments in design studios.   Maher et al[31] defines VDS as a computer-supported architectural studio where team members can be remotely distributed across space and time. Thus, students and staff can interact and exchange information using their desktop computers, making the traditional physical studio out of place.  Hence, a precise definition of the VDS can be that it is a networked design studio that is assumed to enhance the performance of the architecture students in their learning of design subjects, where the use of computer-mediated tools such as synchronous and asynchronous techniques and 3D visualisation techniques are combined with appropriate learning methods to achieve effective learning.  Many studies[32,33,34,35,36] have explored the advantage of using VDS in design education.

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[29] UNESCO. (2003). op.cit. p3.

[30] Andia, A. (2002). op.cit. p11

[31] Maher, L. M., Simoff S. J.  & Cicognani (2000). op.cit. p6.

[32] Andia, A. (2002). op.cit. p11.

[33] Clayton, M. J., Warden, B. R., Parker, T. W. (2002). op.cit. p229.

[34] Kubicki, S., Bignon, J., Leclercq, P. (2008). Cooperative Digital Studio IT-Supported Cooperation for AEC Students. Santiago, Chile

[35] Kvan, T. (2001). 'The pedagogy of virtual design studio'. *Automation in Construction*. 10. p345-353.

[36] Merrick, K., Maher, M. L. (2007). 'Motivated reinforcement learning for adaptive characters in open-ended simulation games'. *ACM SIGCHI International Conference on Advances in Computer Entertainment Technology*, (ACE 2007). Salzburg, Austria. p127, 127-134.

## 1.3 Architectural Project Cycle and Process

The architectural process includes several phases and undergoes various stages. The students in their theory-based courses are taught about these processes. Nevertheless, it is necessary for them to develop an understanding, in practice, of the differences between each phase. The students also need to understand the role of the designer in each phase. This section will highlight the architectural process cycle according to the Royal Institute of British Architecture (RIBA) and the American Institute of Architecture (AIA).

Both RIBA[37] and AIA[38] have defined phases which the architectural processes undergo. These phases reflect the project development stages. Each phase is described by its own characteristics according to the RIBA and AIA institutes, which differ in the way the architect behaves and carry on the tasks required for the project. Thompson[39] defines five phases of the design procedures. He identifies the agenda of conducting a project. These stages, according to AIA include originate, focus, design, build and occupy. In the first three stages the main concern is to come up with the design according to the proposal and need, and the final two are the actual execution of the idea generated. While, according to this institute, some researchers have divided the design process into five phases, others have divided the innovation process into three areas that include the fuzzy front end (FFE), new product development (NPD), and the commercialisation. Figure 1.1 shows the different stages.

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[37] RIBA plan of work stages. (2009). *Creating Excellent Buildings: A guide for clients, CABE and Being involved in School Design*. CABE accessed online at http://www.scribd.com/doc/20932564/RIBA-Plan-of-Work. [accessed 12 October 2009]

[38] American Institute of Architecture. (2010). 'Five phases of design', *How Design Works.* <http://howdesignworks.aia.org/fivephases.asp> [accessed 12 October 2009].

[39] Thompson A. (2002). *Architectural Design Procedures*. Oxford: Architectural Press.
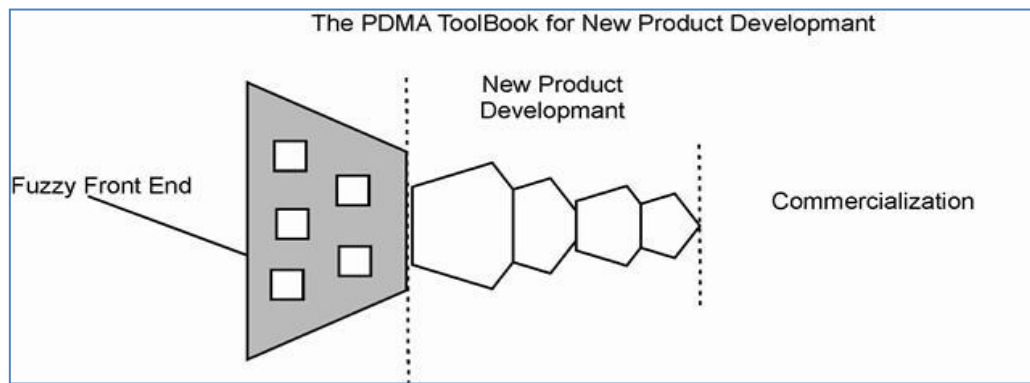
**Figure 1.1: The innovative process**

The FFE stage is where the communications and discussions take place between the architect and the clients. Most of the innovative and creative ideas appear in this stage because of the flow of information and due to the constant exchange of ideas among the project members. Henceforth, Reid[40] identifies this as the greatest opportunity for improvement and innovation. Teaching students to think creatively enables them to generate innovative ideas. This is essential at the beginning of the design process where most of the creative ideas flow. Students also need to understand the importance of sharing ideas at this stage and communicate with different project members.

Researchers[41],[42] have also identified the role of the architect at this stage as the leader of the project process. The architect maintains his role as the designer of the project who comes up with the innovative ideas. At the same time, the architect acts as the organiser of the whole project and maintains all the communication according to the current architecture practice. Accordingly, students have to be made aware of the importance of collaboration and team-working. They also have to be equipped with the necessary communicative and technological skills to work in a successful team. This skill has to be integrated into the curricula in a manner that matches its use and benefits the students in their study. In the actual practice of architectural projects the architect

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[40] Reid, S. E., De Brentani, U. (2004). 'the fuzzy front end of new product development for discontinuous innovations: a theoretical model'. *Journal of Product Innovation Management. 21* (3). p179, 170-184.
[41] Ibid. p170-184.

works with a team of people including the engineers, the clients, other designers, investors or authorised people (see Figure 1.2). This preparation and education is necessary for their successful future practice.
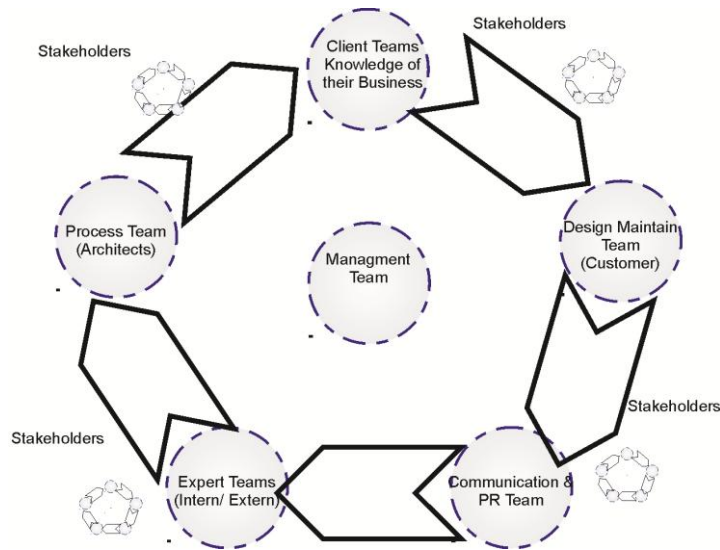


**Figure 1.2: Project participants – adapted from Schekkerman, 2004, the (Enterprise) Architecture Process Cycle**

## 1.4 Problem Statement

With what has been described above we now arrive at the main purpose of this research. It will address the issue of utilising technology for teaching complex skills at the conceptual end of the architectural design process. This is to be achieved with the aim of encouraging creativity and collaboration within architectural design education in the UAE. The UAE is one of the fastest developing countries in the world. Official higher education in the UAE is a relatively new academic process. The UAE higher education started when the UAE federal government established the United Arab Emirates University (UAEU) in 1977. This date marked the first formal higher education system in the UAE. Until then, the UAE society practiced no formal higher education;

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[42] Niezabitowski, A. M. (2009). 'Architectinics a system of exploring architectural forms in spatial categories'. *ArchNet iJAR International Journal of Architectural Research*. 3(2).p92-129.

consequently this resulted in the lack of expertise[43] among UAE citizens. The lack of skilled national manpower forced the UAE to depend largely on an experienced expatriate workforce to develop its infrastructure. Lately, however, realising the need for its own nationals to take over and participate in its awakening, the UAE's planned for educational improvement. This development in education is hoped to help in creating a generation that is capable of tackling future challenges and compete with the foreign experts. Such movements resulted in the emergence of the concept known as 'Emiritaisation' which can be defined as "the replacement of foreign workers by qualified and skilled national ones".[44] In order to achieve this, the UAE needs to launch high standard educational programmes. The UAE has a grand vision for investment in human resources. This is reflected in many aspects of UAE improvement plans. It is also reported in many educational summits.[45] Emphasising proper education for UAE nationals is within the UAE's mission statement and is required to meet the needs of the national workforce.[46] The UAE government has invested heavily in human resources enhancement as part of its development plan for sustainability. In his announcement for the UAE Vision for 2021 (the date that UAE will celebrate its golden jubilee as a federal government) H.H Sheikh Mohammed bin Rashid Al-Maktoum[47] emphasises the Emirati citizen as the centre for all the development and the most influential factor in the development process.

*"With Man we start and by Man we conclude"*

H.H. Sheikh Mohammed bin Rashid Al-Maktoum

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[43] Lootah, M. S. (2007). 'Women and political participation in the United Arab Emirates: a diagnosis of the reality and the drive towards more effective participation'. *United Nations Development Fund for Women, Arab States Regional Office UNIFEM*. p9.

[44] Al-Ali, J. (2008). 'Emiratisation: drawing UAE nationals into their surging economy'. International *Journal for Sociology and social policy*. 28 (9). Emerald Group Publishing. p365-379.

[45] Mohammed bin Rashid Al-Maktoum Foundation & United Nation Development Programme. (2009). *towards continues productive Knowledge. Arabic Knowledge Report 2009*. Dubai: Al Ghurair Press.

[46] Shihab, M. (1996). 'Human development in the United Arab Emirates'. *Economic Horizons*. 17,(66). p9–31.

[47] Dubai Media Foundation, (2010), *UAE local news*, Sama Dubai T.V. aired 16:30pm on 17.2.2010.

This statement assures that human development is the target of all the development plans.[48] Investment in education is one of the most significant issues for the UAE strategic planning.

*"Investing in man for man"* [49]

H.H. Sheikh Mohammed bin Rashid Al-Maktoum

The above phrase was uttered by the Prime Minister of the UAE, H.H. Sheikh Mohammed bin Rashid Al-Maktoum, the ruler of Dubai, in the day of launching what was formerly known as Burj Dubai and is now named Burj Khalifa, the huge and impressive tower of Dubai. Burj Khalifa was renamed after the president of the UAE H.H Sheikh Khalifa bin Zayed Al-Nahyan.

For this investment to be productive and accomplished, many issues have to be considered. Coping with the latest advances in science and technology in education and the incorporation of the new skills is required for future challenges.  Since the UAE is investing heavily on building its infrastructure; design education is one of the most important aspects of development for a country like the UAE.  This is obvious in the UAE's architecture development.

## 1.5 Purpose of the study

As information technology is becoming widely available and instrumental, it is also a fundamental mechanism for any contemporary modern society. The main purpose of this study is to formulate and evaluate a framework to implement virtual design studio as a new technology in design education in the UAE architectural departments. The framework will address the issue of integrating technology into design education. It will examine the use of technological tools to encourage creativity and collaboration at the conceptual end of the architectural process in teaching design studio.  This framework will consider many factors such as the educational needs of the UAE

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[48] ibid. aired 16:30pm on 17.2.2010.
[49] ibid. aired 16:30pm on 17.2.2010.

society, and the diverse socio-cultural factors within the country. The framework will also address pedagogical issues, which are fundamental, when integrating technology in education.  This study will investigate issues related to learning and teaching architecture design as a basic tool.  The study will develop a framework to implement high technological tools and techniques in the UAE education system.  The framework will take into account the incorporation of collaboration and creativity skills. Researchers[50,51] believe that these skills are essential for future developments; hence, should be acquired.  This will be tackled within an action research framework.  The researcher will evaluate several case studies to assess the appropriate promotion of collaborative and creative skills in education. The researcher then will identify the best international practice as part of her research. The researcher will also highlight the utilisation of the best practice and its suitability for the purpose of this work. This study aims to make theoretical contributions through the development of a framework to support design education in the architecture education of the UAE.

The key issues that this study analyses are:

1) Formulation of a valuable framework that adheres to the high international standards and meets the need of the UAE society.

2)   Assessment of students' interaction with the implemented framework.

3) Identification of the socio-cultural factors that have affected the implementation of the VDS framework.

4) Evaluation of the impact of VDS on the educational system in the UAE.

## 1.6 Research Question

As technology advances, the Higher Education (HE) institutes have consistently come under lots of pressure and undergone periods of

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[50] Hung, D. T., Cheung,  S. C., And Hu, C. (2004). op.cit. p120-128.

transition in order to successfully utilise this advancement. As belief in technology grows, research[52,53] reveals that technology has much to offer to education. Many researchers[54,55] believe that technology can tackle many of the educational challenges. For that reason, many universities have invested heavily towards technology-facilitated classrooms. Architecture Education is not an exception. Nevertheless, the challenge is to find an appropriate approach towards the integration of technology into the curriculum. Western HE institutes have made many attempts to integrate technology into education. The question still remains: - what skills can these technologies provide for the students? Yet, in the UAE, a society that is controlled by a conservative culture, more influential factors have to be taken in consideration. Therefore a fundamental question is, "What would form the best framework, that consists of the most advanced technologies, and that can develop skills required for the future, and what are the critical issues involved in the effective implementation of such a framework in architectural design education into a culturally distinctive society (i.e. the UAE)?.

## 1.7 Significance of the Study

The obvious economic growth in the UAE is associated with physical and socio-cultural changes.[56] The UAE government has previously launched a five year strategic plan for the development of its infrastructure. Unfortunately, this plan was faced with the difficulties of lack of manpower and skilled designers which resulted on dependency on foreign expertise. Mustafa[57] asserts that the impact of environmental design on the psychological sense of community has a strong relation

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[51] Al-Ali, J. (2008). op.cit. p365-379.

[52] Emmitt, S. (2002). *Architectural Technology*. UK: Blackwell Science Ltd.

[53] Clayton, M. J., Warden, R. B., Parker, T. W. op.cit. p228

[54] ibid. p228.

[55] Fryer, W. A. (2007). 'Integrating technology in the classroom: mobile digital storytelling', *The Journal of the Texas Computer Education Association,* creative commons.

[56] Abdullah M., (2007). *the United Arab Emirates a Modern History.* Abu Dhabi: Makarem G Trading and Real Estate LLC.

[57] Mustafa, Y. M. (2009). 'Design and neighbourhood sense of Community: An integrative and cross-culturally valid theoretical framework'. *Archnet iJAR International Journal of Architectural Research*, 3(1). p71-91.

with the lifestyle of its occupants.  On the other hand, Yıldız et al[58] stress the importance of cultural aspects when designing, emphasising the importance of the culture-design relationship. Architecture and built environment are a way of life directed by faith, traditions and the life style of the inhabitants.  It is obvious that the built environment of a certain society will reflect the characteristics of a certain society within a period of time.  Accordingly, the character of a society can also be analysed through their built environment and architecture.  There are few areas that have witnessed so many efforts to solve the problem of accommodating local traditional environments, than the architectural sphere within the modern way of life and its techniques.  The Arab culture is relatively new, in return there seems to be no traditions toward many of the new buildings (i.e. banks, airports, and TV stations). The challenge is in the lack of the model which the designers can refer to. This led to the dependency on western models which do not reflect the Arabic architectural image.   Hence, developing creativity within individuals is essential and will enable them to create innovative designs that are suitable for their needs.

Asserting a cultural identity is difficult anywhere but it is difficult to do so especially in the UAE, where the treatment of high technology has taken over and unbalanced traditional architecture.  Mukhtar[59] argues that as long as there remains a strong relationship between architecture and the community, this relationship will serve to provide answers to modernity versus tradition.   In the era of global civilisation modern technology cannot be ignored, it has to be rationalised, readapted, and has to create the tool of the culture.[60] This means that technology is in the service of the culture, and not vice versa.   Architecture education bears the burden to facilitate technology to teach students how to be creative in order to creatively reshape the future of their countries.  It will be more

[58] Yildiz, H. T., Inalhan, G., Tok, S. Y.(2009). 'Using traditional and historical cities in architectural design education', *Archnet IJAR*. 4(2). p263-274.
[59] Mokhtar, A. (1999). 'Architectural engineering education: an avenue for an efficient and sustainable environment'. *Proceedings of the Second International Conference on Sustainability in Desert Regions. UAE, Al Ain*: United Arab Emirates University. p318-326.
[60] ibid. p318-326.

effective if the architect/designer belongs to the society that needs to be redesigned.

According to the UAEU statistics[61] there has been an increase in the number of the architecture departments' graduates since 1977, yet, these graduates did not make any substantial contribution to the emergence of the distinctive towers built in the UAE lately. The reason behind this lack of participation could stem from the education these students experience and the lack of encouragement and promotion of the creative abilities in students.[62] Equipping these students with the technological as well as the creative skills and encouraging their innovative imagination will enable them to participate in the redesign and rebuild of their countries infrastructure. This will benefit the country with its own nationals who know best about what is suitable for their needs to make their contribution in the development.

Thus, this study is beneficial on many different levels: first it proposes a novel framework that did not exist before for integrating technology in architectural design education in the UAE. Second, it is in line with the UAE's mission for educating its nationals and shielding them with the functional complex skills that will put the country in the front line with the developed world. Third, other Gulf countries share the same characteristics with the UAE which means that these countries could also benefit from this study. Fourthly, other Arab countries in the region will also benefit from this study as they share same educational issues with the UAE. Finally, the framework itself is a contribution to the reason it addresses socio-cultural factors whilst attempting to integrate new technology into education.

## 1.8 Overview of Chapters

Chapter One: this chapter provides an introduction to the thesis and a background commentary to the study. It establishes the background of

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[61] United Arab Emirates University. (2007), Student Handbook, Al-Ain: UAE University.
[62] Siddiqui, Z. S., (2008). 'Creativity in Higher Education: Great Expectations'. *International Conference on Assessing Quality in Higher Education 2008*, p226, 226-236.

the study, the purpose of the study, the research question, and a brief overview of the methodology to be conducted. The chapter also summarises the cycle of architecture process and the importance of team-working among architects as well as the promotion of creative ideas. The chapter defines the significance of the study as a result of the above factors.

Chapter Two: this chapter establishes the historical background of UAE as a country as well as the architecture development through time and the different images of architecture due to the infrastructure development. The chapter also summarises the architecture education practice in the Arab world in general, and specifically in the UAE. It also introduces architecture education in the UAE and details the challenges facing architecture schools in terms of technology integration and skills development.

Chapter Three: this chapter presents the needs analysis of this study. The theoretical issues in terms of the UAE's Vision for 2021 and the emphasis on skilled national manpower are also presented. The chapter refers to the UAE's management style in order to understand the issues concerned with technology integration. This chapter also pinpoints the use of IT in architecture education making specific references to the UAE architecture education.

Chapter Four: this chapter discusses the teaching and learning methods in architecture education in the UAE highlighting the emergence of the new methods in teaching and learning according to the literature and the UAE higher education role to adapt these methods. The chapter also summarises the design education in the UAE and highlight the current design curriculum.

Chapter Five: this chapter presents the methodological framework and the research design. The chapter further discusses the principal model, the treatment of data collection methods utilised in the study, the reliability and validity issues, and the research question and the

hypothesis. The chapter also summarises the curriculum used for the case study.

Chapter Six: this chapter provides the technical and theoretical description of the Virtual Design Studio model; the development process in the action research framework. The chapter also presents the underlying layers for the developed models and pinpoints its importance and significant characteristics in relation to the theoretical stance.

Chapter Seven: this chapter presents the evaluative study of the proposed VDS; how the student interacts with it and the impact of this VDS on design education in the UAE.

Chapter Eight: this chapter presents the analysis of the VDS framework, the factors that promoted its utilisation and the factors that prevented the underutilisation of some aspects of the VDS environment; these factors are then discussed in detail.

Chapter Nine: a review of the findings resulting in a series of recommendations is presented. These form the basis of the proposed framework and future recommendations. Finally, a brief summary of the work is presented. An overview of the results is seen and the experience acquired by the model and the potential application of this model in the future are presented.

## 1.9 Conclusion

This chapter contains the basic information that will help the reader establish an understanding of the research in its context and the theoretical aspects of it. Moreover, it presents the significance of the study and the reasons supporting its conduct. The chapter also initiates the formulation of the research question. In addition the framework for the thesis is also presented. The chapter introduces the reader to the concept of the study and to the work undertaken in it. It is intended that this chapter should support Chapter Two in forming the context of the case study conducted. The next chapter will develop a better

understanding of the research context and the environment in which it has been developed and rationalises the need for its being undertaken.

# Chapter 2: Historical and Cultural Background

## 2.1 Introduction

*"He who does not know his past cannot make the best of his present and future.  For it is from the past that we learn."*[63]

(H.H. Sheikh Zayed Bin Sultan Al-Nahyan)

This chapter includes a brief history of the UAE and its architectural development.  Developing a clear understanding of the UAE's current situation is crucial in understanding the socio-cultural factors of the society; hence, it is important for the purpose of this research. Therefore, it is beneficial to define the UAE's past influences and events. It is also advantageous to include a brief historical outline of the United Arab Emirates union since its inception in 1971 and briefly to describe the situation before 1971 (for the purposes of this research there is no need to include any detailed events prior to this, although a brief summary is included).  A PEST analysis of the UAE is also presented in this chapter. The chapter will also include a brief description of the UAE architectural development. The chapter will outline the change in architecture development through the time. This will enable the reader to develop an understanding of the dominating factors in UAE architecture post- and pre-unification.

## 2.2 Background of the United Arab Emirates

United Arab Emirates is a federation of seven "emirates" or states including Abu Dhabi, Dubai, Sharjah, Ajman, Um al Qaiwain, Ras Al-Khaimah and Fujairah.  Abu Dhabi is the capital city of the UAE, while Dubai gained its fame from being an international city.  Dubai's central location between the eastern world and the west made the city a trade centre. The UAE is located in south-eastern corner of the Arabian

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[63] ODPM - Information Affairs. (2005), *Immortal Words of Late Sheikh Zayed*, the Cultural and Media Centre UAE.

Peninsula. It is bordered by the Persian Gulf to the North, Saudi Arabia to the South and West, and Oman and the Gulf of Oman to the East.[64] The UAE occupies an area of 83,600 sq km. The UAE geographical and geological locations consist of three main types, the coastal area, the desert zone and the mountain zone. Arabic is the official language in the UAE but English is the second official language and is widely used. Urdu and Persian are also popular among workers.[65]



**Figure 2.1: The Map of the UAE**

### 2.2.1  Historical Background

In earlier times the UAE was ruled by a Sheikh who managed the states according to their tribe. This system is known as the tribal system; each state of what is now called the UAE was ruled by a different Sheikh. The Sheikh in the old states of the UAE was the head of his people and, therefore, took full responsibility for his citizens. The Sheikhdoms were located along the southern coast of the Arabian Gulf and the north-western coast of the Gulf of Oman. The UAE throughout history has occupied a prestigious trade location between Europe and the East.

Islamic religion was introduced to this region in the 7th century; According to Fenelon[66] the Islamic era in the UAE during the period of the 7th century to the 14th century was not documented remarkably

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[64] Federal Research Division. (2007), *United Arab Emirates: Country Profile*, Library of Congress. p3.
[65] ibid. p5.

well. The Portuguese were the first Europeans to arrive to the UAE; followed by the British Empire. The Portuguese used the lands to fight rear-guard action against Persia.[67] The Al-Qawasim tribe controlled the maritime regions which were repeatedly attacked by pirates. These attacks continued irregularly. In the year 1835, the Sheikhs agreed not to engage in any conflicts in the sea.[68]

The Al-Nahyan family have ruled Abu Dhabi since the 18th century and Dubai was founded by an offspring of the same family in the 18th century.[69] Sayed[70] narrates that in 1853, an event occurred which is now known as the "Trucial Sheikhdoms". The Sheikhs and the United Kingdom agreed to a "perpetual maritime truce" to be imposed by the British, who would also serve as mediators in cases of disagreements between the Sheikhs. The United Kingdom and the "Trucial Sheikhdoms" established closer bonds in an 1892 treaty, (other Gulf principalities entered similar treaties with the UK), primarily in response to the intention of other European countries in the region. In return, the Sheikhs agreed not to dispose of any territory (except to the United Kingdom). The UK promised assistance in case of land attack and offered protection for coastal areas. The Sheikhs also agreed on obtaining consent from the UK before entering into discussions with any other foreign government.

Abdullah[71] describes how in 1955, during the dispute between Abu Dhabi and Saudi Arabia over the Buraimi Oasis, the United Kingdom sided with Abu Dhabi. However, the 1974 Agreement to resolve the dispute (and that of the Oman Border) has yet to be ratified by the United Arab Emirates and is not recognised by the Saudi Government.

In 1968, the UK announced its decision to terminate the treaty relationships with the seven "Trucial Sheikhdoms".

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[66] Fenelon, K. (1976). The United Arab Emirates: *An Economic and Social Survey*. London: Longman, p140.
[67] Bryan, A. D. (2009). *The United Arab Emirates: True Book*. Children publisher. p12
[68] Al-Abed, I. (2007). *The United Arab Emirates*. Trident Press.
[69] Al-Fahim, M. (1995). *From Rags to Riches: A story of Abu Dhabi,* London: London Centre of Arab Studies.

## 2.2.2  UAE POST-1971

This British announcement, which was reaffirmed in March 1971, affected Bahrain and Qatar, states that had also been under the protection of the British.  Abdullah[72] points out that the states attempted to form a union of Arab Emirates, but by mid-1971 it became clear that they were unable to agree on terms of union.  The termination date of the British-Trucial Sheikdoms Treaty was the 1st of December 1971, after which they became fully independent (it may also be recorded that Bahrain became independent in August 1971 and Qatar in September 1971).  Following independence, six of these areas, namely Abu Dhabi, Dubai, Sharjah, Ajman, Ummal Qaiwain and Fujairah, entered into a union named the United Arab Emirates (the seventh Emirate, Ras al-Khaimah, joined in early 1972)[73].  After the unification, the UAE gained recognition by the United Nation and became a member of the League of Arab States.  The UAE has developed very fast since its unification. Human development as well as infrastructure development is at the core of the UAE's strategic vision for the future.

## 2.3 Architectural Development in the UAE

The architecture style in the UAE has changed due to the economic changes within the country in the last four decades.   The UAE architecture style could be classified according to Al Harthy[74] into three different styles, the traditional, the contemporary and the post-modern. Each reflects the time when it was built.  There are some arguments regarding the relevance of traditional architecture to contemporary architecture varying from complete rejection to complete acceptance. Niezabitowski[75] describes how complete acceptance involves the imitation of traditional architecture and its unique features.   To completely accept the relevance of the traditional, Niezabitowski argues that traditional architecture is the only truly authentic architecture in the

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[70] Lootah, M. S. (2007). op.cit. p7.
[71] Abdullah M., (2007). op.cit. p62.
[72] Abdullah M. (2007). op. cit. p156
[73] Al-Fahim, M. (1995). op.cit. p55
[74] Al Harthy, S. (2002). *Reading the Traditional Built Environment of Oman.* Lausanne: Comportments.
[75] Niezabitowski, A. M. (2009).op.cit. .p92-129.

Arabian Gulf region and that contemporary architecture imitates western one. This traditionalist viewpoint denies the positive influence of modern practices and their impact on humanity by over-emphasising the heritage and old architecture as the definitive dominant and unique style. It is a philosophy that views technology and modern materials as damaging to architectural heritage. On the other hand, Mahgoub[76] describes the elemental philosophy as the use of elements of traditional architecture in new construction designs. There is a current fashion for using traditional elements in commercial architecture. This is popular with the public, according to Mahgoub, and if so it would be democratic to utilise this method. Khan's[77] idea is that contemporary architecture is a continuation of traditional architecture. This argument points to traditional architecture as being a source of inspiration for contemporary architecture and interpreting the heritage of different periods to illustrate the relevance and meaning of rational solutions in a contemporary time.[78]

### 2.3.1 Early Architecture

The architectural heritage of the Persian Gulf, which is also called the Arabian Gulf, is intertwined with Islamic architecture. Prior to Islam, Arabic countries developed a multi-cultural architecture depending on the strategic location of the country (for example, Syria, whose architectural influences included the Byzantine Empire; and Egypt contains 7000-year-old pharaoh structures).[79] After the introduction of Islam, in 622MD, the first square shaped mosque was designed by Prophet Mohammed bin Abdullah, which revolutionised Middle-Eastern architectural practices. Architecture reflects the design embraced by the society in a specific time. It also reflects the need for the society. In the

[76] Mahgoub, Y. (1997). 'Sustainable architecture in the United Arab Emirates: past and present'. *CAA-IIA International Conference on Urbanisation and Housing. India*. p2-27.
[77] Khan, H. (1987). 'Architectural education: learning from developing countries'. *Journal of Architectural Education*. 40(2), p31-32.
[78] Arkoun, M. (1986). 'Islamic culture, modernity, architecture'. *In Architectural Education in the Islamic World. Ahmet Evin, ed. Singapore: Concept Media/Aga Khan Award for Architecture*. p15-21.
[79] Lapidus, I., M. (2002). *A History of Islamic societies.* Cambridge: Cambridge University Press. p73.

UAE, the vernacular architecture reflected the traditional life style and the customs of UAE citizens.

The lack of communication and transportation system in the early 1970s resulted in the difficulty of moving building materials from one place to another. In return, the people in these areas depended on elementary materials for buildings. These materials were taken from the desert or the surrounding plants like the palm tree. The palm tree was used in building houses in the area near by the sea and these houses were then called 'alareesh'. While deeper in the desert people depended mainly on clay (al jas) with ordinary stone as a material for building their houses. Tents were also heavily used among Bedouin as it was practical for their unsettled life style. Privacy is one of the most important and dominating factors in the social life of the UAE and other Gulf countries. The effect of privacy was obvious on the way the buildings were designed. From the horizontal perspective the isolation of men and women leisure spaces was obvious at this time. The female private areas are usually covered and the entrance of the house was separated from the rest of the rooms by a wall. One of the main features of UAE architecture during this time was the use of the wind-towers (al Barajeel) which were used for ventilation purposes in all of the building in the UAE (see figure 2.2). The main characteristic of the UAE's architecture is the change through time and the effect of development on the UAE architecture style.



**Figure 2.2: Wind towers (Al Barajeel) in the UAE Early Architecture**

## 2.3.2   Contemporary Architecture in the UAE

In late seventies, the economic wealth in the UAE gained by the discovery of oil generated an urgent need to construct new buildings more suited to the demands of the UAE's inhabitants. Municipalities established planning departments in both rural and urban areas to oversee work on civilian housing, plus commercial and public constructions.  According to Mahgoob[80] an era of rapid change of the built environment ensued.  Western architects enjoyed increasing roles in the construction of new buildings (using new materials and reinforced concrete).  This Westernisation featured an increasing use of technology in the building and design process.[81] The Western influence was further increased by the Arabic Academics' utilisation of Western text books as references (rather than by improving the local materials which adhered to the religious aspects of Arabic architecture).

The current social and cultural evolution of the UAE affects all aspects of life. Civilians depend on cars and other transport methods and this in turn causes cities to expand too rapidly. Uncontrolled expansion transforms major cities into metropolitan areas and evolves the traditional lifestyle into a postmodern one.  The transformation of the UAE society from a simple traditional Bedouin society that depended on basic needs to a complex modern one has been witnessed through time.  The transformation of the whole infrastructure of the UAE to accommodate the needs of the current development encouraged new transportation systems.  The transformation of the inhabitants from the primitive life style to a modern one is witnessed through the introduction of villas to replace the simple houses.

Current architectural practices not only affect the appearance of the landscape but the inhabitants' social and cultural lives.  According to O'Reilly[82] the community is now based on social class and wealth rather than the traditional family neighbourhood.  The relationships between

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[80] Mahgoub, Y., (1997) op.cit. p 2-27.
[81] Al-Tars K. (2009), *Traditional and Heritage Architecture in the United Arab Emirates;* Awan Web Site;
[82] O'Rielly (1999). op.cit. 8

social groups is being substituted by the fast pace of life. Despite the rapid development of architecture and its influence in the change of people's lifestyle in the UAE, there is still an influence of traditional values in the design and build of new architecture. As described in the previous section; the UAE society prefers a culture of separation between male and female leisure areas; this factor is still present in the design of new villas. The quality of the house is indicative of social class, with the socio-economic ability interwoven with the expense and design of the home. Privacy is a crucial factor in the life of the UAE citizen and that could be visible from the great emphasis on the territory separation and the high walls that separate the buildings, which according to Al Tars[83], are often carefully decorated.

Contemporary public buildings convey the image of the institution or establishment. Modern materials such as glass dominate the character of most modern structures. In many parts of the country, public gardens have been facilitated in nearly every neighbourhood. Street landscape maintained, at large cost, and kept to a high standard. Streets in the country are built to be wide and intersected by roundabout systems called 'Al Dawar'. These roundabouts are replaced by traffic lights and flyovers in the modern architecture style. UAE culture is dominated by using private cars as means of transportation while within the modern time public buses and the Dubai Metro were facilitated by the government to promote the culture of utilising public transport. Ownership of four-wheel-drive vehicles has become a status symbol and enables citizens to visit the desert and enjoy desert based leisure activities such as hunting with hawks.[84]

Society's preferred image is reflected by the architecture style as in the UAE; older architecture is associated with poverty and the past while new structures convey an image of modernisation and wealth.

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[83] Al-Tars K. (2009), op.cit. Awan Web Site.
[84] Martin, A. (2003). 'An experience of teaching in the United Arab Emirates'. *English Today 74*, 19(2). p49-54.

Altars[85] points out how the new commercial building types, such as hotels, offices, shopping centres, etc., were erected since the late 1970s. These structures dramatically changed the urban landscape. Young[86] asserts that large high-rise housing blocks were built to incorporate the growing populations of foreign workers see figure 2.3. There are also many architectural styles being used described with the titles, 'Modern, Islamic, Indian, and Arabian'.



**Figure 2.3: The World Trade Centre of Dubai**

### 2.3.3 Modern Architecture

The discovery of oil resulted in an economic wealth and population increase. This change had a massive socio-cultural impact in the UAE; accordingly, this required a massive infrastructure building. The advanced building materials combined with the modern design ideas and the use of technology in design replaced vernacular architecture. Old buildings were turned into public museums and heritage centres. Some of the structures have not managed to survive the harsh environment. However, major cities recently adapted well-designed technologically innovative buildings as its basic feature which explains the case in the UAE. Abdulla[87] describes how internationally respected architects, such as the British architect Tom Wright, were commissioned to design the buildings for government organisations and institutions.

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[85] Al-Tars K. op.cit. Awan website.
[86] Young, B. J. (2005) 'Evaluating the Integration of Learning Technology at Zayed University: A Case Study of a Laptop University in the United Arab Emirates' (PhD. Thesis, Griffith University), p28.
[87] Abdullah M. (2007). op.cit. p158.

The grand expansion is also obvious in the introduction of the high rise buildings. Further the grand opening of the Dubai Metro on the ninth of November 2009 a date marked in the UAE history as (09-09-09) has introduced a new culture of transportation that never existed in the past.



**Figure 2.4: Modern Architecture in the UAE**

There is increasing public interest in the quality of the built environment and vernacular architecture, born from a combination of longing for the past and concern for the future. Gorat[88] asserts that critics of the present architectural practices are concerned about the continuing cultural identity and these concerns manifest themselves in the seminars and conferences hosted to discuss issues related to the preservation of architectural heritage. According to Mahgoub[89], a new postmodern trend emerged in the nineties – the fashion was to revitalise the architectural heritage of the past to stress the identity and architectural design on the area. This process involved demolishing many of the seventies-style buildings and replacing them with buildings similar to the locality. While some buildings utilised modern materials and reinforced concrete and air-conditioning were deemed a success, many were judged to have been overdone. Nowadays, an increased concern for cultural identity is a major issue in the UAE. Researchers in this field have been calling for a revival of traditional designs.[90]

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[88] Gorat, L. (1982). 'Meaning in post modern architecture: an examination using the multiple sorting task'. *Journal of Environmental Psychology*. 82(2). p3-22.
[89] Mahgoub, Y. (1997), op.cit. p16.
[90] Mahgoub, Y. (1997), op.cit. p17,18.

## 2.4 Cultural Aspects of the UAE Society

The population in the UAE as published on the seventh of October 2009 in an English-printed gulf newspaper in the UAE has breached the six million mark. Most of the population in the UAE originates in India (about one million)[91] and the next largest amount is from Pakistan. The Emirati nationals comprise 20% of the total population. Figure 2.5 shows the population growth in the UAE from 1960 to 2008.
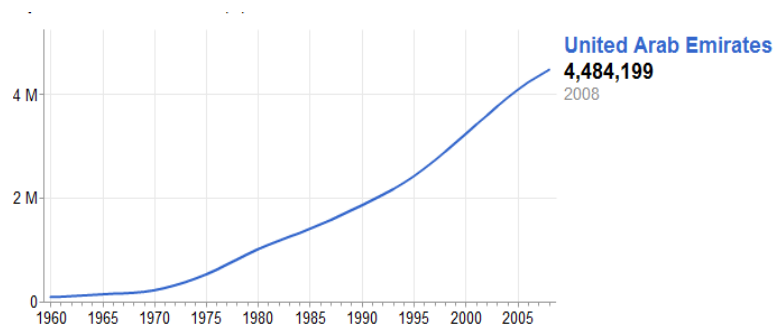


**Figure 2.5: population growth in the UAE Adapted from World Bank, World Development Indicators**

The Emirati population can be divided according to Kay[92] into two main groups that include the Hadar (civilians) and the Bedouin (nomadic). In recent years this classification faded as education increased and there were movements towards civilising the nomadic in the UAE.

Islam is the religion of the UAE and like all other Muslim countries the UAE applies Sharia Law. Islamic traditions became part of the UAE culture and dominate the life style of people, although with the diversity of nationalities in the UAE as shown above a great diversity in culture is present. For more than four decades the UAE culture has been mixing with other cultures including Eastern and Western diversities.[93]

The big gap between the citizens to the foreigners' ratio of 1:4 is a major concern for the UAE government and the UN. According to the UAE

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[91] Ministry of Information and Culture. (2009). *UAE Yearbook*. Ed Vine P. and Al-Abd I. Accessed online at http://www.uaeinteract.com/uaeint_misc/pdf_2009/ on 13. 10. 2009
[92] Kay, K. (2006). *Sharjah Heritage and Progress.* (Ajman: Motivate Publishing), p11.
[93] Abdullah M. (2007). op.cit. p160.

interact website[94] the foreigners in the UAE are given temporary resident visas. Young[95] states that the foreigners in the UAE society live in apartments close to the urban areas; whereas, citizens occupy suburban estates complete with villa and large areas of land.

The rapid development of the infrastructure in the UAE and the diversity of culture have enabled the UAE people to change to fit into the new modern society.

## 2.5 UAE Culture and Hofstede's Dimensions

In general, integrating technology into a new environment requires an understanding of the motivating factors that is believed to influence the integration policy. It also requires proper planning and decision making. Hence, it is important to understand the socio-culture factors of the society into which technology will be integrated. This will help to make suitable decisions on the type and need of technology and the proper ways of conducting the integration process. According to Punie et al[96], using technology in education has a great benefit if it is firmly grounded to the changing social realities. Punie et al state that the world is witnessing a transfer from the industrial society into knowledge based society. They further argue that using technology is becoming the centre of what he identifies as learning spaces. Learning spaces according to Punie et al is where the educational needs of the learner will have priority. Moreover, Punie et al highlight the importance of embedding technology according to the social and cultural context in order for these technologies to be effective. This section classifies the UAE culture according to Hofstede dimensions[97] in order to understand the socio-cultural factor and its influence in the UAE society to make better decisions for technology integration. Hofstede Dimensions have been known as the appropriate dimension to understand the culture of a society.

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[94] Abdualla, M (2007). op.cit. p187.
[95] Young, B. J. (2005). op.cit. p.32.
[96] Punie Y., Ala-Mutka K. (2007). 'Future learning spaces: new ways of learning and new digital skills to learn', *Digital Kompetanse.* 2. p210-225.
[97] Hofstede G. (2001), *Cultural Consequences.* 2nd ed. London: Sage Publication.

*"Culture is more often a source of conflict than of synergy. Cultural differences are a nuisance at best and often a disaster."*

*Prof. Geert Hofstede, Emeritus Professor, Maastricht University".*

In his book "Cultural Consequences", Hofstede[98] identifies four dimensions 'The Dimensions of Powers' and they are namely: 'Power Distance Index' (PDI); 'Individualism' (IDV); 'Masculinity' (MAS); and 'Uncertainty Avoidance Index' (UAI). Hofstede then added a fifth dimensions that he named 'Long-Term Orientation' (LTO). Hofstede argues that each index indicate the countries power according to their percentage in each dimension. The PDI reflects the people's acceptance of power which in turn according to Hofstede represents the society's adherence of inequality among its members. IDV represents the society's tendency to working independently and the ties between society members are loose. The MAS index represents the dominance of the male in the society while UAI refers to the society's tolerance for uncertainty and risk taking factor. The fifth dimension is LTO. This dimension originated from a study conducted in China among university students. LTO reflects the society's acceptance of virtue versus truth. Societies with high LTO are said to have respect to traditions as opposed to acceptance of trends and modernisation.

Accordingly Hofstede[99] classified the Arab countries to be dominated by Islamic traditions. The UAE, as one of the Arabic societies in the Hofstede[100] study scored very high as far as PDI (80) and IDV (69) is concerned this makes the UAE society a role oriented and caste system society with law and order and regulations to minimise the amount of uncertainty.

The high score of UAI indicates the low level of tolerance for uncertainty in an attempt to minimise uncertainty the people become more obedient

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[98]. Hofstede G.(2001). ibid. p9
[99] ibid. p368.
[100] Ibid. p500.

to rules, policies and regulations, it also makes adherence to change in the society more of a challenge.

The UAE society is also found to be a male dominated society with rules driven form the Islamic religion which gives men the power and authority in order to play their role as main providers and protectors of the family.

The UAE society also scored low in the IDV index being a Bedouin society with strong relationship among its members that made people in the society prefer working together rather than working individually. The UAE society was also found to have a high LTO index which makes it pay more respect to the traditions and the customs especially those driven from Islam.

## 2.6 PEST Analysis of the UAE

### 2.6.1 Political

The UAE political system is a unique combination of the traditional and modern values. This system allows the country to maintain a great degree of stability despite the enormous economic growth.[101] The UAE political system is not a democratic system, yet, there is a high freedom of speech. The country is mainly ruled and dominated by the president and selected authorities. The president is the only person who is entitled to make decisions and legislates. One initial step to encourage the public participation in the government was introduced by the indirect elections to the country's parliament.

The political directive in the UAE ensures education for all and the national vision of the UAE is to prepare a generation that is equipped with knowledge and complex skills to cope with the current and future market challenges and demands and technological changes. In 1997 the UAE formally launched the country's government strategy for the years ahead. Covering twenty one individual topics among which is the improvement of the civil service, based on competence, effective 'Emiratisation' and leadership training.

The former president and the founder of the UAE, H.H. Sheikh Zayed bin Sultan Al-Nahyan, emphasised the importance of education and the importance of the skilled manpower stressing the importance of human:

*"Man is the real wealth of the UAE "[102].*

H.H Sheikh Zayed Bin Sultan Al Nahyan

Moreover, H.H. Sheikh Mohammed bin Rashid Al Maktoum the UAE prime minister and the ruler of Dubai has assured many times that the UAE's strategy towards its nationals stressing that the human resources is the most effective factor in the countries development plan.

### 2.6.2 Economical Status

The UAE is classified as the second largest country in the Gulf region in terms of economies after the Kingdom of Saudi Arabia. The UAE is one of the most flourishing and fast developing countries in the Middle East region. The year 2000 marked an increase of the UAE GDP to over 60 billion dollars. The growth amount of 4.4% is considered high according to international standards.[103] The numbers indicate that the UAE is recording its fastest growth in the last decade. The economy witnessed an increase by 17%. The non-oil sectors accounting for 66% of the GDP.[104] The main source of income in the UAE is the oil resource, similar to most Gulf countries. Meanwhile the UAE developed a vision to minimise the dependency on oil resources. A new theme for the economic development was established which supports diversification of economy. The UAE government is giving great attention to projects like tourism and trade zones. The government also has initiated other innovative projects such as Dubai Internet City and Dubai Media City. The UAE is also investing on projects such as renewable energy. Abu Dhabi is aiming to be the international centre for renewable energy which reflects the UAE's interest on multiplying its resources.

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[101] Federal Research Division. (2007). op.cit. p10.
[102] ODPM - Information Affairs, (2005), *Immortal Words of Late Sheikh Zayed,* the Cultural and Media Centre UAE.
[103] Ministry of Information and Culture, (2009), *UAE Yearbook*.
[104] Al-Ali, J. (2008). op.cit. p365-379.

The UAE encountered a rapid growth in the construction industry due to the country's spending on the physical infrastructure and the desire to build a high standard of living for its nationals. This growth, due to the lack of experienced national workforce, required great dependency on expatriate workforce. This resulted in a challenge facing the UAE to prepare a national workforce that is as skilled and knowledgeable as the expatriates' counterpart. The UAE 'Vision 2021' encouraged this strategy to reduce the dependency on oil as the main source of income.[105]

### 2.6.3  Social Status

Prior the discovery of oil the UAE society depended mainly on simple trades like pearl diving and fishing, consequently the UAE nationals lacked high skills and knowledge which in turn resulted in high dependency on expatriate workforce. The increased number of expatriates is one of the UAE's most obvious features in terms of social status. The UAE society is divided into two main categories: the nationals (al muwateneen) and the expatriates (al wafedeen) where the nationals count to 20% of the total population of the UAE.[106] The multiculturalism in the UAE made the people tolerant to change and to new traditions and customs with keeping their own identity. The development of the welfare benefits had been impressive in the UAE offering facilities that covers the citizen from birth to death, a facility that has been described by socialists as womb to tomb[107]. These facilities include high standard health care, education, allowances and housing.

### 2.6.4  Technological Status

The UAE has a technological friendly environment. In the year 2004 the UAE was ranked as one of the most advanced countries in internet use with a number of 1.25 million internet user, 31% of the population.[108]

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[105] Dubai Media Foundation, (2010), *UAE local news*, Sama Dubai T.V. aired 16:30pm on 17.2.2010.
[106] Abdullah M. (2007). op.cit. p160.
[107] Al-Ali, J. (2008). op.cit. pp365-379
[108] Vodanovich, S., Urquhart, C., Shakir, M. (2010). 'Same but different: understanding women's experience of ICT in the UAE'. The Electronic Journal on Information Systems in Developing Countries. 40 (4). p1-21.

On the governmental level, the UAE has launched the e-government project making it one of the first countries to start such projects not only among the Arab countries but also on the international level. The United Nations gave the Emirates an e-government index of 2.17, ranking it number one among the Arab states and twenty first in the world. Other projects such as the above mentioned Dubai Internet City reflect the countries high interest in the technology.[109]

## 2.7 Education in the Arab World

Many Arabic educators and institutes have initiated projects to improve the quality of education in the Arab countries. [110,111] Many of these have focused on improving computer literacy, teaching methods, and on updating the content of teachers' technical knowledge. Unfortunately, in many cases the projects have been of short duration and range, and have suffered from similar problems to the pre-HE level teaching i.e., they have been tutor, "as opposed to learner-orientated", focusing attention on theoretical issues rather than on effective classroom teaching skills. There is a real need for proper training for teachers as well as students to adopt different learning style and teaching methods. Learner-centred approach has been promoted to replace the rote-memorising approach of learning. Eldeen[112] reports that there is a lack of material and support to accomplish this. She also asserts that these conditions resulted in one-off conference-style group-training experiences where large numbers of teachers were trained together and then left to their own devices in the classroom with little support.

Many of these training programmes lacked the necessary post-programme mechanisms to enable teachers to examine the effect of training and university education on teachers' classroom practice.

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[109] Federal Research Division. (2007). op.cit. p28.
[110] Reffat, R. M. (2008). op.cit. p897-907.
[111] Okeil, A. (2010). 'hybrid design environment: immersive and non-immersive architectural design', Journal of Information Technology in Construction (ITcon). 15, p205.
http://www.itcon.org/2010/16
[112] Eldeen, H. S. (2001). 'Experiential Learning in Undergraduate Education: Cases from Egyptian Universities', Architecture Education Today. Cross-Cultural Perspectives. Lausanne: Comportments. p101-107

Moreover, neither were supplementary instructional materials provided, nor the teachers trained to produce such materials. These materials are, according to Akbar[113], essential for the implantation of student-centred teaching and inquiry approaches to scientific education. Put another way, many teacher-training programmes in the Arab world attempted, yet failed to achieve, effective learning programmes. Finally, there have been a large number of attempts to implement successful distance learning in a number of Arab states (e.g., Egypt).[114] However, these attempts have suffered the same difficulties that have afflicted traditional teacher-training and development approaches as above; that is, they are trainer- rather than learner-orientated, focusing on the dissemination of information and lacking follow-up and support strategies. This resulted in deficiency in achieving the level of learning hoped by the higher education managements that is desirable for the future.

## 2.8 Technology Use in Education in Arab World

As technology is becoming widely available, its supporters anticipated achieving better learning environments where technology could be utilised. Yet, in the Arabic educational systems settings there are some issues of concern that has arisen. Rubbo[115] identified two major problems that are being faced by architectural education when technology is used. These problems are the level of access to technology and the quality of technology utilised within architectural education. Reffat[116] adds that the proper infusion of technological tools into architecture education is a third factor. According to UNESCO's newsletter for international science[117], many Arabic countries have attempted to increase the utilisation of technology in architecture education. Yet, the report argues that the rate of technology utilisation

[113] Akbar, J. (1986). 'Architectural education in the Kingdom of Saudi Arabia'. In *Architectural Education in the Islamic World. Ahmet Evin, ed. Singapore: Concept Media/Aga Khan Award for Architecture*. p123-130.

[114] Bates, A. W. (2005). *Technology, E-learning and Distance Education*. New York: Routledge.

[115] Rubbo A., (2008). 'Towards A New Design Education Paradigm, Center for the Education of Women at the University of Michigan'. Faculty of Architecture design and planning. p187-196.

[116] Reffat R. (2008). op.cit. p901.

[117] UNESCO (2003). op.cit. p4

in education is still not satisfactory. The report further suggests that the Arab education system has to address the issue of technology utilisation in education. Arabic education systems should emphasise on creating individuals with technological literacy combined with the critical thinking, complex and creative skills. For architecture education to be effective and functional in the global village, this integration needs to be stressed.

Many Arabic universities have launched programmes and strategies for utilising technology in architecture education. Examples include the implementation of the paperless studio at King Fahd University of Petroleum and Minerals (KFUPM)[118]. Several other universities have witnessed attempts to integrate technology into architecture education, yet, all of these attempts were individual efforts which did not receive wider recognition i.e. the CAVE technology in the UAEU[119]. The use of technology in architecture education remained limited to the utilisation of CAD technologies as standalone software. However, once the problems of access and availability are resolved, there remain the dominating problems of the quality of the education experienced by architectural departments and the proper integration of the allocated technology in the education system to be used to its full potential. The issue of quality is evident in teaching and learning methods adopted by both teachers and students in the architecture departments in the Arab world. The emphasis is on theoretical science education as opposed to hands-on and practical activities. Computers are increasingly available as standalone machines rather than integrated technologies (or the use of obsolete equipment). The quality of architectural education programmes is considerably low. According to Salama[120] the teachers lack the support to implement new teaching methods and to use new technologies in architectural education. This factor further hampered and delayed technological integration in education.

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[118] Reffat R. (2002). op.cit. p347-354
[119] Okeil, A. (2010). op.cit. p202-216
[120] Salama, M. A. (2008). 'A theory for integrating knowledge in architectural design education', *Journal of Architecture Education Archnet IJAR*, 2(1), p100-128.

The Arab League Educational Cultural and Scientific Organisation (ALLECSO) [121] have also been involved in promoting the utilisation of science and technology in education. The organisation has launched many strategies for utilisation of technology for educational purposes. According to Fensham[122] a number of Arab countries have adopted scientific frameworks developed by ALLECSO in their education system. These strategies have been developed by Arab experts who are fully aware of the need of the society in which they live. This resulted in strategies that are compatible with the society's need. Architectural education in the Arab world benefited from these strategies. Yet, all of these efforts lacked the insight and depended on the theoretical aspect of knowledge. Reffat[123] argues that these strategies neglected the application of technology in everyday situations; he further adds that these attempts lacked the potential to teach the students' skills of investigative, problem-solving and critical thinking. According to McCullough[124] these strategies did not include students' interests or their background. He further stresses that no consideration was given to student's creativity and imagination or the context in which they live. Some other countries adapted strategies that have been developed in the West. These strategies served to accommodate the individual needs of the countries in which it was developed; however it lacked the insight of the local culture where it is being reused and the social needs.

Similarly, El-Erian et al[125] conducted a study to assess the quality of architectural education and textbooks in Egypt, Syria and the UAE. The study revealed that there was a deficiency in the utilisation of technology in teaching. Moreover, social and cultural problems associated with the applications of technology were not properly addressed. The students complained from the lack of proper training for practical life. Moreover,

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[121] Fensham P. J. (2008). op.cit p24
[122] ibid. p24
[123] Reffat, R. (2006). Developments of e-learning in design and architectural education. Muscat, Oman
[124] McCullough, M. (1996) Abstracting Craft: The Practiced Digital Hand. Cambridge, Massachusetts: MIT Press, p232.
[125] El-Erian, A., Abou-El-Fadl, S., El Mounajjed, G., Nofal, M. (2003). 'Comparative Survey Analysis of Architectural Education Curricula Development in the Arab World', *Proceedings of the 2003 WFEO/ASEE e-Conference, American Society for Engineering Education,* p6.

Akbar[126] as well as Salama[127] stated the lack of Arabic resources and that the contents of some of the architecture textbooks taught in the Arab world appeared to be copied from foreign resources. This leaves the local science-related social and cultural problems unaddressed. Similarly, the application of technology in science and in everyday life is not utilised. Salama[128] also states that the textbooks lack the activities which are based on inquiry and investigation. The activities also encourage rote-memorising rather than learning by discovery.

Hence, we conclude that the teacher-centred approach is the dominating principle within education in the Arab world. The pedagogical system in the Arab countries encourages memorising and neglect the development of critical thinking and problem-solving skills in general and specifically in architecture education. Previous studies[129,130,131] in the Arab region encourage further research in this area and reveal the need to adopt new and more student-centred teaching methods in architecture education. Research[132] also stresses the importance of utilising technology for this purpose.

## 2.9 Conclusion

This chapter summarised the history of the UAE. It highlighted the architecture development and the economical change. The chapter also summaries the impact of economy advances in the UAE on the rapid change of architecture. The chapter has also introduced the UAE socio-cultural factors and the main traditions, and also how the nationality diversity is affecting the UAE culture. The chapter also highlighted Hofstede's classification of the UAE in terms of indicators of cultural consequences. The chapter summarised architecture education progress in the Arab world and how it is different in the UAE as well as the use of technology in architecture education in an attempt to

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[126] Akbar, J. (1986). op.cit. p127.
[127] Salama, M. A. (2008), op.cit. p100-128.
[128] ibid. p114
[129] ibid. p127.
[130] Siddiqui, Z. S. (2008). op.cit. p226-236.
[131] Reffat, R. M. (2008). op.cit. p904.
[132] Ibid. p897-907.

understand the lack of utilisation in comparison to the developed world and to what is appropriate for the UAE development plans.

# Chapter Three:  Needs Analysis

## 3.1 Introduction

This chapter presents the needs analysis related to the development of this study.  The needs analysis of the study determines the importance of focusing the study object.  The needs analysis also helps the researcher to define their goals and objectives.  Defining the goals and objectives makes it clear what the researcher intends to accomplish. Needs analysis also determines the requirements for developing a certain project.  This study aims at meeting the needs of the UAE development plans in terms of the use of technology to enhance architecture education.  The study also considers the socio-cultural factors of the UAE society.  Hence a needs analysis of the UAE society in general and architectural education in particular was essential.  This chapter establishes the foundation of the study.  In this research, the needs analysis of the UAE requirement of the use of technology is assessed.  This chapter presents the background of the needs analysis of the UAE.  The chapter includes the UAE's vision for its national's development plans.  The chapter shows that this study is in line with the UAE's mission for the future.  It proposes the need for the integration of technology in education in the UAE.  The chapter evaluates the impact of IT on architecture education.  It also highlights the need for an effective utilisation of IT in architecture education in the UAE.  The chapter further investigates the strong infrastructural arguments for IT utilisation. An overview of the use of creativity in architecture education is then discussed and the use of collaborative skills is evaluated.  The chapter then concludes with the highlight of the benefits for the UAE from international practice.

## 3.2 UAE Vision 2021

In his famous book, titled Rouyaty[133] which could be translated into English as "my vision", H.H. Sheikh Mohammed Bin Rashid Al-Maktoum highlights the importance of human development and places a great emphasis on the leaders of the future in which he refers to the UAE younger generation. H.H. emphasises the importance of the entire development in which he includes the education, health and all other aspects that he refers to as being not only important but essential in the development of any nation. Sheikh Mohammed states that:

*"When God wishes to gift a country he blesses it with talented and influential leaders and that is the case in the UAE".*

H.H. Sheikh Mohammed bin Rashid Al-Maktoum

Sheikh Mohammed believes that competent leaders always inspire and encourage talents in their people. In the same book[134] the Sheikh pays great attention to innovations, talent and creativity believing that no nation could progress and compete in the global economy without promoting creativity and innovation among its people.[135]

*"This is generally the equation for making civilisation and development and it's got a big secret, fifty years of intensive creativity and excellence could push the country one thousand years ahead*".[136]

H.H. Sheikh Mohammed bin Rashid Al-Maktoum

As Sheikh Mohammed emphasises creativity and excellence he also stresses the importance of collaboration and teamwork.

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[133] Mohammed Bin Rashid Al-Maktoum (2004). *Rouyaty the Challenges in the Excellence Competition*. Dubai: Motivate.
[134] ibid. p105.
[135] ibid. p107.
[136] ibid. p22.

*"People say a bird needs two wings to fly and I ask only two? If you count the feathers in the birds' wing it will make definitely a big number and without these feathers the bird will not be able to fly".[137]*

H.H. Sheikh Mohammed bin Rashid Al-Maktoum

This implies the importance that H.H. places on the idea of team-working and collaboration. Giving many examples of the past and the earlier civilisation Mohammed bin Rashid draws on his experience of collaboration and team-working and stressing its importance for the progress of mankind.

## 3.3 Management Style in the UAE

In his book "Gods of Management" Handy[138] associate the management styles with the Greek ancient Gods. Handy attempts to identify the different management styles and its characteristics. He classifies four different Gods, Zeus, Apollo, Athena and Dionysus. Handy further associate a culture type to each of the Gods based on the nature of the God (see figure 3.1).
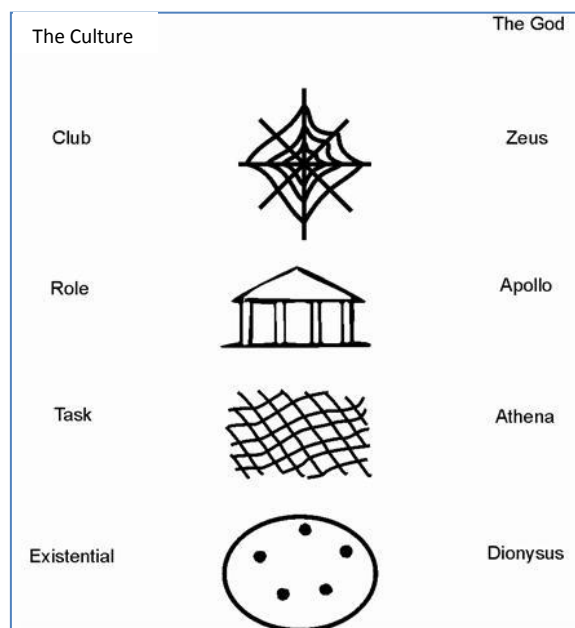


**Figure 3.1: Gods of Management according to Handy- adapted from Charles Handy's Gods of Management**

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[137] Mohammed bin Rashid Al Maktoum (2004). op.cit. p73

Figure 3.1 shows the culture of work in association to the Greek Gods. Handy associated a picture to each culture type based on his definition of that culture.

According to Handy[139] the Zeus God is managed by the club culture which he believes that it works on informal basis. In the Zeus culture each member is authorised to take instant action to execute the task. This authority entitles the individual to make decisions according to the situation without going back to the above in power. The Zeus culture gives a lot of authority to its members which represent the culture name. The members of the team are chosen according to their personality and their efficiency on taking the right decision at the right time. Personality and charisma are the motivating factors when hiring members according to the Zeus culture. The role culture, on the other hand, is represented by the God Apollo. Due to the nature of this management style, as Handy[140] declares, this type of culture follows the hierarchy style in management. Decisions always have to be made by authorised members. These members are setting at the top management. In this management style culture each individual has a job description and they stick to the job assigned to them. Unlike the Role culture, the Zeus members are unbound by job descriptions. The task culture in Handy's[141] description follows the Athena God. Athena is a female God in the Greek ancient culture. This style of management as the name implies revolves around the task rather than the members. The main concern of this culture is to have the job done rather than who is doing it. This culture works with a team to solve a problem in hand and then move on to solving another one with different members according to the nature of the task. The final type, according to Handy[142], is the Existential culture which concentrates on the professionalism giving total freedom to its members to tackle the tasks according to their

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[138] Handy, C. (2009). *Gods of Management*. Souvenir Press Ltd.
[139] Handy, C. (2009). op.cit. p21.
[140] Ibid. p22.
[141] Ibid. p30.
[142] Ibid. p33.

professional background, with no restrictions of any kind on their decisions.

The UAE is an economy that depended on simple trades before the discovery of oil. This kind of trade that included fishing, pearl diving and simple trade forced the kind of work culture that requires a collaborative nature. The pearl divers used to travel in groups for months choosing a leader to direct the whole trip called the "Nokhatha" which means the captain of the ship. This kind of management can be classified using Handy's gods as the Apollo God or the role culture. The Nokhatha is the person in power who usually owns the ship and the divers are his employees. The pearls then get traded to India where they are industrialised and resold to the other parts of the world.[143] After the discovery of oil, the UAE government launched plans to build its infrastructure. Due to the lack of professional skills among UAE nationals the development plans depended of the experiences and skills of expatriates. These experts originate from different countries from all around the world. Each individual exported his own culture of work that they practiced in their home countries. This resulted in the variety of management styles in the UAE. Yet, the role culture remained the dominating work culture among UAE nationals. This type of culture dominated in the UAE until lately when the ambitious government of the UAE stated its mission for excellence achievements. This goal can only be achieved by applying the right culture in the right place. A mixture of cultures is required as opposed to a dominance of a certain culture.

## 3.4 IT Infrastructure in the UAE

The UAE has been classified as a country with a very strong IT infrastructure[144]. The huge interest in the use of IT in education motivated the HE institutes in the UAE to adopt a 'laptop' strategy as in the case of Zayed University and the UAEU's Laptop Strategy. This strategy encourages the student to own a laptop each and facilitate

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[143] Abd Al-Rahman, A. (1990). *The UAE in the memory of its people*. (in Arabic). UAE writers union.
[144] Vodanovich, S., Urquhart, C., Shakir, M. (2010). op.cit p1-21.

students' loans for lab top purchase. Cornish[145] argues that the approach of facilitating laptops in education encourages a strong infrastructure of wireless networking and provides an interactive platform that facilitates resources and communications between architecture education and their student. The UAE universities are provided with the required tools and wireless networks that enable the student to freely access the networking resources. Yet, there should be a proper framework of IT applications and freedom of use among the student and the staff which ensure proper utilisation of available technologies.

## 3.5 Architecture Education in the UAE

The UAE is becoming increasingly famous for its outstanding architecture. Dubai city is becoming one of the most famous cities in the world in terms of its skyscrapers landscape. Abu Dhabi is also investing on its architecture projects. The capital city launched several projects such as the Diamond Ring hotel. The city of Sharjah on the other hand adopted the Islamic architecture style to which it is best suited so that the city has been selected as the cultural capital for the UAE. Architects find a great demand for their innovative and ambitious designs in the wealthy country. The interesting fact behind this statement can be understood within the context of ordinary observation and deduction. It is questionable that none of the innovative designed building is actually designed by a UAE national or a graduate from the UAE educational system.

Considering the innovative designs of the landmark buildings i.e. Burj Al Arab, Burj Khalif, Palm tree, the Diamond Ring hotel and many others, show that all these landmark buildings have been designed by famous architects. Those who succeed in producing a concept design locally will often use cut and pasted idea from a library of images. This lack of innovative designers is the result of an inadequate education programme. Further examination, concentrating on the academic input

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[145] Cornish, E. (1996) 'Introduction', *in Cornish, E. [Ed] Exploring Your Future. World Future Society,* Berhesda, Maryland, p5-6.

of architecture within the UAE, will reveal the absence of any locally initiated academic programme. In fact the academic programme practiced in the UAE is originated from neighbouring Arabic countries who themselves deny its success. [146,147]

This situation is not appropriate for a country which ambitiously deployed architecture for its iconographic qualities within countless marketing and overseas charm offensives. It is also not meeting the UAE's mission that it has been launched for its nationals to take the lead and participate in all the countries ambitious projects. It will be more beneficial for the UAE if its own nationals can participate in the infrastructure development. Architects from within the society are more aware of the society's need. Architects success is measured when their buildings connect with the aspirations of the society in general and the users of these buildings in particular.[148] Buildings are successful and look appropriate when they feel correct for both visitors and users. Integrating skills such as creativity in architecture education will enable the future young architects to produce innovative buildings that are related to the society in which is serving. Excellence in urban design embraces an integration of quality-driven factors, but the measurement of success can be reduced to an analysis of space and the concept of place. Public and semi-private spaces at the urban level in turn derive their character from deployment of physical elements such as landform, circulation routes, materials, and buildings, all of which influence the social interaction of users. Again, integrated architectural thinking is fundamental to the success of urban planning and landscape design, especially in terms of sensitivity towards the natural environment when devising the educational programmes for the future; this also implies planning new professions that must be recognised, not only by the various client bodies, but especially by the UAE government.

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[146] El-Erian, A., Abou-El-Fadl, S., El Mounajjed, G., Nofal, M. (2003). op.cit. p10.
[147] Eldeen, H. S. (2001). op.cit. p101-107.
[148] Niezabitowski, A. M., (2009) op.cit. p92-129.

A common education in the first three years of a bachelor programme of environmental design will connect the thinking of tomorrow's professionals who understand the need for integrated design and planning along with a genuine interaction between the professions. Perhaps, eventually, within the context of the UAE as an example for the Gulf region, it seems reasonable to argue that well-mannered, carefully proportioned and simply-styled buildings exhibiting due acknowledgement of appropriate environmental, cultural, and technological considerations should be the minimum standard of architecture delivered to clients by tomorrow's architects and contractors. In turn, civic spaces can emulate successful interiors by becoming environmentally reassuring settings that people actually want to experience. Hence, emerge the importance of paying great attention to design at the front end stage where most of the innovative and creative ideas emerge and collaborated.

It was found in the exploratory survey[149] conducted by the researcher in the UAE that design courses in the UAE are usually taught by less experienced instructors. Considering the time-consuming nature of these courses, usually most of the practical work is done in the studio by the student, indeed these courses are usually tutored by mature student undertaking higher degrees in the university than the instructors themselves. It was also observed that the courses are taught using the traditional form where the students gather in the design studio room and spend hours sketching manually or using CAD programs that they have been taught in previous traditional courses. Students work separately on their designs and rarely communicate until the design is finished. Even though the UAE's school system design is taught from the first year of study to the final year (see Appendix A) most of the teaching concentrates on the students' use of the tools of the specific technology rather than teaching them on how to utilise it to produce creative designs. It was also observed that the students spend long hours in the

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[149] Al-Ali, A. I. (2007). 'Readiness for the use of technology via VDS: the case of the United Arab Emirates'. *Embodying Virtual Architecture ASCAAD*. p439-456

studio working on their design ideas while the use of virtual tools is minimal. The application of creative ideas is very much linked to the imitation of western building rather than concentrating on the local building and the society needs.

Therefore the instructors in charge of teaching design courses should be aware of technological advances and their proper utilisation and integration in the studio place and the curriculum[150]. Moreover, the curriculum itself should be revised to better accommodate technology taking into consideration the incorporation of new skills.

Architectural practice has been criticised by those that claim there is a lack of architectural refinement in the production of architectural departments where creativity is seen as the production of fantastic forms rather than commitments to the reality of the world of practice.[151] Similarly, there is an argument for the subjects being taught in architecture department and their suitability and compatibility with the architecture practice.[152] Architecture departments have been accused of not using the real world situations for their student which in turn result in architects with insufficient experience.[153]

Since this is regarded to be the international case, it could be used as an indicator for the UAE design education case. The researcher's observation also revealed the lack of real life projects in the practice of design education in the UAE architecture departments.

## 3.6 Effective Utilisation of VDS on Architecture Design Education

Reffat[154] argues that the use of computers in the teaching of architecture design was primarily for purposes such as information processing, communication, and visualisation tools in the design process. Reffat adds that the use of computers for the full range of visualisation aims at

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[150] Reffat R. (2002). op.cit. p347-354.

[151] Buchanan, P. (1989). 'What is wrong with Architecture Education? Almost Everything', *Architectural Review.* 185.

[152] Lathem, M. S. (1994). *Constructing the Team*, London: Department of the Environment.

[153] Nicol, D. & Pilling S. (2000). *Changing Architectural Education: Towards a New Professionalism,* London: Spon Press.

improving quality and effectiveness of the building design process. The advancement of technology encourages the growth in the use and application of computer in design education. The use of computers in design is not only advantageous to assisting the architect's basic needs, but also further to become instrumental for the architecture process. Computers are becoming an effective mechanism for designers and architects in relation to the use of traditional media.  The availability of the Internet and advanced networking channels encourages the exchange of correspondence between architects.  Today it is difficult to imagine an architectural practice that is not making use of this new medium.  Kubicki et al[155] states that the use of IT in architecture design education has tremendously increased in the past decade.  They further underline its importance in facilitating team-work and collaboration. The importance of the use of computers in architecture practice has become essential in its success. Hence, computers and advanced CAD technologies facilitate the design of complex modern buildings and VDS tools facilitate communication among project members due to the advances of communication tools.

Mark et al[156] state that the use of computers in design and design education will exceed the capacity of being only a medium to play a more important role. Computers will be used as a significant part of the process that could be utilised as a Knowledge Integration Tool, a Decision Support Tool, and Design Tool. Therefore, viewing IT as an effective tool for architectural design education that requires the developing of new methodologies and techniques to realise the purpose to which the utilisation of IT can be put in architectural design education. Hence, this study attempts to investigate this objective by developing a framework for effective integration of VDS in architectural design education.  This framework can assist in developing complex skills

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[154] Reffat, R. (2006). Developments of e-learning in design and architectural education. Muscat, Oman.
[155] Kubicki, S., Bignon, J., Leclercq, P. (2008). 'Cooperative Digital Studio IT-Supported Cooperation for AEC Students'. *International Conference on Information Technology in Construction. Santiago, Chile.*
[156] Mark, E. et al (2001). 'The Ideal Computer Curriculum', *the 19th ECAADE-conference (ECAADE - Education for Computer Aided Architectural Design in Europe). Helsinki, Finland*, p168-175.

amongst the students. Reffat[157] details the development of the use of IT in architecture design education. He identifies four stages of IT development in design education specifically computational design method, CAD visualisation, paperless studio and Virtual Design Studio. Reffat[158] illustrates that all of the mentioned development links to an IT based architectural curricula. Reffat[159], Andia[160], Kubicki et al,[161] and many others agree on the need for modifying the architectural design curriculum in order to facilitate the integration of the new technology. Reffat[162] further stresses the importance of reviewing the architectural design programmes in the Arabic education systems. He also stresses the importance of addressing the structure of architectural design education in order to potentially realise the new opportunities of the use of IT in design education. Mark et al[163] examined the computer related subject in detail in order to propose a broad outline of computer use. Architectural departments in the West have been researching the use of VDS as the latest technology for design education. Maher et al[164] argue that VDS is an important transition in design education. Kvan[165] further argues the importance of running a VDS in architecture design education stating that since teaching student real life projects the use of VDS is crucial in promoting such experiences among the students. Ion et al [166]also assert the effectiveness and importance of the design studio for students experience with others who are geographically distributed. Yee et al[167] further draw on their experience on conducting a VDS among several universities (Massachusetts Institute of Technology in US, Miyagi University in Japan, Kumamoto University in Japan, and Kyoto Institute of Technology in Japan) as part of a shared project and

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[157] Reffat, R. (2008) op.cit p897-907.
[158] Ibid. p902.
[159] Ibid. p897-907.
[160] Andia, A. (2002). op.cit. p7-13.
[161] Kubicki, S., Bignon, J., Leclercq, P. (2008). Cooperative digital studio IT-supported cooperation for AEC students. Santiago, Chile
[162] Reffat, R. (2008). op cit. p897-907.
[163] Mark, e. et al (2001) 'op.cit. p168-175.
[164] Maher, L. M., Simoff S. J & Cicognani (2000). *Understanding Virtual Design Studio*. London: Springer.
[165] Kvan, T. (2001). op.cit. p353.
[166] Ion W. J., Thomson A. I., Mailer D. J (2000). Development and evaluation of a virtual design studio. University of Strathclyde. Scotland. p3.
[167] Kalay. Y. E. (2004). 'Virtual learning environments'. *ITcon*. 9. p195.

stressed the importance of the "fourth dimension" which is the time dimension. They facilitated the VDS tools for working around the clock to compensate for the time difference between US and Japan. Despite the apparent importance of VDS in design education, Reffat[168] states his concerns regarding the integration issue of infusing VDS tools into the design pedagogy and stresses the student factor and their background as an important element. The socio-economic factors should also be considered when integrating new technology in education according to the literature.[169,170] Hadjiyanni[171] explores the importance of using the latest technologies in design education and further asserts the importance of utilising technology to teach complex skills to equip tomorrow's designers with the required skills. Hesham et al[172] asserts the importance of the collaborative tools found in the VDS environment for the globalised world. Furthermore, Reffat[173] emphasises that architecture courses underlying the socio-cultural domain are not the concerns of some architecture departments in terms of the number of courses and their academic content and rarely refer to the environmental context within the region.

## 3.7 Design Education and Creativity

Researchers argue that creativity is difficult to define.[174,175,176] Creativity is a mystical realm and an idea only vaguely understood; it has different meanings in different contexts. Some[177] define creativity as

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[168] Reffat, R. (2002). op.cit. p347-354.

[169] Bates, A. W. (2005). Technology, E-learning and Distance Education. New York: Routledge.

[170] Emmitt, S. (2002). Architectural Technology. UK: Blackwell Science Ltd.

[171] Hadjiyanni T. (2008). 'Beyond Concepts a studio pedagogy for preparing tomorrow's designers'. *Archnet-IJAR International Journal of Architectural Research*, 2(2), p41, 41-56.

[172] Hesham T. Eissa, Lee J. (2008). 'Dynamic adaptive web-based model for architectural design education (DAAD) an e-Learning environment for an architectural design course'. *Archnet-IJAR, International Journal of Architectural Research*, 2(2). p24 ,23-40.

[173] Reffat, R. (2006). Developments of e-learning in design and architectural education. Muscat, Oman

[174] Sternberg R., J. (2006). 'The nature of creativity'. *Creativity Research Journal*. 18(1). p87-98.

[175] De Bono, E. (1970). *Lateral thinking: creativity step by step*. New York: Harper & Row.

[176] Guilford, J. P. (1981). 'Potentiality for creativity'. In J. C. Gowan, J. Khatena, & E. P. Torance (Eds.). *Creativity: Its educational implications* 2nd ed. Dubuque. IA: Kendall Hunt. p1-5.

[177] Heap, J. (1989). *The management of innovation and design*. London: Cassell.

restructuring old ideas to produce new innovations. Others[178] relate creativity to originality and uniqueness of idea. De Bono[179] stresses that

*"No one calls creativity something that they dislike."*

Research[180],[181] has been active in finding approaches to studying creativity. Creativity has been long dominated by the psychometric approach.[182] It has been explained by two methods of thinking: convergent and divergent thinking[183]. De Bono[184] suggested the terms "vertical thinking" and "lateral thinking"; others refer to "left hemisphere" and "right hemisphere".[185] Guilford[186] and Torrance[187] both concentrated on divergent thinking as the bases for creativity, yet it is generally accepted that design problem solving involves divergent and convergent thinking. Lawson[188] argues that both thought processes are required in science:

Some artists work in an entirely original and creative way, while others may follow traditions, developing ideas but not breaking fundamentally new ground. Not all artists are generally considered highly creative, but even those that clearly demonstrate the qualities of perseverance and single-mindness are not usually associated with divergent thought. Lawson[189] affirms that multi-thinking is required in the process of design, and limiting one-way thinking is not helping the production of innovative design. Others[190] also assert the importance of understanding the

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[178] Coyne, R. (1995). *Designing information technology in the postmodern age: From method to metaphor*. Cambridge, MA: MIT Press

[179] DeBono, E. (1991). *Teaching Thinking*. London: Penquin Books.

[180] Siddiqui, Z. S. (2008). op.cit. p226-236.

[181] Sternberg R., J. (2006). Op.cit. p87-98.

[182] Guilford, J. P. (1981). op.cit. p1-5

[183] Ibid. p1-5

[184] DeBono, E. (1967). *New Think: The Use of Lateral Thinking in the Generation of New Ideas*. New York: Basic Books.

[185] Michael Tovey, (1986). 'Thinking styles and modeling systems', *Design Studies*. 7. (1). p20-30

[186] Guilford, J. P. (1950). 'Creativity'. *American Psychologist*, 5, p444–454.

[187] Torrance, E. P. (1998). The Torrance Tests of Creative Thinking Norms-Technical Manual Figural (Streamlined) Forms A & B. Bensenville, IL: Scholastic Testing Service.

[188] Lawson, B. R. (2004). 'Schemata, gambits and precedent: Some factors in design expertise'. *Design Studies, 25*(5), p443-457.

[189] Ibid. p 443-457.

[190] Schmitt, N, G., Chen, C. C. (1991). 'Classes of design classes of methods classes of tools', *Design Studies*. 12. (4). p246-251

design problems and finding a way to balance divergent and convergent thinking abilities.

Solving design problems thus requires both methods of thinking. De Bono uses the symbol of hats to tackle each situation using creativity where each hat represents a certain way of thinking and dealing with the situation in hand. While Cooper[191] claims that the use of metaphor in design is limiting and can harm the design product. Others[192,193] assert that its use can help designers to understand complicated design situations, think unconventionally, and encourage the application of novel design ideas. Burke[194] defines metaphor as "a mechanism that enables its user to see things to represent other things. It brings out the thisness of that or the thatness of this". Lakoff and Johnson[195] relate metaphors to our cognitive system:

*"Our conceptual system … is fundamentally metaphoric in nature".*

They assert that metaphor is not just about language; it is a way of thinking "in the way that we conceptualise one domain in terms of the other".[196] Using metaphors in design can help the student generate new and creative ideas and innovations. In a recent study, Casakin[197] pinpoints the use of metaphors and how it helps the designer to identify and capture design concepts, and establish their goals and requirements.

*"Metaphorical reasoning is an iterative process through which designers gradually increase their knowledge of a design situation. Basically, the use of metaphors aids in structuring design problems"[198].*

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[191] Cooper, Alan. (1995). The myth of metaphor' *Visual Basic Programmer's Journal.*

[192] Casakin H. P. (2007). 'Metaphors in design problem solving: implications for creativity'. *International Journal of Design. 1*(2), p22-33.

[193] Hutchins, E. (1989) 'Metaphors for interface design' in Taylor, M.M., Néel, F., and Bouwhuis, D.G. (eds.), *the Structure of Multimodal Dialogue*. New York: Elsevier Science Publishers.

[194] Burke, Kenneth. (1945) *A Grammar of Motives and a Rhetoric of Motives*, University of California Press.

[195] Lakoff, George and Johnson, Mark. (1980) *Metaphors We Live By*, University of Chicago Press.

[196] Lakoff, George. (1993) 'The contemporary theory of metaphor' in Ortony, Andrew (ed.), *Metaphor and Thought*, Second Edition, Cambridge University Press.

[197] Casakin H. P. (2007). op.cit. p22-33.

[198] Ibid. p22-33.

The use of metaphor is also considered as a way for inspiration. As all metaphors are juxtapositions, which means that two things are put together to find their shared characteristics. Any metaphor, therefore, triggers new ways of thinking which encourages inspiration and in turn encourages creative thinking.

Shank and Gleber[199] state that juxtapositioning encourages brainstorming:

> "*The human mind cannot tolerate a meaning vacuum. If we compare some X to Y, then we strive mightily to understand that comparison. Sometimes the comparison is simple and transparent. When we compare, say, a smile to a flower, then it is easy to abduct that the smile is pretty and pleasant, much as a flower is pretty and pleasant. When we make such simple abductions, then we are staying well within our current 11 range of preconceptions about the meaning of things in the world. When our metaphors are arbitrary, however, then we are no longer in "safe" preconceptual territory. There is no easy and apparent solution to the metaphor "puzzle". Also, even though we know that the comparison is arbitrary, we still feel the tug of our desire to render the comparison as meaningful. Therefore, we have no choice but to leave our familiar preconceptions and engage in meaning exploration".[200]*

In academia there are arguments if creativity is something that can be taught to student. Many researchers believe that creativity can be acquired through learning only if there is an adequate place for it in the curricula.

Casakin[201] conducted a study to assess the use of metaphor in creative problem-solving in the context of first year design studio students. Casakin argues that these tools are very important for the student in their first year to overcome their lack of experience in design problems, and concludes that

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[199] Shank G., Gleber C. (2001). *Six Metaphors in Search of the Internet.* (Accessed March 22, 2010).
[200] Ibid. p4.
[201] Casakin H. P. (2007). op.cit. p22-33.

*"The most important role that metaphors play in design problem solving*
*is to support the design of innovative products."*

This study will investigate creativity dimensions in order to utilise VDS tools identified above for promoting this skills among students.

## 3.8 Design Education and Collaboration

Research has shown the importance of creativity and teamwork in the performance of the organisations. In his report "Constructing the Team", Sir Michael Latham[202] identifies and sets the stage for many of the resultant changes over the last decade. In it, he highlights the consequences of a fragmented and adversarial culture. As the title suggests, Latham[203] recommends that the way forward is by improving the relationship between the parties through effective teamwork. Latham identifies the need to shift from individualism in the industry towards more of teamwork and collaboration that is based on the foundation of trust.

The key principles that were advocated by this report include: performance, efficiency, and being fair to all. At the same time, Latham's report has an echo of the education practice as research revived to integrate teamwork and collaboration skill in architecture education.[204]

Collaboration in design enriches the design experience. As far as education is concerned, collaboration also prepares students for their future in which they will be expected to work with others in their design projects. As the students proceed in their design collaboration they encounter the ideas of others in the group and they learn to work with the tension and bias of others towards their ideas. The communication and the healthy intersection of ideas is the environment in which

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[202] Lathem, M. S. (1994). *Constructing the Team*. London: Department of the Environment.
[203] Ibid. p17.
[204] Nicol, D. & Pilling S. (2000). Changing Architectural Education: Towards a New Professionalism. London: Spon Press.

innovative ideas emerge. Schoenfeld[205] argues that it is within the process of collaborative design the student should find the joy, rather than from the final product.

As this study aims at integrating collaboration and creativity in design education with the help of technology; it was important to highlight the importance of creativity among teams. Leonard and Swap[206] argue that creativity is a process that can be managed. When seen from this perspective, according to Ambile[207], the correct level of challenge has to be taken into account when trying to stimulate creativity within teams. The creative process, according to Ambile[208] and Leonard and Swap[209], ranges from the day-to-day processes to the breakthrough point as seen in the creative process. They believe that this process can be managed and learnt by groups by providing the right culture and the safe environment. Ambile[210] categorises three parts of creativity: expertise, flexibility, and motivation. She further classifies motivation into the intrinsic and extrinsic. Intrinsic motivation, according to Ambile, is the internal desire to do something while the external motivation is outside influencing factors. Ambile claims that intrinsic motivation is a far more potent creative channel.

From the above we can deduce that when integrating creativity and collaboration in the design studio culture we have to take into consideration the factors promoting these skills, which in turn will arm the student with skills required for their future.

## 3.9 IT-based Design education

As technology advances, the importance of integrating technological tools in education increases. IT supporters stress that pedagogical issues have to be considered when planning a successful integration

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[205] Schoenfeld, A. H. (2004). 'The math wars'. *Educational Policy*, 18(1). p253-286.

[206] Leonard, D. A., and Swap, W. C. (1999). 'When Sparks Fly: Igniting Creativity in Groups' (1st ed.). Buston, Massachusetts: Harvard Business School Press.

[207] Ambile, T. M. (2006). 'How to Kill Creativity'. *Harvard Business review on breakthrough thinking*, 66 (5).p76-87.

[208] Ibid. p76-87.

[209] Leonard, D. A., and Swap, W. C. (1999). op cit.p21.

plan. The benefits of the use of technology in education manifest far better when appropriate plans of pedagogy modification are involved.[211] Pedagogy is defined by web definitions[212] as the art of teaching and the principles of instruction.

Mark et al[213] define pedagogy as activities that is been carried out by an individual for the purpose of enhancing the learning of another. Reffat[214] reports that pedagogy can be an individual issue; it can also be said that pedagogy is the art of preparatory training or instruction. Educational technology, as a subset of pedagogy, (also called learning technology) defined by Davis[215] as

*"The study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources".*

Alternatively, IT emphasises more on the use of digital tools to collect process and deliver a set of information. Christie et al[216] argues that it is not possible to separate educational and information technologies if effective learning is to be achieved. While Fleming et al[217] reports that using digital tools and technology to improve learning requires careful consideration of pedagogical issues. Universities have always been concerned about pedagogy development issues; in addition, the potential for a fundamentally different more innovative pedagogy has to be explored. Pedagogy can be improved and advanced when good IT supports it. Improper use of IT can on the other hand ebb and undermine the pedagogy. Combining a weak pedagogy with

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[210] Ambile, T. M.. (2006). op cit. p76-87.

[211] Gao P., Choy D., Wong A. F. L., Wu J. (2009). 'Developing a Better Understanding of Technology Based Pedagogy'. *Australasian Journal of Educational Technology,* 25(5), p714-730.

[212] http://www.yourdictionary.com/pedagogy

[213] Mark, E. et al (2001) op.cit. p168-175.

[214] Reffat, R. (2006). Developments of e-learning in design and architectural education. Muscat, Oman

[215] Davis, C. P. (2001). 'The evolution of pedagogical changes in a multicultural context'. *Journey of a university professor.* Unpublished doctoral dissertation, Charlottesville, VA: University of Virginia.

[216] Christie, M. et al (2004) 'the mutual impact of educational and technologies: Building pedagogy of e-learning'. *Journal of Information Technology Impact.* 4. (1). p15-26.

[217] Fleming, L., Motamedi, V. & May, L. (2007).'Predicting preservice teacher competence in Computer technology: Modeling and application in training environments'. *Journal of* Technology and Teacher Education.15(2). p207-231

inappropriate technological tools is a disappointment for the future of students' learning in general and architecture in particular. Research has been very active recently to investigate the effective utilisation of technology in education and its relationship to pedagogy issues is also considered. Reffat[218] advocates that many researchers encounter a serious problem in this area. He states that this could be related to the failure to isolate and quantify the improvements gained due to the use of IT from the other factors. Therefore, qualitative feedback could be effective in evaluating the benefits that is gained from using IT for delivery of education, taking into consideration the conceptual level and relying on user feedback and perception. To evaluate the effect of utilising new information technologies on delivery of education at the conceptual level, one can examine advances in information technology in the enrichment or facilitating of various facets associated with delivery of education and topping it up in every cycle of the research. This in turn indicates the impact as the process development. Some of the major areas are adjusting technology to the pedagogy need, improving tools, customising it to a student learning experience, based on the student's past performance, and using specific information-presentation schemes to enhance understanding.[219]

## 3.10 Benefits for the UAE from the International Practice

As discussed earlier in this chapter education in the Arab world has undergone many attempts at improvement. The use of technology in architectural education in the Arab region is in its infancy. Attempts to increase access to technology and its use has been active in the Arab countries as they have realised that the use of technology is essential for improving education and for achieving excellence.

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[218] Reffat, R. (2008) op.cit. p897-907.
[219] Schmitt, G. (1997). 'Design medium design object', in Junge, R. [Ed.] *Proceedings of the 7th International Conference on CAAD Futures.* Kluwer Academic Publishers, Dordrecht.

Abu Shakra[220] argues that the use of technology in education in the Arab world cannot be generalised. Arab countries differ in the availability of funds and resources. Some countries are more capable than others in placing a computer in each classroom and providing internet access. Yet, even in countries with available resources, education systems are plagued with serious problems such as the lack of experienced staff or the lack of expertise in deploying the technology into education. The lack of educationally and culturally proper educational programmes also corresponds to the Arab students needs. According to UNESCO there is no evidence of educational programs that are aligned with architectural education curricula. This is considered another serious deficiency in Arabic educational programmes, when considering using the Internet in the architectural education classroom.[221]

This work will consider socio-cultural issues of the UAE when integrating technology into architecture education. Since the UAE shares similar culture and educational systems with other Arabic countries; this work could guide other studies in the region. The study will formulate a framework for integrating technology that promotes the necessary skill in one of the UAE universities. As discussed in Chapter One, the work will investigate the international best practice in terms of design education, in an attempt to utilise the most advanced technology and to promote collaborative and creative environment to ensure maximum benefit.

The tremendous change in the design and the infrastructure of the UAE required the implementation of new technological tools to be used in architecture design. This renovation in the design practice has to be accompanied by a change in design education in terms of skill

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[220] Abu Skakra, G. (1993). 'The status of science and technology in Arab education and its potential to meet the needs of Arab society after the year 2000'. A diagnostic document. In: M. Debs (ed.), *Proceedings of First Scientific Conference on the Future of Science and Mathematics Teaching and the Needs of Arab Society*. Beirut, Arab Development Institute. p114-121 (in Arabic)

[221] Sariyildiz, S. et al (1998) 'Integrating pattern grammar and wavelets in architectural design', *the Sixth International Conference in Central Europe on Computer Graphics and Visualization* 98. Plzen, Czech Republic.

development as well as technologically utilisation. Reffat[222] proposed a framework for introducing technology in architecture education. This framework consisted of important components that Reffat anticipated. This framework will potentially facilitate an effective utilisation of information technology in architectural design education. While Andia[223] highlights that for information technology to be effectively utilised; it should address communication and collaboration issues. This includes redesigning the curriculum arrangements for better management and delivery of resources; facilitating the communications between stakeholders and architectural professionals; providing a platform that can support designing, presenting, and reviewing the products of architectural design education. Figure 3.2 proposed by Reffat in which he summarises the important components of integrating IT into design education.
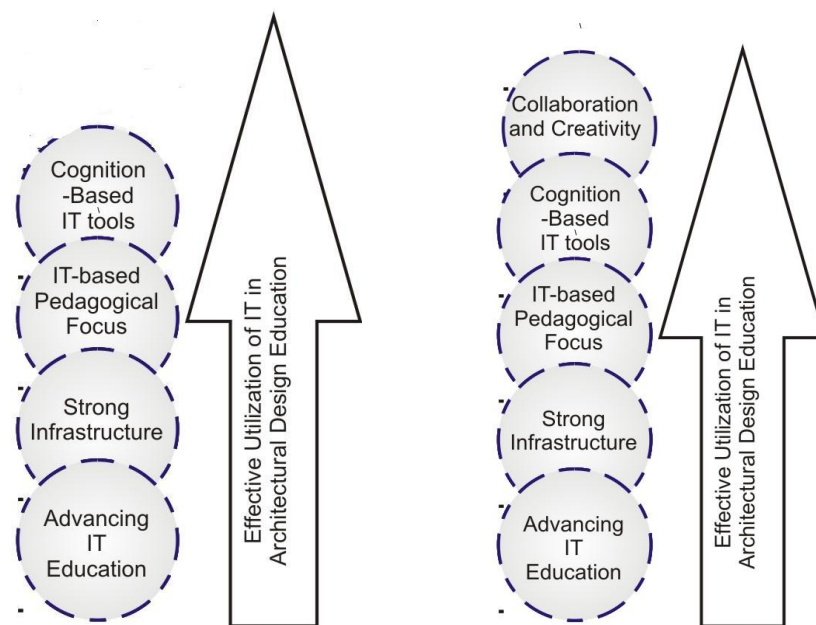


**Figure 3.2: The proposed framework for effective utilisation of information technology in architectural design education – Adapted from Reffat (2008)**

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[222] Reffat, R. M. (2008). op.cit. p902.
223 Andia, A. (2001). op.cit. p12.

According to Reffat[224] the effective utilisation of technology should be based on four components: advancing IT education in architectural design, strong infrastructure, IT-based pedagogical focus and cognition-based IT tools.

Reffat believes that the use of IT in education in architectural design should be based on the idea of using IT as an integrated tool rather than a separate stand-alone tool for the designer. He further assures that the strength of the infrastructure is an important factor when utilising IT in education. The pedagogy according to Reffat's model should be facilitated and focused to better accommodate IT tools. In the last component Reffat argues that the designer at the conceptual stage prefers to use pen and paper as opposed to the CAAD system. The designers believe that the use of pen and paper is more suited and promotes their creativity flow. On the other hand, the new generation of designers who have a better relationship with IT recognise the effectiveness of using computers in terms of saving time, easing the tasks and precision on one hand but on the other hand they also question that current CAAD systems are not providing design feeling when drawing and also not giving the opportunity to reflect the abilities of the designer and his creative ideas. Therefore, Reffat argues that the cognition-based IT tools are an important component.

In the Western countries, the use of IT in design has acceded to using more effective technologies such as the VDS which they regard as the fifth trend in the utilisation of technologies in design education. There is no evidence of the use of this technology in any of the Arabic countries or the UAE. There have been some attempts to integrate technology in architecture education in some of the Arabic countries. These attempts included the experience of the paperless studios at King Fahad University of Petroleum and Minerals (KFUPM). This university is located in the kingdom of Saudi Arabia. The study encouraged the use of technology such as CAD to replace the current methods of designing.

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224 Reffat, R. M. (2008). op.cit. p903.

Al-Qwasimi[225] has also conducted a study that aimed at limiting the use of pen and paper in the design studio and replacing it with computers and CAD systems. This study took place in Al Petra University in Jordan. All the studies encouraged further research in this area as this area requires development in the Arab world. The studies also recommended curriculum modification as a main part for success when integrating new technology in design education.

This work will investigate the best international practice of the use of technology in design education and attempt to formulate a framework for the UAE that could also benefit other Arabic countries taking into consideration the pedagogical issues.

## 3.11 Conclusion

This chapter presented the needs analysis developing a framework that integrates technology to promote complex skills in the UAE. The chapter briefly introduced the impact of technology on architecture. The chapter further outlined the development of architecture education in the Arab World in general, and the UAE specifically, with a great emphasis on the impact of technology in architecture education. The need for architecture education development was examined according to the literature, and the importance of integrating technology to improve design education practice was concluded. The chapter also outlined the importance of complex skills (collaboration and creativity) for design education.

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[225] Al-Qawasmi, J. (2006)*.'Transformations in design education: the paperless studio and the virtual design studio'. Open House International. 31 .(3) p95-103.*

# Chapter 4: Teaching and Learning Methods in the UAE

## 4.1 Introduction

This chapter provides an overview of the Higher Education scene in the UAE. The main concern of this chapter is to provide an indication of the teaching and learning practice in the UAE. The objective of this chapter is to familiarise the reader with the Higher Education environment in the UAE in general and of architecture education in particular. It also outlines the development of Higher Education establishments in the UAE. The chapter names the premier educational institutes, and considers the architecture design curriculum in the UAE focusing on design studio and its practice within UAE educational system. The chapter finally highlights the vision of the UAE as far as education is concerned and plans for sustainable development.

## 4.2 Teaching and Learning

Since the introduction of Problem-Based Learning (PBL), the higher education institutes all around the world have been challenged to implement the new methods of teaching. PBL, active learning, and student-centred learning are all new approaches that shift the focus from the teacher to the student. Hesson and Shad[226] emphasise the need for successful technology-supported educational programmes. They conducted a study at the UAE University and concluded that teaching and learning in the UAE follows the old method of learning that concentrates on teaching rather than learning. The methods used in the UAE Higher Education are not particularly much different from those used in secondary schools in the same country. The focus on teaching and learning has moved lately more towards student-centred learning[227,228,229] rather than teacher-centred learning. In student-

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[226] Hesson M., Shad, K. F. (2007). 'a student-centered learning model'. *American Journal of Applied Sciences,* 4(9), p628-636.
[227] Hung, D. T., S. C. Cheung, W. S., And Hu, C. (2004). op.cit. p120-128.
[228] Hesson M., Shad, K. F. (2007). op.cit. p. 628-636.

centred learning the teaching process becomes a learning activity in which the teacher works as facilitator rather than educator.

## 4.3 Higher Education in the UAE

Higher Education in the UAE is a fundamental sector of the UAE federation system. Preparing for sustainable development, the UAE is investing heavily on education and substantially in Higher Education. The Prime Minister of the UAE and the Crown Prince of Dubai, H.H. Sheikh Mohammed, declares that the UAE's realises the needs of the youth and their education is among our priorities.[230] The increased number of Higher Educational institutes in the UAE in the last decade reflects the country's mission for sustainable development.

The focus of this section will be on the government established universities that are coming under the rule of the Ministry of Higher Education. The private institutes will not be addressed due to the lack of publicity and homogeneity and the fact that they do not reflect the society of the UAE and the model in this study addresses the UAE culture specifically.

### 4.3.1 Governmental Universities in the UAE

Higher education in the UAE started in 1977 when the University of the UAE was first established.[231] Before then the UAE lacked a formal educational system, as far as higher education is concerned.[232]

Sayed[233] conducted a study under the banner of the United Nation Educational, Scientific, and Cultural Organisation (UNESCO). The report entitled "Women, Politics, and Development in the UAE" asserts the importance of education in the UAE.

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[229] O'Neill, G., Moore, S., McMullin, B. (2005). 'Student-centred learning: What does it mean for students and lecturers?' All Ireland Society for Higher Education (AISHE).

[230] Mohammed bin Rashid Al-Maktoum Foundation & United Nation Development Programme (2009). op.cit. p38

[231] Young, B. (2005). op.cit. p28.

[232] Pamela J. Creedon, Mai Abdul Wahed Al-Khaja, Dean Kruckeberg (1995). 'Women and public relations education and practice in the United Arab Emirates'. *Public Relations Review*. 21. (1). p59-76.

[233] Sayed, S. (2002). Women, Politics, Development in the United Arab Emirates.

The last few years have witnessed an increase in the number of private as well as governmental universities in the UAE. This study will focus on the governmental universities. The reason is that the governmental universities which are managed by the Ministry of Higher Education in the UAE follow a national curriculum that is developed in the country. This curriculum has been developed to benefit the UAE nationals and takes in consideration the needs of the UAE society. This curriculum also meets the political attitude adopted in the UAE and takes into consideration the socio-cultural factor in the UAE. Hence this study will formulate a framework that takes into consideration the socio-cultural factor when integrating technology in architecture education. As stated earlier the education system in the Arab region lacks the insight of the socio-cultural factors and the private universities that implement the foreign educational system suffer also from the same problem. The main university in the UAE is the United Arab Emirates University (UAEU) which is located in Al-Ain. This university was the first official university to be launched in the UAE. It is also considered the premier educational foundation in the UAE. The first survey of this research was observed and undertaken in the UAEU because of its dominant role in UAE higher education system and the facilities that it encompasses.

The second largest educational establishment in the UAE is the Higher Colleges of Technologies (HCT). Alongside the UAEU, Higher Colleges of Technology play a vital role in educating UAE nationals and the UAE government invest heavily in facilitating technology for both institutes. The HCT aims at preparing a national workforce that is equipped with the latest skills and technologies taking into consideration the needs of the UAE society. In the year 1998, the UAE government founded the third higher educational establishment which is Zayed University (ZU) for female students located in Dubai. ZU also offers various educational academic programmes that suit the UAE female workforce taking advantages of the international expertise. The University of Sharjah (UoS) located in the Emirate of Sharjah is a semi-governmental institute, where the final phase of this study was undertaken at the University of

Sharjah. The university was founded in 1997 by Supreme President and Chairman Dr Sultan bin Mohamed Al-Qasimi; it is a semi-governmental Higher Educational institution aiming to meet the Emirate of Sharjah's educational and cultural needs as well as the UAE in general. Sharjah city is the third largest city in the UAE. Sharjah maintained its role as the cultural capital of the UAE preserving its Islamic values and traditions. The university is divided into two campuses according to gender – which is also the case with all the other universities in the country. All of these educational institutes share the same mission.

Along the governmental universities the UAE houses non-governmental universities. The non-governmental universities in the UAE all obtain international recognition. These universities include the American University of Sharjah (AUS), the American University in Dubai, Al-Hosn University in Abu Dhabi and Ajman University of Science and Technology in Ajman to name a few.

The above mentioned institutes whether public and private invest heavily to provide comprehensive academic and professional programmes of the highest quality. They aim to become pioneering academic institutions in the Middle East and become well recognised worldwide.

These academic institutions assign foreign experts to provide a distinctive method of learning that encourages the students to prepare for leadership roles in society. Preparing students for leadership meets the needs of UAE society. These institutions continue to fulfil their obligations and responsibilities towards their students by adding to human knowledge and scientific research.

### 4.3.2 Architectural Schools in the UAE

Some of the above mentioned universities house a College of Engineering where the department of architecture is located (UAE University, Ajman University for Science and Technology, Al Hosn

University and the University of Sharjah). The College of Engineering offers unique undergraduate and postgraduate courses. These colleges adapt their curriculum from the best engineering colleges in the region. Architecture departments at these universities strive for excellence in teaching and learning, scientific research and community service. They have outstanding facilities to support students and aim to achieve a rich and balanced university experience, both in and out of university.

Architectural departments at the above mentioned universities offer a degree in architecture engineering (bachelor of architecture engineering). Although this may vary but the departments mainly follow a similar curriculum programme. In the UAEU the students spend the first year studying general requirements including mathematics, English, Arabic and basic computer skills. The students should complete 21 credited hours successfully before being accepted to the department. At the department of architecture the students are required to undertake college requirement modules alongside their specialised architectural modules. The college requirements modules include basic design studio hours. The total credited hours that the student should pass to get the B.A.E. In architectural engineering there are 168 hours of which 21 hours are for the university general requirements, 38 hours are college requirements and eighty eight hours are college specialisation requirements. Although titles may vary but other universities offering architecture engineering degrees in the UAE follow similar programmes. University of Sharjah for example offers a degree in architecture engineering and the students should successfully complete 160 seven credit hours before they get their degree. Like the UAEU, 30 hours are credited to university requirements modules while 34 hours are credited for college requirements. The remaining hours the students spend studying specialised modules.

The American University of Sharjah was the only university in the UAE hosting a school of architecture that is offering a bachelor degree in architecture, the bachelor's of Architecture (B.Arch.), followed by the American University in Dubai in 2009. The aim of the Bachelor of

Architecture is in line with the UAE's mission for its nationals by preparing highly qualified graduates for professional employment in the field of architecture. The programme teaches the students the fundamental skills and knowledge of architecture, while integrating technological, artistic, socio-cultural, legal, and financial dimensions. The program promotes professional ethical values, cultural diversity, and environmental awareness. The nature of study in these two Architecture school differs from the department of architecture in the other universities. The program consists of one 160 hours of required credit and has been designed to meet the standards of the National Architecture Accrediting Board (NAAB) in the United States (U.S).

Unlike the departments of architecture, in Architecture school the students start their first year studying basic architecture skills in which the design studio is also present. This means that the students start building their architectural knowledge from their first year studying at the university. At this programmes students are enrolled for five years followed by training to meet the NAAB standards.

### 4.3.3  Design Studio in the UAE

The design studio has been long considered to be the backbone for architecture education, where the student experiences projects that imitate real-life ones. The students inside the design studio have the freedom to practice what is learned in lectures. The design studio in the UAE architecture departments as well as schools of architecture is still practised in its traditional form, with the aid of the latest technology used in the isolation of the studio curriculum. The students in the UAE meet in an open studio space that is not equipped with computers but is equipped with all the necessary tools for the design practice.[234] The students have to refer to nearby computer labs for any computer-aided design that they need to undertake. The computers are solely used as sketching devices and for data processing purposes.

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[234] Al-Ali, A. I. (2007). op.cit.p439-456.

### 4.3.4 Design Curriculum

Design courses are offered from the second year to the final year in the UAE architecture departments. While in the schools of architecture the students start exploring the design studio from their first year of study. The purpose of these design courses is to give the students the opportunity to experience real-life projects in their design practice. They also aim to give the students the technological skills needed for design projects. It is also an opportunity for the student to practise hands-on what they have learnt in the lecture room. In the UAE educational system there are four design courses offered to the student.

In the UAE University the students undertake the first design studio course upon joining the architecture department. This course aims to introduce the student to the key concepts of architectural design. They are also introduced to the primary software that they will be using in their future projects. In the second design studio course the students develop a set of relatively simple architectural projects; using form and space as fundamental elements of architectural design. They also get the opportunity for more hands on 2D and 3D visualisation software such as AutoCAD. As the students progress in their studies they encounter more complex architectural projects. They experiment with multiple principles of spatial organisations, such as central, linear, radial, modular, and clustered patterns. At later stages of their study, the students start their graduation projects. The first graduation project aims to engage the students in real-life project. The projects are based on the real needs of society. The students practice what they learnt in the theories and apply methods of architectural programming. The students also employ a contemporary architectural design criticism. They initiate design processes through research and design methods. At this course students also conduct a literature review, gather data, and analyse the potential sites and similar existing buildings. The emphasis is placed on physical and social documentation, visual surveying, users' needs, and evaluation required for the project and programme preparation for Graduation Project II course (Prerequisite). While the second graduation

project aims at developing skills suitable for the final graduation project design. Based on the skills that the students initially developed during Graduation Project I; the students learn final detailed design solutions of the project and produce an architectural model and report.[235] The design studio programmes are credited four hours each.

In the schools of architecture i.e. AUS and AUD, the students start the design coursed from the first year at the university.  The students study design studio one and design studio two at the first year and each is credited four hours.  In the first design studio the students are introduced to the fundamentals of manual drafting and the different sketching tools that they will use throughout their studies. The second design studio builds on the skills learnt in the first design studio and the students enrich their experience of the vocabulary learnt and the basic computer software used for designing. In the second year the students study design studio three and four each credited six hours. Design studio three introduces the students to the environmental issues and the socio-cultural issues and the students start to build their analytical skills as well as their critical skills in design. In design studio four the students are introduced to the strategies of architectural design.  In the third year the students study design studio five and six each credited six hours. The third year design studios encourage the student to develop architectural theories and methodologies. The students are also encouraged to develop their problem-solving skills and critical thinking which is later helping them to develop new ways of analysis for architectural objects. Further design studio courses at year four are design studio seven and eight in which the students are introduced to more sophisticated design techniques taking in consideration the urban context. These courses are credited six hours each.  In the fifth year the students undertake design studio nine and ten each credited at six hours. In design studio nine the students prepares the material they need for their final projects. In design studio ten the students are

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[235] Undergraduate Academic Programs and Curriculum for the 2007 and 2008 Cohorts June.

expected to finalise their design project and implement their thesis research that incorporates all the skills they learnt previously.

Although the design studio practises in the traditional way in both streams of architecture education in the UAE, higher education institutes in the UAE are competing to integrate student-centred learning approaches, and it has been asserted by H.E. Sheikh Nahyan that there is a need to move further towards this by taking into account student assessments and learning in general.[236] The adoption of such an approach is a complex task for the UAE context, taking into consideration the students' prior backgrounds and the previous learning methods in their schooling systems. The school systems in the UAE highly stress a rote learning and didactic teacher-centred-approach.[237] A challenge that is facing higher education in the UAE is how to motivate students from being passive receivers to being active participants in the learning environment. Hesson and Shad[238] developed a model to integrate student-centred learning for Biology students in Egypt, in their study which is published at UAE University, they argued that this model is of teaching integrative thinking, based on existing models of creativity and synthesis. Hesson and Shad[239] further add that students in the UAE lack motivation to conduct a student-centred learning approach but concluded that using the technology-based tools promotes students' enthusiasm. They[240] concluded that for this approach to be successful; the departments need to modify their curriculum to accommodate these changes. Young[241] has also conducted a study at Zayed University in the UAE to evaluate the integration of learning technology and he asserts that the use of technology-based curriculum in the UAE requires a shift from teacher-centred learning approach to a student-centred learning approach. It is also of great importance for both streams of architecture education to

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[236] Young, B. J. (2005). op.cit p28
[237] Walters, T. S., Quinn L. Walters (2003) 'Gen Zeds: Arab women speaking with still small voices'. *Equi Novi 24* (2). p181-194.
[238] Hesson M., Shad, K. F. (2007). op.cit. p628-636.
[239] Ibid. p. 628-636.
[240] Ibid. p. 628-636.

properly integrate technology in teaching and facilitating these design studio courses. This work aims at formulating a framework for implementing technology in architecture design education which makes it valuable for both streams of design education in the UAE that are described above. The framework will also potentially benefit any design-led curriculum in the UAE and Gulf region.

## 4.4 Conclusion

This chapter summarised the teaching and learning methods in the UAE Higher Educational institutes. It also showed how the methods are based on teacher-centred styles in opposition to the desired student-centred styles that are recommended by learning theorists. The chapter specifically considered architecture education in the UAE, introducing the universities that house schools of architecture and architectural engineering department, and discusses specifically the design curricula as practised in the UAE, aiming at highlighting their weakness and introducing ways of improvement in the future to meet the required standard. This review informed the preliminary field work and the identification of potential partners for the testing and implementation of the VDS.

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[241] Young, B. J. (2005). op.cit. p38

## Chapter 5: Methodology

### 5.1 Introduction

This chapter defines the methodology used in this research. The chapter discusses in detail the methods applied and the rationale behind the choice of these methods. It also presents the research design and how it is implemented. Moreover, the chapter includes a discussion of the data collection methods that have been utilised in both its primary and secondary modes. It also presents the procedures and the participants alongside the validity and reliability issues. It is shown that the research adapted a cyclic nature which resulted in three phases of development; each phase is also described in this chapter in terms of the methods used. The chapter summarises the case studies carried out in this project, and also includes a synopsis of the curriculum developed for the framework of implementing VDS in design education in the UAE.

### 5.2 Research Methodology

The research is based on an action research methodology. Greenwood and Levin[242] define action research as a series of collaborative efforts and strategies to generate knowledge in a certain subject area and design action based on feedback with the aim to developing dramatic change. This research aims to initiate a change in the architectural design studio practice in the UAE by introducing VDS to promote new skills. Since this research considers modifying the design studio curriculum to accommodate new technology, action research is a tool agreed on by researchers[243]. Elliot[244], draws on his previous experiences as a teacher, states that action research emerged as a tool

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[242] Greenwood, D., and Levin, M. (2007). *Introduction to Action Research: Social Research for Social Change.*2nd ed. California: Sage. p3.
[243] Elliot, J. (1991). *Action Research for Educational Change*. Buckingham: Open University Press.
[244] Ibid. p3.

for reforming school based curriculum. Bennett[245] adds that action research approach is effective for solving practical problems and collecting scientific knowledge. This study plans to formulate a framework for integrating VDS into architecture design education; hence, it is essential to investigate the effectiveness of the developed framework. According to Bennett[246], the researcher designs his study and conducts it to investigate the effectiveness of the subject under study. The researcher's aim is to improve the subject under study. Action research is cyclical in nature. The cyclical nature of the method allows researcher to experiment with the solutions and benefit from the feedback of every cycle. This research went into three cycles. Each cycle is referred to as a phase. Each phase subsequently consists of three stages. The final stage of each cycle presents useful feedback that the researcher uses to experiment with and benefit from for the next cycle. This helps the researcher to make appropriate decisions on the development of the next cycle. Action research can be conducted individually; it also can be a collaborative activity. The team approach is called collaborative inquiry.[247] In this study, a pluralistic action research framework was used in some stages of the research; specifically, in the third stage on phase three of the action research cycle. The researcher had to collaborate with the administrators and lecturers at University of Sharjah to facilitate the smooth implementation of the final product and to enhance the experience of the students with variety of knowledgeable instructors which in turn ensured a variety of ideas. This is one of the important aspects of this research.

Action research has the potential to generate valid and constant improvements for academic institutions. It enables the educationalist to assess their teaching practice and reflect on it; it also offers them the chance to explore new ideas, test new methods and materials and to measure the effectiveness of new approaches. This in turn can help to

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[245] Bennett, C. K..(1994) 'Promoting teacher reflection through action research: what do teachers think?' *Journal of Staff Development*, 15(1), p34-38.
[246] Ibid. p34-38.

make decisions on which new approaches to include.  The aim of this research is to formulate a framework for integrating VDS into the architectural design education of the UAE.  Therefore, compared to other studies the aim is not to evaluate and analyse exiting practice.[248] The aim is to introduce a new practice that did not exist before.  Using action research helps in making the right decision on the specifications and the tools of the new framework.

According to Lewin[249] action research is pursued with iterative cycles of "plan-act-observe-reflect".  Furthermore, Elliot[250] highlighted the basic cycle of action research in Lewin's model as

"*identifying a general idea, reconnaissance, general planning, developing the first action step, implementing the first action step, evaluation, revising the general plan and from there the researcher then spirals into developing the second action step, implementation, evaluation, revising general plan, developing the third action step, implementation, evaluation and the loop goes on*".

In the light of action research definition and procedures identified in the literature this research adopted an action research design as stated above. Figure 5.1 illustrates the research design developed for this study.

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[247] Somekh, B. (2006). *Action Research a methodology for change and development.* England: Open University Press.p114.

[248] Fincher, S., Petre, M. (2004). *The Field and Endeavour.* London: RoutledgeFalmer.

[249] Lewin, K. (1951). *Field theory in social science; selected theoretical papers.* New York: Harper & Row.

[250] Elliot, J. (1991). op.cit. p70.
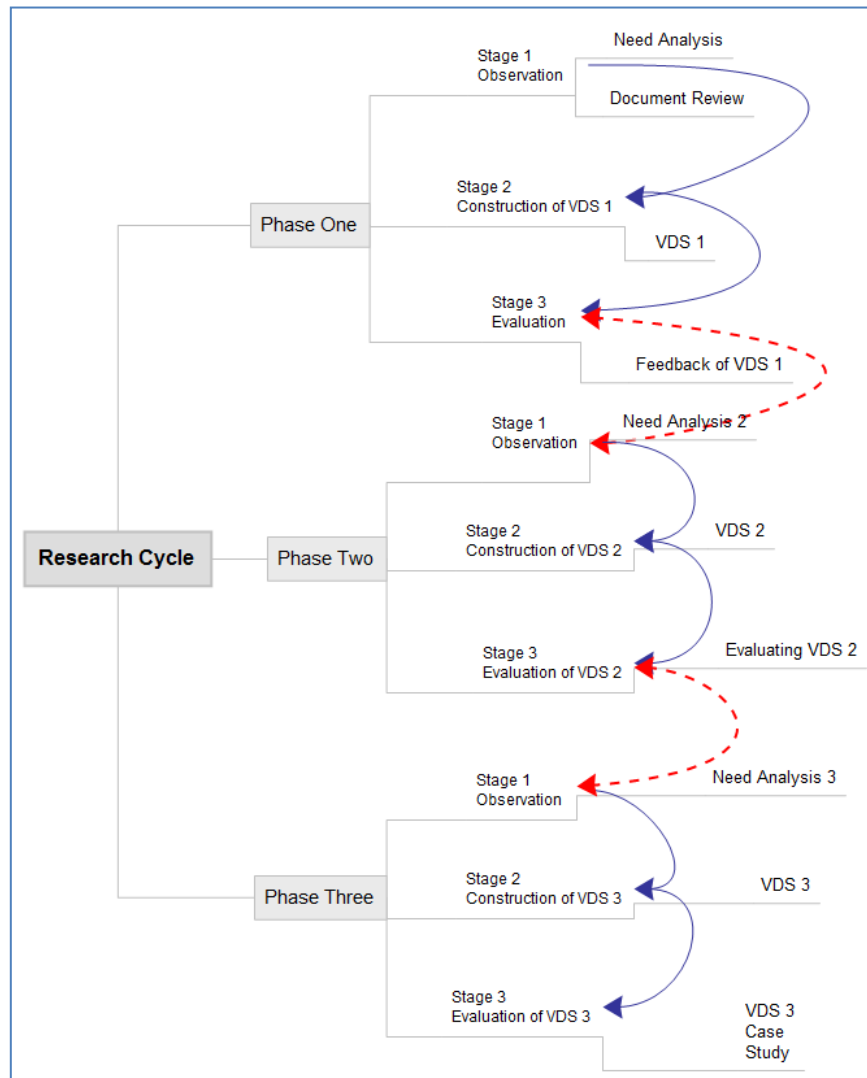
**Figure 5.1: Research Design Cycle**

## 5.3 Research Design

The research problem is to develop a framework for implementing VDS into architectural design education. As described above the research adopted an action research method.[251] The action research method in turns embraces a cyclical style. The research undergoes three phases. Each phase consists of three stages. These stages are called respectively the observation, the construction, and the evaluation. Each stage is processed using different research approaches. These approaches are: the descriptive approach, the constructive approach and the evaluative approach. The descriptive approach uses literature review. The constructive approach consists of activities such as

formulating a framework or a model. The evaluative research approach evaluates the model using the appropriate evaluation tools. In stage one of phase one; the descriptive approach used a secondary data collection method and review of the existing literature. The researcher investigated the needs of the UAE society. This investigation attempts to determine the needs of the UAE in terms of the use and application of technology in architecture design education. This investigation served as the needs analysis of this research (needs analysis and document reviews – see chapter 3). The second stage was the construction stage, based on the needs analysis in stage one of this cycle (phase one), the researcher developed an understanding of the needs of the fast-developing UAE society. The researcher considered many factors such as lack of skills and the dependency on an expatriate workforce. The stage also determined the needs and the policies of the UAE governments. The needs analysis of the UAE shows the need for skilled national graduates. The needs analysis revealed the importance of advancing the educational systems in order to achieve the required skills among national graduates. In stage one; the literature review aims to obtain a better understanding of the use of technology in design education. The researcher identified the use of VDS as the most advanced and effective form of using technology in architecture design education. In stage two of phase one, the researcher formulates the first framework of a virtual design studio (VDS 1). The framework coordinates with the UAE society needs and helps in the integration of technology alongside the complex skills needed for the development of the society according to the requirements of the revised development plans.

The third stage is an evaluation of the developed VDS; the researcher conducted a preliminary study in the UAEU. The aim of this study was to investigate the perspectives of UAEU students and lecturers toward using technology and visualisation as instructional aides. The researcher also introduced VDS 1 and conducted a short study to

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[251] Elliot, J. (1991). op.cit. p75.

observe the students' and the lecturers' acceptance of the new technology and its suitability.  For more information about this study and its results see appendix C.

The research then goes into the spiral action.  The next cycle (phase two) starts with stage one as the observation stage.  The literature again is reviewed to assess the developed model (VDS1) with the international best-practice of VDS (see chapter 3).  An investigation was conducted to identify the important elements in the VDS practiced internationally and its use in the educational setting.  The cases of Sydney University and the University of Strathclyde were closely considered and investigated using secondary data collection method that included online searches, document reviews and personnel contacts.  This in turn leads to the improvement of VDS1. New features are then added to VDS 1 to mark the emergence of VDS 2.

A third cycle is performed that consists of the three stages of observation, construction, and evaluation. In the third cycle named phase three, the observation stage (stage one) used a primary data collection method.  A case study was conducted.  The aim of this case study was to observe a studio practice that uses creativity and collaboration technique in a design studio in Wales (UK).  This studio was named 'Cardiff Chimera'.  Cardiff Chimera is an international design studio that was conducted by Richard Goodwin annually to facilitate and promote creative and collaborative skills among students of different nationalities in different environments.  The observation of this case study prompted ideas for the use of collaboration and creativity in design studio.  Based on the observations of this case study and the feedback of the previous VDS; the researcher formulated a VDS framework that utilises technology to promote collaborative and creative skills among students in the UAE.  This VDS is then named VDS 3.  Stage three of phase three aims at evaluating VDS 3.  This was achieved by conducting the field work at the University of Sharjah.

The research approach used for this study is qualitative.[252] Herr and Andreson states that:

"*Qualitative research is much more subjective than quantitative research. Qualitative research uses completely different methods of collecting information. These methods can be both primary and secondary*".

This study uses both methods which ensure precise understanding of the subject of study and also variety of information, in addition to the action research. Qualitative research is exploratory in nature.[253] Qualitative research is usually less costly than the survey. The information acquired is accurate as the methods used in this approach are more effective. It is also less costly than the survey approach.

Next chapter will explore in detail the development process of the VDS in its three stages, for the purpose of this chapter the phases will be explored in terms of the methods applied in each phase.

## 5.4 Overview of Data Collection

Two methods of data collection techniques are applied in this research. The data is collected from multiple sources to answer the research questions. The research problem in this study is to formulate a framework for integrating a VDS at the conceptual end of the design studio at the UAE architecture education. The research problem is processed through three stages of research approaches: descriptive, constructive, and evaluative.[254] Descriptive research approaches are often based on a literature review process which is conducted through primary as well as secondary data collection method. A secondary data methodology is used - which is based on the literature review at the start of this study to validate its purpose and needs. Primary data collection is also applied in the form of a preliminary survey, personal communication, and researcher's observation. The constructive

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[252] Herr, K., Anderson, G. L. (2005). *The Action Research Dissertation*. California: Sage Publication. p52.
[253] Greenwood, D., and Levin, M. (2007). op.cit. p77.

research approaches include activities according to Glass et al[255]; in such approaches an existing theory, process, or method are evaluated using an appropriate research method such as case and field studies, and this is achieved thorough the constructional stages mentioned above, and in the evaluative approach that is conducted through summative and formative analysis which is in the evaluation stages.

The data collection went through three stages according to the nature of research. In the first stage the aim is to collect preliminary information. The second stage aims to assess the construction of the model and the final stage is to get feedback and exploratory data, this procedure was repeated throughout the research cycle. In the course of all the stages there have been a variety of methods for collecting data, that included observations, focus group, interviews, audio and video recording of events, still images and computer logs. The data collection methods will be explored further in this chapter as each phase is described.

## 5.5 Interviews/ Focus Groups

Strauss and Corbin[256] state that one of the main purposes for engaging in any type of interviewing techniques is to obtain "immediate constructions" and "reconstructions" of persons, events, activities, organisations, feelings etc. In the course of this study, group interviews as well as individual interviews were conducted. Interviews with the UAE University (UAEU) students, and unstructured individual interviews with lecturers from UAEU and the American University of Sharjah (AUS), were carried out. Further details about these interviews and the findings, can be found in appendix C.

In phase 3 interviews with the participant of Cardiff Chimera were conducted to get an in-depth understanding of the students' reaction towards group work and creativity imposed to them by the studio work.

[254] Glass, R. L., Ramesh, V., Vessey, I. (2004). 'An analysis of research in computing disciplines', *communications of the ACM*. 47(6). p89-94.

[255] Glass, R. L., Ramesh, V., Vessey, I. (2004). Op. cit. p89-94.

[256] Strauss, A. & Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Technique*. Newbury Park, CA: Sage Publication, Inc.

It also works as a guide for the enhancement of VDS 3 taking in consideration student perspectives. In stage three of phase three the interviews were conducted to validate the feasibility of the final VDS model and assess its suitability to the curriculum; to identify areas of improvements and get more in-depth analysis of student's participation.

In the evaluative stage of phase one a preliminary focus group was conducted at the late stages (evaluation stage) to determine the effectiveness of the developed VDS model and compare it to the needs of the UAE educational system with reference to design in terms of technology integration (see appendices C). Another focus group was conducted at the evaluation stage of phase three to determine areas of improvement for the proposed VDS framework and get participants views and attitudes towards it. Moreover, the focus group aimed to evaluate the overall impact of VDS 3 on the students at the University of Sharjah and more generally on the design education in the UAE. According to Kitchenham & Pfleeger[257] focus groups can be used at the preliminary or exploratory stages of a study to assist in the identification and development of claims, concerns, and issues that will be explored throughout the study. Lampila et al.,[258] cite Kruger and Casey who asserts that "*focus group can be used for program development and evaluation, planning and needs assessment*".

The use of focus groups in this research involves group interviews in a guided discussion at two different stages of the research, the preliminary and exploratory stages.

## 5.6 Case Studies

In the course of the research and specifically in phase one and three, case studies are conducted. In stage one of phase two a case study is conducted using the secondary data collection method. The aim was to examine the international best practice of VDS after specifying two

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[257] Kitchenham, B. A., Pfleeger, S. L., Egan, S. (2001). *An empirical study of maintenance and development projects*. Staffordshire: UK: Keele University.
[258] Lampila, P., Lieshout, M., Gremmen, B., Lahteenmaki, L. (2009). 'Consumer attitudes towards enhanced flavonoid content in fruit'. *Food Research International*. 42 (1). p122-129.

models as the best practiced VDS according online searches and database queries (see appendix C).  In stage one of phase three a study was conducted to closely observe a case that facilitated collaboration and creativity in design education.  The purpose of this case study was to validate the information collected through the literature search and to confirm the dimensions specified for the research in terms of collaboration and creativity.  It also aims to observe the application and use of collaboration and creativity and its dimensions in design studio settings to get an in-depth understanding of its use.  Finally, a case study was conducted at stage three of phase three to evaluate the final VDS.

## 5.7 Rich Picture Method

Checkland[259] introduced the term 'rich picture' as a technique that he believes it helps managers to define a problem domain.  According to Checkland, rich picture is a flexible technique the user can apply to understand and analyse certain problems or situations that he is trying to understand.  Horan[260] further adds that rich picture is a universal technique that can be easily understood and communicated.  Horan states that the flexibility of rich picture stems from being a graphical tool, rich picture has no rules or constraints.   This research applied rich picture technique in a variety of situations.  The researcher utilised rich picture technique to understand and analyse certain situations while observing it.  Details about the use and application of this method is shown later in this chapter.

## 5.8 Visual Method

This research uses various research methods.  This has been proven to give rigour and objectivity to the research.  Visual methods are used in the research at certain stages. Banks[261] advocates that the use of films and photographs in documenting a culture of a certain society is not

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[259] Checkland, P. and Scholes, D. (1999) Soft Systems Methodology in Action, Chichester: Wiley  p45.
[260] Horan, P. (2000). 'Using 'rich picture in information system thinking'. *1st international conference on system thinking in management*. p257.
[261] Banks, M. (2002). Visual research method. *Indian folklore life*. 1(4). p8.

problematic and has been a tool for researchers for a long time. In this research, the socio-cultural factors of the UAE society are given great emphasis. Hence the use of still images and video recordings is helpful in determining such factors. More details about the utilisation of this technique are presented later in this chapter.

## 5.9 Computer Use

During this research, the researcher created a database to help to analyse and query the international best practice of VDS. The database acted as a repository where existing practice could be entered, queried, and analysed to find the practice(s) that most fulfilled the criteria for best practice. The practices that met all or most criteria are considered the best practiced. A conceptual framework for the proposed VDS was then initiated.

In the evaluation stages the project also relied on the use of computer programmes and software in assessing the student's participation and for grading purposes as part of the proposed model; the data was also used to aid the qualitative investigation.

The computer software Nvivo 8 was used to aid the organisation and analysis of the raw data obtained through the study. The nature of the research also encouraged the use of computer logs to assess the student participation in the VDS 3 environment.

## 5.10  Hypothesis

The research attempted to construct and evaluate a framework for the integration of technology in design education for an architectural curriculum, bearing in mind the UAE society and its socio-cultural aspects. The research therefore hypothesises the following:

VDS is instrumental in promoting creativity and collaboration in architectural education and the main hypothesis is that socio-economic factors within the UAE and other Gulf States need to be addressed to implement successfully VDS into the curriculum.

The main hypothesis is further expanded to the following sub-hypothesis:

| Sub Hypothesis | |
|---|---|
| H1 | VDS tools are instrumental in promoting creativity |
| VDS helps the student identify the main problem and issues of concern. | |
| VDS motivates the students to take active part in their design | |
| VDS helps the student in generating ideas and think metaphorically | |
| VDS makes the student flexible in sharing their ideas with colleagues as well as building on other's ideas. | |
| VDS directs the student in learning new methods of design and freely adapt them in their design ideas | |
| VDS encourages the student to expand their initial ideas and make complete projects out of it. | |
| VDS encourages the student to investigate new methods and search for new ideas | |
| VDS encourages the student to overcome obstacles and reach their final goal. | |
| H2 | VDS is instrumental in promoting collaboration |
| VDS facilitates communication between team members | |
| VDS encourages the students to share responsibilities in their | |
| VDS helps the student to create a shared vision for their work | |
| VDS makes the students aware of their final goal | |
| VDS encourages the students to take initiative in making decisions and monitor their progress. | |
| VDS makes the students involved in their project. | |
| H3 | VDS tools address pedagogical issues. |

**Research Sub-Hypothesis**

The research hypothesis will be addressed and further elaborated in chapter seven. The sub-hypothesis will also be aligned to the evaluation.

## 5.11 Validity and Reliability

Herr and Anderson[262] argue that action research is interested in action-orientated outcomes. They believe that action research goes beyond generating knowledge. Action research proves its legitimacy through the choices and decisions made throughout the research rather than proving the validity of the methodology.[263] Theorists agree that addressing reliability and validity issues in qualitative research differs from those used in quantitative research[264], Herr and Anderson[265] further state that action research differs even more. In action research usually there are many types of involvement by the researcher. The main broad types are either "insider" or "outsider". If the researcher is an insider who is undertaking a study in the organisation in which he is employed, then it becomes difficult to be biased towards the study and prove reliability of his data.[266] In a different stance, the researcher may be an outsider, so his involvement in the subject is minimised and some data might not be accessible. Herr and Anderson[267] suggested a pluralistic approach to conduct an action research to preserve both perspectives. In the case of this study the researcher maintained the outsider perspective of the research problem and yet maintained the balance of being aware of some insider opinion having previous experience as a lecturer in the HCT colleges of the UAE. Hence, the advantage of having prior knowledge of the problem exists. The researcher also used the pluralistic approach at a point of this study to gain in-depth views of the insiders. The use of multi-methods in collecting the data was also utilised as the data was collected using observations, focus groups, and interviews.

According to the literature a study can be said to have an external validity if the findings of that study can be generalised.[268] As this

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[262] Herr, K., Anderson, G. L. (2005). op.cit. p63
[263] Herr, K., Anderson, G. L. (2005). op.cit. p65
[264] Lincoln, Y. S., Guba, E. G. (1985). *Naturalistic Inquiry.* Beverly Hills: Sage.
[265] Herr, K., Anderson, G. L. (2005). op.cit. p82
[266] Greenwood, D., and Levin, M. (2007). op.cit. p32.
[267] Herr, K., Anderson, G. (2005). op.cit. p84
[268] Brewer, J., Hunter, A. (1989). *Multimethod research: a synthesis of styles*. John Brewer, Albert Hunter. London: Newbury Park.

research aims at formulating a VDS framework for implementing technology in design education in the UAE, and due to the cultural similarities between the UAE and other countries in the region, this study can be confidently applied in other countries in the region to obtain the same results.

## 5.12   Methods of Phase 1

### 5.12.1 Data Collection Methods and Instruments in Phase 1

Secondary data collection method

Secondary research uses all sort of information that has been collected from various resources such as literature reviews, internet sources, published materials, broadcast media, and other non-human sources. This type of research does not involve human subjects.  The data is extracted from various journals, articles, and books.  The criteria for selection of the literature are relevant to the research topic and the year of publication.  The university library was visited to acquire the data. Online searches were also conducted.  Some of the online database that was accessed using the *findit* link on the University of Glamorgan website included e-database, e-journals and e-books facilities.  Some of the keywords used to conduct the search were: United Arab Emirates, Architectural Education, Technology, Innovation, Teaching Methods, Architecture Design Education, Design Education and Technology etc. The UAEU curriculum analysis document was also reviewed.[269]   The needs analysis aimed to at identify the needs of the UAE society in terms of appropriate skills development and the use of technology in the educational system and ways for improvement, as well as identifying the UAE's mission for development and for the use of technology in education.  The investigation also revealed the construction boom in the UAE and the high concern at this stage of building the country's infrastructure. In addition it showed the UAE's government concern

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[269] United Arab Emirates College of Engineering. (2004). 'Undergraduate academic programs'. Accessed online at: http://www.uaeu.ac.ae/catalog/engg/20090824_ceng_catalogue.pdf. on 14/3/2004.

about human developments associated with the construction development. UAE's government mission for better education and the countries ambition for competence in terms of its construction directed this study.

The research methodology uses a survey of various educational practices in the field of architecture in the UAE via online search, the researcher's personal observation, and focus group sessions. In the course of this study, the researcher considered investigating various resources. The researcher used methodology tested in previous studies, the researcher started with a thorough and broad review of the available literature, because the UAE is a relatively newly developed country – less than four decades old it was a complex task to extract enough literature concerning education and other important aspects due to the lack of documentation. This research also includes different comments and feedback of teachers and guides in architecture education in the UAE. The findings and conclusions are based on the evaluation of the experiment and the case study.

The researcher used a number of sources to conduct the secondary data collection approach, including library visits and use of the Internet. The researcher visited the libraries to gather valuable data from available sources. The electronic journals are also very rich and updated. The researcher utilised the Internet as a major tool to obtain relevant information by searching for articles in journals and newspapers from database.

Primary Data Collection Method in Phase 1

❖ Interviews

In phase one, interviews were conducted after the focus group session. The purpose of the interviews was merely to validate the information collected from the students. For this reason, the interviews take the form of casual conversations whenever the researcher found an opportunity to talk to a lecturer in the UAEU after one of the focus group sessions. AUS lecturers are interviewed to ascertain that the learning

environment in this university is not disparately different from that of the UAEU.

❖ Focus Group

The focus group methodology was conducted at the exploratory survey in stage one.   The aim is to identify students' perspectives of the current teaching and learning practices in the design courses offered in the architecture school of the UAEU and to evaluate the students' perceptions of the first proposed VDS.  The aim of this investigation was initially to gain a preliminary understanding of the difficulties, approaches, attitudes, perceptions, and motivation related to the learning of design in architecture schools.  Secondly, the investigation was designed to assess the extent to which the students would be interested in the use of sophisticated technology in the teaching and learning environment of the UAE architecture education schools in order to achieve effective learning.   Finally, the aim was to investigate students' perception towards the developed VDS after a short trial.  The study was conducted in the UAEU because it is the largest university in the UAE, and because other universities that house an architectural department in the UAE follow a similar educational system. The study revealed students' interest and motivation towards using technology such as visualisation and 3D in their learning.  The students added that the use of visual aids assisted their learning and understanding and made learning more fun.

❖ Observations

As part of this research and the data collection the researcher was involved as an external member researcher.  It has been shown that observations create rigour in a study when combined with other research, thus providing depth as well as enhancing consistency and validity.[270] The researcher spent one semester in 2005 closely observing the teaching and learning processes in the Department of Architecture in

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[270] Brewer, J., Hunter, A. (1989). Multimethod research: a synthesis of styles.  John Brewer, Albert Hunter. London: Newbury Park.

the UAEU for the purpose of collecting information about the use of technology, learning methods, and teaching methods. The researcher notes that there are five design courses and one graduation project in the department of architecture in the UAEU. In other words, the students study a design course in each semester of their study period in the university.

The researcher observed there is a considerable amount of interest in the use of technology in teaching revealed by the availability of several computer labs in both men's and women's campuses – see appendix C – with the ratio of students to computers being approximately 4:1.

Both men's and women's campuses contain what is called a Model-Making lab. The lab supports all design courses and an elective course of Model-Making. It is a very useful facility that has enabled students to produce more accurate models of challenging architectural designs. The university also houses nine traditional design studios, three at the women's campus and six at the men's campus. These labs are equipped with Pentium 4 processors and enabled with advanced software such as ArchiCAD, AutoCAD, 3D Studio Max and FormZ, which are all the latest products as far as drawing technologies, are concerned.

The researcher also observed the existence of the CAVE technology. In CAVE, the student feels the experience – not just sees it. CAVE allows the student to visualise the 2D drawings in a 3D walk-through immersive environment. An instructor walks through a design with his student and critiques the design, discusses modifications, and leaves behind markers with annotations to record specific suggestions for later design modification. CAVE also allows experimenting with new instructional concepts that are not currently possible with either traditional or CAD-based computer graphics techniques. CAVE technology is an advanced technological tool that is developed for the UAEU.[271] The CAVE is built of white wooden walls by several projectors to imitate the technology of

the real CAVE. It is observed that the technology despite of its existence but was not properly integrated into the design curriculum of the UAEU.

❖ Participants

The design of this research required the involvement of participants at its different stages. In the first stage the participants are students and staff from UAE University. The staff consists of five male lecturers in the UAE with two male design studio instructors and one female design studio instructor. The student participants were both male and female, aged 18 to 23, studying design studio as part of their education programme. 80% of the students are UAE nationals and 20% are coming from other Arab countries (Palestine, Iraq, Jordan and Syria) but were born in the UAE or lived there for several years. For more about the focus group questions refer to Appendix C.

## 5.13 Methods of Phase 2

Secondary Data Collection Method in Phase 2

At this phase the same internet search tools mentioned above were used to further identify needs of the UAE society in terms of the VDS developed in the first phase. An investigation of the international best practice of using technology and specifically VDS in architecture education in the world was conducted. In addition, a database management system was created and placed to accommodate and administrate the data collected (more about the database will be detailed in the next chapter). Two models were identified according to the author. The models were further studied as case studies using a secondary data collection method. The researcher conducted an online search and article search (see appendix C). A database table was created and a second VDS was formulated and then rectified in stage three according to the international best practice.

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[271] Okeil, A. (2010). op.cit. p202-216.

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## 5.14 Methods of Phase 3

Secondary data collection method in Phase Three

The same internet and library searching tools were also utilised at this stage aimed at finalising the VDS model and equipping it with all the required tools.  In addition, a live case study was conducted and observed for the use of creativity and collaboration in the design studio the case of Cardiff Chimera - more about this case study and its findings can be found in appendix B, the next section will briefly introduce the case study as a research method in stage three of phase three.  More details of the case study are found later in this chapter.

Primary Data Collection Methods

❖ Case Studies

Two case studies were conducted in this phase.  The first case study was conducted in stage one of this phase and the second case study was conducted at stage three of this phase.  The first case study consisted of observing a collaborative and creative design studio.  The purpose was to gain in-depth understanding of tutors and students perception of the use of these skills in a design studio setting.  This case study was called Cardiff Chimera.  The next section provides more details about this case study.  The second case study in this phase was conducted at stage three (evaluation stage).  The evaluation stage has to take place in the research-targeted environment – in this case the University of Sharjah (College of Engineering - Architecture Department) which required facilitation from the university's staff.  University of Sharjah is a semi-government university and conducting the case study at this university gave the research an external validity dimension in the sense that the study could be extended and generalised to more than one setting.  The University of Sharjah was also selected because unlike the UAEU it better reflects the UAE society in terms of cultural diversity.  As the UAEU is mainly occupied by UAE nationals, the national culture dominates there whereas the University of Sharjah attracts people from different cultures including the national culture.

Also the variation of the model nature and lecturers from different background were involved in providing their experiences.

## 5.15 Cardiff Chimera Case Study Analysis

### Introduction

This study aims at identifying the usefulness and effectiveness of promoting skills such as creativity and collaboration in design education. It also aimed at understanding the potential use of tools to support creativity and collaboration in design education.

### Participants

Staff Profiles

This case well illustrates the variety of academic backgrounds, ages, interests, and attitudes of the contributors that lent to a diversity of perspectives and a wide variation in possible teaching methods. The contributors served to lead the students in new directions, exposing them to new ideas which at times caused confusion, but ultimately stimulated creativity. Each contributor guided the students towards different ideas which provoked the students' determination to champion their specific design ideas.

Professor Richard Goodwin has been practising for over 30 years as an internationally exhibiting artist and architect, Goodwin has sustained a prolific professional practice of art and architecture. His work, ranging from freeway infrastructure to gallery installation, to "parasitic" architecture, public artworks, is held at major collections, including the Art Gallery of NSW, the National Gallery of Victoria, the Nuremberg Museum and numerous Regional Gallery and private collections.

John Punter is a Professor of Urban Design at the School of City and Regional Planning at Cardiff University. Professor John Punter's interests range from contemporary urbanism, in particular aspects of urban planning, urban form, urban design, and architecture to all aspects of contemporary planning practice, especially the comparative

analysis of planning systems, having completed such studies of France, USA, Canada, and Australia. For twenty-five years he has been working on aspects of design control and the design dimension of planning, and this has included major studies in British cities, Wales, Europe, the USA, Canada, and most recently in Australia.

Emma Price is a Sydney-based artist who teaches at College of Fine Art (COFA), University New South Wales, Australia (UNSW).

Allison Dutoit is Lecturer and First Year Chair, Welsh School of Architecture; Cardiff University holds a Masters Degree in Architecture from the University of California at Berkeley and studied with Lars Gemzoe in Copenhagen. She is an Architect and Senior Consultant at Gehl Architects in Copenhagen.

Margarita Bauza is a professional tutor at the Welsh School of Architecture, Cardiff University. Margarita takes teaching as an experimentation and research process to achieve personal development for both herself and her students. Entailing design and developing teaching methods, she specifically tailors modules to achieve specific outcomes.

### Student Profiles

The studio attracted an array of students (aged 20–30) worldwide from Tokyo, China, Europe, and Australia from a wide spectrum of academic disciplines. The featured degree disciplines were not only expected, mandatory Architecture and Urban Planning based, but spanned from Landscape Planning to Exhibition Design; from Graphic Media and Textile Design to Ceramics and Product Design. The dynamics of multi-disciplines and diversity of backgrounds and ages of the students and staff enriched the Porosity experience and bolstered creativity amongst the participants.

### Methods

The researcher identified the creativity and the collaboration dimensions and used a checklist prepared previously to identify the use of each

dimension in the studio time. The researcher also used a note taking method to mark the students' participation and their reaction to the tools utilised. The researcher also implied the rich picture method in capturing the students and the tutors' behaviour inside the studio (see appendix B). Video and audio recording were also utilised to help the researcher stay concentrated and give the chance for a second round of observation after the studio time in the researcher's own time. Still image picturing was also used as part of this case study. Finally semi-structured interviews were used with the students and the lecturers to gain an in-depth view of their perceptions and views of the studio.

**Procedure**

The researcher acted as an observer participant. Full attention was paid to observing the students behaviour and reactions to the surrounding atmosphere. The researcher sat in all of the activities and lectures taking part in asking questions and gaining understanding of the studio's theoretical base. The two weeks long studio started daily at 0900 and continued until 2100. The studio started with a two hour lecture and ended with a lecture that varied in length (1-2 hours). After the studio time the students usually gathered for informal drinks with the lecturers. During the lectures the students got broad information about the area of study in terms of its demographics, historical and geographical background as well as the directions and views of the city planners. This information helped the students create a vision of the city's need which in turn helped them in their design ideas. After the lecture the student usually gathered in the studio room and started collaborating on their design ideas. The researcher observed the whole group communication as well as the tutor-student interactions. Taking notes, video and audio recording and rich picture sketching were the researcher's main role. After each day the notes, pictures video and audio tapes are all transcript and revisited to formulate the main theme for each day and identifying the utilisation of tools for encouraging creativity and collaboration in design. At the end of the studio workshop the researcher conducted semi-structured interviews with the studio

director, the tutors and some of the students.  The interviews revealed the effectiveness of the tools used in promoting creativity and collaboration and encouraged the student to come up with unique and innovative ideas that is based on creativity.   The following sections summarise the main themes and findings.

**Findings**

Six Zones approach

As part of the Porosity Studio's aim to immerse the students in Cardiff's history and infrastructure, the participants were required to produce two minute presentations regarding at least one of the zones visited during the tour. Here, the research was cited rather than explained and the presentations were delivered with clarity and academic precision.

Before the tour, the students were informed that Cardiff has two centres: the city centre and the bay, both of which are intensely developed. Between the two centres are the older residential areas and the newly developed areas. In this "lost space" the building of more than 6,000 houses are planned over the next ten years. They were asked to consider whether this was a small city or big neighbourhood; a large district, or whether a neighbourhood even exists. Through the students' observation and interrogation they deemed it a district with neighbourhoods and identified nine vacuums, holes in the city's fabric, potential development sites, and opportunity spaces. Issues explored amongst the students included the city's connection or disconnection with the rest of the UK, fragmentation, healing the city, the splintering urbanism, diversification, consolidation, and animation. It was here that the metaphorical ideas of the students emerged.

Considering the impact of distinctive neighbourhoods nearby, consolidation into larger neighbourhoods, the necessary requirements for liveability, how small neighbourhoods could be encouraged to grow and how a single district could be created with smaller sub centres, the

students were required to intervene and reinterpret their observations in an attempt to alter perceptions and meaning.

Required to create new dynamics when considering the connection and disconnection aspects of Cardiff, the students were to think about particular modes of interrogation when considering which network, what cues, and which markets they would explore; what public realm and what form and focus would the networks have.

The six zones were visited on Day Two: Cardiff Bus and Walking Tour were not only chosen to give the students a basic overview of Cardiff's historical origins, but it served to stimulate the students' creative thought process. Through fundamental research of Cardiff's history and geography, the students could summarise the urban conditions and problems of Cardiff's infrastructure in relation to other small cities in the UK and Europe. All students were required to read the key texts and overseas students were advised to make use of Google Earth at the point of entry to their studies.

### Pecha Kucha

Pecha Kucha presentations served to give the group a snapshot of each participant. They were quick, brief introductions of cultural and academic background. The purpose of the Pecha Kucha presentation was for students to affiliate themselves with others, based not on gender, age or ethnicity, but on particular philosophies and ideas. The presentations were quick and were designed to give the group some brief information about each student without them sounding long-winded and boring.

### The Brief

With assistance from the tutors, the students were required to produce their own brief. Implied by the project name: Cardiff Chimera 2020, the students had to devise appropriate outcomes for the problems facing Cardiff. Professor Goodwin visualised the emergence of Chimera 2020 through a collective process of reflection, intensive studio sessions, and a multiplicity of participants.

Goodwin's use of multi-disciplinary practitioners for lectures and tutorship (typified in Postmodernist multi-disciplinary studios) formed the core of this project as practitioners' personal histories, expertise and spatial intelligence were vital ingredients in the Chimera project. Students speculated the scale, territory, and content of the territory of their choice and were then required to express their vision through a physical mode, in this case: presentation. The presentations served as a tool to form groups. According to Professor Goodwin, "*Once the groups were decided the multi-disciplinary process begins.*"

At this point, the studio encouraged the use of metaphor and philosophical background as key tools. The initial presentations included drawings, data, photographs, performance, and digital display which aimed to capture the essence of Cardiff's direction as a developing city. Due to the volume of ideas, feedback and discussion were reserved for studio tuition and interaction at a later date. In accordance with the studio's Political, Economical, Social and Technological (PEST) analysis approach, the students were asked to explore Cardiff and think metaphorically in terms of what the city needs. The students' political beliefs had to be established early on to provide a solid basis for their contributions.

Following the film screening with Neutral Film-makers Tapio and Christian, the students were encouraged to embrace filmic language. The brief was to form groups to then collectively produce a three-minute film to convey their projected strategy and encapsulate their design concept.

### Facilitation: Small Cities /Big Neighbourhoods

From the outset Prof. Goodwin instilled a sense of community within the students and focused on the social neighbourhood as a platform for their ideas. To begin, he gave a broad overview of the small cities and big neighbourhoods, advocating that the mix of people, opportunities, sense of identity, and facilities are the most important aspects of any social neighbourhood. As the project progressed he became more specific,

encouraging the students to enquire and create solutions to problems such as climate change, sea level fluctuations, and conflict. He asked them to remember that these solutions must address human survival both socially and physically as well as psychologically.

The project lent on multi-dimensional, multi-cultural, and multi-disciplinary viewpoints to broaden both the discourse and the video juxtaposition exhibitions. The Neutral workshop taught the students how to communicate through an accessible medium which added an authenticity to the project, allowing the students to develop their ideas using filmic language and thought.

In particular, Professor Goodwin exercised a PEST analysis in every aspect of the project to encourage the students to shed their initial preconceptions and consider every aspect of Cardiff's infrastructure in terms of its development. The lectures were delivered with the PEST analysis at their core. This enabled the students to get an overview of the city and focus the concentration their own ideas and belief systems.

Observers and supporters included Cardiff Council, Cardiff University, and the Welsh Assembly. First Minister Rhodri Morgan's attendance to the initial informal lunch gave the project a sense of prestige, which is crucial when attracting a variety of industry experts, lecturers, and students worldwide.

Professor Goodwin's goal to encourage multi-disciplines within each group not only served to achieve original, fresh ideas, but also to create tension. By intersecting different age groups, cultural backgrounds, and academic disciplines, the groups were not only exposed to surface tensions such as communication boundaries and conflicts of interest, but were also stimulated creatively. Although there were some dramatic moments when one of the students refused to continue with the project, the students appreciated the method of learning and found the space to work sufficient. With consistent support from the tutors, the students managed their projects successfully and felt the deadlines were fair.

Through the use of "free time" the students were required to socialise, relax, and above all reflect upon their projects. Donald Schön's[272] innovative theory surrounding notions such as the "*learning society*", "*double-loop learning*" and "*reflection-in-action*" has come to typify theoretical academic thought. The students were encouraged to become reflective practitioners and embrace the relationship of reflection-in-action to professional activity.

Notions of reflection-in-action and reflection-on-action are integral to Donald Schön's philosophy in "The Reflective Practitioner"[273]. The former, at times described as "thinking on your feet", involves using experiences, connecting with feelings, and attending to our theories in use. This involves building renewed understanding to inform action in a particular situation which is unfolding.

The practitioner must experience something alien in an uncertain or unique situation to reflect on the phenomenon. Drawing on previous innate understanding of the practitioner's behaviour, the practitioner then experiments with these new-found behaviours which ultimately serve to generate a fresh take on the phenomenon and therefore initiate change within the current situation.

In accordance with the delivery of the project the students were required to employ reflective analysis throughout the project, the alien environment acting as a stimulus for their design ideas. The idea was to encourage the students to get an understanding of "self"; to clarify any previous preconceptions; to be able to grasp the theory and make sense of the data. This stripping of the students encouraged them to be inductive. Their understanding was gradually built through the emersion and reflection of the project stimulated by a combination of participatory observation, lectures, and studio-based sessions. The aim was for the

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[272] Schön, D. (1985). *The Design Studio: An Exploration of its traditions and potentials*. London: RIBA Publication for RIBA Building Industry Trust.
[273] ibid. p81.

students to identify and build on new dimensions which ultimately challenged their original perceptions.

Throughout this reflective process, Goodwin operationalised a metaphorical, collective approach to urban design, employing the city's historical origins and functional importance as a basis for the design projects. Chosen specifically to give the project a rich sense of diversity, the contributors stimulated creativity, and through Goodwin's emphasis on metaphor the students could freely develop their projects in accordance with the suitability of Cardiff's history and identity.

## Final Installation

To give the project a sense of finality the films were then screened at the finale installation. Serving to boost creativity, the films aided the students' storytelling, allowing them to exhibit the material they had gathered over the course of the project. Based on the students' original metaphors, the films were silent in order to cross the language barriers. The films explored metaphors, including a pomegranate and soap bubbles. With regards to the segregated, diverse, ethnic groups on the outskirts of Cardiff, one of the students saw the pomegranate as a metaphor to "bring the outside in". Another student suggested that soap bubbles represented small businesses in Cardiff, and that they should be joined together just like the bubbles.

The installation took place at the National Westminster Bank on Bute Street and served to encourage public critique, create a sense of achievement and pride within the students, and to give the project closure. The project also received press attention, adding to its prestige for future projects.

## Summary

The case study took two weeks of intensive and thorough observation of the studio activities. The tools utilised in the studio to promote students' creative thinking proved its effectiveness. The students were encouraged to not limit their thinking and open their horizons. The

students were encouraged to ask questions and wander freely to discover the surroundings. The afternoon lectures acted as an aid for the students to observe examples of metaphoric thinking. The re-mixing technique also encouraged the student to adapt and build on each other ideas, share vision and identify their goals.

The use of technological tools was limited to the traditional CAD and basic drawing software that are located in the labs nearby.

## 5.16 The University of Sharjah Case Study

❖ Participants

Three faculty members participated in the project. One of Dr. Hassan Radoine (a Moroccan) was the head of the Architecture department in the University of Sharjah, and his participation lent importance to the project. He also helped inject ideas that brought participants back to reality after the studio coordinators set them to fly high in their imagination when conducting the studio tasks. The other members Dr. Lomker (a German Instructor) and Randa Taher (Canadian female Instructor) specialised in design. The German lecturer specialised in the Virtual Design Studio applications and the Canadian lecturer specialised in creativity in design which served as a good participation for the project.

In the evaluative stage of the final phase (Phase Three) the data is collected by the researcher and an assistant. The researcher's role was to lead the focus group sessions for the students, interview the instructors and observe the students' behaviour as they were working on the project in their groups. The assistant's role was to take notes in the interviews and the focus groups. Since the data was collected mainly by the researcher some subjectivity is expected. The assistant's role was important in the sense that it minimised subjectivity enforced by the researcher.

Beside the researcher and the research assistant there are many faculty members plus the students aged between 18 and 23, studying

architecture as the major subject of their first and third years. Thirty four students attended from the 50 who had initially registered for the workshop.  The researcher attempted to discover whether those who had dropped out had different important characteristics from those who attended.  The college records indicate that there are no major differences with regard to age, gender, or academic performance. Twenty six of the students were female.  Five of the students were UAE nationals and the rest were from different Arabic countries; there are also two Indians. This perfectly represented the actual variation in the UAE society in terms of nationalities.

❖ Focus Group

After the completion of the VDS 3 workshop the researcher conducted a focus group survey with a number of students - who voluntary attended the workshop to get an in-depth insight of their view of the workshop and its importance in introducing new ways of thinking and new ways of learning using technology. The group was selected randomly by emailing the students using Facebook, asking them to meet with the researcher and her assistant in the university at 1600 after they had finished their study commitments.  Some of the students turned up.  The researcher was looking for at least 15 students – only 10 arrived.  The researcher had previously prepared some questions but intended only to direct the conversation rather than limit the answers. The researcher handled the task of inquiring the students and facilitated the presence of the research assistant who performed the transcription for the whole conversation.  The students were asked about their feedback on the workshop in which they indicated that it had been the first time for them to undertake a workshop of that kind, carrying all of these ideas and new methods of teaching in addition to the introduction of games and activities in the classroom.  The students also indicated the importance of introducing social networking technologies such as Facebook and that they should start using it not only for the workshop but for their entire university study, as they believed in its potential in saving time and easing communications, especially when issues such as gender are

concerned. The students also indicated that the workshop made them realise their hidden potentials that they were not aware of before its existence. Some of the students pointed out the importance of working in groups as many ideas are generated; others asserted that they resented splitting up and joining other groups at the beginning but before long had realised the importance of mixing with people from different backgrounds. The students reaffirmed that the use of Facebook in terms of easing the communication with the other gender especially in anonymous basis as when they met face to face it was easier to communicate after they have been talking online. The students were grateful for the use of "icebreaker" activities and thought it was a good activity in preparing them for the workshop. They also were appreciative in the use of activities such as role playing, indicating that it made them learn by playing and by doing.

Up to this point the students were not opening up fully, and were not talking about the things that they did not like in the workshop or their feedback for improvements. The researcher tried to encourage them to speak and express their feelings freely. After few trial runs, the students opened up. They stated that because the whole idea was new for them, and the title "Re-design Sharjah" disturbed as the time allocated for this workshop would not be enough to do the tasks required. The main purpose for the use of the title was to make the students think freely and creatively; they were made aware of this fact through the workshop. They also complained about the ambiguity of the workshop and said that they were confused, as they did not know what was to happen next. Although the students were assured many times of what was happening, because the whole idea and method was something they were not used to, they felt the ambiguity. More about the student perceptions of the workshop will be detailed later in the analysis chapter alongside the explanation of their stance toward the workshop.

The students also complained about the lack of time and support of tutors to do the workbook activities in class (which is not meant to be) and that was the main reason that they did not do it, reflecting the nature

of the way they were raised and taught in the past; a spoon feeding style in which the teacher always tell them what to do. That was also obvious through their behaviour in the workshop. The students also complained about the lack of time of the workshop which did not allow them to do the films as they hoped to. It was seen that the time was sufficient for the job required and the end results for the students was surprisingly amazing, although they had not seen it, due to the lack of self-confidence that had arisen during their childhood and their educational background. Further information about this focus group is contained in Appendix C.

❖ Observation

During the implementation process of the VDS 3 in The University of Sharjah, an observational survey is conducted. The survey aimed first at assessing the students interaction with the VDS 3 environment; secondly, to investigate the difficulties encountered by the students; thirdly, to receive an informative feedback about the VDS 3 environment in use for future development; fourthly, to assess student performance throughout the VDS 3; and finally, to assess the outcome of the VDS 3 and its effect on students performance. The observation is conducted through the use of close observation of the students; video and audio recording was utilised, with still images and checklists which were also used in addition to rich picture drawings.

❖ Visual Methods

During the observation stage of both case studies conducted in this phase the researcher used visual methods. The researcher used still pictures as well as video recordings. In the Cardiff Chimera case study the researcher used still images and video recordings to be able to analyse and further understand students' perception and interaction with the methods and techniques of the case study in progress. The researcher observed the students' body language when it came to communicating with each other and exchanging their ideas. The researcher's aim was to investigate the willingness of students to share

ideas and collaborate. Video recordings further helped in getting deeper understanding.

In the field work, the researcher also utilised both techniques described above to get in-depth perceptive of the students' interaction and acceptance of the VDS framework.

## 5.17 The Curriculum

This section briefly introduces the curriculum developed of this study to work as a cornerstone for the model proposed for integrating the technology into design education in the UAE.

The Virtual Design Studio workshop aims to educate future designers through the use of computer supported collaborative design environments, using both synchronised and unsynchronised digital technology.

The studio intends to channel and develop students' existing philosophical beliefs as a basis for their design strategies.

Ultimately, the studio endeavours to provide innovative creative learning methods and push existing cultural boundaries to encourage collaboration between both male and female students in the pursuit of developing original design strategies for the architectural future of Sharjah.

Students are expected to obtain a coherent and systematic body of knowledge facilitating the multi-technological tools and applications available.

Students are expected to embrace all aspects of the virtual design process including prolonged and extended use of the VDS technology in order to achieve the best possible results through intensive collaboration.

Students are required to prepare for the studio through a means of set texts and tasks given prior to the actual studio in order to familiarise themselves with the philosophy and expectations of the project.

Students must begin in the studio with a clear idea of their own philosophical and political beliefs which will be encouraged by the tutors and built upon throughout the course of the studio.

The assessment philosophy of this studio places value on the collaborative aspect of the studio; therefore assessment will take place throughout the duration of the studio, and students will be assessed on their level of participation. The final film installation will also be assessed.

Participants will be assessed in the following methods:

Continual Assessment: Due to the nature of the studio, the tutors will be responsible for continually assessing the students both online and off. Students will be assessed through critique, debate, and discussion; verbal and visual presentations during studio time; and through their use of the Digital media provided, namely Facebook. Tutors will focus on status updates, and contribution to individual Facebook groups. Students will also be assessed on their contributions made to the daily discussion board and blog available on the VDS website and the VDS group on Facebook.

Self-Assessment: Students will also be subject to self-assessment which will be provided in the form of a questionnaire, found in the open learning work-book.

Peer Assessment: Students will be subject to peer assessment, which will be recorded on the VDS group Facebook page wall. Individual Facebook groups will also be monitored and assessed.

Project Assessment: Students will be assessed on their final film presentations at the installation, along with their 100-word written brief.

Students will also be required to assess the studio, and tutor performance and input, using a questionnaire provided in the open-learning workbook.

### 5.17.1 Studio Descriptors

The Virtual Design Studio aims to engineer creative collaborative design, employing multi-technological applications and digital media tools to promote connectivity and collaborative practice in architecture and design. Coordinated by the author, the project aims to encourage students from the University of Sharjah's School of Engineering to collect, collaborate, and rethink Sharjah as a developing city. With the guidance of specifically selected expert tutors, the participants must redesign the future province of Sharjah with its heritage and religion placed firmly at the root of design. The students will take part in revolutionary studio-based workshops, with tasks taken from a multitude of disciplines. The intensive three-day studio will require students to complete online and hardcopy open-learning workbooks. They will consistently update and share their findings, make observations and present material both verbally and via designated digital mediums. The participants will be expected to work collaboratively for the production of design ideas linking the old Province to the new developing, cosmopolitan Sharjah.

The studio's focus is firmly placed on creative collaboration and will include intensive, inter-disciplinary workshops to encourage quality work regarding the role of art and design when redefining design and architecture through the promotion of virtual design pedagogy. It will embrace a diverse range of experience as students from the United

Arab Emirates (UAE) will study the urban and suburban conditions of Sharjah. Students from Architecture, Urban Planning and Design disciplines will work collaboratively to explore the possibilities for innovative design solutions through the use of virtual design tools and practices. The organisers will coordinate and document the project, and closely tutor the students. They will prepare all essential materials and technological tools to facilitate and enhance the production of innovative design concepts, culminating in a final installation of film presentations.

To combat the prevalent cultural restrictions the essential technological tools rely heavily on digital media sources including: the social networking website Facebook; real-time interactive graphics such as Whiteboard; 3D Visualisation programmes such as Sketch-up and AutoCAD; and other forms of online communication such as video conferencing via MSN Messenger and email. A VDS website was also available with all relevant links for reference and collaboration. Essential materials for the project consist of mainly key texts fundamental to the philosophy of the project itself; the VDS website; lectures from field experts and academics; studio-based work including informal and formal meetings with project tutors. Due to cultural restrictions the project was run parallel for male and female students in separation.

Prior to the VDS, participants were made fully equipped with all the necessary technological tools via the VDS website, Facebook, and MSN messenger. Students were required to create a Facebook page where they will be expected to complete the profile requirements; they were also required to have MSN identification, where they were encouraged to network and collaborate with fellow participants and they had instant access via a desktop icon to the VDS website where all relevant links were made available.

## 5.18 Conclusion

This chapter outlined the design of the research covering the participants, the methodology used in the research, which is action research, and the different stages that the research has undertaken. It

also covered the data collection instruments and procedures that were undertaken. The chapter also introduced the main and sub-hypothesis of the research and detailed the data collection instruments that included document analysis, interviews, focus groups, and observations. The chapter also highlighted the reliability and validity issues and explained their scope in this research. The curriculum of the proposed VDS was then introduced alongside its aims and objectives, its desired outcomes, and the fundamental background of it.

# Chapter 6: VDS Framework Development

## 6.1 Introduction

This chapter presents the development of the Virtual Design Studio framework.  In this research the development process went through three phases.  The researcher developed and evaluated a VDS framework for each phase.  In the third stage of each phase the researcher evaluates the VDS framework developed for this phase.  The research then used the feedback gained at the evaluation stage for each phase for improving the framework which then leads to the next phase. The three phases respectively are: VDS 1, VDS2 and finally VDS 3.  As explained earlier in the methodology chapter this study adopted an action research method.  This chapter explains the development process through each phase of the action research described earlier.  It also presents the final Virtual Design Studio (VDS) and the implementation process in addition to the technical and theoretical aspects behind its formulation.  This resulted in the emergence of four layers. These layers will be described later in this chapter.  The chapter outlines the theoretical as well as the practical basis of the VDS framework.  The technical aspects of the VDS and the theoretical and pedagogical aspects are all presented and detailed.

## 6.2 The Development Process of the VDS

As explained in the previous chapter, the action research method adopts a spiral circle.  This cyclic nature keeps on revolving around the topic of study until a satisfactory result is achieved.  This research adopts Lewin's[274] cycle of plan, observe, act and evaluate.  The research starts by observing the subject of study and then proceeds to act for improving the current situation and finally evaluate the proposed development and get the feedback and finally use it for improving the proposal.  This leads

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[274] Elliot, J. (1991). op.cit. p75

to another cycle of observation, action and finally evaluation. This research started by observing by the means of investigation the UAE needs for design education development. The research then constructed a first framework for development and then evaluated the framework aiming at improving it. The research went through Observe, Construct and Evaluate cycles (see figure 6.1). Based on the first literature review and needs analysis (chapter 3) a first version of the VDS was developed. The first VDS consist of the technological tools as well as the pedagogical tool based on the available literature and technologies when this project first started; this phase was the starting point for further development. The second phase was the re-design phase where the feedback of the previous phase was used; VDS 1 was revisited and further developed according to the second needs analysis and observations - the case studies that has been conducted. Then the third phase started where the feedback of VDS 2 was used to develop a final version. The field work was then conducted to come back to further development, suggestions and recommendations for future enhancements. Figure 6.1 illustrate the development process loop.
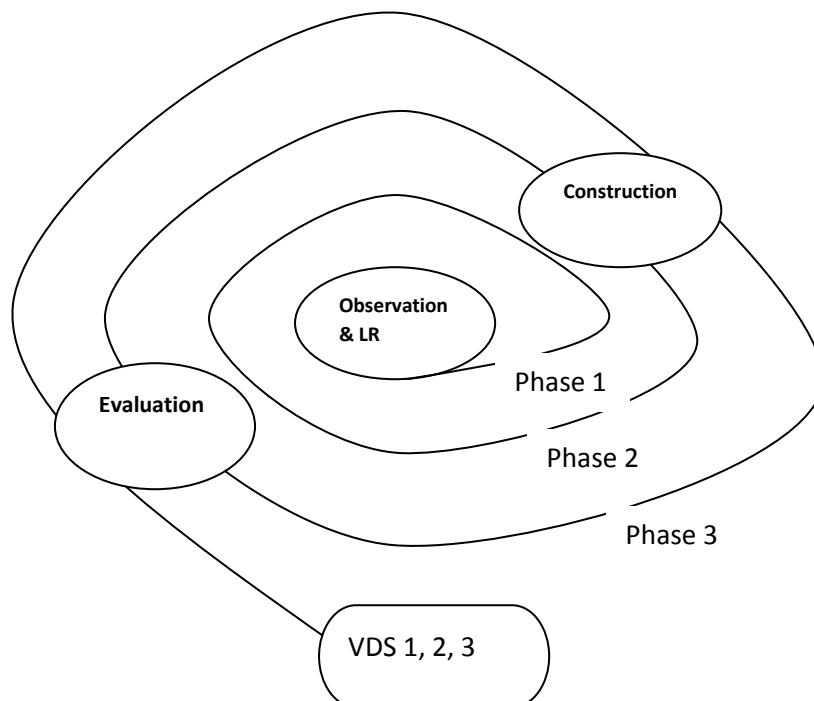


**Figure 6.1: Development Process**

The development of the VDS went through three observative, constructive and evaluative stages. Each was conducted in a different phase. Phase one was the first attempt to construct the first VDS depending on the literature review and the needs analysis of the UAE society. The evaluation was conducted through a survey carried out in the UAEU (for more details about this study see appendix C). The feedback was then used in the development and redesigning of the second VDS. The second evaluation was then conducted using international best practice indicator and surveys. In the second phase respectively the feedback was used into the development of the third VDS, named the Virtual Design Studio 3 (VDS 3). A study was then conducted in phase 3 and a final version of VDS is proposed based on the recommendation, developed and implemented. The next table shows the study contexts and surveys.

| Phase | Study Background | Evaluation Type | Improved VDS |
|---|---|---|---|
| 1 | Literature Review & Need Analysis | Survey | VDS 1 |
| 2 | Feedback from Phase 1 survey | Best Practice Indicator & Survey | VDS2 |
| 3 | Literature Review & Need Analysis and Feedback 1 &2 | Case Study | VDS 3 |

**Table 6.1: Three Phases of the Development process of the VDS**

A different evaluation scheme was used for each different phase depending on the phase type and nature. The main aim was to evaluate the effectiveness of the VDS and its suitability for the purpose and to analyse the appropriateness of its tools. The following sections will explain in details the three phases and the stage of development of the VDS 1, 2 and 3.

## 6.3 Phase One

The needs analysis in phase one concentrated on identifying the vision of the UAE government in terms of education development and defining the broad lines for the implementation of technology in design education (chapter three). The lack of potential utilisation technology in the UAE despite the availability of resources was then acknowledged.[275] An investigation was performed to identify the available technologies that could enhance performance in design education. A thorough literature review was executed at this stage of phase one. The literature review consisted of document revision and curriculum revision as explained in chapter five. His Highness Sheikh Mohammed bin Rashid Al-Maktoum stresses the importance of human development and the preparation of the UAE nationals as successful leaders. In addition, His Excellency Nahyan Bin Mubarak Al-Nahyan, the Minister of Higher Education in the UAE has consistently emphasises the importance of integrating new technologies by highlighting the importance of their role, as well as his expectations of the graduates of the UAE universities to be equipped with language skills along with information technology.[276]

This promoted the researcher to review the existing literature on the use of technology in architecture design education to identify the new technologies in teaching design technology. The literature review revealed that the use of technology in architecture in general and in design in particular has gone through many phases pinpointing the Virtual Design Studio (VDS) as the latest and the trendiest form (Chapter Two).[277] Based on the UAE society requirements and the international approach the first VDS was then developed.

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[275] Al-Ali, A. I. (2007). op.cit. p439-456.
[276] Sayed, S. (2002). Women, Politics, Development in the United Arab Emirates.
[277] Andia, A. (2001). Integrating digital design in architecture during the past three decades. Computer Society.

### 6.3.1 The First Proposed VDS Model

Maher et al,[278] classified metaphors about the VDS as Desktop metaphor and Place metaphor. The desktop metaphor refers to the use of collaborative tools as if they were lying on a working desk in a physical office. On the desktop, and nearby, a designer finds tools for drawing (e.g., pencils, rulers), communicating (e.g., telephone), archiving (e.g., folders, filing cabinets), organising (e.g., diary), finding information (e.g., catalogues, archives), and so on. In general, the designer has access to all the office resources necessary to perform the design task. On the electronic desktop – which is based on a metaphor of the physical one – all the functions are present on the same interface, in this case, visible on the computer screen.

This approach is the most common and is presented as the "toolkit approach" by Kvan.[279] When adopting the place metaphor, preparing a virtual design studio is much like designing a physical studio.[280] The studio is set up to facilitate and support collaborative design activities. A virtual design studio differs from the physical design studio in a significant way: where a virtual studio can automatically react to people's use and presence, a physical studio is passive and is changed only when people physically change it. As the international best practice investigation resulted in the choice of two models[281], Maher's model was modified according to the UAE's characteristics and then proposed as the first attempt in this research.

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[278] Maher, L. M., Simoff S. J & Cicognani (2000). Understanding Virtual Design Studio. London: Springer.
[279] Kvan, T. (2001). Op.cit. p345-353.
[280] Maher, L. M., Simoff S. J & Cicognani (2000). op.cit. p13.
[281] Al-Ali, A., Sharma, P. (2009) 'Creativity and collaboration in architecture education in the United Arab Emirates', *Digitizing Architecture Formalization & Content*, Bahrain: Bentley. p245-256.
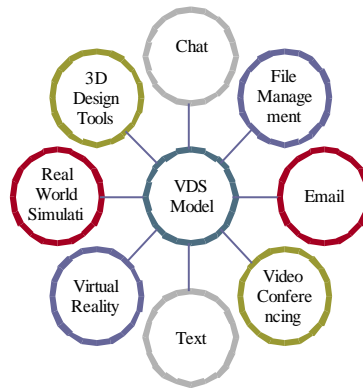
**Figure 6.2: VDS 1 basic elements**

The pedagogical aspects were implemented within the first model using blackboard and active worlds. Blackboard was used as a learning management system that supports educational elements. Active world backed up by blackboard assisted the student to work on their design ideas. Students participate in the studio by going to the virtual place to present, discuss and develop their design. Their presence in the world is represented by avatars. In addition, the Blackboard is used to facilitate communication and educational tools such as: learning materials, bulletin boards, whiteboard, and email.

### 6.3.2 Evaluation of VDS 1

An exploratory survey was conducted at this stage to get a thorough understanding of the design education need in the UAE educational institutes.[282] The survey also aimed to investigate the students and instructors perceptions of the proposed VDS. The study confirmed the UAE educational institutes' need of the VDS environment. The study also revealed the existence of high technological tools in the UAE educational institutes yet not potentially utilised[283]. For more about this study refer to appendix C.

### 6.4 VDS 2

The feedback from the previous study alongside the literature review was used as a need analysis for the further development of the VDS.

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[282] Al-Ali, A. I. (2007). op.cit. p439-456
[283] ibid. p439-456

The needs analysis and the documentation review highlighted the important pedagogical aspects that needed to be integrated into the curriculum to enhance learning using the technology. The goal was also to get more insight and fresh ideas on how to incorporate the VDS into the design curriculum in the UAE.

A thorough revision of the literature was then conducted to evaluate and identify the international best practised VDS.[284] From the obtained definition of VDS (see Section One), the author created an evaluation scheme to evaluate the first developed VDS. The evaluation scheme consisted of a database repository system. The main aim of this system was to identify the international best practice of VDS for two purposes: first identifying the tools that may be useful for effective learning, and secondly to be used as a basis for a short course, as this is part of the research procedure.[285] The database acted as a repository where existing practice could be entered, queried, and analysed to find the practice(s) that most completely fulfilled criteria for best practice (Figure 6.3). The practice(s) were queried and those that met all or most criteria could then be considered the best practice. A conceptual framework was then developed for the second VDS and new technological and pedagogical tools were added. Depending on the literature review, the author identified the common components characterised by a VDS and accordingly a database form was created using Microsoft Access (Figure 6.3). The database was created to extract the existence of the use of technology with the idea of relating the VDS tools to the features of the constructivist and cognitive learning theory.

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[284] Al-Ali, A., Sharma, P. (2009). op.cit. p245-256.

[285] Al-Ali, A., Sharma, P. (2009). op. cit.p245-256.

**Figure 6.3: Database Form for Identifying International Best-Practised VDS**

The first section requires information about the university in which the VDS is practised, i.e., the department name and the country in which it is located. The second section presents the technology details of each department in terms of the communication skill used and the network infrastructure and most importantly the 3D and visualisation techniques in that department. The third part is concerned with the educational side of each model in terms of applying problem-based learning, project-based learning, group discussion, critical thinking, and so on.

Figures 6.4 and 6.5 show the VDS international practice in terms of the facilitation of the technological tools mentioned in the best practice form.
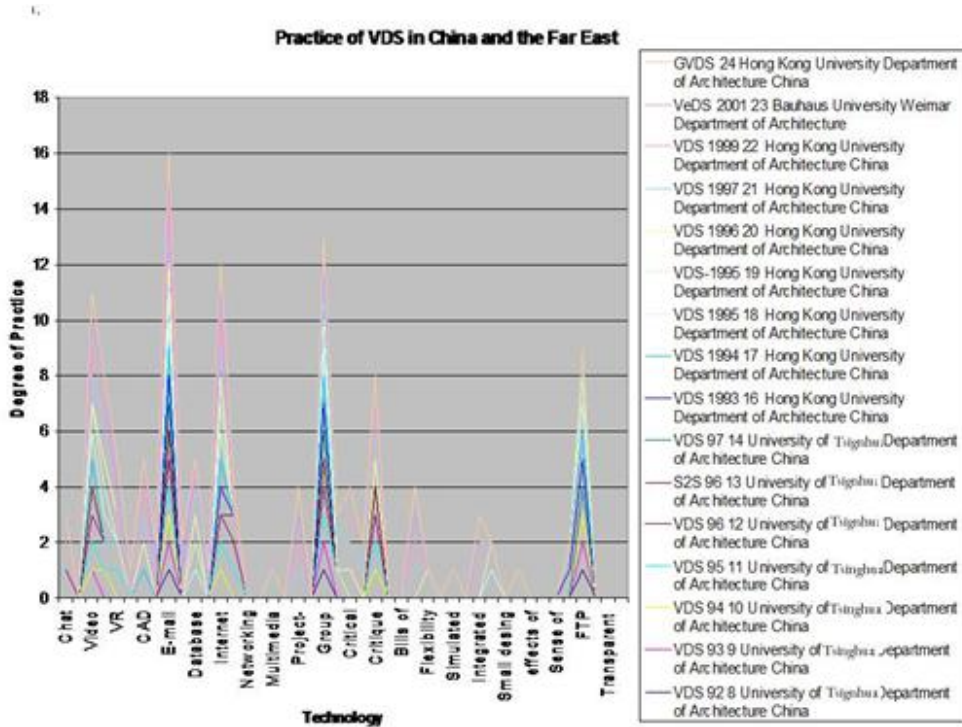
**Figure 6.4: Practice of VDS in China and Far East**
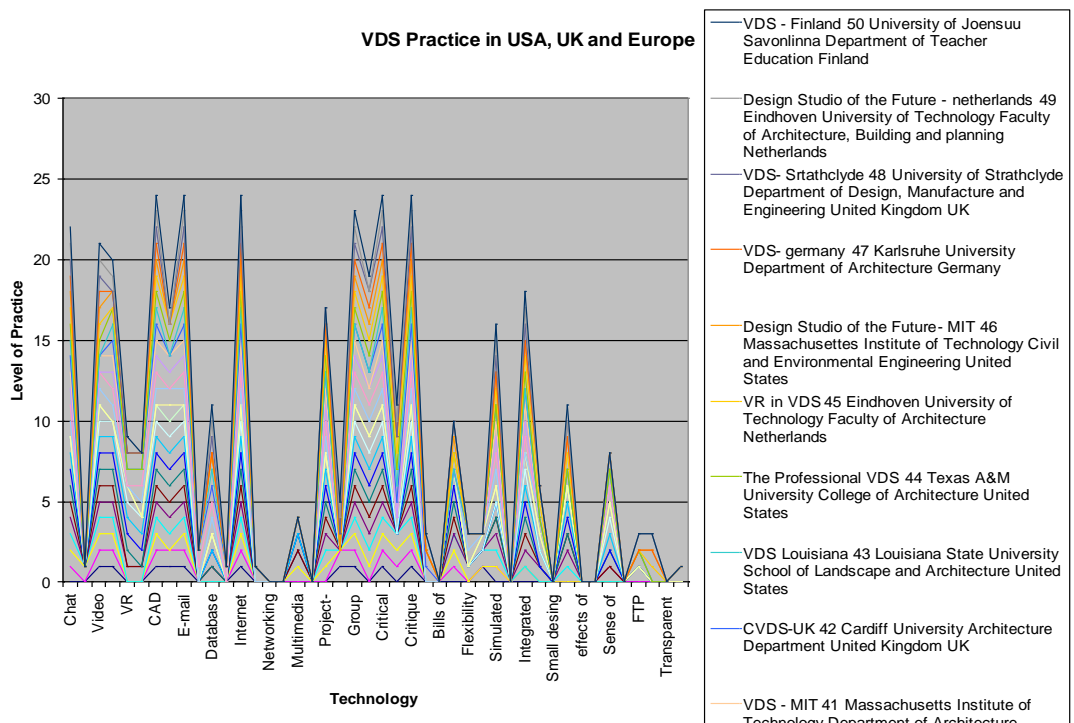


**Figure 6.5: Practice of VDS in USA, UK, and Europe**

Due to the large amount of data entered into the database, the universities were classified into two groups according to the area of practice. Figure 6.4 illustrates the availability of the technological tools

in universities in China and the Far East, while the practice of the universities in the UK, USA and Europe are illustrated in figure 6.5.

Although there were some good examples of implementing an educational VDS in the curricula, the database showed no results matching the specifications mentioned. However, two examples stand out as the best and were defined as the best practice.

- Sydney University VDS

- University of Strathclyde VDS

The above mentioned universities scored higher than the rest according to the criteria matrices for more details about this see appendix C.[286] An evaluative study of the two cases was conducted through an evaluative research to determine the best practice and establish ideas for the better model (See Appendix C). A case study was conducted through internet search and personal communication (emails and phone interviews) to highlight the main elements of the VDS practiced in the above mentioned universities (for more about this case study see appendix C). The aim was to identify the main elements of technology practiced and to get students perception of the VDS and its overall impact on the student performance in the above mentioned universities.

### 6.4.1 Evaluation of VDS 2

A socio-cultural study of the UAE was conducted to estimate the feasibility of the proposed VDS with its new pedagogical and technological components.[287] The BPI (Best Practiced Investigation) mentioned above was used to determine the feasibility of VDS 2 according to the international standard. From the observational study there were new ideas generated (see chapter five – the analysis of Cardiff Chimera study). The studio generated new ideas that were required for the development of the studio and its pedagogical aspects which were then implemented in the final version of the VDS.

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[286] Al-Ali, A., Sharma, P. (2009). op. cit.p245-256.
[287] (Al-Ali & Sharma, 2009) op. cit. p245-256.

## 6.5 VDS 3

At the first stage of Phase 3, the feedback of the previous phase was used to determine areas of improvement for VDS 2. Creativity and collaboration were the new dimensions added to the VDS 3. Table 6.2 below shows the development of the VDS in its three phases.

| VDS Model | Improvements |
|-----------|-------------|
| VDS 1 | Consists of the main technological tools |
| VDS 2 | Important pedagogical tools were added |
| VDS 3 | Collaboration and creativity dimensions were added. |

**Table 6.2 Improvements of VDS**

A new learning skill was then found to be required by the society for future development. An observational case study of the Porosity Studio that promotes creativity and collaboration was also conducted to enrich the VDS with new components. An observational case study was conducted at stage one of this phase to identify the effectiveness of creativity and collaboration in the design studio. The study also aimed at determining the dimensions for creativity and collaboration and students perception of their use and areas of improvement. The next section details the case study and its findings.

## 6.6 VDS 3 Construction Stage

The final version of the VDS was constructed from all the above-mentioned studies and evaluations. The final VDS consisted of four layers, each representing an important aspect of the model. The next section will describe in detail the development of the VDS 3 and the theory behind its infrastructure. The model was then implemented in the University of Sharjah with its all unique components and a study was

conducted to get in-depth understanding of its feasibility and insights for improvement for the future. The analysis chapter will detail the survey and the results.

## 6.7 Implementation of VDS 3

In this section the implementation procedure of the VDS 3 will be presented. The implementation of the VDS 3 is classified into four layers. These layers are: pedagogical layer, technological layer, socio-cultural layer and behavioural layer. In each of these layers different aspects of the VDS 3 were implemented. First, the main concepts will be detailed with examples of application. The pedagogical issues will be explained and the theories behind the VDS 3 will be highlighted.

### 6.7.1 Structure of the VDS 3

VDS 3 is a virtual environment project that facilitates the use of high technological applications and effective learning methods to enhance the student learning process and promote complex skills, creativity, and collaboration. The function of the project is based on the utilisation of technology as well as learning methods to promote creativity and collaboration among students.

The project contained different layers that contain to the main concepts and the grounding structure for the project. These layers are the pedagogical layer, technological layer, behavioural layer, and socio-cultural layer respectively. Each layer contains the elements corresponding to the concepts involved in the development of the VDS 3.
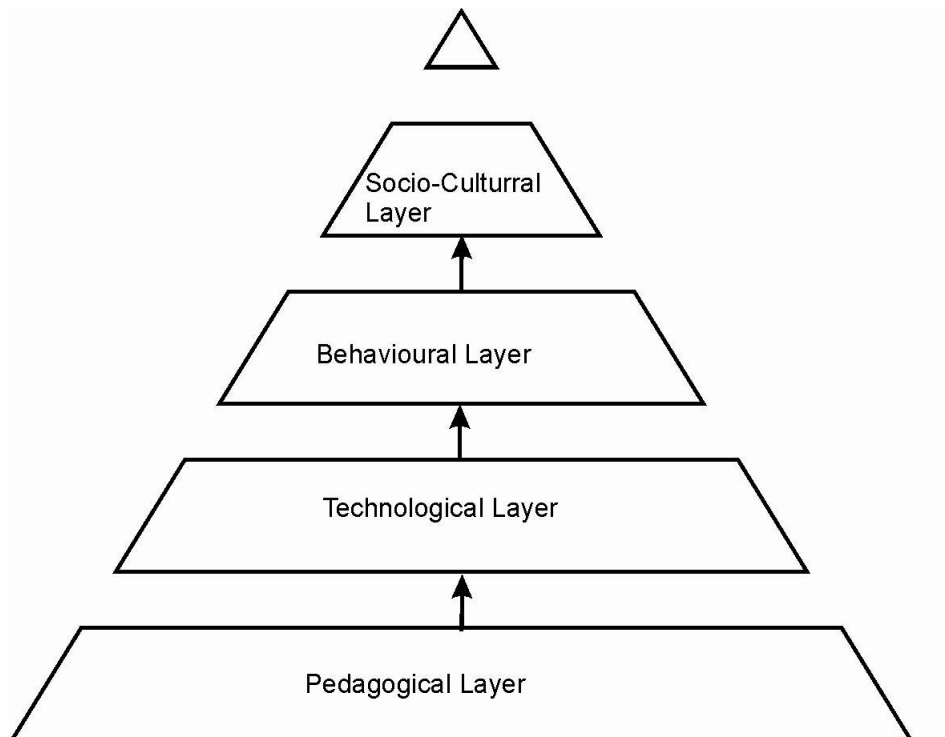
**Figure 6.6: VDS 3 Layers**

*The Pedagogical Layer*

The pedagogical layer is the base of the VDS 3 as it depicts the support given to the learners. The pedagogical layer in VDS 3 originates from both theory and practice. The pedagogical aspects of the VDS 3 were implemented through several functional elements: student work book, games, and icebreaker activities.

❖ *Student Centred Learning Approach*

The student-centred learning is active learning where the student takes responsibility for their own learning.[288] Student supporting material (the workbook - see appendix A) was implemented to support learners self-directed learning process where learners process parts of the information in their own time and path where the learners take the initiative of their own learning.[289],[290] The workbook contained activities,

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[288] O'Neill, G., Moore, S., McMullin, B. (2005). 'Student-centred learning: What does it mean for students and lecturers?'. *All Ireland Society for Higher Education (AISHE)*.

[289] Cross, K. P. (1981). 'Adult as Learners'. San Francisco: Jossey-Bass.

[290] Knowles, M. (1975). *Self-Directed Learning: A Guide for Learners and Teachers*. New York: Association Press.

which supported the curriculum of the VDS 3 and helped the student to be focused and to generate their unique ideas for the project by invoking several issues of concerns. The workbook also helped to keep the workshop cohesive by refereeing the student to the all-available material and make them interact with it to get the best benefit. The activities in the workbook varied in their nature and style and each aimed at providing the student with specific learning outcomes, which is an important element in creating learning materials.[291] The workbook activities were classified into three main topics and further into subtopics. The main topics refer to the three intensive days' main concepts and themes where the activities concentrated on different themes and helped the student during their virtual collaboration when there were no face to face sessions. The students were made aware of the main objectives of the workbook in general and for each specific activity. The sole purpose of this workbook was not to assess the students' capacity of knowledge, but to encourage them to think for themselves. The lectures and studio time worked in harmony with the workbook to provide the student with the inspiration, guidance and support them to fulfil all aspects of their brief. The workbook acts as an account of the students' personal development throughout the course of the studio. For the purpose of this study the students were asked to submit their completed workbook at the end of the workshop to perform as a supplementary data gathering technique for this study.

The workbook consisted of three parts, each serving the requirements of the main theme of each in of the class meetings. The main theme of the first part was aimed at helping the student to establish their views about the surrounding political situations as far as design is concerned which is believed to help the student develop their characteristics in design as well as making them aware of the surrounding culture and the political situation which were affecting their designs in the future. The second aim was to familiarise the student with the technology supporting the

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[291] Palloff, R. M. & Pratt, K. (2007). Building Online Learning Communities: Effective Strategies for Virtual Classroom. San Francisco: Jossey-Bass.

VDS environment and to make sure that the students were utilising the technologies and making required use of it. Figure 6.7 shows a sample of the activities available for the participant.

**Activity 2:** Website

Log onto the VDS website www.vds.com and follow the link to Facebook. Strike up a conversation with your fellow colleagues using the chat facility. Ask them about their own political perspectives, including justification and origins of their particular perspectives. Think about how your viewpoint differs from your colleagues. Update your Facebook profile with your viewpoint, and sketch your ideas below.

**Feedback 2: Website(Cont. Overleaf):**

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**Figure 6.7: Workbook Activities: Workbook activities based on Situated-Learning Style**

The second theme aimed at encouraging the students to observe the surrounding environment, in this case the Emirate of Sharjah, and help them establish their initial views about areas of improvements (see appendix A). It was also aimed at engaging the students in more virtual work through the use of Facebook and the web page and furthermore it encouraged the student to reflect on each other's views and on their own and finally the student is asked to think freely and get inspired by their surroundings.

The final section concentrated at preparing the student for their final submission by referring them to concrete examples of previous studios (in this case the Cardiff studio)

The workbook activities encouraged collaboration and creativity throughout the whole process by encouraging the student to think freely and observe the surroundings and work in groups.

❖ *Games*

Another important element of the pedagogical layer is the deployment of games as a learning tool. Using games in classroom can help the

student engage with their learning materials and make learning fun. Using games also appeals to a wider range of learning styles; these games are visual, auditory, dynamic, and colourful involving more than one sense. When rote memorisation is necessary[292] interactive games offer a tool that makes the memorisation more effective. The students are more in control of the information they receive. According to their learning abilities the students can control the information they receive as well as the information they produce. The students also are responsible of the flow of information rather than having a teacher do it which responds to the student-centred learning method mentioned above. Games were used in this VDS 3 with clear links and relevance to the curriculum of the VDS 3. The students were made aware of the benefit of these games and their academic relevance. There were two types of activities in the VDS. Some were presented in the workbook and others were carried out in the classroom and all the activities had their academic relevance to the VDS 3. (See figure 6.8 – see attached CD for more pictures)



**Figure 6.8: Student conducting some in-class games**

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[292] Wright, P., (2009) 'Trainee Teachers' e-Learning Experiences of Computer Play', *Innovate*, 5(4).

❖ *Learning by Doing and Problem Based Learning Approaches*

Another important element of the pedagogical layer is the concept of learning by doing. [293] Schank and Cleary illustrate that:

"*The reason learning by doing works is that it strikes at the heart of the basic memory process upon which humans rely. Human memory is based on scripts and the generalisation of scripts. We learn how to do things and then learn what we have learned is wrong and right. We learn when our rules apply and when they must be modified. We learn when our rules can be generalised and when to make note of exception. We learn when our rules are domain bound or when they can be used independent of domain*".[294]

We learn all this by doing, by constantly having new experiences and attempting to integrate those experiences, or more accurately, the memory of those experiences into our existing memory structures. This integration process relies upon new data provided by experience. When new data is simply told to us, we don't know where in memory to put it because we don't really understand the use of that data. When we experience the data ourselves, we also experience, at the same time, other sights, sensations, feelings, remembrance of goals achieved and goals hoped for, and so on. In other words, we have enough contexts to help us to know how to characterise what we have learned well enough to find a place for it in memory and to begin the generalisation and exception process.[295] This was promoted in the VDS 3 through the variety of activities that encouraged the student to tackle the challenging exercises before they attempted the feedback. The students were put into situations where they were asked to perform tasks that lead them later to realising its relevance, which helped them gather necessary

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[293] Karp, L., Lee, H. (2001) 'Learning-by-doing and the choice of technology: the role of patience'. *Journal of Economic Theory*, 100(1). p73-92.
[294] Schank, R., Cleary, C. (2008). *Engine for education*. The institute for the learning science. Accessed online at http://www.engines4ed.org/hyperbook/misc/ils.htm on 14/11/2009.
[295] Kolb, A., Kolb, D. A. (1999). *Bibliography of research on experiential learning theory and the Learning Style Inventory.* Cleveland, OH: Department of Organizational Behaviour, Weatherhead School of Management.

skills to tackle similar problems through the VDS 3 environment (see Figure 6.9).



**Figure 6.9: Students conducting learning by doing exercise**

The pedagogical layer also integrated a problem-based learning approach. This approach is helpful in exercising the memory. This then results in better memorisation of information. It also speeds up the recall procedure and increases the volume and the abilities of memorisation. The approach also develops creative and innovative abilities. Schwartz et al states that:

"*Problem based learning approach facilitates the improvement of faster body responses. Interactive games provide opportunities for exercising brains in these various ways described above*".[296]

"Icebreakers" are activities that are prepared by the educator and designed to put the learners at ease. It helps in establishing a relaxed atmosphere. The learners introduce themselves to each other, and energise themselves in what it is normally "*an unduly formal atmosphere or situation*" according to O'Neill et al.[297] Icebreakers are not normally related to the subject area, whereas "openers" are. Moreover, icebreakers are known to melt the ice and make people smoothly interact. Icebreakers assist the learners to communicate and form groups in a non-threatening and fun way. The first informal introduction

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[296] Schwartz, P. Mennin, S. Webb, G. (2001). *Problem-Based-Learning: Case Studies, Experience and Practice*. London: Kogan Page Ltd.
[297] O'Neill, G., Moore, S., McMullin, B. (2005). 'Student-centred learning: What does it mean for students and lecturers?'. All Ireland Society for Higher Education (AISHE).

of the students to each other was done through an informal "ball" activity, where the students briefly introduced themselves. Other similar activities were carried all through the VDS 3. Another is the "most-wanted" activity. This served two goals: first it worked as an icebreaker where the students had to informally introduce themselves to everyone in the class using a portrait drawn of themselves by themselves; secondly, it worked as a replacement for the "Pecha Kucha" activity which has to be cancelled due to organisational issues (Chapter Three). Figure 6.10 shows some of the students presenting their "most wanted" portrait. (For more pictures and information see attached CD.)



**Figure 6.10: Most Wanted Activity - Icebreaker**

The importance of these activities stems from its informal nature where it encourages the student to speak freely and with no restrictions and also to make a relaxing social environment in the classroom which helped in the case of the VDS 3.

❖ *Team-Working*

Another important factor in the pedagogical layer is the culture of team-working. This was promoted through challenging exercises and activities which required the student to work in teams. The students were provided with challenging tasks in groups which allow them to develop as individuals as well. Team-working culture is one that is aimed at by all the governments of the world at the current time and the UAE government emphasised the importance of team-working for future generation.[298] Team-working is believed to improve production and quality and many have argued that team-working improves work patterns and outcomes.[299]

In Kolb's experiential learning cycle he pointed out the reflective observations as being the stage where the learner reflects on their experience. Many investigators[300]emphasised that it is important to reflect at what you are learning. Donald Schön[301] suggested that by enabling the learner to reflect on what they are learning or to reflect on action makes the learner engaged in a process of constant learning. Schön marks this as one of the defining characteristics of professional practice.

*"The cultivation of the capacity to reflect in action (while doing something) and on action (after you have done it) has become an important feature of professional training programmes in many disciplines, and its encouragement is seen as a particularly important aspect of the role of the mentor of the beginning professional".*

In the VDS 3 this was utilised by giving the students free time in which they could reflect and observe either with others or on their own.

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[298] Mohammed bin Rashid (2004). op.cit. p77.
[299] Sugarman, K. (2004). 'Understanding the Importance of Teamwork'. Teamwork', *Brian Mackenzie's Successful Coaching*. 13.
[300] Kolb, A., Kilb, D. A. (1999). Bibliography of research on experiential learning theory and the Learning Style Inventory. Cleveland, OH: Department of Organizational Behaviour, Weatherhead School of Management.
[301] Schön, D. (1985). The Design Studio: An Exploration of its traditions and potentials. London: RIBA Publication for RIBA Building Industry Trust.

*The Technological Layer*

The second layer is the technological layer, consisting of all the technological aspects that were used in the VDS 3. The VDS 3 main aim was to formulae a framework for implementing VDS in design education in the UAE to promote creativity and collaboration among the students and to make sure the students absorb the skills required for the future market. To facilitate this goal many 3D as well as 2D technological applications were utilised. Facebook, Second Life, Blackberries, the Web, video conferencing, blackboard and virtual tour were all utilised to achieve that goal.

The webpage especially designed for the VDS 3 environment was utilised as the main platform for the workshop. The VDS 3 web page consists of links to all the other applications as well as containing some of the main pedagogical features such as the workbook, the referencing materials and the blog. As part of the curriculum requirements the students were referred to the web page for gathering information and for participation in the different activities such as the blogging. Some of the activities in the workbook were made with the intention to keep the students logging on to the web page and keep tracking the changes (see Figure 6.11).
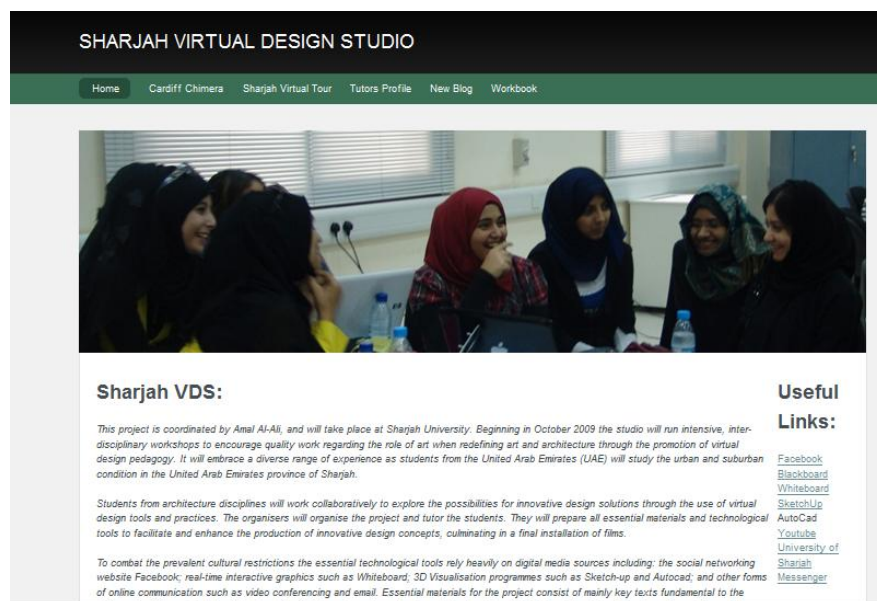


**Figure 6.11: Web Site Home Page**

Facebook was utilised in this project as an educational tool facilitating its feature according to curriculum specifications. Facebook has been acknowledged as a learning tool by many educationalists and its utilisation has been widely encouraged by the British government as well as worldwide.[302] The report for Childnet International and funded by Becta, the government body for technology in learning, states that despite the fact that Facebook and other social networking tools are used by lecturers and teachers, they may not be fully aware of its educational potential for their students. The report says:

*"In addition to providing a whole community with useful information about a school, college, organisation or event, a social network profile sends a clear message to learners that you are aware of the types of spaces they enjoy online"*.[303]

The academic relevance of using these social networks stems from utilising its features for academic purposes.[304] The students were asked to create an academic e-portfolio for themselves to support their meta-cognitive processing[305]. Many studies highlighted the positive effect of using academic portfolio on overall performance.[306] The e-Portfolio acts as information storage of the students' portfolio and achievements. The students update this e-Portfolio on a regular basis to align it to their ongoing development. The students were also encouraged to create learning Facebook groups which facilitated their communication and helped in tracking their participation as part of the assessment requirement (see Figure 6.12).

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[302] Sugden, J. (2010). '10000 on YouTube for learners'. The Times. News p23

[303] Lipsett, A. (2008). Facebook a valid educational tool, Teachers told. Childnet international;.

[304] Sugden, J. (2010). op.cit. p23

[305] Pintrich, P. R., (2002). 'The role of metacognitive knowledge in learning, teaching, and assessing'. *Theory into Practice*. 41(4). p119-225.

[306] Clarke, A. (2008). *E-Learning Skills*. New York: Palgrave Macmillan.
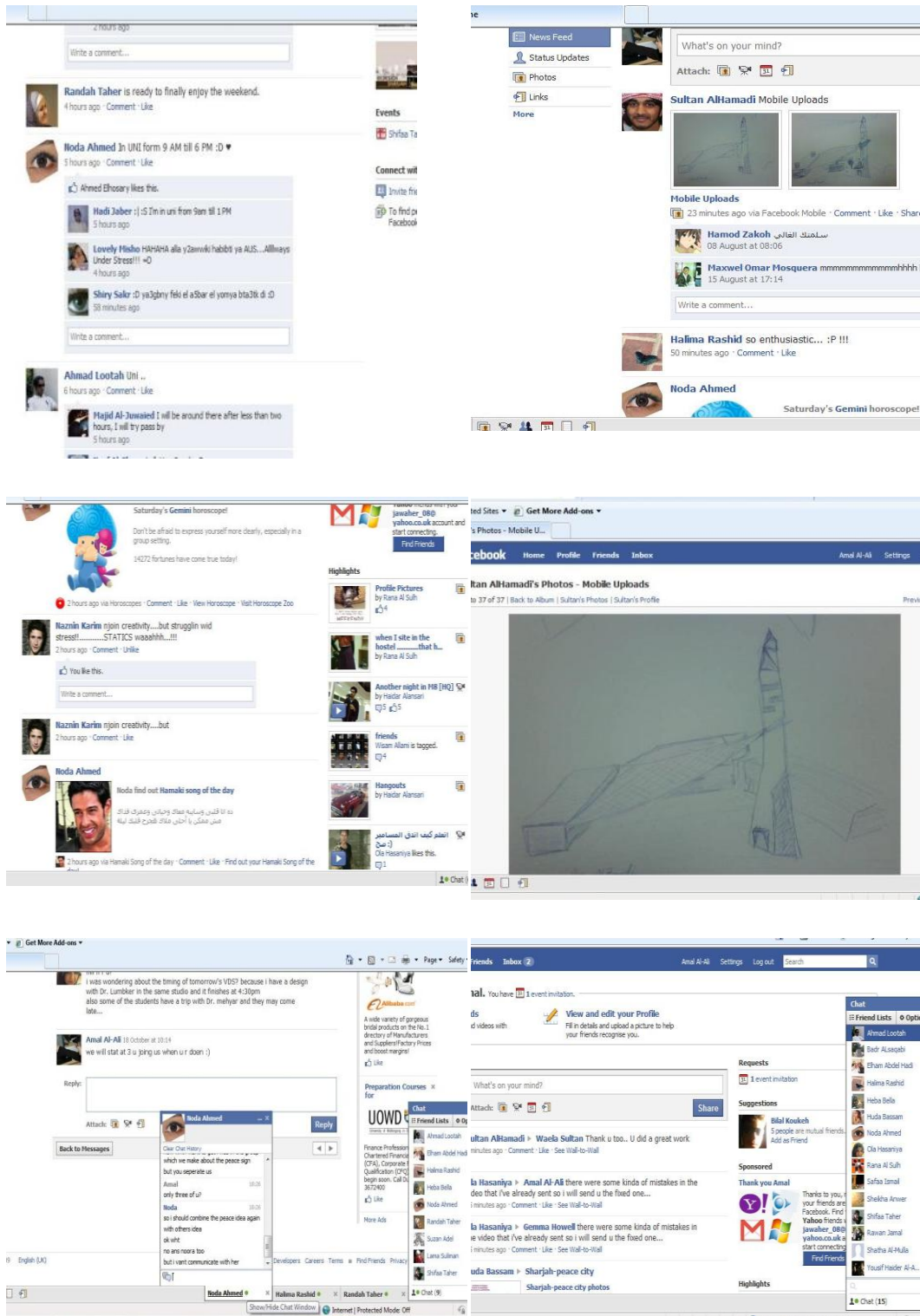
**Figure 6.12: Use of Facebook for Academic Purposes**

In addition, Second Life was used as a 3D and virtual reality tool for the students. Second Life provides the immersed environment for learners. As part of its facilities, Second Life provides its own unique learning environment where the students can choose their own courses. But as a

supportive educational tool Second Life also can provide the students with a 3D interactive environment in which to build their own designs.[307] The facilities available in Second Life match the method of learning by doing and the integration of games mentioned above. Second Life helps the students to learn using role-playing or a scaventure hunt in which the students can hunt for the right information in an interactive game-playing environment. Students can use objects available in Second Life to make buildings and implement their designs ideas. Second Life also gives the students an opportunity to co-create their buildings. As well as Facebook, Second Life also provides opportunities for synchronous and asynchronous tools such as chatting, blogging, and emails; the students can meet in Avatar style. Whiteboard is another popular educational tool in Second Life. Second Life was introduced in the project as a 3D tool. It was facilitated to the students but it was an optional tool as the students have to decide whether to use it or not. The workbook provided referred the students to use Second Life in their design process. In line with the students' centred learning style adopted in this project, the researcher introduced the tools to the student but left the decision to them on which tools they will use.

Other synchronous and asynchronous tools were implemented in the VDS 3. These included video conferencing, chat applications, and emails.

Blackboard was also used in this project to give the students extra opportunities for referring to materials and to use all other facilities.

*The Behavioural Layer*

The behavioural layer in the VDS 3 consisted of the tools that promote required behaviours such as creativity and collaboration. The VDS 3 environment encouraged the student to collaborate through the use of activities and technological tools. The workbook contained activities that encouraged the students to work together both inside and outside the lecture room. The activities encouraged the students to work both at the

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[307] Karrer, T. (2007). Second Life as a learning tool.

basic level as well as the professional, face to face, and virtual levels. Several types of activities encouraged the peer discussions of certain topics (basic collaboration) while others encouraged the remix and rematch of the groups where the students had to create new groups based on skills and experiences (professional level). The activities also encouraged the students to work in class by sharing and exchanging information in the lecture room as well as "virtually" by blogging, chatting online, or discussing certain views.

The use of these in class activities also encouraged the students to work with peers and at a later stage to form bigger groups, then to remix and work with different groups in which the students had the chance to intersect their ideas and come up with a shared vision for their final product.

The students were also encouraged to think in a free and creative manner through the use of workbook activities that encouraged unlimited free thinking and through the use of metaphorical thinking exercises.

### *The Socio-Cultural Layer*

The socio-cultural layer is concerned with the cultural traditions of the UAE society. This work is aimed for the UAE student. Since the UAE culture differs from the western culture and the technology transfer throughout the literature[308] has been noticed to be limited by cultural diversity and cultural factors, this work considered the sensitivity of the UAE culture and addressed this issue by using the available technologies to overcome cultural restrictions. An example of this is the use of the virtual tour in which the student can virtually walk outside the campus (an advantage that could not be reached otherwise due to the female restriction issue) and explore the surroundings.

Other use of technology to overcome cultural restriction is the use of Facebook with all its facilities to overcome the gender issue as male and

female are not supposed to be mixing inside the classroom. Synchronous and asynchronous were utilised to facilitate communication between students which helped the student to overcome the gender restriction. Chapter eight will give more details about this issue.

## 6.8 Conclusion

This chapter outlined the layers supporting the development process of the VDS environment as well as the process of the action research supporting the development process. The four layers: pedagogical, technological, behavioural, and socio-cultural are all discussed in detail with providing the supporting material through the literature and the technology used. The final VDS is then developed and the next chapter will evaluate the final version of VDS and its impact and use in the UAE-The University of Sharjah.

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[308] Hill, C. E., Loch, K. D., Straub, D. W., El-Sheshai, K. (1998) 'A qaualitative assessment of Arab culture and information technology transfer'. *Journal of Global Information Management*. 6(3). p29-38.

# Chapter 7: Evaluation

## 7.1 Introduction

In this section VDS 3 is evaluated and the findings of the case study regarding the implementation of the third VDS (VDS 3) are represented. The main hypotheses are examined and addressed alongside the primary hypothesis. An evaluative approach is used. Many[309] have classified evaluation as a fine tool consisting of assessing educational programmes or other kinds of educational products while they are being developed to help shape them into their final forms.

## 7.2 Definitions of Evaluation

The most frequently given definition of evaluation is found to be:

*"Evaluation is the systematic assessment of the worth or merit of some object."[310]*

But as there are many types of evaluation that do not result in finding the worth or merit of an object many consider this definition as lacking. Another definition found to be more adequate is:

*"Evaluation is the systematic acquisition and assessment of information to provide useful feedback about some object." [311]*

From this definition we conclude that the evaluation of an object is to get useful feedback about an object of study to help improve it and understanding its usefulness. There are many types of evaluation, but for the purpose of this study three types of evaluation were used: formative evaluation, summative evaluation and experience evaluation. Each of these evaluation types was used to achieve a certain outcome.

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[309] Ruggiero, J. (2006). 'Performance evaluation in education'. In *Handbook on Data Envelopment Model. (William W. Cooper, Lawrence M. Seiford and Joe Zhu71 eds.)*. 71. Springer: US. p323-346.
[310] William, M. K. (2006). *Research methods Knowledge Base*. 2nd ed. Atomic Dog Publishing.
[311] Guba, E. G., Lincoln, Y. S., (1981*). Effective evaluation: improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco: Jossey-Base.

Formative evaluations improve and develop the object being tested. By examining the delivery of the program or technology it helps shaping and reshaping it accordingly, the quality of its implementation, and the assessment of the organisational context, personnel, procedures, inputs[312]. Summative evaluations, according to McKavanagh et al, [313].

*"examine the effects or outcomes of an object; they summarise it by describing what happens subsequent to delivery of the program or technology, assessing whether the object can be said to have caused the outcome, determining the overall impact of the causal factor beyond only the immediate target outcomes, and estimating the relative costs associated with the object"*

For the purpose of this study both types were used. The formative evaluation was used through the whole study for the purpose of analysing and improving its performance, and at the later stage a summative analysis was used to examine the outcome and the effect of the VDS. Experience evaluation consists of the tools that the researcher used to achieve the results and feedback.

For the final product the following scheme was used (see Figure 7.1):
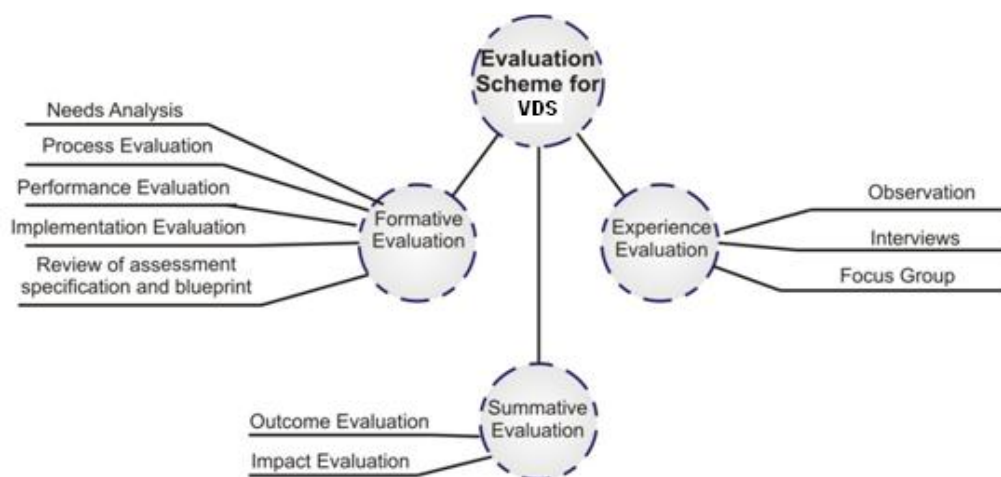


**Figure 7.1: Evaluation Scheme for VDS 3**

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[312] William, M. K. (2006). Research Methods Knowledge Base.2nd ed. Atomic Dog Publishing.
[313] McKavanagh et al. (2001) 'Evaluation of web-based flexible learning: findings and implications'. In: *9th International Conference on Post-compulsory Education and Training*. Queensland, Australia.

Three different observation methods were used. Interviews were used after the completion of VDS 3 workshop the aim was to find out how lecturers perceived VDS 3 as a virtual learning environment tool. The technological tools used were examined and the lecturers' attitude towards them, evaluating its ways forward, the impact of the VDS 3 on the students and the curriculum, and if the VDS 3 outcome meet its goal. The interviews were analysed by highlighting the main themes. Focus groups were used to examine students' attitudes towards using the new tools and how they perceived VDS 3 as a virtual learning environment tool from their own point of view, what difficulties there were and/or how VDS 3 helped them, as well as how it affected their future studies. Observational checklists were also carried out while the students were performing the tasks and undertaking the VDS 3 workshop to examine their interaction with the new environment and whether the VDS 3 achieved its goal.

## 7.3 VDS 3-Workshop Evaluation

In this section the evaluation of the VDS 3-workshop is presented. The VDS 3 was implemented in the University of Sharjah as an intensive workshop lasting for ten days. This section will present the needs analysis for VDS 3, and the results of both the formative evaluation and the summative evaluation.

### 7.3.1 The Needs Analysis for the VDS 3

Based on the feedback of phases one and two, VDS 3 was formulated, implemented, and evaluated. A VDS curriculum was developed and VDS 3 tools were integrated. Prior to the actual implementation a rehearsal of the VDS took place in September/October 2009. Students from Glamorgan University and Swansea University volunteered to undertake this workshop. The mock study imitated the exact scenario of the targeted study on a smaller scale. The mock study took place at Glamorgan University from the period of 23 of September 2009 to the 10th of October 2009. The ten students who volunteered were provided with materials, including the handouts, the workbook, the programme,

the diary of events, and the timetable before they attended the workshop. The workshop was then carried out as it was planned to be, the volunteers having to attend some lectures and carry out some virtual work during this time. The volunteers were introduced to the tools of the workshop and their relevance to the aims and objectives of the study. The feedback from this mock study was then used to improve the materials as well as delivery methods for the VDS 3. There were some other factors predicted to restrict the VDS 3. Some of them are cultural restrictions, students other commitments and staff involvement. The next section will highlight these factors.

First, there were time constraints, as the Glamorgan University volunteer students had other commitments and could not devote all their time to the intensive nature of the studio. Secondly, the restrictions existing on the Internet by the internet service provider in the UAE restricted the students' accessibility to everything that is available on the World Wide Web. Finally, the implementation of complete digital learning materials covering the whole curriculum was too much to compose within the time given.

Because of the time constraints for the students and the university, the timetable of the workshop had to be altered and extra virtual tools had to be implemented to compensate for the restrictions which enriched the studio experience with more virtual communications and to give the students flexibility and control over their working time. The second goal was to provide as much material as possible on Facebook to overcome the restriction of the internet service provider in the UAE. The final goal was to make a framework of VDS 3 for the students to use and ideas of extending the workshop to run over a longer period of time was suggested by the University of Sharjah administrators.

*Evaluation of the Implementation of VDS 3-WS*

*Hypothesis*

The main hypothesis of this research was highlighted in chapter 5. This section will consider in details the main and sub hypothesis and align the main hypothesis and the sub-hypothesis to the evaluation elements.

The main hypothesis: Socio-economic factors such as the work culture and male female issues within the UAE and other Gulf States need to be addressed to implement VDS successfully into the curriculum.

*Sub-hypothesis*: VDS is instrumental in promoting creativity and collaboration in architectural education and to examine the above hypothesis an evaluation scheme was developed. The scheme considered a formative evaluation to examine the use of creativity and collaboration in VDS 3 and to evaluate the socio-economic factors in the VDS 3 as well as a summative evaluation to discuss the overall impact and the outcome of the studio on these factors.

The VDS 3 contained several layers (see chapter 6). Table 7.1 shows the content and the scope for each intended pedagogical issue and the tool (technological or educational) used to implement it.

| Application / Dimension | Aim | Implementation Tool |
|---|---|---|
| Creativity- problem identification | Help the student identify the main problem or issue of concern | -Virtual tour<br><br>-formal and informal synchronous tool (chat)<br><br>-workbook activities |
| Creativity- Motivation | Encourage the students to think freely and metaphorically | -Activities in workbook<br><br>-Use of Facebook as a sociable tool<br><br>-Lecture by Radoine<br><br>- Games<br><br>-icebreaker Activity |
| Creativity- Fluency | Assist the students to think outside the box and base their thinking on their surroundings | Idea generation based lectures<br><br>Metaphor thinking promoted |
| Creativity- Flexibility | Aid the students in their generation of new ideas and adoption of others. | Idea intersection method<br><br>Regroup and re-match approach |
| Creativity- Originality | Help the students on their initial idea generation. | Metaphoric thinking |
| Creativity- Elaboration | Help the students to build on others ideas. | Extension of initial ideas into a complete project<br><br>Critique |
| Creativity-Inquisitiveness | Encourage the students' curiosity to research and absorb new knowledge and ideas. | Facebook and web page materials and links |
| Creativity- Persistency | Encourage the students to identify their goals and work hard to achieve it. | Facebook group formation<br><br>Workbook activities |

**Table 7.1 Creativity Dimension and its Implementation Tools**

| Collaboration- team-working | Tasks |
|---|---|
| Level of involvement | Shared tasks<br><br>Workbook activities<br><br>Shared responsibilities<br><br>Peer assessment exercise<br><br>Mixing of group |
| Awareness of goal | Vision and mission identification |
| Shared vision | Lectures<br><br>Motivation<br><br>Mixture of ideas |
| Communication | Synchronous and asynchronous<br><br>Face to face<br><br>Tutor: student and student: student communication |
| Sharing responsibilities | Task allocation |
| Relationships | Ideas generation<br><br>Trust in each other's through encouragement and conflict resolution processes<br><br>Willingness to compromise through critique and lectures<br><br>Emphasising the importance of time and time management skills<br><br>Encouraging commitment |
| Authority | Encouraging the student to take initiative in making decisions and monitor progress |

**Table 7.2 Collaboration Dimension and it Implementation Tools**

| Dimension | Aim | Implementation Technique |
|---|---|---|
| Pedagogical issues – problem- based learning | Individual and group ideas | Re-mix and re-match |
| Student-centred learning | Student taking responsibility of their own learning | Workbook activities and online activities |
| Critical thinking | Taking part in critique and analysis of others work | Studio activities |

**Table 7.3: Pedagogical Issues and How it was Implemented**

Several types of learning methods were used in the development of VDS 3. Collaborative: collaborative learning, active learning, problem-based learning and engaged learning (see pedagogical layer in chapter 6).

In the collaborative learning the emphasis was on using technology to encourage collaboration among students inside and outside the classroom. Collaborative learning in VDS 3 consisted of other related methods such as cooperative learning and discovery-based learning. The structure of VDS 3 concentrated on the idea of working in teams. The students were encouraged throughout VDS 3 to work in groups and communicate their ideas, building on each other's ideas and taking initiative in their design. Activities on the workbook also encouraged the students to use synchronous and asynchronous tools to exchange and discuss ideas related to their work. The students were also asked to form Facebook groups to act as a platform for exchanging and discussing ideas that the tutors could join in with and also maintain the tracking of student progress and activity in the group. The students were also expected to declare their broad vision of their design in their Facebook group and work toward that vision. On the other hand, the idea of cooperative learning at the same time originated from the concept of using technology in education. In VDS 3 the use of technology was encouraged by its synchronous and asynchronous types (see above). Because discovery-based learning takes its structure from the use of the Internet to locate and discover the

information required or to look for models that can inspire or motivate the learning, the students in VDS 3 were encouraged to surf the net and look for information that had not been available or models that they could imitate or find inspiration from. Activities on the workbook referred the students to the Internet very often to look for information or to browse similar situations such as the Cardiff Chimera workshop. The students were also encouraged to use YouTube and the VDS main web site as source of information.

The active learning, on the other hand, was based on the idea of using activities and making the students in control of their own learning. Researchers also went further in saying that learning can be done at the students own pace, time and location (see pedagogical layer in chapter 6). In VDS 3 the active learning was used with its basic function to give the students a chance to work independently and introduce them to a new way of leaning. The workbook was written based on the standard of open-learning material that supports active learning (see chapter 3). The activities in the workbook were designed to keep the students engaged in their learning, motivated, and give them the chance to take control of their own learning.

The whole environment of VDS 3 was circulated around the concept of problem-based learning, where the problem was presented to the student and they had to work in collaboration to solve it. The problem to tackle was the redesigning of Sharjah, taking into consideration the issues surrounding this city and its challenges as a modern city. The lecturers worked with this idea, prompting the students in this sense, when the issues of Sharjah were raised and the student had to think creatively and metaphorically to pinpoint and resolve these issues. The breakdown of the VDS also contained the idea of problem-based learning with which large scale problems were narrowed down to smaller cases and tackled accordingly. The workbook contained some activities that helped the students to see the problems and to help in tackling them in the right way. The workbook also contained activities

that helped the students in working with smaller problems to put them in the suitable mood for it.

The students were fully engaged in the environment of the VDS 3. Many tools were used to help the students getting fully engaged in the environment. High retention methods such as simulated experience were used in the form of games, role playing, and use of media to demonstrate record drama. Such tools kept the student involved and they were engaging in the environment.

The digital learning material helped the students to tightly link to the curriculum and all the supportive material for student were available for them on the specially designed webpage that is also linked to the all-facilitated environment.

The assessment part of VDS 3 consists of formative as well as summative assignments. According to Mateo et al[314]

*"Quality of learning should be measured not only in terms of student-learning achievements or success, but also related to the effectiveness of the teaching action and to the satisfaction towards the assessment process. For this reason, one of the most important concerns of online education institutions is to develop a formative assessment system. Assessment must help to identify and apply improvements in the student-learning process, through a permanent feedback".*

In this VDS 3, assessments were of many kinds. Self-assessment was used to make the students assess their own learning by providing a self-assessment checklist at the back of each workbook. The students had to mark their own progress and provide feedback about any learning obstacles or difficulties. The second type of assessment was the peer assessment with which the students were asked to provide feedback about each other in the same group. Another form was the formative assessment, when the final product was assessed and the groups were

awarded marks for each.  The students were also asked to provide a report of approximately 500 words, each describing their project.

## 7.4 Performance Evaluation

The approaches used for evaluation as described above contained focus group, observations checklists, audio and video recording, interviews and computer logs.  The students' performance was analysed to examine how they perceived  the VDS 3 environment and interacted with it, for the purpose of evaluating its feasibility in meeting the goals it was set up to perform.   Table 7.4 Illustrate the alignments of the research hypothesis and the data collection.  Nvivo 8 was used as a tool to organise and categorise the data collected and to identify relationships.

| VDS 3 is instrumental in promoting creativity and collaboration in architectural education  (Student Perspective) | |
| --- | --- |
| Need Analysis | Reviewing previous VDS cases in the UAE context |
| Observation Checklist | Use of technology (maintain tracking via Facebook and web page)<br><br>Use of technology to promote collaboration and creativity |
| Focus group | Learning outcome and skills development |

**Table 7.4 alignment of analysis to the research hypothesis**

The data can be related to the areas of treatment identified for this study, the following table summarise these areas

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[314] Mateo, J. and Sangra,A. (2007). 'Designing online learning assessment through alternative approaches: facing the concerns'. *European Journal of Open, Distance and E-learning.* Accessed online at http://www.eurodl.org/materials/contrib/2007/Mateo_Sangra.htm.

| Creativity | Critique |
|---|---|
| | Enthusiasm and Motivation |
| | Elaboration -Idea Generation |
| | Metaphor |
| | Flexibility |
| | Fluency |
| Collaboration | Critique |
| | Level of involvement |
| | Awareness of goal |
| | shared vision |
| | Communication |
| | Sharing responsibilities |
| | Relationships |
| | Authority |
| Cultural | Confusion |
| | Cultural Transformation through time |
| | Disciplines |
| | Diversity |
| | Identity |
| | Student Background |
| | Tradition |
| | Work |

**Table 7.5 creativity, collaboration and cultural dimensions**

The observation study focused on the themes mentioned in Table 7.5 above. The aim was to observe the students' interaction with the new integrated methods. The methods used for this study were notes taken though out the execution of the workshop. Still pictures and video-recordings were also utilised to capture students' behaviour in certain moments. New themes emerged as the analysis took place which is presented. The following charts show the observed factors that mostly are connected with each of the above mentioned themes.
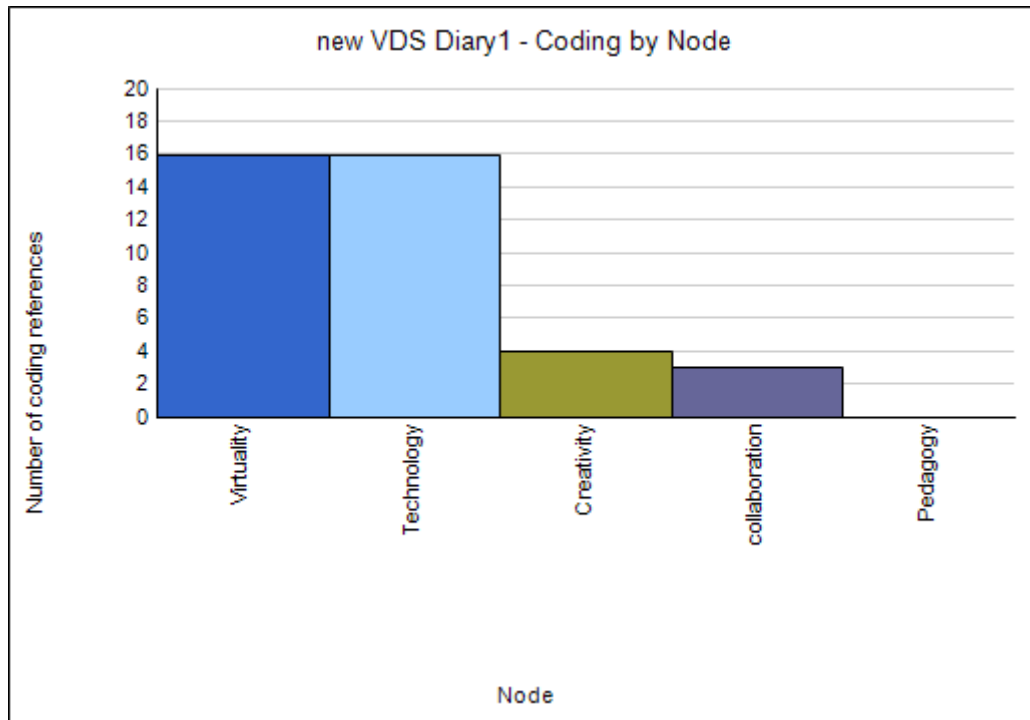
**Figure 7.2: The Use of Skills Level**

Figure 7.2 above shows the main themes of the VDS 3 environment from the ones mentioned in Table 7.5. The figure illustrates the usage of each of these main elements promoted in the VDS 3 environment. The information depicts the level of utilisation of the VDS elements that was received by the students. The usage was calculated according to the number of coded references according to the data collected during the observation. From above we can conclude that the mostly used features were the technological ones represented by the technological tools being synchronous, asynchronous, virtual reality, or any other technological tools.

### 7.4.1 Technology utilisation

The main goal for this work was to integrate new technology in architecture design education in the UAE; this section will illustrate the students' utilisation of the technology that was made available to them in this workshop in an attempt to analyse the important factors to be considered as far as technology is concerned plus students' performance and how they perceived and used the technologies

available. Figure 7.3 illustrates students' utilisation of the available technologies in the VDS 3 environment.

## 7.4.2 Creativity

The detailed aspects of creativity usage in the VDS 3 environment are illustrated in table 7.5. Some more themes emerged as well and were concluded from the observation. Table 7.6 below summarises these themes.

| Creativity | Bandwidth |
|---|---|
| | Critique |
| | Enthusiasm and Motivation |

**Table 7.6: Findings Related to Creativity**
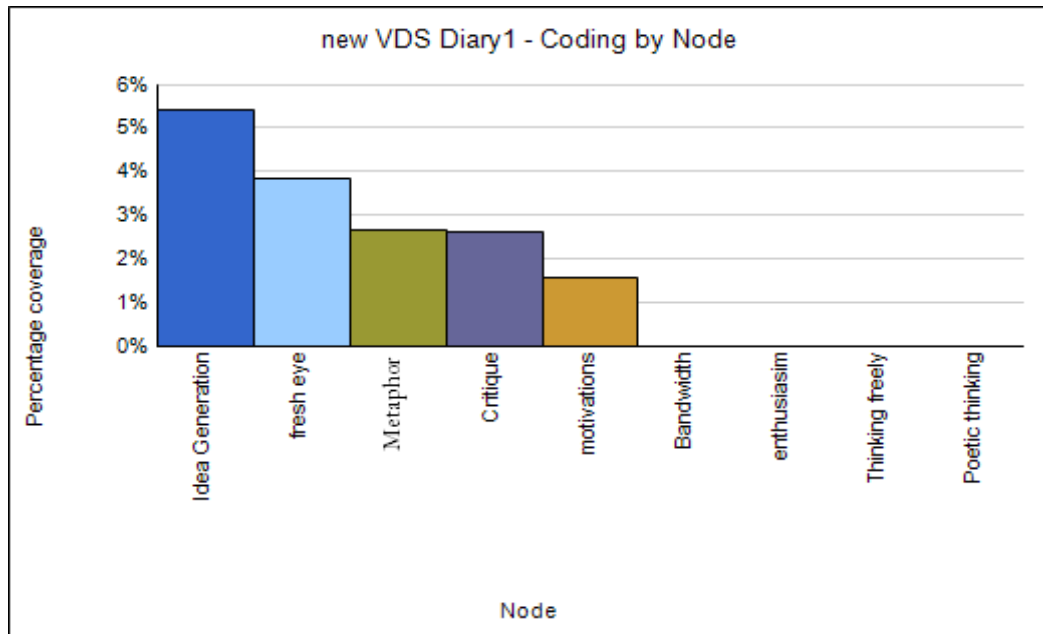


**Figure 7.3: Use of Creativity Dimensions Level**

Figure 7.3 shows the emerged themes of the use of creativity in the VDS 3 environment. As it shows the Idea Generation was observed to be heavily used in comparison with the other features. The Fresh Eye ideas (represented by the contribution of the tutor visiting the UAE for the first time) and the idea that these generated in the studio environment received a high score. Metaphor and Critique share the

same level, used in the VDS 3. The figure also shows that the students were motivated as observed in the study. The rest of the elements were minimal with no obvious observation of them in the environment of the study.

### 7.4.3  Collaboration

The following graph shows the observational study results of the utilisation of collaboration and its main themes among the students in the VDS 3 environment.
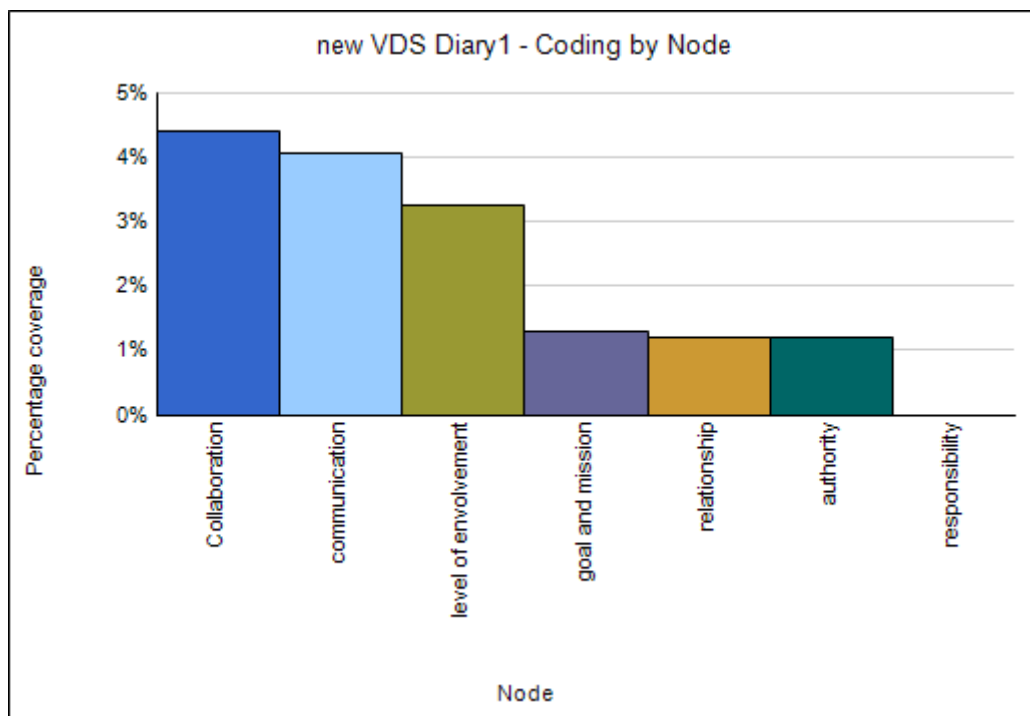


**Figure 7.4: Collaboration Dimensions and Level of Use in the VDS 3**

Figure 7.4 illustrates the utilisation of collaboration dimension in the VDS 3 environment and the students' perception of it. The figure shows its high percentage, along with communication and level of involvement, while goal and mission, relationship, and authority scored approximately the same while responsibility scored the least, indicating that it was the least to be used and utilised. The observational study also experienced the emergence of new themes related to collaboration plus the ones mentioned above. Table 7.7 illustrates these themes.

| Collaboration | Anonymous |
| --- | --- |
|  | Critique |

**Table 7.7: Findings Related to Collaboration**

### 7.4.4 Focus Group

After the completion of the VDS 3 workshop the researcher conducted a focus group survey with 10 of the students who attended the workshop to get an in-depth insight of their view of the workshop and its importance in introducing new ways of thinking and new ways of learning using technology. The focus group concentrated on asking the students about their feedback on VDS 3 and to measure their contribution and the way the perceived and interacted with it. Figure 7.5 shows the student interaction with the main themes of the VDS 3.

The figure shows the students' use of collaborative and technological tools to full potential but there was a limitation in the use of the creative tools in comparison. Figure 7.5 shows the use of the collaboration tools in detail and compares the most used tools.
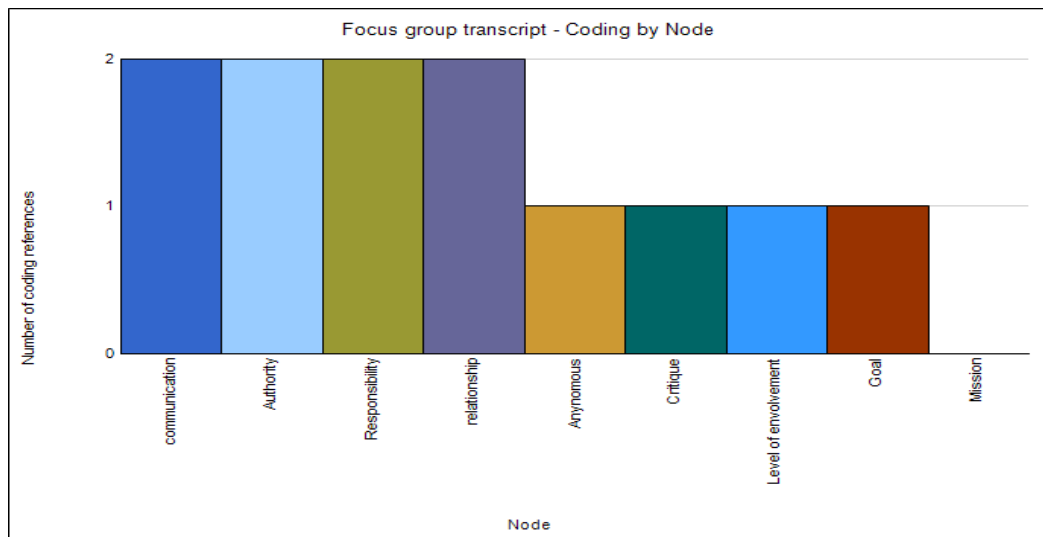


**Figure 7.5: Use of Collaboration According to the Student**
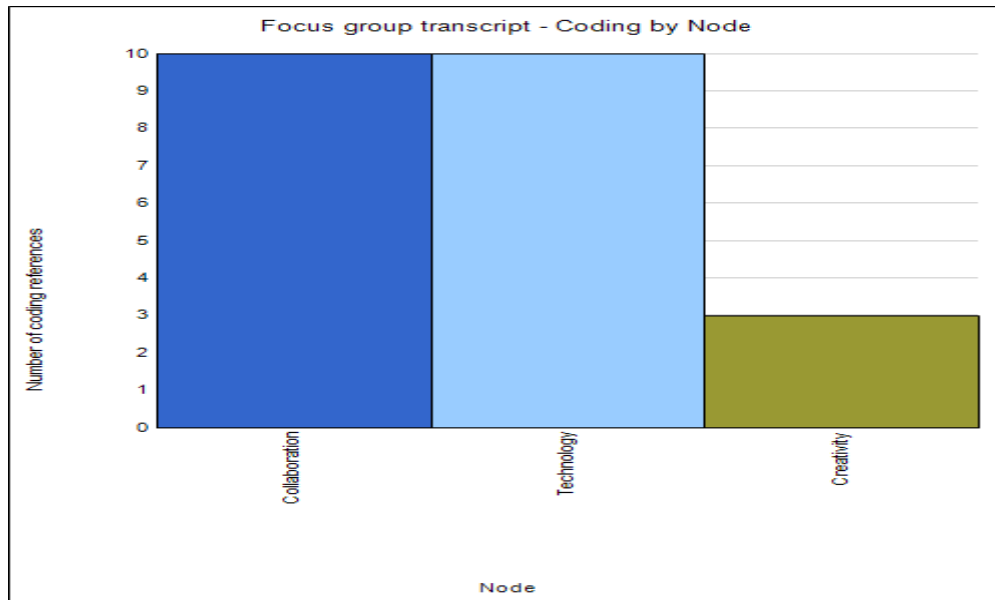
**Figure 7.6: The Use of Collaboration, Creativity and Technology in VDS 3 According to the Students**

Figure 7.5 shows that the use of communication tools alongside the authority, responsibility, and relationship, dominated the other factors.

Figure 7.6 shows the utilisation of technological tools in the VDS 3 environment.
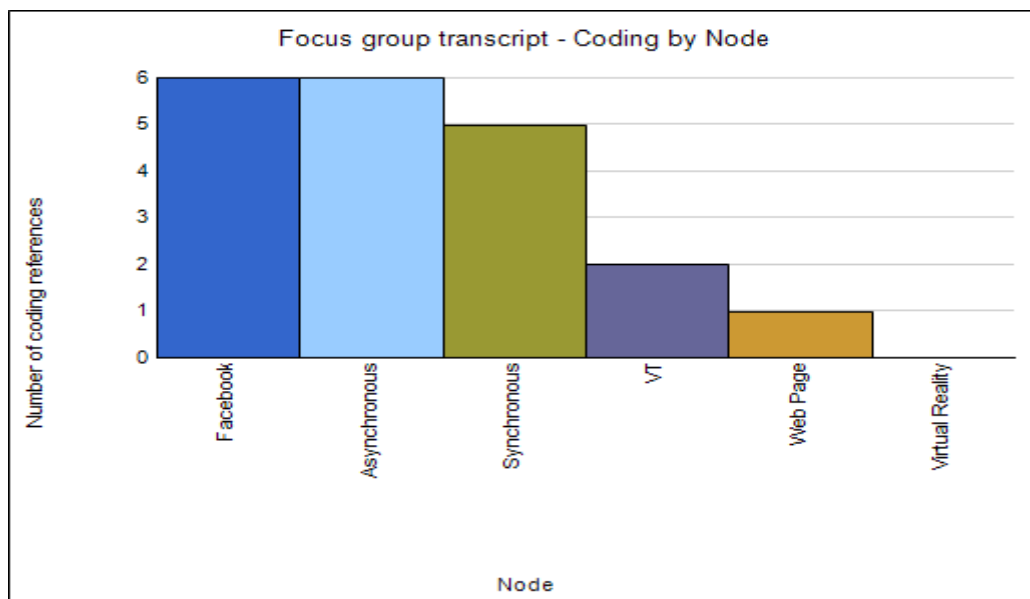


**Figure 7.7: The Use of Technological Tools According to the Students**

Figure 7.7 shows that the use of Facebook and the asynchronous tools were rated very highly in comparison to other tools. The use of the

synchronous tools scored highly comparing to the other tools.  The virtual tour also scored reasonably alongside the webpage tool, yet the virtual reality tools such as the 3D environment were rarely used in the VDS 3.  The reason behind this underutilisation could be related to the time needed to learn this new environment which the student did not have.  Another reason is the nature of this commercial software, although they come downloadable for free, yet it is very expensive to run them and use the build in facilities.

Figure 7.8 illustrates students' perception of the use of creativity tools in the VDS 3 according to the focus group analysis (see below).
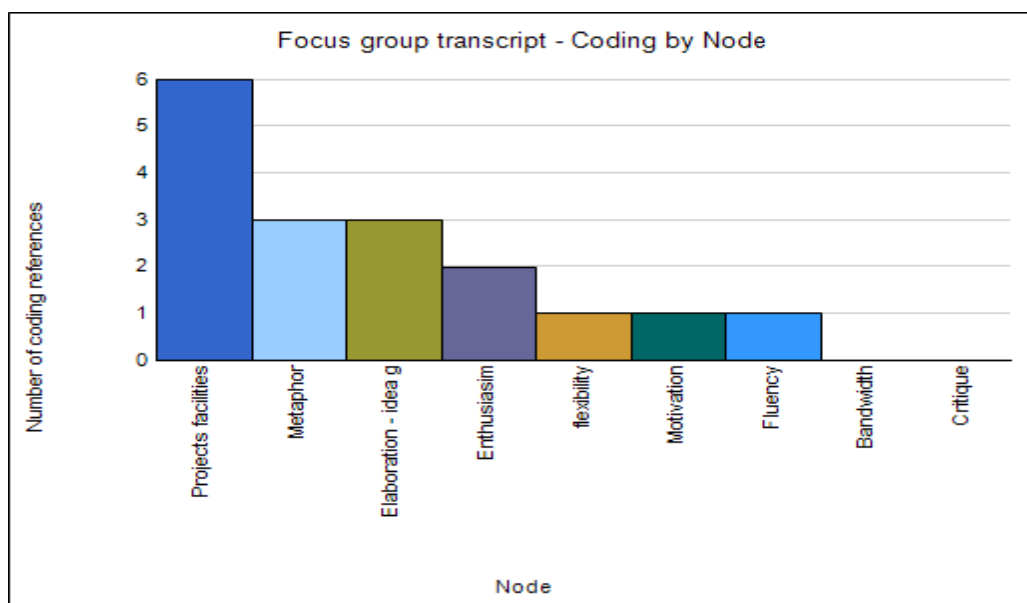


**Figure 7.8: The Use of Creativity Dimensions According to the Students**

The above figure shows that the use of project facilities that include activities in and outside class scored really highly among student performance in the VDS 3 environment.  The graph also shows that the students adhered to the idea of building their projects based on the metaphor basis as well as elaboration of their ideas and building on each others' in the final designs.  As shown in the graph above, the feasibility, motivation, and fluency factors were perceived at the same level.  Bandwidth and Critique factors did not score in the VDS 3 according to the students' answers in the focus group.

## 7.5 Summative Evaluation

It is understandable that a framework which is formulated to evaluate integrate technology into education and evaluate the effectiveness should be evaluated.  It is important to estimate the effectiveness of such a project.  This chapter outlines the approach used to evaluate the overall project.  The chapter presents the findings and conclusions of the evaluation.   The chapter states the effectiveness of the implementation process, the overall project and its intended outcomes. This section examined the effects or outcomes of some object – they summarise it by describing what happens subsequent to delivery of the programme or technology, assessing whether the object can be said to have caused the outcome; determining the overall impact of the causal factor beyond only the immediate target outcomes, and estimating the relative costs associated with the object.  The summative evaluation in this study can be subdivided into two branches: the outcome evaluation and the impact evaluation.   The outcome evaluation is defined as investigative of whether the programme or technology caused demonstrable effects on specifically defined target outcomes. The strategy for evaluating this project had the following two goals: to report on how well VDS 3 was implemented and received and to analyse the extent to which the stated outcomes of VDS 3 were achieved.  As a result, in this study the outcome evaluation discussed the results or effects of VDS 3 on improving the participating student's performance in using technology and using the tools of collaboration and creativity tools; while the impact evaluation is defined as broader and assesses the overall or net effects – intended or unintended – of the programme or technology.  As a result, the impact evaluation in this study discusses how VDS 3 affected the education process in the environment in which it was implemented.  The tools used in this were the lecturers' interviews, observations, and the focus group analysis.   In the summative component of the evaluation, it was observed that the students extended their use of the skills learnt in VDS 3 to other subject they undertake at The University of Sharjah.  Facebook accounts showed the

extended use of Facebook accounts to include other subjects and communicate with each other about issues related to other subjects. The students were also observed to pick up and adopt the style of learning encouraged in the VDS 3 workshop. The students started to take responsibilities of their own learning. The students also started to think creatively in attending some of the tasks for other subjects. At the end of the VDS 3 workshop it was evidenced in the campus corridors the students' use of the skills they learned in VDS 3. The students involved their surroundings in solving their academic problems. The students also began to work with each other in a less stressed manner especially as far as gender is concerned.

Interviews with the lecturers revealed a change of attitude by the students toward their learning. Dr. Radoine comments that "*I could see the motivation developed inside the students not only in turning to the VDS 3 on a Saturday morning but also in using what they learnt in VDS 3 in other subject areas.*"

The effect that this workshop left on the educational institutes in the UAE was covered also by the press in the UAE. [315] Also the University has already demanded some more collaboration in terms of conducting new VDS and having it as a continuous activity. The University of Sharjah web page has also addressed VDS 3 as one of the important events that occurred in the University in 2009. [316]

## 7.6 Outcome Evaluation

The outcome evaluation was measured through the use of the data obtained from the observation and the student focus group and the lecturers' interviews. A set of intended outcomes were identified as shown below:

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[315] Al Sada Magazine (2009). Virtual design studio to redesign Sharjah: by an Emirati PhD. student Amal Al-Ali. Emirates. Year 11. 544. p52. (in Arabic)
[316]http://www.sharjah.ac.ae/English/Academics/Colleges/Engineering/Departments/ArchitecturalEngineering/events/ArtActivities/Pages/Redesignsharjah.aspx

- Ensure the students have gained transferable skills in attending and interacting with their study demands.
- Ensure the sustainability of the use of the skills obtained for the future.
- Produce students who facilitate the Virtual Design process through the use of digital media, social networking tools, and of multi-disciplinary type, in order to forge strong working partnerships.

The study would also result in producing a digital VDS curriculum for the use in design studios.

| VDS 3 environment Outcome | Process to gain outcome | Type of data considered |
|---|---|---|
| Gaining transferable skills | Lectures, workbook activities, in- class activities, assessment, and technological tools | Still pictures during lectures, videos, Facebook snapshot, workbook, and assessment |
| Sustainability of use | Technological tools | Student feedback and Facebook follow up procedures. |
| Use of technology | Facebook follow up, blogs, web page, and 3D technology | Facebook snapshot, webpage blogging follow up, workbook activities and assessments |
| Final product | Teachers' feedback | Interviews |

Table 7.8 details the outcomes and the process used in the VDS 3 and how they were evaluated.

**Table 7.8: Evaluation Process for Outcome**

Figure 7.9 illustrates the student's gaining of the required skills throughout the workshop.
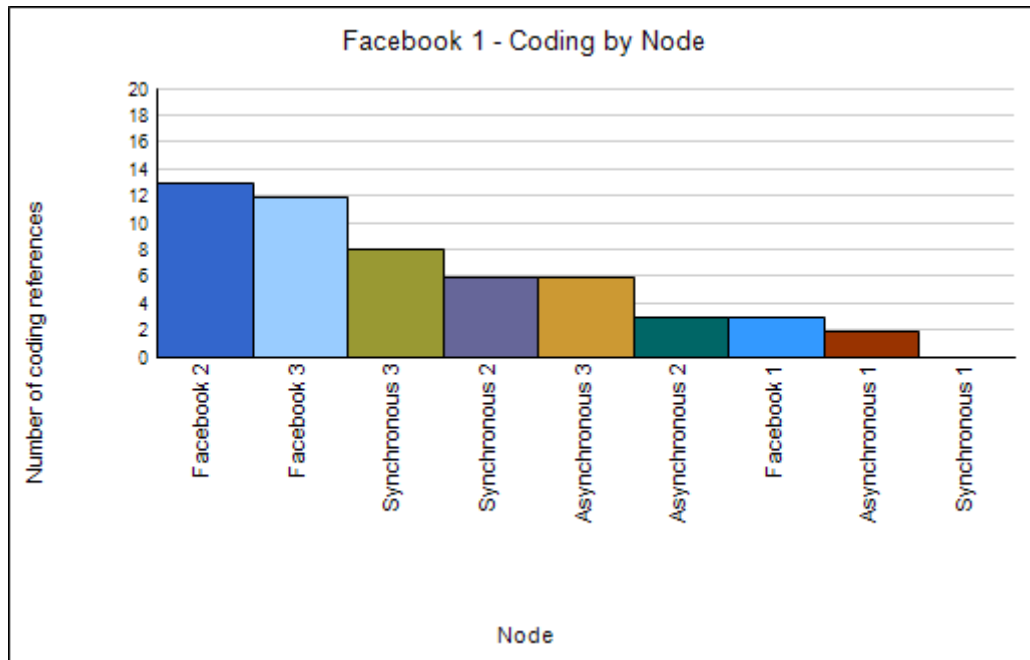
**Figure 7.9: Student Performance**

Figure 7.9 shows the increase of the use of the facilities inside the VDS environment as the workshop progressed. The numbers accompanying the name of the facility represent the stage of the workshop as the observation and the Facebook follow-up procedures were divided into three stages for the purpose of analysing the data acquired. Each number represents the stage in the VDS. Stage one was at the very beginning of the workshop whereas stage two represents the middle stage and stage three is the final stage. The figure shows the increase and the utilisation of the facilities by the students as the workshop progressed.

## 7.7 Impact Evaluation

In this section the impact of VDS 3 as a project on the educational system in the university is presented and the wider implications on education in the UAE education system considered.

### 7.7.1 Focus group:

The focus group revealed the students perception of the tools deployed in VDS 3. The students stated that they enjoyed using Facebook as a learning environment. The students started creating Facebook groups

for different activities in the university. The students also developed skills for applying Facebook tools for other educational purposes such as creating study groups. They also indicated their enthusiasm towards the skills acquired during VDS 3. The students agreed that they started applying the skills they acquired in VDS 3 such as working together (team working) and they used it in other areas of study. The students also agreed that the use of thinking skills they learnt in VDS 3 were helping them when applied in other subject areas.

### 7.7.2 Interviews

The interviews conducted with the lecturers of the University of Sharjah also revealed that the lecturers adopted skills they acquired while observing VDS 3. The most important factor is the use of e-portfolio for educational purposes. Facebook is becoming very popular among the lecturers and the students and it is becoming a crucial element for exchanging and storing educational materials.

Using of blogs has also attracted the staff and the students at the University of Sharjah and it is becoming part of the assessment procedure in some of the modules taught at the University.

### 7.7.3 Observations

Using Facebook as an observational tool, the researcher observed the continuous use of Facebook as a communication tool. The students make regular access to Facebook. Many events are published on Facebook and many materials are witnessed to be shared using Facebook tools. The students also continued updating their e-portfolio and are regularly contacting the coordinators of the VDS 3 asking for further workshops.

The researcher also observed the use of the creative tools they acquired during VDS 3. The corridors at the University of Sharjah show the students use and application of skills such as metaphoric thinking by linking their ideas to a metaphorical icon or something from the nature surrounding.

## 7.8 Conclusion

This chapter discussed the evaluation scheme for the VDS framework. The chapter outlines the different evaluation methods used to assess VDS 3. These evaluation methods were aligned to the hypothesis to assess the extent to which the VDS met the desired outcome. Student performance was assessed using Nvivo 8. The observation was used to evaluate the students use and interaction with the proposed framework. The overall impact of VDS 3 was also assessed using observations and focus group data.

# Chapter 8: Analysis

## 8.1 Discussion and analysis

This chapter will present the factors that played part in implementing and promoting VDS 3 at the University of Sharjah as a case study for the UAE. The main factors are presented in table 8.1 below

| Summary of the Factors that affected the implementation of VDS 3 | |
|---|---|
| 1 | The factors that affected the technological part of the VDS 3. |
| 2 | The factors that affected the promotion of creativity. |
| 3 | The factors that affected the promotion of collaboration. |

**Table 8.1: the Factors that affected the implementation of VDS 3**

Figure 8.1 illustrates the important factors that emerged during and after the integration of VDS 3 in the design curriculum in The University of Sharjah as a case study for the UAE educational system.
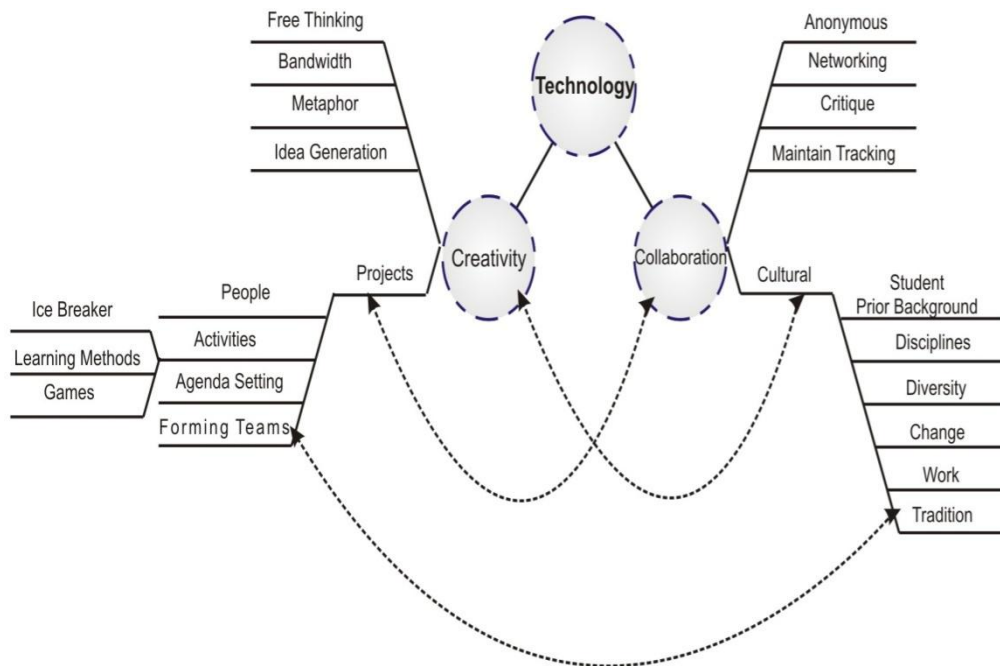


**Figure 8.1: Themes of Discussion in VDS 3**

The figure above shows the main themes of discussion in this section and their subsections.

## 8.2 Technology

Technology is the main driver for this research. It was considered as the main theme from where all the other themes have emerged. This classification is due to the role that technology is aimed to achieve in terms of promoting the other themes. As this VDS 3 utilises technology to promote skills such as creativity and collaboration so the use of technology was subdivided according to its promotion of those skills, which is further subdivided to more subsections. The students showed great interest in the use of technological tools. This was not a surprise as the students were aware when they enrolled for this workshop that it is technology oriented workshop. Some technological tools received greater interest from the student. This is due to the nature of each technological tool applied. Some of the tools were straightforward and required less learning time. While others like SecondLife were more complicated and they were also expensive to use.

## 8.3 Collaboration

Participants in VDS 3 stated that collaboration was the key driver behind the project and therefore became the foundation of it. "You start building the team as soon as you start the activities." For the UAE being classified as a sociable culture by Hofstede's[317] individualism and collectivism indices it was not surprising to observe that the students started working in groups before they were asked to. Even if the activity suggested working individually the students still consulted and asked other students in the class. Collaboration as stated earlier in this study was one of the main themes of the VDS 3 workshop that aimed at promoting collaboration among the student in the University of Sharjah using technology.

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[317] Hofstede G. (2001). op.cit.p282.

Participants expressed their opinion that a collaborative culture was created and encouraged by the VDS ethos, through its practice and procedures. Some of the activities in the project contained a collective nature to encourage the student to work together and share information. As discussed in the previous chapter the VDS was equipped with technological tools as well as pedagogical tools to reach its goals. The factors that influenced the student collaboration are discussed below in more detail:

### 8.3.1 Anonymous

As the students' cultural background played an important part in preventing male and female students from interacting directly inside the classroom, the anonymous factor played an important role as the students were asked as part of this project to create a Facebook account specifically for the purpose of this workshop. The students were asked to use their ID numbers at the start. From observation, students were found to be interacting freely in the virtual time. Not knowing the gender of the other party helped melt the ice as far as gender issue was concerned. At a later stage the students were encouraged to interact face to face as when in class they found out the identity of the person they were working with. Accordingly, this factor was believed to be one of the factors that fuelled and helped in promoting collaboration.

### 8.3.2 Networking

The networking aspect of VDS 3 as shown in Figure 8.1 (see above) is a shared factor between the main two themes collaboration and creativity. Using VDS 3 the networking factor was strengthened as the students made their first social networking opportunity with the creation of their Facebook accounts. As the students progressed through the use of Facebook according to the observation study they strengthened their networking skills inside the VDS 3 workshop. Facebook played an important part within the structure of the VDS 3 workshop to promote collaboration among the students.

Networking also helped the students to exchange and share ideas which helped them build on each other's ideas and increased their flexibility. This will be discussed later in this chapter as we explore in detail the factors that affected the integration of creativity.

### 8.3.3 Maintain Tracking

As part of the assessment procedure the students were made aware that their contribution in the technological tools would be monitored and they would be assessed on their contribution. As part of the pedagogical layer discussed earlier (see Chapter 6) many activities were made with the purpose of referring the students to the technology made available for them in this virtual environment. Being aware that the use of technology would be assessed was believed to encourage the students to participate in using the available technologies. The results in the previous chapter show that the students made much use of Facebook as a tool for synchronous and asynchronous communications and to exchange ideas and discuss issues related to their designs. The students used all the facilities available in Facebook; in contrast, other aspects of the technologies available for the VDS 3 were rarely used. The students were made aware of the website that links to other synchronous and asynchronous tools (messenger and video conferencing) as well as discussion forms and blogs and the students were referred to use these aspects regularly but they decided not to do so. The results shown in chapter seven illustrate that the use of 3D technologies as well as the web page was minimal.

The reason behind this is that Facebook is the trendy fashion in the communication technology at this time so the students were enthusiastic and motivated to explore the new fashion in communication and so used it as part of their learning process.

### 8.3.4 Shared Vision

Establishing a unity of purpose helps teamwork. As the literature revealed[318], shared vision is an essential part of project success and a successful team-working aspect. This project attempted to encourage the students to have a shared vision by emphasising the importance of it and a targeted goal through lectures and examples. In reviewing the students' answers in the focus group about the clarity of the shared vision and the goal they had for their designs, the answers varied. Most of the students disagreed with the fact that they actually knew what they were doing at the beginning; the reason behind this is related to the nature of the workshop as the students were not exposed to all the information straight away to give chance for their own ingenuity to explode, to encourage their creativity. Another reason which is also related to the nature of the workshop is the students having to regroup many times through the workshop to give opportunities for the intersection of ideas which in turn enriches their final design ideas. Yet, towards the end of the workshop the students agreed that the goal was clear for all of the members of the group and they all worked towards it, which in their belief specified their achievement and encouraged it.

### 8.3.5 Culture

As discussed earlier in the literature review, the UAE society belongs to a culture that is considered to be conservative and traditional. The UAE citizen has a respect for the culture and cultural values stemming the importance of the cultural factor. The culture factor in this study consists of many dimensions due to the nature of the UAE society. The first dimension is the students' element as the background of the students played an important role in this studio. Secondly there was the culture in which the University of Sharjah performed in terms of administration and lecturing. Thirdly is the tradition of the UAE as a conservative society. Fourthly, the diversity factor also played an important role and

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[318] Turner, R. Muller, R. (2005). The project manager's leadership style as a success factor on projects: a literature review. *Project Management Journal*. 36(1). p49-61.

the discipline of being part of the cultural aspect and finally the culture of change. All of these aspects will be discussed in detail.

### 8.3.6  Students' Background and Character

The students in the UAE "being a conservative culture" belong to a conservative background themselves.  The students' life style in the UAE is not similar to any in the western world.  As mentioned earlier in the literature review chapter, the UAE society is a dominated one and the freedom is limited to the traditions that are believed to be driven from the Islamic culture, and consequently the parents in the UAE have control over their children.  The students in the UAE, being in their first year of study having just left secondary school, had little control over their studies.  This made the students dependant on the lecturers and limited their initiative.  This factor limited the students' creativity as we will see later in this chapter, but on the other hand it encouraged collaboration among the students.  Being a sociable culture the students in the UAE did not have a problem collaborating with others.

Students in the UAE are not used to the mixed gender culture which was a problem in the face to face communication and the female students avoided collaborating with male students at the beginning.  The students preferred to choose the group to work with. They usually preferred to work with the person setting next to them, which also reflected their affection by the society, as the tradition in the UAE encourages the importance of neighbourhood, and that the priorities always go to the neighbour.  The seating also was planned from the very beginning as the students always sat next to friends and never with a stranger.

At different points of the VDS 3 the students were re-arranged and remixed to encourage idea-exchange and to encourage different kind of collaboration.  The students resisted the remix and showed their unhappiness with it and in the new groups. The male/female collaboration was minimal with girls being very conservative and the boys under-estimating the girls' abilities.  Later the students discovered

the purpose of the remix and after working together in a different atmosphere the students realised the importance of mixing with those who they never worked with before; they appreciated the idea of working as a team.

❖ Work

This section is about the culture of work and how it affected the integration of the project.  This factor is further subdivided into two subsections: the organisation or the senior management and their way of working and the studio culture that is affected by the management. The culture of work is shown according to the effect it has on the VDS workshop and the project integration either directly or indirectly practised. Handy[319] emphasises the importance of any culture at work on the efficiency of the products; he also further stresses that knowing a culture of any organisation helps in understanding the needs for this organisation and the way things work inside this organisation.

This section will highlight the importance of this factor in the integration of the VDS 3 project in the light of the studio itself and the organisation as a whole in which the project was integrated.

### 8.3.7  Organisation

The University of Sharjah as described earlier is a semi-governmental institute which is partially run independently by the Emirates of Sharjah. As the rest of educational institutes in the UAE this university follows the role culture (according to Handy's classification of cultures at the work place) and as the name implies works based on the job to be done rather than on the personalities.  As this culture of work deals in procedures and hierarchy and the person in charge, this in turn affects the integration of the project and limited it to some extent.  Due to a distinct lack of communication and the complication of the procedures the studio could not equip the students with all relevant materials because the finalised list of participants had not been confirmed until

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[319] Handy, C. (2009). Gods of Management,

just an hour beforehand with the formal involvement of the Head of the Department. The studio coordinators expected 50 participants and only 34 arrived on the first day. Therefore all virtual requirements were compromised but improvised at a later date during the studio. Also, due to the nature of the coordinators' role and lack of support from the staff at The University of Sharjah the MSN identification was abandoned by the students and they chose to use the Facebook chat facility as their main method of communication.

Written approvals were also required in case of using any facilities inside the campus.

Collaboration in the above-mentioned culture was limited to collaborative work among the lecturers inside the departments (if existing) so it was even more difficult to pass this skill on to the students. The researcher was aiming at some point to observe some collaboration between the different departments within the university such as the civil engineering, and other non engineering departments but this was not achieved. The nature of the project also required the collaboration with outsiders, but this was a dream which was very difficult to fulfil as expressed by Dr Radoine in an interview:

*"There is no way to make these people collaborate. They think more about competition rather than collaboration."*

As for the creativity, the role culture practiced in the university worked as an important factor in limiting the creative thinking. The nature of this culture has been described by Handy[320] as working on procedures and analysis on logical fashion which in turns limits the inspiration and the impulse thinking. This was an obstacle to the integration of the project as the researcher had to do lots of pursuing at the beginning for the administration and with the full support and enthusiasm of the Head of Department this integration went smoother.

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[320] Handy, C. (2009). *Gods of Management.*: Souvenit Press Ltd.

### 8.3.8 Studio

Inside the studio the researcher and the participating tutors followed a totally different approach as a mixture of cultures was present. The students were introduced to new ways of working and collaboration. Teaching the students in the new way was something of a challenge at first, but as they started to absorb the nature of the work activities went smoother.

### 8.3.9 The Adaptability of Change

The UAE society is a cosmopolitan society where 70% of its citizens come from different parts of the world (see Chapter Two). This cosmopolitanism made the UAE society adaptable of new customs and traditions. In his classifications of power indicators Hofstede[321] introduced a new fifth indicator called long-versus-short term orientation in which he examined the countries according to their adaptability of change. Hofstede[322] examined the eastern countries in accordance with this indicator, and classified the Muslim countries.

Many countries with dominant Muslim traditions are still caught in a definition of Truth that hinders their coping with modernity. Muslim countries that have temporarily collected enormous riches from their oil resources have hardly adapted better to the modern world than those that have remained poor. The oil benefits may have been a liability rather than an asset.

Yet, this classification seems to be very wide and general as classifying Muslim countries in total. Although sharing Islam as a tradition, each Arabic country reserves its own identity derived from within. Many case studies[323],[324],[325] have been conducted in the UAE that show the UAE as a country which is highly adaptable to change and acceptance of foreign cultures. This was also obvious in the current research as the students

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[321] Hofstede G. (2001). op.cit. p 315.
[322] Hofstede G. (2001). op.cit. p325.
[323] Al-Ali, J. (2008). op.cit. p365-379.
[324] Young, B. J. (2005). op.cit 58.
[325] Martin, A. (2003) op.cit. p49-54.

positively adapted the new culture and very soon were emerging themselves with the new methods applied.

### 8.3.10 Diversity

One of the features of collaboration is diversity, where knowledge and experiences are shared and exchanged. The researcher hoped for diversity in discipline but this was not greatly achieved as most of the students come from architecture or civil engineering backgrounds. The researcher hoped for more collaboration among other specialisations including fine arts etc., yet the diversity of civil engineering and architecture backgrounds enriched the students' experiences once they started a proper collaboration. At the start of the workshop the students preferred to work in groups that they created themselves, with the architecture students working separately from the civil engineers. After the remix the students started to see different angles for collaboration where they intersected their ideas and relied on each other's expertise.

Diversity also promoted creativity among the students hence they realised the importance of building on each other's knowledge and dealt with it without limiting their thinking. The students learned how to elaborate others ideas.

### 8.3.11 Projects

This factor consists of other sub-factors. These include all the materials that were used in the workshop that could be referred to as projects. The factors include: the activities used, the people involved, the agenda setting, and the team-forming activity.

The projects played an important role in integrating the VDS 3 workshop and its components.

### 8.3.12 Agenda Setting

Setting the agenda of the scene was an important factor for implementing the VDS 3 framework. The agenda setting included: preparing the materials, preparing the students, and preparing the model itself. Preparing the material consisted of preparing all the written

work for the workshop in addition to preparing all the other needed materials such as the tools, the Internet materials, and the needed games (toys). Preparing the students was to provide them with the skills needed to attempt this workshop in terms of Internet-use as the students were supposed to be able to check their emails and make a sufficient use of the Internet. The students were also supposed to be introduced to the core principles of the workshop by reading the handouts. They were also to know the time through the use of the timetable provided to prevent any delays and hence the students could dedicate all their time for this workshop due to its intensive nature. Unfortunately this was not achieved due to the lack of proper communication discussed above in the traditions section. The students could not be fully dedicated to the workshop which resulted in distraction in their behaviour; also they ended up spending extra time working on the project. To overcome this problem, the students made sufficient use of the technological tools available. This benefited the workshop in terms of virtual and technological utilisation.

### 8.3.13 People

The people involved in this project were the receivers and the contributors. The contributors were the tutors who facilitated this project. The tutors came from different backgrounds (see Chapter Six) which enriched the experience of the workshop and provided the students with different feedbacks and different directions of thinking which in turn facilitated their creative thinking by encouraging them to think freely and encouraged diversity of thinking. The receivers in this case were the students themselves. The students were exposed to many new ways of learning which they were supposed to absorb and accordingly chose the suitable ways for them which would help them build their final products and make successful use of this workshop. The students were supposed to use the tutors as facilitators to help them widen their thinking horizons. The students were also supposed to communicate with the tutors and collaborate in a successful way.

### 8.3.14 Creativity

As shown in Figure 8.1 above there are some factors that are shared between the creativity element and the collaboration element. There are some other factors that are separately affecting each of the two elements. The factors are discussed above; these following sections will discuss the factors affecting the creativity elements separately.

### 8.3.15 Idea Generation

As the students were asked to work individually towards developing their initial ideas was important at the beginning of the studio to gain a variety of ideas and to help the students contribute their ideas to others. It was also important to make the students evaluate the effectiveness of their ideas and develop them according to other ideas in the assigned group. Unfortunately, this could not be achieved at the start of the studio because the students decided to work in random groups from the very beginning. Also the restrictive nature of University of Sharjah did not help the students in acquiring various ideas because they were not allowed to leave the campus. The students nevertheless made good use of the Internet and the surroundings to come up with their ideas. The students depended on their close nature in developing their initial ideas, which was impressive. The students came up with really unique ideas using the creativity techniques they were encouraged to use by the tutors and the ideas of metaphor. The students were then asked to collaborate with other groups having their initial idea in mind and to try to intersect it and collaborate it with others. The students found it difficult at the beginning but with the help of the tutors who showed the students new areas of intersections, they found their ideas convergent.

### 8.3.16 Bandwidth

The concept of bandwidth reflects the students' ideas width and breadth. Collaborating and building on each other's ideas helped the student to increase their ideas variations. The variety of ideas helped the students in achieving better results for their final outcomes than they would have otherwise. The students realised that building on each other's ideas

helped them in having a rich product at the end and they then realised the importance of collaborating ideas which in turn helped in reaching creativity in thinking.

## 8.4 Conclusion

This chapter presents the analysis of the VDS 3 workshop which was conducted at the University of Sharjah. The chapter indicates the students' perception and interaction with the technology provided to them in the VDS environment. The chapter presents the main themes that emerged and the analysis of these themes. The chapter also emphasised the importance of these themes in promoting and facilitating the implementation process. The researcher observed the factors that might hinder the implementation of VDS in UAE design education which helped in modifying and suggesting the final framework.

# Chapter 9: Recommendations

## 9.1 Introduction

This chapter presents a series of recommendations based on the evaluation of the case study.  It also discusses the implication for the major findings that were found upon the completion of the case study. The recommendations result in a framework for implementing the virtual creative collaborative design studio and its effective integration into the conceptual end at the design learning environment in the UAE higher education environment.  Furthermore, suggestions for further developments are presented.

## 9.2 Purpose of the Study

The study's premier goal was to formulate a framework that facilitates the integration of technological tools at the conceptual end in the architectural education design studio, in order to promote skills such as creativity and collaboration among the students within the cultural distinctive society of the UAE.  The UAE has a grand vision for excellence emphasised repeatedly by the UAE's leaders.  It is a vision that is represented in many aspects of its developmental process.  In the educational field, there has been a great deal of investment within academia to raise educational practice to the advanced level of the highly skilled graduate.  The researcher sought to contribute significantly to the ideas of technological utilisation and integration within the teaching and learning environment, with the aim of nourishing creative and skilled Emirati graduates.  The research aims to establish a framework for utilising technology in an architecture design studio, whilst considering the best practice of the use of VDS in architectural education.  Many factors were considered and have been developed for the initiation of the framework, including integration policy.  This study considered the UAE's cultural distinctiveness as well as the work culture in which the UAE higher educational organisations operate with respect

to the role of technology in the curriculum and the nature of technological integration into the learning environment. This work also intended to contribute to the literature of technology utilisation and integration in the UAE to promote creativity and collaboration skills. It also sought to develop a framework model for the design studio at the conceptual end of the design process in architecture education.

## 9.3 Discussion of Major Findings

UAE's vision for 2021 has been stated in chapter 1 and 2 which reveals the countries need for studies and research in the area of technology and its use in architecture education and the need for promoting creative skills among UAE nationals. These chapters attempted to attend to the first stage of the research which is referred to as the needs analysis stage. The needs analysis established an understanding of the rationale underlying the purpose of this study. Following these statements, the first framework was then initiated. The research then followed its cyclical nature in the sense of developing a framework that upheld the needs of the UAE society in terms of its distinctive cultural identity and skill developmental requirements.

The research then considered the socio-cultural factors as they emerged as a vital factor for VDS implementation. The analysis of VDS 3 in the previous chapter indicated the need for consideration of the socio-cultural factors within the policy of the integration process of VDS into the UAE's curriculum.

This current chapter presents the resulting framework and a series of recommendations responding to the research question for this study. The research question of this study as stated in chapter one is "What would form the best framework that consists of the most advanced technologies that can promote skills required for the future, and what are the critical issues involved in the effective implementation of such framework in architectural design education into a culturally distinctive society (the UAE). The following sections present a summary for the findings and the implications of the research.

The summary of the findings of the workshop were presented in the previous chapter. As stated in chapter 8 there were factors affected student performance in the VDS 3 environment, these factors were mainly based on the students' previous background and learning habits. The following section will present a summary of the most influential key factors within the findings, the factors which had the highest impact on the recommendations are presented later in this chapter. The four axes selected by the researcher to base the findings on are: Students; Senior Management; Network and Instructors. The researcher believes that addressing these factors is influential when considering technology integration.
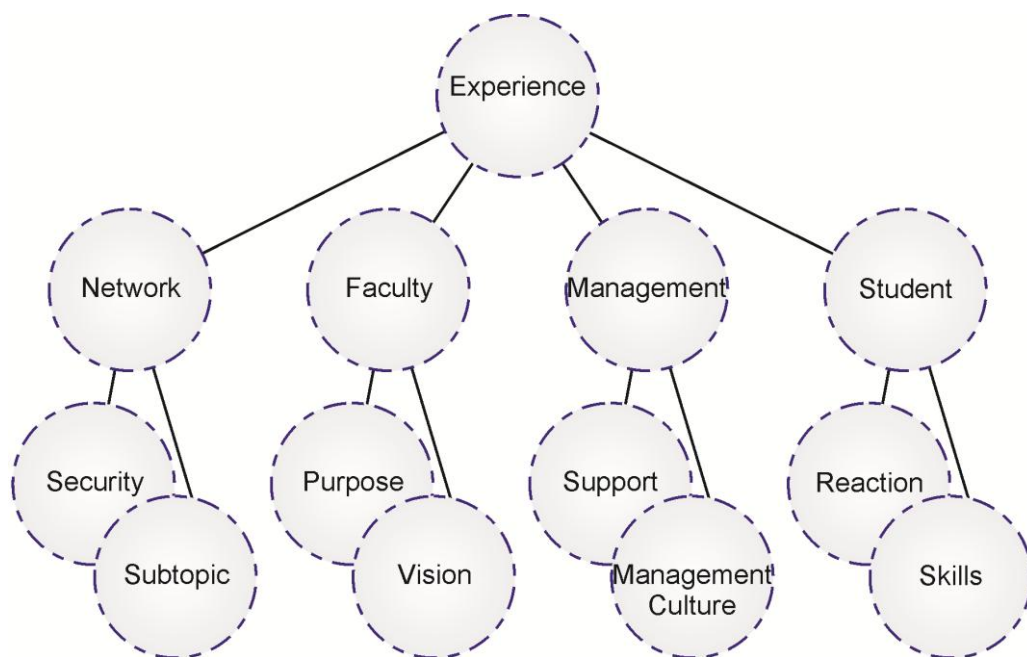


**Figure 9.1: Findings Facets**

## 9.3.1 Students

As evidenced in chapter seven, the final version of the VDS (named VDS 3), received extensive interest from the faculty and the students of the University of Sharjah. This is due to its unique nature and the innovative deployment of high technological tools in the architectural design education. Positive feedback was received from the faculty staff and students with the consistent and current use of a number of tools by collaborators (for example the use of social networking sites in

communicating creative ideas between students, faculty staff and researchers).  One major issue of concern regarding students' performance was the lack of required technological experience in effective use of the tools for the environment.  This required a large amount of tutorial studio time and resulted in a specific 'underutilisation' for a number of these technological tools by some of the less 'technologically-minded' students.

It was also evident that the teaching practice inside the studio followed a pattern that was totally new for the student, namely a 'student-centred environment'.  This environment is not traditional within the UAE's academic institutions.  However, the students generally showed a great interest in the way the studio was directed and were capable of controlling their own learning with minimal direction

### 9.3.2  Senior Management

The senior management of The University of Sharjah reflects the management style in society which could be described as, according to Charles Handy[326], affected by the "Apollonian" or role culture.  This culture, as described earlier in Chapter 3 manifests itself in a hierarchical style.  The management in this culture is the hegemonic force within the entire organisation. For this case study the managerial level presented difficulties in collaboration and this resulted in the lack of support in the domains of integrative technology and maintenance of the VDS.  This is a good example of the organisational resistance to being studied, referred to by Bryman.[327]  The enthusiasm of the Head of Department in the University of Sharjah and philosophical support of this project facilitated the informal experiment of the VDS and this later proved the project's success.  The interview with the Head of the School revealed the underlying issues he was faced with during the integrative process.

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[326] Handy, C. (2009). op.cit. p102
[327] Bryman, A. (1989), 'Research methods and organisation studies'. In *Bulmer, M. Contemporary social research series*. London: Unwin Hyman. p25

### 9.3.3 Networking Facilities

The open nature of the studio in terms of the accessibility of online learning materials raised an issue about the security and confidentiality of online material availability. The use of the online social networking site Facebook resulted in students' accounts being exposed to unauthorised users. Nevertheless, the network in The University of Sharjah showed a great deal of reliability and stability which assisted the use of video and audio facilities. The focus group and the interviews provided evidence that a number of system enhancements and modifications were required to more effectively support the learning outcomes and to programme the evaluation progress. It was evidential that links to other universities and online reports were required for the multi-disciplinary nature of the VDS. A need for a maximum utilisation of the available network facilities was also evidenced, as the observation depicted an underutilisation of available resources, such as blackboard, made available for the students and the faculty by the university.

### 9.3.4 Instructors

Despite the nature of the work ethic practised in the university and the importance of the hierarchy in terms of making decisions in academic circles within the UAE, the faculty members (instructors) practice freedom in the tools they use in their teaching. However, the importance of having a vision of standardised technology deployment is essential in that it creates a shared standard and gives equal opportunities to all students following design courses, regardless of the instructors' positive or negative attitude toward the technology. The importance of instructor training initiatives (in the technological aspects) is also highlighted as a point of difficulty, as the underutilisation of technology is directly linked with the instructor's ability. The availability of a support network is also crucial as this will enable the instructors to approach the technology without fear or lack of knowledge. The Interviews conducted on the stage 3 (evaluation stage) of phase 3 with the lecturers in the University of Sharjah revealed that Instructors'

training in the use of these technological tools proved to be an important factor in the utilisation of these initiatives.

The interview also revealed only a minor increase in skill of the instructors utilising the technology since their individual membership of the University of Sharjah.  The researcher believes this is explained by the lack of a shared vision of the relevance of technology within teaching practice as well as the lack of clear vision and communication by senior management.

## 9.4   Recommendation

The recommendations suggested here are built on the findings and the implications associated with the ideas previously presented in this chapter namely the need of full collaboration between students, senior management, networking facilities and instructors. The implications indicate recommendations made specifically for higher education in the UAE in the sense of it being culturally distinctive society.   This framework, however, can also be applied to other educational institutes in the Middle East and also other countries in the West and beyond that share a common belief of integrating technology with design education. Based on the axes mentioned above the researcher formulated a proposal for a VCCS (Virtual Creative and Collaborative Studio) to address the important factors for a virtual design studio.  Framework will be explored in detail later.  The VCCS is a response to the research question resulting from the researcher's investigations.  This framework is intended to provide educational institutes with criteria for utilising technology in design education as well as integration policy for smoother deployment of these new educational facilities for management.
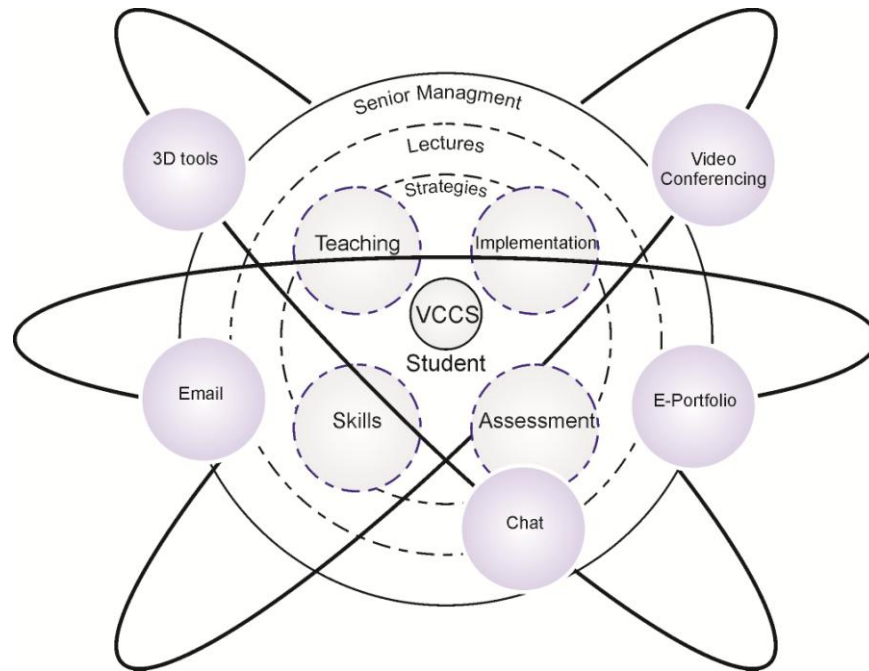
**Figure 9.2 VCCS Framework**

The research and the literature clearly indicate that smooth integration and acceptance of the framework achieves the most effective results through the utilisation of technology. While educational practice in the UAE needs to make better use of technologies in design education, especially those which promote high skills necessary for society developments, this framework examined the principles of the smooth integration of a framework that consists of high technological skills.

It is also important to record achievements by the academic staff in terms of their professional development as well as their utilisation of technology and the introduction of and archival database in the form of portfolios. This has been proved successful in other situations and was henceforth added to this framework [328]

## 9.5 Framework

The proposed framework will have the VCCS of the Virtual Creative Collaborative Studio as its core. The elements of the VCCS consist of four dimensions, respectively the skills; the strategies; which in turn make the teaching strategy; the implementation strategy and the

assessment. These elements wrapped up by technology are sufficient in delivering a useful framework that addresses socio-cultural factors for easier and successful integration.

### 9.5.1 Recommendation 1: Integration Policy and Support Services

#### *9.5.1.1 Support*

In his book 'Gods of Managements', Charles Handy[329] classified four types of management styles that he represented by Greek Athenian ancient gods named respectively: 'Apollo; Zeus; Athena; and Dionysus'. In his classification Handy described how each culture of work practice preferred to operate and the specific management style of each culture. The following figure shows the different cultures
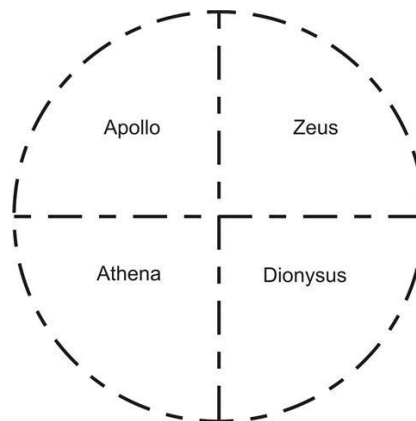


**Figure 9.3: Gods of Management according to Charles Handy**

On the other hand, Geert Hofstede[330] classified the cultures by dominating factors when he created his indicators of power. These domination factors measure to what extent each culture is dominated by the factors he proposed. The four major factors according to Hofstede are: power, uncertainty, masculinity, and individualism. According to Handy's classification of power of managements, Hofstede's indicators could be represented in relation to Handy's gods of management as shown in Figure 9.4.

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328 Young, B. (2005).op.cit. p294.
329 Handy, C. (2009). op.cit. p12.
330 Hofstede G. (2001). op.cit. p28.
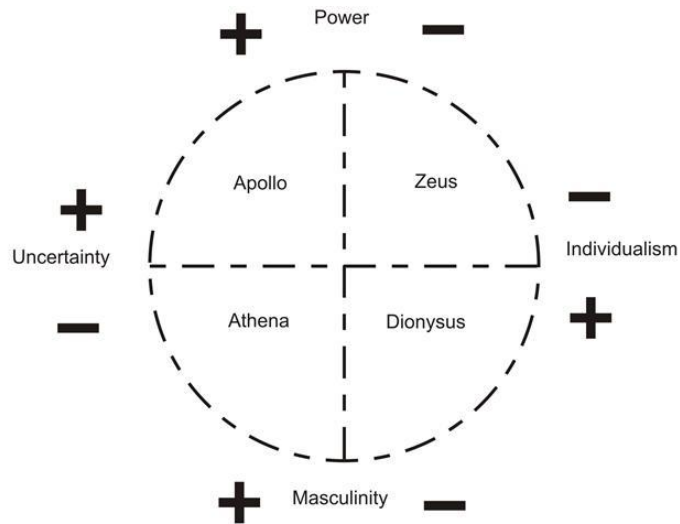
**Figure 9.4: Hofstede classifications of cultures compared to Handy's culture of management model**

According to Hofstede's classification of Muslim countries that they score very high as far as power is concerned, the UAE is no exception. As we have seen earlier in this thesis (Chapter Two), the country's political status is more of Sheikhdom style where the power is located in the hands of the president of the country. It was also evidenced in chapter two that the Bedouin nature of the UAE society means that there is a tendency to work in collectivism rather than individualism. This was was also clear in the workshop among the students. According to Hofstede the collectivism society is more prone to obey the person in power rather than work independently, which is also relevant to Handy's Zeus culture where working together is considered the core for the Zeus person. The UAE also scores highly in the uncertainty indicator which shows the culture is more prone to be obedient to the system seeking for more security that the system can provide and making the people more dependent on the government. Also the Bedouin nature of the UAE society caused it to score highly in the masculinity power index being a male-dominated country. All of these factors make the UAE in terms of Handy's culture of management to be classified as Apollonian. The Apollonian culture as discussed in Chapter two works in a hierarchical nature with the orders always coming from the higher echelons of power. Because the organisations of the society are always

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a reflection of that society; the organisations' working culture could be classified as Apollonian in Handy's terms too.  Universities, by the nature of their professional activities, are always seen to follow the Athenian to Dionysus cultures or the task culture; yet in the universities of the UAE the Apollonian culture seems to be the dominant model as evidenced by interviews.  Integrating new technologies proved to be a complex task and integration policies should take into consideration the culture in which the technology is to be used.  As the UAE society is Apollonian dominated; integrating technology should be top to bottom approach.  That is the integration should be descending from top or senior management.  Implementation models that have proved success in the past should be considered.

In the case of the VDS, as it proved its usefulness and its success in the first workshop and the repeated demand from the university to hold another one and the attention it arose in the media prove the importance of such systems in the UAE. In addition, the VDS met the visions of the UAE that were highlighted by the leaders in the country and it works in parallel with the requirements the government has placed for its graduates.

The VDS experience in the University of Sharjah revealed the lack of technical support due to the management style in perception of the workshop.

### 9.5.1.2    The Need for a Champion

The VDS 3 case study analysis (Chapter 8) revealed the importance of having a champion; or a person who believes in the effectiveness and usefulness of the use of technology in order to facilitate technology integration.  In the VDS 3 case study Dr. Radoine's enthusiasm towards the VDS and his informal support after talking to the researcher helped to smooth the integration process.  This indicates the importance of having a champion who believes in the technology and facilitates its use among the staff.  To achieve this, a sponsor or a champion should be contacted before hands.  The sponsor could do more than offer moral

support by providing financial support or sponsorship. Having people involved from outside the university especially who work in a related field of design or construction also enriches the experience of the student and give support to the whole environment.

### 9.5.2 Recommendation 2: Change of Management Style Culture

As indicated previously the UAE work culture is mainly dominated by the Apollonian (role) culture, the current globalised world requires variation in the style or culture of work. For the UAE society to be able to cope with global issues it is a necessity to mix and match all the management cultures and styles. Attending to complex tasks requires adopting different cultures such as task cultures or professional cultures. These cultures are more suitable for promoting creativity and innovation rather than concentrating on doing a routine job. The proposed VDS framework aims at utilising technology to promote new skills that are needed for development and for future market demands. The fast development in the UAE requires reconsideration of the way work is performed. The UAE government has a plan for excellence in performance. The culture of management should be modified to accommodate this plan. Adopting a mix of management styles will help in achieving better working culture which will result in better performance. This in turn will meet the mission of the UAE for better future and better work place. The VCCS framework considers the introduction of new philosophy in the working environment by introducing collaboration and creativity skills. Thus, as this framework facilitates technology to promote collaboration among the learners which will in turn affect their future career. The use of virtual tools and communication tools inside the learning environment facilitates communication between staff. It also makes it easier to reach higher levels of achievement. Studies revealed that due to the advances in technology and virtual communication the world has became flat in the sense that business can be carried out from any location. This in turn has affected the way people communicate and carry out business as the role culture is no longer dominant. Handy suggested a mix of

management cultures in order to suit the existing globalised economy. Using collaboration in the VDS model and a shared vision among the working group suggests a new way of working as a team culture is promoted.

### 9.5.3 Recommendation 3: Professional Development Approach

In line with the UAE's mission towards technology use and the availability of a strong infrastructure for technology integration which the educational institutes are aware of and which has been stated repeatedly by H.E. Sheikh Nahyan (the Minister of Higher Education). The faculty lecturers' attitude towards the VDS is a crucial factor in its success as evidenced by the focus group and the interviews. Research supports the view that the effective integration of technology in education is directly related to the intrinsic motivation of the teaching staff. This highlights the importance of skills development among staff and professional development in technological skills. It is crucial for the staff and the management to have a shared vision in terms of technology's role in education and its integration, and the help and technical support available for staff. The universities should provide on-going professional development courses and make its goals regarding technology and its use in education a visible statement. The university would benefit from deploying some techniques to motivate lecturers to undertake professional development courses. It will also benefit from motivating the lecturers to deploy technology in their teaching practice.

The lecturers' awareness of the university's adoption of a vision for technology could help them align their attitude towards technology use.

#### 9.5.3.1 Faculty Professional Development

As the UAE's vision for technology adaptation is growing the need of an equivalent response from the faculty at the universities is critical. Literature[331] also revealed important factors that support the faculty's

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[331] Bennet, J., Bennet, L. (2002). 'A review of factors that influence the diffusion of innovation when structuring a faculty training program'. *The Internet and Higher Education*. Elsevier Sciences. 6(1). p53-63.

positive attitude toward technology integration in the learning environment; one of these factors is motivation. As the students will be encouraged to create their e-portfolios, the lecturers also should do the same and create their e-portfolios. The e-portfolio will be used for the purposed of showcasing the faculty's knowledge and will be a motivating factor for them in their professional development process as they can show their acquisition of knowledge through time. The university could use this to set up an online award for best development which in turn will motivate the staff.

### 9.5.3.2    *Climate for Experimenting*

One of the most crucial factors in fearing technology is the failure in its proper use. As the interviews indicated, some faculties refrain from using available technologies because they are not sure of its success if used. Providing a suitable climate for experimentation without fear is one of the most important factors in promoting creativity and the UAE as a country took the lead in applying this approach in its tactic in the development. The universities should be no different and the staff and the students should be allowed the chance to experiment in the use of technology with the availability of proper technical support.

### 9.5.4   Recommendation 4: VDS Enhancement and Mobile Learning

As the students in VDS 3 benefited from the use of Facebook as a collaborative social network which raised an issue of security in learning materials published online in addition to students' work that is also made available online as a mean of exchange of information with team members or as a showcase of their work. These issues need attention in future versions as far as copyright issues and ethical issues are concerned.

The use of Facebook accounts and the encouragement of students to create their own educational profile could reap benefit by making a long-term functionality policy for the students' use of their portfolios for future use.

### 9.5.4.1    *Linkage with Other University*

The first VDS was meant for multidisciplinary as well as multi-university purposes. The aims were difficult to achieve due to the work culture practised in the UAE and the way universities compete with each other. While working in groups was resisted at first, it then was realised by the students how beneficial it was for them to work with people from different backgrounds and genders. The multi-universities approach will benefit the universities as well as the students in the UAE to work with people from different universities using virtual tools.

### 9.5.4.2    *Mobile Learning*

The wide availability of mobile phones and especially Blackberries among UAE students encouraged the introduction of using mobile phones in the VDS environment. The use of mobile phones was limited to exchanging text messages and voice calls while it could be expanded to include assessments and digital storytelling for assignments and discussions; it also facilitated discussions and chatting while on the go.

### 9.5.5   Recommendation 5: Enhancement for VCCS

Yamashita[332] in his book titled "Unstuck" identifies ways of getting unstuck as a leader. Yamashita identifies dimensions for consideration to getting unstuck. These dimensions are represented below.
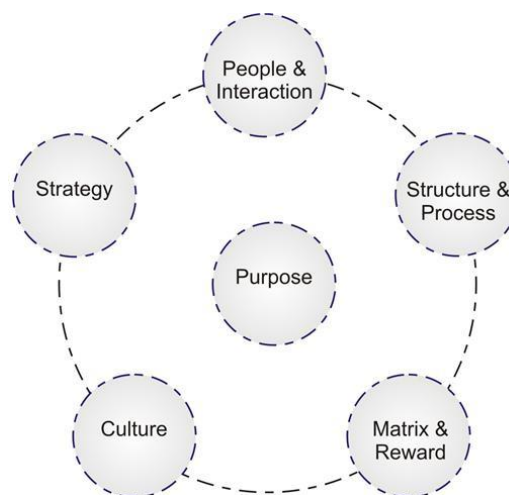


**Figure 9.5: Getting Unstuck according to Yamashita**

To better accommodate the above recommendations, the following enhancements to the VDS Framework is suggested which in turn results in the development of the final VCCS (Virtual Collaborative Creative Design Studio). The development suggested above was aligned with Yamashita suggestions.

The aim of the VCCS Framework is to accommodate the recommendations mentioned above to enhance the experience of the virtual environment for future deployment and to better enhance learning environments. A new dimension had to be added to the VCCS model that represents the implementation process and its foundations. The following figure shows these dimensions.
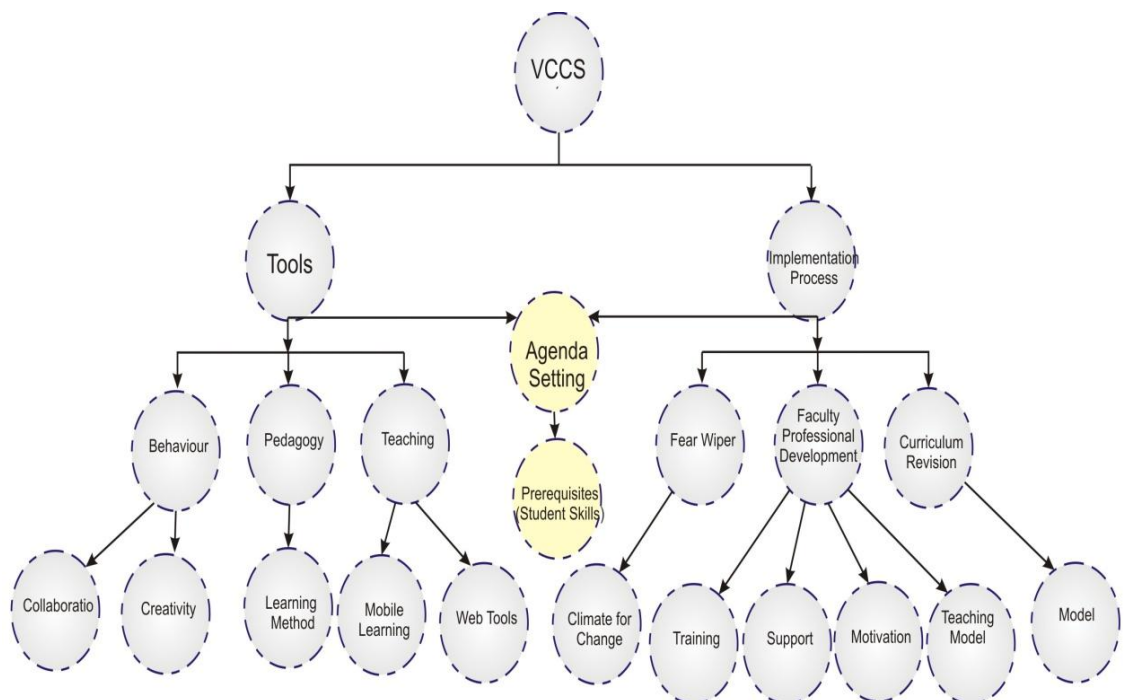


**Figure 9.6: VCCS Dimensions**

As evidenced in the interviews, the support of management is a crucial factor in the success of technology use and its integration in the educational environment. The above figure highlights the foundations for implementing a procedure that can benefit the use and integration of the VDS framework in higher education in a distinctive culture like the UAE. The factors that are believed to be vital are described below.

332 Yamashita, K., Spataro, S. (2007). Unstuck: a tool for yourself, your team and your world. 2nd ed.

### 9.5.5.1    Setting the Agenda

As the use of technology requires some skills and knowledge about certain software, hence the VDS framework requires some knowledge in the use of some sophisticated computer software. It is therefore necessary to spend some hours trying to set up the scene and prepare the student for the new way of learning. The students will also be required to prepare some materials that will help them in their self-learning. These materials include e-portfolio, e-learning diary, e-to do list and e-progress monitor sheets. Using the available online tools for the course (Google accounts) the students will make available their course materials for different purposes.  The use of e-portfolio will help the students know more about each other in terms of personality and skills which will make it easier for them later to work together and collaborate. It will also help in assessing the students' progress through the course. The use of the organisational material will help the students' plan and share their tasks among the groups. The students will also be asked to create a web page using Google's free site creation tools. The WebPages will be later linked to the main VDS 3 web page.

### 9.5.5.2    Curriculum Revision

For the VCCS to be effective and useful the design curriculum has to be revisited to integrate the VCCS model in it and make the tools available in VCCS useful and relevant to the aims and objectives for the course it is representing.  Models are made available for the lecturers will make it easier for them to learn, adapt, and then use for the benefit of their students.

As for the VDS tools new dimensions were added as follow:

❖ Assessment

The availability of e-to do list, and e-progress monitoring sheets, as well as the e-learning diary will assist the teacher in assessing the students' progress as well as their contribution towards the tasks allocated to

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Penguin Group USA. P54.

them. The e-learning diary will also help the students in reflecting on their knowledge which is a very important part in the learning cycle.

❖ Web Alerts and Rich Site Summary Service (RSS)

Google Alert will aid the students by alerting them when new information is added online on a subject of their choice and RSS will assist the students and the teachers when blogs are used, as it will also alert the users of a new blog entry.

❖ Mobile Phone

The widespread use of mobile phones and especially Blackberries could be made useful by introducing mobile assessment where the students could undertake their essay assessment on the move as has proven successful in undertaking a storytelling type of assessment.[333]  It also could be made useful by exchanging all forms of information with the students. The students could set up the applications associated with their Blackberries to receive alerts of any update that occurs on the course material.

## 9.6 Future Research

There are some areas in which further research could be recommended:

Security

As this research utilise web tools as means for communication an important issue of security emerge. Further research in protecting students' information on the internet as well as other educational materials provided for them online is recommended.

Assessment

Assessing online learning is an important issue for e-learning.  It is also becoming more complicated when collaboration and creativity is combined with e-learning.  In a collaborative work it becomes a complex

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[333] Fryer, W. A., (2007). 'Integrating technology in the classroom: mobile digital storytelling', *The Journal of the Texas Computer Education Association*.

and challenging task to assess the students' participation in a certain project. This work suggested some tools that have proven efficiency in assessing collaborative work for educational purposes. Yet, due to the nature of this work and the time constraint factor this issue was not thoroughly investigated. Further research in this issue will be significant as collaborative learning is becoming more popular.

Mobile Learning

As this research project was reaching the final stages, mobile learning was observed to be a useful tool that could be utilised in learning. More investigation in the use of mobile learning and implementation strategies for such technology in education in the UAE will be an important and useful subject.

Multi-discipline and Multi-universities VCCS

This researcher aimed for a multi-discipline collaborative work for the final stage of this research project, yet this could not be achieved because of the culture of work adopted in the UAE universities – more details about this could be found in chapter eight. Thus further research in this subject is important. The same is applicable for multi-university projects. A VCCS that could link different discipline form different universities could enhance collaboration and promote creativity among students.

Opportunities for other disciplines

This work aimed formulating a framework for implementing technology in architecture education in the UAE. This work was done targeting architecture education but it is not exclusively for architecture education. Other disciplines could benefit from this study for the purpose of integrating technology in education. The work addressed the soci-cultural factor in the UAE which make it beneficial for other disciplines to consider and build on.

**Conclusion**

Future Architects

This work emphasises the need for academic revisions of architectural design education to develop an academic program which should be technology orientated. Technology should be used to assist and provoke the students' creativity and assist collaboration. The students should be made aware of technological advances and how to make proper utilisation of these advances for better innovation in design. This work proposed a framework for the implementation of VCCS at the conceptual end of the design process. The researcher believes that conducting such implementation is important for educating the students and help them to understand the meaning and value of designing at the conceptual end. This should enable the student to design culturally appropriate buildings. To enable the students to design culturally related buildings; there is a need for a new approach to the design of the built environment which necessitates the revision of architectural programmes curricula and their implementation and use of available technologies.

It is recommended that architectural educators balance the way in which students view relationships with the physical and social world.. Teaching the students skills to be creative and innovative requires opening their horizons to many aspects and elements including the social world in which they live and their surrounding nature, to enable them to design with relation to the nature and not opposing it. It is therefore important to utilise technology for achieving this goal. Proper technology integration in the curriculum is a requirement. It is important to make sure that the technology is utilised rather than dominating. Improper integration can lead to dominance by technology which results into disruption in learning.

This work suggested a framework for integrating technology in design education. The framework utilises technology for promoting competent

skills such as creativity and collaboration among student. These skills are a requirement for the students to be the designers of the future.

As this work is directed to the UAE, consideration of socio-cultural factors was a must. The UAE is a society with conservative traditions. For any innovative approaches to be considered the socio-cultural factors should be taken into account. The framework also utilised technology to overcome some of the restrictions implied by the society to enable the student aware of their surroundings with the help of technology.

This study resulted in recommendations that are very useful to be taken into account when implementing new technology in education is concerned.

# Appendices

# Contents

# Appendix A

## a. The University of Sharjah Field work

*Interview with Dr. Hassan Radoine Transcript*

Q1.  Do you think the aspect of the virtual collaborative studio was fulfilled in this workshop?

Absolutely, the student were very virtual, the collaboration aspect was very strong and was obviously present. If they were not virtual they will not think of redesigning sharjah in 3 days the way they worked and the utilisation of technology helped the student overcome many problems that might prevent the production of films in this short time.  As an outsider I think  you were successful in meeting the virtual elements and in widening the scope and the horizons of the student imagination.  The use of the virtual tour was also helpful in that matter as the student had an imagination of sharjah and for places they would never visit or it would have been very time consuming and efforts as well to do a field visit.  The student's horizon was widened and they were sent to fly and then come back to a connecting dot so you objective was attended and obtained.

In terms of what you said about creativity in the Middle East, do you think that this workshop contributed in promoting it taking in consideration the student's final products?

When I said about Middle East I was trying to put in context your model of VDS in the Middle East setting and specially the UAE.  The problematic area is the architectural education and the elements are creativity, collaboration and virtuality and the objective is to know the capacity of Middle East minds/ intellectuality and how they perceived themselves.  To cope with difficult situations and how they perceive their own self.  Understanding their own issue (the case of sharjah) through creative engine to make student of sharjah realise their own problems which might not seem obvious for a citizen who is living in this city and for the student to realise and address this issue was a great success of the studio and a way of new thinking.  The strategic issues of the city in its urban planning level was reduced to the architectural level and addressed inside the vds studio was beautiful.  They were dealing with the urban planning and they think they can do it (make them believe in

their own abilities with the help of computers). The title also captured this and was very important in opening the student' horizons and highlight the problems of the citizen's of sharjah. The education system in the middle east is fairly new (less than 3 decades) so there is a need for new ways of thinking and new skills and critical thinking. Critique is very important because in this part of the world to critique something is looked at as not being very polite but it is very important aspect and it stimulates creativity. Creativity is crossing the boundaries, it might not be real but this is needed in the middle east as people are not creative, looking at their villas design can reflect their traditional thinking and the lack of creativity as these villas built with new and modern materials but yet conserve the old fashion styles like arches because people can't get out of the box and be creative and brave in their creativity.

In terms of time constraint as the student and the staff had their own pressing commitments, how do you see ways of improvements in the future?

I don't look at it as improvement the way you hit it and the way you tackled the issue is not a usual way of teaching many new ideas were involved it is all new for the formal school. Your purpose is not structured if you try to structure it you will lose the sense of it...in this short time you fly the student and make them land again.........interrupted by but did you have a look at the curriculum that we prepared for this workshop? Will you call that structuring?

Yes I understand what you mean, you need a connecting thread for the student you need to provide you inputs and directions the films we saw is 20% of what was filmed how could you capture in 3 mins what you did in a week that was the talent and to say your message in these 3 mins.

Q3. The main purpose of this research is to provide a model for design studio in the middle east so we are talking about a curriculum that we can put together do you think that was met?

In 2 ways include it as a way of thinking, state of the mind and teach it to the faculty member, it is a unique thing and it has your characteristics so do make it as a model you have to make instructors leant the engine may be you can make a kit to apply it in schools to stimulate creativity and teach it to the faculty members to learn the engines. Suggested a kit to apply in schools, elements to catelogise creativity engine in different specialities and disciplines. Doing this you will target wider population not only architecture.

Q4.  We were hoping that this is going to be a multidiscipline and across universities, why do u think this did not work?

No way to mix them these people have their own culture and as I said before you need to change their culture to make this happen, there is a lot of competition happening....he said things that he want to consider confidential.

But in my opinion you need homogenous groups to start with as it will be impossible to do it with multidisciplinary groups. Involvement of other disciplines would have prevented you from doing your research ...... again he said things he wanted to consider confidential.

*Interview with Ms. Randah Taher*

Q1. Do you think the aspect of virtuality (use of computers) was fulfilled in this workshop?

It was used and very helpful. The effects showed more after the workshop as the groups kept in touch with each other (some of them). Perhaps it would have been much more helpful if the virutality was across countries and the connection was between students at UoS and at Glamorgan university. That would have been much more interesting and fulfilling. Also, since most students came from the same department, they were completing their work meeting in the main halls and classes, and not necessarily online. So it did not fulfil the "virtuality" concept in this sense (the process) but only in the final product.

Q2. Do you think that this workshop contributed in promoting Creativity taking in consideration the student's final products?

It did promote creativity with the different approaches/tools offered. But did the students use those tools in finishing up their final products? Other than the film production (which was a great addition) did they use the concept of writing (or free-flow writing) or producing lots of ideas before choosing one? Again, I don't know.

Q3. In terms of time constraint as the student and the staff had their own pressing commitments, how do you see ways of improvements in the future?

The timing was a big issue not only of the duties of the workshop within one week but also the timing of it (during exams). If students knew about it at the beginning of the semester then some work might have been done prior. For example, the instructors from Glamorgan could have produced a short video to show the participants before they come here and ask them to do some work (using in-house facilitation). They could also start connecting the groups and following their progress, watching the virtual tour, etc.

That way no stress in time would be as big. Also, finishing up their project in a short time added to the stress level of not only the students but also their instructors from other classes who complained about students missing class and/or not coming prepared with their assignments. Should it have covered 2 weekends instead might have been a better story, but again, each time option has its pros/cons.

Also, being strict with time, outreach to other universities was very limited and no students came from outside the department.

Q3. The main purpose of this research is to provide a model for design studio in the middle east so we are talking about a curriculum that we can put together do you think that was met?

My understanding of Virtual Design Studio is that it connects with people who can't be together in the same room. If the workshop did that then it would have been a great success story. However, the biggest success I saw was the collaborative design as the process was great and the final product even better considering the time and skills the students had. I would suggest to name this workshop collaborative design studio (using technology) and not limit it to virtual (or only facebook , which many students refused to open accounts for valid reasons).

Q4. We were hoping that this is going to be a multidiscipline and across universities, why do you think this did not work?

Timing issue. We barely had time to finish the logistics of our department before advertising in other colleges and universities. Also, if the departments were involved from the start in this workshop more students from outside would have attended.

Q5. Suggest ideas for improvements ☺

It was a great experience and something definitely to build on. Thank you for putting this together. Please consider sharing your preparations for the workshop with your facilitators and coordinators prior to attending, that way they can add value to your program and suggest things that they think is useful to the students (I,e more time doing a certain activity or arranging for material to help with the process).

Nov. 21, 2009

### b. Focus Group phase 3

After the completion of the VDS workshop the researcher conducted a focus group survey with a number of students who attended the workshop to get an in-depth insight of their view of the workshop and its importance in introducing new ways of thinking and new ways of learning using technology. The group was selected randomly by emailing the student on facebook and ask them to meet with the researcher in the university at 4 o'clock one evening after they finished their study commitments. Some of the student turned up. The researcher was looking for at least 15 students only 10 turned up. The researcher has previously prepared some questions but intended only to direct the conversation rather than limiting the answers. The researcher did the task of inquiry and facilitated the presence of the research assistant who transcripted the whole conversation. The student were asked about their feedback on the workshop which they have indicated that it was the first time for them to encounter such a workshop carrying all of these ideas and new methods of teaching and the introduction of games and activities in the classroom. The student also indicated the importance of introducing technologies such as facebook and indicated that they start using it not only for this workshop but for their entire university study for now as they believed in its potentiality in saving time and communicating freely especially when issues such as gender is concerned. The student also indicated that the workshop make them realise their hidden potentials that they never knew of its existence. Some of the student pointed out the importance of working in groups as many ideas was generated, other asserted that they resented splitting up and joining other groups at the beginning but soon later they realised the importance of mixing with people from different backgrounds. The student also recommended the use of facebook in terms of easing the communication with the other gender especially in anonymous basis as when they met face to face it was easier to communicate after they have been talking online. The students were grateful to the use of icebreaker activities and thought it was a good activity in preparing them for the workshop. They also were appreciative to the use of activities such as the role playing saying that it made them learn by playing and by doing. The students up to this point were not opening and were not talking about the things that they did not like in the workshop or their feedback for improvements. The researcher tried to encourage the student to speak and express their feelings freely after few trials the student opened up. The student then said that because the whole idea was new for them and the title re-design sharjah freaked them out as of the time

allocated for this workshop will not be enough to do the job required. The main purpose for the use of title was to make the student think freely and creatively, the student were made aware of this fact through the workshop. The student also complained about the ambiguity of the workshop and they said that they were confused as they didn't know what is going to happen next. Although the student were assured many times of what is happening but because the whole idea and method is something that is they are not used to they felt the ambiguity. The student also complained about the lack of time and support of tutors to do the workbook activities in class (which is not meant to be) and that was the main reason that they did not do it and that reflect the nature of the way they were brought up and taught in the past which is basically a spoon feeding style where the teacher always tell them what to do and that was also obvious through their behaviour in the workshop. The student also complained about the lack of time and the short time of the workshop which did not allow them to do the films as they were supposed to. I see that the time was sufficient for the job required and the end results for the student was surprisingly amazing although that they did not notice it due to the lack of self confidence that they built up during their childhood and their educational background.

Focus group transcript

Amal says hello and thanks for coming, the purpose of this discussion is to get your in-depth views and recommendations for better VDS workshops in the future. The answers will be used for my PhD research, please tell me your honest view as this is going to help me develop better understanding for future models. So in terms of teaching how would you describe the teaching of the lectures?

Student: it was really nice and unique we enjoyed the unusual activities and the way we got introduced to each other, we wish it could happen for all our lectures.

Student2: we are really appreciative for it and we thank you very much.

Student3: you did it very funny and amazing teaching tools.

Student 4: I had some confusion in the beginning which made my understanding slower.

Where the lectures relevant for your project do you think?

Student: yes it was, it gave us deep understanding of the project and examples of what we can do in it.

It was in a simple language and the use of multi-ways of presentation make the ideas more easy to be understood e.g. use of stories, videos, discussions, game ...etc)

Forcing us to work and interact with others was very difficult at the beginning but later we feel the advantage of interacting with everybody even if we don't prefer to.

Student2: we wondered how easy it was to collaborate with others.

Do you think that VDS taught you something new in your personal learning?

Student: Yes definitely, we learned new techniques like thinking outside the box and try new approaches to problems and relate strange things to each other to come up with new things. Use the imagination in a better way and learn to respect one self.

Student2:

The studio improved my skills in team working and leadership.

Student4: i worked very hard to encourage other members to work and keep our group ahead of others.

How successful was it to work in groups?

Very successful we learnt to deal with many people. Sometimes it is easy to deal with and sometimes it is difficult.

Student4: some members were taking it seriously and others not but all over it was very good working in groups.

Student4: although i didn't like the regrouping at all in the beginning but later i discovered how useful it was to me.

How would you rate the effectiveness of the use of technology in the studio?

Student: Was good we learnt new things but I hope to have learned more.

Student2: especially facebook the technological application was very useful

Did the exercise helped you during the studio?

Student4: Yes indeed i discovered some hidden places in my brain and helped me to think in a different way.

Other suggestions?

Student1: The workshop will be more efficient if it takes a longer (other students agree) time because the movement from phase to phase during 1 session is not always an easy job, also when the time is limited and one miss one session they will miss the whole thing because many things happen in one day and it would be better to prepare the part of the workbook before every session like print it and distribute it on daily basis to the participant at the beginning of the day this way one will write everything and get the juice of the exercise.

Student2: to do it more and more and apply it in the university classes and studies

And to have more adverts

Contact with us after the studio is finished to have like a group of all participants.

Student 4: I didn't like how random student joined our group on the 3rd day.

Student 4: In the end I enjoyed every millisecond of this workshop i wish we do it again and again

# UNIVERSITY OF SHARJAH
## College of Engineering

## Architectural Engineering Department

# REDESIGN
# SHARJAH
## A THREE-DAY INTENSIVE WORKSHOP

The Virtual Design Studio is a three-day intensive multi-technological workshop based on collaborative design. Using inter-disciplinary tools, you will explore innovative architectural and design solutions for the city of Sharjah.
All final installations will be documented in a film presentation. No prior experience in architectural engineering is required.

Contributors :
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Venue : W9 - Department of Architectural Eng.,  University of Sharjah

Dates :
Tue.  Oct 13  (3pm to 7:30 pm)
Sat.   Oct 17  (9am to 6pm)
Mon. Oct 20 (3pm to 7:30 pm)
Attendance to all three dates is important

To register:
Randah Taher
rtaher@sharjah.ac.ae
For more info:
06- 505 3959

Students  from all colleges and departments are welcome

## c. **Diary of Studio Events**



Virtual Design Studio

Est. October 2009

Diary of Studio Events

12<sup>th</sup> October 2009-21<sup>st</sup> October 2009

Virtual Design Studio Est. 2009

*The Virtual Design Studio aims to engineer creative collaborative design, employing multi-technological applications and digital media tools to excel connectivity and collaborative practice in architecture and design. Coordinated by Computer Science Lecturer, and technological design visionary Amal Al-Ali, the project aims to encourage students from the University of Sharjah's School of Engineering to collect, collaborate and rethink Sharjah as a developing city.*

*With the guidance of specifically selected expert tutors, the participants must redesign the future emirate of Sharjah with its heritage and religion placed firmly at the root of design. The students will take part in revolutionary studio-based workshops, with tasks taken from a multitude of disciplines. The intensive three day studio will require students to complete online and hardcopy open learning workbooks. They will consistently update and share their findings, make observations and present material both verbally and via designated digital mediums. The participants will be expected to work collaboratively for the production of design ideas linking the old Emirate to the new developing, cosmopolitan Sharjah.*

*The studio's focus is on creative collaboration and will include intensive, inter-disciplinary workshops to encourage quality work regarding the role of art and design when redefining design and architecture through the promotion of virtual design pedagogy. It will embrace a diverse range of experience as students from the United Arab Emirates (UAE) will study the urban and suburban condition in the Emirate of Sharjah. Students from Architecture and Urban Planning disciplines will work collaboratively to explore the possibilities for innovative design solutions through the use of virtual design tools and practices. The organisers will coordinate and document the project, and closely tutor the students. They will prepare all essential materials and technological tools to facilitate and enhance the production of innovative design concepts, culminating in a final installation of film presentations.*

*To combat the prevalent cultural restrictions the essential technological tools rely heavily on digital media sources including: the social networking website Facebook; real-time interactive graphics such as Whiteboard; 3D Visualisation programmes such as Sketch-up and Autocad; and other forms of online communication such as video conferencing via MSN Messenger and email. A VDS website will also be available with all relevant links for reference and collaboration. Essential materials for the project consist of mainly key texts fundamental to the philosophy of the project itself; the VDS website; lectures from field experts and academics; studio-based work including informal and formal meetings with project tutors. Due to cultural restrictions the project will run parallel for male and female students in separation.*

*Prior to the VDS, participants will be fully equipped with all the necessary technological tools via the VDS website, Facebook and MSN messenger. Students will required to create a Facebook page where they will be expected to complete all profile requirements. They'll also have an MSN identification where they will be encouraged to network and collaborate with fellow participants and they will have instant access via a desktop icon to the VDS website where all relevant links will be available.*

**Day One: 12/10/09: 15.00hrs**

**Introductory Day: Welcome & Virtual Tour**

The day will begin with a short introduction from Studio Coordinator Gemma June Howell. Then an introductory lecture, from Studio Director Amal Al-Ali will follow which will serve to welcome the participants and provide them with a brief overview of the project itself. She will emphasise the importance of the use of technology, placing great emphasis on extensive use of the VDS website which will contain links to all relevant material, design applications, digital mediums and collaborative tools. Drawing on the success of Prof. Goodwin's *Porosity Studio,* Al-Ali will initiate the employment of metaphorical free thinking when devising design strategies. In conjunction with the VDS tools and digital media, this freedom of thought should make for successful creative collaboration in the production of innovative design concepts - both aspects of which are crucial to the focus of the studio, and will subsequently form backbone of the VDS.

In relation to the studio's philosophy of embracing digital technology as a means to educate future generations, Al-Ali will offer her own socio-political and philosophical opinions to encourage the participants to establish their own philosophical beliefs and political viewpoints. In order to establish how the participants must approach the project, Al-Ali will draw on Prof. Richard Goodwin's successful *Porosity Studio*. At this point, Al-Ali will select examples of the *Porosity Studio's* best final exhibition films to give the participants a clear idea of what is expected. The introductory lecture will also include speeches from both Pradeep Sharma and Randah Taher, who will consider the future challenges and the expectation of the UAE nationals as an educated generation.

Al-Ali will then take the participants through a Virtual Tour of Sharjah to offer a clear overview of the emirate, both historically and politically. Participants are expected to physically explore the emirate during free periods and their own time. Due to the

cultural restrictions and time constraints, the Virtual Tour, rather than a 'Walking Tour' gives the participants a basic geographic overview of the emirate, looking at specific zones on which they can observe physically or virtually on the VDS website.

The zones of observation include:-

- The Old Sharjah in the Al Hesan area of the Emirate.
- The City centre of Sharjah.
- The University City in Sharjah.
- The Old Souq.

After the Virtual Tour, the participants will be subject to an informal icebreaker.

After lunch, the group will return to the lecture hall for the *Pecha Kucha* presentations. Due to cultural restrictions, the *Pecha Kucha* presentations will then take place in the form of pre-prepared films to be viewed by both groups. The *Pecha Kucha* films are designed to provide participants with the opportunity for an informal introduction where each participant is given two minutes to introduce themselves via a pre-prepared short film.

Following the presentations, the participants will be encouraged to think freely and poetically with the intention to produce metaphorical, original ideas. At this stage, the group will be instructed to work in their free time; exploring the nature of their environment, specifically taking inspiration from this.

The sole aim is to produce innovative and creative ideas for *Virtual Design Studio,* to redesign Sharjah. At this point the participants will claim spaces for the production of models and research, and some will be elected to explore the city, libraries or visit the computer labs. The participants must form their initial the groups then collect and synthesize all ideas in preparation for their two minute presentations for the next session.

Drinks will then be served as an informal way to meet one other and network. Working relationships will be established here.

**Day 2. 17/10/09: 09.30 hrs.**

**Collaboration & Initial Presentations**

The day will begin with a lecture from Randah Taher. The lecture will serve to 'crush' the participants' ideas, giving a realistic perspective of the possibly ambitious design concepts initially formed, and will be provided via a video conferencing link, via MSN for the female/male group. After a short break, another lecture will follow from Prof/Dr******* who will give the participants a better idea of 3D design technologies and how to employ these when devising design strategies.

The participants will then be instructed to explore and observe the emirate, and prepare their individual presentations which will take place after lunch. The participants will then break for a flexible break for lunch and prayers, which will be considered in this case as an opportunity for the participants to polish their final presentations.

After lunch and prayers, the participants will then present their initial design ideas in a via a video conferencing facility to enable the male and female groups interaction and on a film format. The films will be broadcast on MSN and stored on Facebook for future reference. Discussion and critique will be reserved for studio time.

The participants will then partake in studio-based work. It is here where Al-Ali and the tutors will re-form the groups, using information from Facebook and the Pecha Lucha presentations as a basis for doing so. At this point, design briefs need to be finalised for the final exhibitions films. Studio-based work will then commence, with the tutors working closely for guidance and support. At this point, the participants will be informed of that the deadline for their presentations is the end of the following day.

During the studio-based workshop the groups will be remixed and matched by the tutors, and will be expected to work on finalising their design briefs. The participants are then encouraged to socialise, reflect and relax in accordance with the studio's philosophy on Schon's theory of reflection. During this time the participants can visit the appointed zones covered during the virtual tour or work within their newly formed groups. They must facilitate the VDS tools, using links from the website to explore the emirate using, and Facebook to answer workbook questions and update status etc, all of which will be monitored by the tutors for assessment.

The day will then end with a lecture from Studio Coordinator Gemma June Howell, concerning creativity and design thought processes. This lecture will encourage the participants to think metaphorically in terms of poetry and design, teach them to trust one another as team members and will inspire them to create their final design strategies.

**Day 3. 21/10/09: 09.30-11.30hrs**

**Submission & Installation**

The final day is reserved solely for presentations and critique. During the first hour of the day the students must submit their final projects. The female presentations will take place via a video conferencing link, discussion and critique will follow from both tutors and groups. The participants will be required to submit their presentations and all relevant material for their design projects from the participants.

The will then have a free period until 13.30hrs where they will regroup for the final presentation and critique session of their projects before the final installation. All of the tutors will be on hand at the point and changes can be made before the final film installation.

The Installation will take place at the theatre hall in the male campus, and guest will include all observers, speakers, relevant representatives from the local authority, partner organisations and the UOS, the wider architectural network associated with Virtual Design Studio, the studio tutors, participants, relevant figure-heads and the press will attend. There will be a brief reception whilst the tutors and participants prepare for the presentations. The final pieces including all models, presentation boards, drawing and finalised digital output will be installed by the groups. Amal Al-Ali, Gemma June Howell and Randah Taher will be responsible for all digital and screen based outputs.

To begin, Amal Al-Ali will provide an overview of the project and introduce the exhibition. The participants will then provide a quick summary of each solution/proposition that has been developed over the past week. Each group will then presents their work as laid out in the self-composed brief. The groups will be encouraged to use the freestanding installations and exhibits to display all materials used throughout the course of their project. The films will be screened and extensive networking will take place.

**d. Open Learning Workbook**

Virtual Design Studio

Est. October 2009

# Contents

# 1. Introduction

The sole purpose of this workbook is NOT to assess your capacity of knowledge, but is to encourage you to think for yourself. The lectures and studio time will provide you with the inspiration, guidance and support you require to fulfil all aspects of your brief, but the workbook will be your own account of your personal development throughout the course of the studio. Please note that due to the nature of the project, i.e. Amal's Phd thesis, at the end of the studio your workbook will be collected by the tutors to analyse results and assess your contribution.

At the end of the workbook you will find several simple questionnaires pertaining to your experience of the project.

Please answer all questions in this workbook as they have be specifically designed to help you achieve the best possible results from this unique experience, but most importantly we want you to enjoy the experience!

# Day 1.
# 2. The Politics of Design

*During the introductory lecture with Amal Al-Ali, we discussed how the political ideology of a particular architect, namely Richard Goodwin, affects their design concepts. Amal Al-Ali presented her liberal feminist views concerning the role of women in the United Arab Emirates and how a particular philosophy is crucial in architectural design. Her belief that women should have more privacy, led her to visualise the Emirate with more and female only facilities. This is an example of how a person's political views can be interpreted in design ideas. She also drew on Prof. Richard Goodwin, from the Porosity Studio, and how his strong socialist perspective shapes the way in which he approaches urban design; focusing on the social aspect of modern design rather than the functional capitalist approach.*

**Activity:** Go to Richard Goodwin's website (http://www.richard-goodwin.com/) see how his philosophy concerning the linkage between art and architecture dictates his urban design concepts. Think about ways in which your political perspective could form the basis of your design strategy. Sketch your ideas below.

**Feedback (Cont. Overleaf)**

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**Conclusion:** There are no right or wrong answers here, but the purpose if the exercise is to get you thinking about your own personal political philosophy or viewpoint. If you don't have one then please read the key texts, and conduct your own research from the guidelines and handout given in the lecture Look at how the philosophy of many architects underpins their designs.

*"In the city we just simply cannot afford to rebuild all our buildings. We have to rethink our existing structures. We can't just have five or ten perfect examples of environmentally sustainable design. We must make our bad buildings better."*

**Richard Goodwin 2004**

**Activity:** Log onto the VDS website www.vds.com and follow the link to Facebook. Strike up a conversation with your fellow colleagues using the chat facility. Ask them about their own political perspectives, including justification and origins of their particular perspectives. Think about how your viewpoint differs from your colleagues. Update your Facebook profile with your viewpoint, and sketch your ideas below.

**Feedback (Cont. Overleaf):**

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**Conclusion:** If you are unsure of your worldview, you can use the provided technology to discuss your beliefs and findings with studio participants and tutors. Remember, there are no right or wrong answers, if you are still unsure just sketch out why, and if you didn't know but have discovered your worldview through this exercise write how you came to that conclusion.

> *"If you can draw something with only a few sweeps of a pen and everyone recognises not only the structure but also associates it with a place of earth, you have gone a long way towards creating something iconic"*
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> **Tom Wright 2000**

**Activity:** In light of the political philosophies of Richard Goodwin, Tom Wright and Amal Al-Ali, presented by the studio, think specifically where you'd place yourself politically and why. Write your ideas below and update your status on Facebook to record this.

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**Conclusion:** If you are unsure of your own political stance please browse the information provided and if neither of the above suit your political ideology feel free to research further to find an ideology which is more suitable for you. Again, there are no wrong or right answers here.

# 3. Virtual Tour

*Due to the nature of the Virtual Design Studio we will be taking a virtual tour rather than a physical tour. This way we also overcome the time constraints and cultural restrictions of the studio, and you can have the freedom visit areas of the city at your own pace. The virtual tour will also give you the opportunity to revisit any place any time at the click of a mouse, which will be a bonus when digitally discussing your design ideas with fellow group members.*

**Activity**: Log on to the VDS website [www.vds.com](http://www.vds.com) and follow the link to the virtual tour of Sharjah. With your political philosophy in mind, identify the problem areas of the Emirate. In terms of facilities, uses, economic growth and socialisation think about improvements of the Emirate. Sketch your ideas below and on your Facebook page.

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**Conclusion:**

In accordance with Amal's feminist principles she suggests that the improvement of female-only facilities such as swimming pools and beaches would be a positive move for the women of Sharjah. Tom Wright, on the other hand is concerned with the iconography a particular building brings to a city and understands the Burj Al Dubai as an iconic structure, designed to symbolize Dubai's urban transformation mimicking the billowing sail of a boat.

**Activity**: After observing the virtual tour, go to [www.facebook.com](http://www.facebook.com), login using your username and password. Reflect on your observations with your colleagues using the chat facility and record these on your wall. Also write your observations in the space provided below.

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**Conclusion:**

Ideas of development include the old airport, now a museum and situated on the main road in Sharjah, could be developed further to improve consumer sovereignty.

> *"When redesigning Sharjah we must think of how we can retain the heritage of the Emirate whilst creating an innovative strategy for the future of an emerging cosmopolitan city. We must think about how traditional, established, often tyrannical rules, can dictate not only the lives of the people but the environment in which we live. The question we must pose is: How can we produce design ideas which stay closely linked to our religion and heritage whilst embracing the challenges of the modern world?"*
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> **Amal Al-Ali 2009**

**Activity:** Think about the key characteristics of the old Sharjah and its impact on the new city. Record any initial ideas below.

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**Conclusion:** Looking to Sharjah's history of the pearl trade, perhaps a female only building could be constructed using the image of the pearl.

# 4. Initial Sparks

*The Pucha Kucha presentations serve as an immediate introduction of the participants and the tutors using the creative form of film. The 2-3 minute films should prompt the participants to think about initial group formations during and after the presentations.*

**Activity:** Log on to the VDS website and review the Pucha Kucha presentations. Consider who you would like to work with to produce the best possible design ideas for the future of Sharjah. Follow the facebook link and discuss with your fellow colleagues possible group formations. Think about the basis for these formations i.e. consider to the correct reasons for group formations: cultural background, gender, political philosophy etc. You should have a good idea of who you wish to work with the next studio. Update your profile and status in accordance. Sketch any ideas below.

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**Conclusion:** The philosophy of the Virtual Design Studio is to encourage collaborative practice for the production of innovative design concepts. In order to achieve originality it is important that participants venture out of their comfort zones. The initial group formations should essentially be a chance for participants to understand one another's particular philosophies and how they 'tick', so to speak. It is human nature to join with people who are alike but in this case, the 'unknown' is a key ingredient in design.

**Activity:** Once you have an idea of who you want to work with either meet in person or discuss initial ideas via Facebook. Make a list of places you believe should be developed and bring initial design ideas to studio on Day 2. Sketch any ideas below.

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**Conclusion:** Ideas surrounding links between the preservation of the old Sharjah and the new developing Sharjah should be prevalent in your initial ideas.

# 5. Studio: Shared Visions

**Activity:** From the Jenga bricks provided please take it in turns to stack the blocks, brick by brick. Once the stacks are assembled, please take a block each. On the underside there should be a coloured label. Whichever colour you get this

is your now your group. With the virtual tour still fresh in your mind, gather in your groups and sketch out any initial ideas you may have between you. Use the space below to sketch out your ideas.

**Feedback** (Cont. Overleaf):

**Conclusion:** This exercise is merely to get you thinking in a collaborative environment. Don't hold back on your initial ideas. Be as creative as you wish.

# 5. Collaborative Reflection

*The purpose of your free time isn't only for the purpose of fun, it is a chance for you to reflect, relax and observe the Sharjah. At the end of Day 1 there will be an opportunity for you to meet and network with your fellow studio participants and the tutors. It is here where you will get the chance to meet all those involved in the project .Please make the most of this time as it will be your only chance to network and ask questions to guest speakers and those who are not directly involved in the project.*

**Activity:** Networking is an important part of the studio in terms of forming initial relationships with participants and tutors. Reflect on this time in terms of what you deem to be a successful partnership redesigning the future of Sharjah. Think about Sharjah's place next to economically thriving Dubai, and if there are any lessons to be learned from here. Be sure to update your Facebook profile in accordance with your new acquaintances and sketch any ideas below.

**Feedback (Cont. Overleaf):**

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......................................... **Conclusion:** The refurbishment of the Royal Crown Hotel has boosted tourism in Sharjah. Think about other ways in which Sharjah could enhance tourism. Perhaps other Royal buildings, such as the Palaces could be opened to the public to enhance tourism in Sharjah.

# 7 Relax & Reflect

**The VDS is an intensive studio and you are expected to observe the Emirate and reflect during your spare time. Reflection is an integral part of the studio and you will be expected to provide evidence of your thoughts and findings via Facebook and in the feedback sections of this workbook, this will be monitored and assessed by the tutors.**

**Activity:** Explore the Emirate individually or in your groups. Go to the cinema, cafes, museums and galleries to get a sense of the Emirate. Ask people from a variety of age groups, genders and different ethnicities, what they think Sharjah needs in terms of facilities and uses etc. Write a list of the Zones you think should be developed and record your findings below and update your Facebook accordingly.

**Feedback (Cont. Overleaf)**

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**Conclusion:** Again, there are no right or wrong answers here. But the exercise will serve to give you a sense of the 'real' Sharjah in the sense of what the people would like Sharjah to become.

# Day 2

# 1. Zones of Development

*The lectures taken by Randah and \*\*\*\*\*serve to 'crunch' your design ideas so to speak. In other words, their purpose is to make you reconsider your ideas realistically, in accordance with Sharjah's needs as a City. In cooperation with the economic zones of Sharjah design strategies ideally need to suit economic needs, geographical location, economic competitiveness, existing infrastructure, telecommunication facilities and transport networks.*

**Activity:** From the zone list you have made think about design ideas with these considerations in mind. Think about Sharjah in terms of industrial growth, in particular the areas of development and the economic growth and successes of neighbouring Emirate Dubai. Sketch any ideas below.

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**Conclusions:** Think about the development of residential areas to house the growing workforce in Sharjah.

# 2. Technologies in 3D Design

**Activity:** The 3D lecture serves to improve your design skills. When developing your design strategy be sure to use all available applications.

# 3. Observe & Explore

**Activity:** When you are out and about exploring the emirate, make sure you take pictures and jot down all ideas, and sketches. **Remember: strike when the iron is hot, because a cold iron won't burn a hole!**

# 4. Inspiring Neighbours

*Architecturally, Dubai has gone from strength to strength in the past ten years. The emirate is the second largest in the United Arab Emirates and holds 15-25% of the world's cranes! Dubai's many architectural marvels include the largest indoor ski resort in world, towering skyscrapers and man-made islands where the world's tallest building in the world, the Burj Al Arab stands. Plans for the shape shifting Dynamic Tower are in progress and it should be finished by 2010. Sharjah is not far behind with increased foreign investment and an grower industrial workforce, standards from neighbouring Dubai could push the architectural development of Sharjah.*

**Activity:** Think of Dubai as a benchmark for design in the United Arab Emirates. Consider the areas in which Sharjah may succeed in architectural design.

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**Conclusion:** With increased foreign investment and a booming industry the Sharjah Municipality predicts, Sharjah is set to be in the same league as Dubai. Architectural marvels of Dubai such as the Dubai Babel, the underwater hotel and the man-made islands could shape in Sharjah's future. Think freely about your design ideas, there are no limits.

# 5. Battle of Concepts

Presentation is a key device of the VDS as it gives you the chance to express your ideas in front of your peers and the tutors. The presentation aspect of the studio not only serves to assess your contribution, but also serves to aid you in the development of your ideas; the feedback and critique serving as a prompt to do so.

**Activity:** Go to the VDS website, view your peers' presentations. Find one which stands out for you. Think about how you may have approached the idea differently. Perhaps there is an object you would have preferred to use, or an object which could've been used as a metaphor for an entirely different design concept. Follow the link to Facebook and discuss with your fellow group members using the chat facility, then update your profile and/or status in accordance with your new ideas. Use the section below to sketch ideas.

**Feedback (Cont. Overleaf)**

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**Conclusion:** This exercise is designed to get you to think and rethink the design ideas presented. It should prompt you and your fellow group members to seek answers outside of the preverbal box. Have fun with it and push the boundaries. Remember, there are no wrong answers in creative design.

# 6. Studio: Mix 'n' Match

*By now you should raring and ready to go with your design ideas. But, hold on! Your official groups have not yet been established. Fear not, because studio time is not just about the development of your specific ideas, but the development of you as individuals also. It is imperative to push your limits so you can achieve the best possible results. Feel free to use the available technology provided through the VDS website* [www.vds.com](www.vds.com) *to collaboratively create your designs. Technologies available include: Auto CAD, Sketch Up and Whiteboard.*

**Activity:** Create a group name for your new appointed group. Please gather in your new group formations and discuss your findings and materials. List three priority areas/facilities for development. **There must be three areas per group.** Sketch your ideas below.

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**Conclusion:** Again, there are no right or wrong answers here. But from the research you have conducted you should be able to target three distinct areas/facilities of development or redevelopment.

**Activity**: Once you have decided your targeted areas for development, in a group and at your tutor's request you must stand in a circle. The tutor will then start the stop-clock for one minute and an appointed person must begin the exercise by saying a random word, without hesitation, the next person must say a word and so on and so on until the clock stops. When the clock had stopped the final word to be said must be used for the next part of the exercise. A video conferencing link via MSN will be set up when needed. Write you word in the space below.

**Feedback**

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**Conclusion:** Although this may seem to be a pointless exercise, word association can be a fun way of awakening the mind, and getting others to lose inhibition. Please do not feel pressured because there are no wrong or right answers here.

**Activity**: Now, with your word you must think metaphorically about a design idea which fits best with **one** of your three areas of development. Choose one and work on the idea as a group. Sketch any ideas below.

**Feedback (Cont. Overleaf):**

**Conclusion:** The idea behind this exercise is to obtain cohesion within your new group. Ideas can be better developed with a unified goal or idea.

**Activity:** Get into your allocated groups, if your groups are cross-gender log into the VDS website and follow the link to MSN messenger so that you can collaborate virtually. Disregard the ideas you have previously formed, but don't forget them entirely. From the selection of random objects provided choose just one item per group. With this object in mind create a design idea, which links into the existing heritage and cosmopolitan development of Sharjah. Sketch your ideas below.

**Feedback (Cont. Overleaf):**

**Conclusion:** Just as there is no pressure, there are no limitations with this exercise, so think freely and metaphorically to produce a simple idea which can be expressed easily.

**Activity**: With your chosen idea, think about the ramifications of its implementation and who will present it. Then, in your own time, go about making your short presentation, using your phone and other applications provided.

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**Conclusion:** Your final project can include any material or findings, any number of speakers. **There are no limits except each film must not run for more than 5 minutes**

# 7. I Am, Therefore I Write

*The lecture with Gemma June Howell serves to get you working effectively in your newly appointed groups. It also encourages you to think about the construction of art, specifically creative writing and poetry, and how this can be related to design. To do justice to your design ideas, we encourage you to look at the world through the eyes of a child- as if everything you see, touch, taste or smell you have done for the first time in your life. Keeping this sense of wonder will enable you to think freely and metaphorically about your ideas.*

*Do not agonise over ideas: the materials for your design strategies are all around you and you have to let your senses be a channel for them.*

**Activity:** In your own time, with your workbook at the ready, sit and close your eyes. Keep them closed for three minutes, then note down the sounds that came to you in this period of attentiveness. If what you have written makes a narrative, write it in the space below.

**Feedback (Cont. Overleaf):**

**Conclusion:** This exercise will encourage you to get a sense of your environment as a new comer. Take note of the noises, smells, and general feelings you encounter during your three minute observation and work into a narrative.

**Activity:** Meet with your group either online or in person to discuss the stories you have written. Think about how you could join your stories into one solid narrative, with one single moral. Take into consideration what you can keep and what you can discard in order to achieve the moral of your story. Write your collaborative story below, upload on your Facebook wall, and send to Gemma at gemmajunehowell@live.co.uk .

**Please note that you only have 24 hours from the end of Gemma's Lecture to submit your story and that the best story will win a Mystery Prize.**

**Feedback** (Cont. Overleaf):

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**Conclusion:** This exercise is intended to get you working as a team in a creative setting. When devising your design strategies it is important that you can agree on the execution of your project, in terms of what is or isn't needed to convey your idea. Keep your stories short, don't exceed 1000 words. **Remember: anyone can have an idea, but it is in the execution of the idea where the skill, the craft comes into play.**

**Activity:** Write a poem**.** Keep note of your daily activities. Jot down words, phrases, incidents, ideas and feelings which catch your attention. Honour and interrogate the everyday. Let what stimulates, disturbs, puzzles, delights, amuses, saddens or angers you prompt your poem, and write below.

**Feedback** (Cont. Overleaf):

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**Conclusion:** Remember a poem does not have to rhyme, it can be a selection of words written free style. You will not be judged on your writing ability or flair for poetry, this is simply an exercise for you to free yourself from your daily constraints. The purpose of this exercise is for you to get in touch with your feelings and thoughts and express yourself through the art of the word.

# 8. Reflective Collaboration

*You will now break from the studio for three days. During this time you must socialise, relax and reflect and work within your new groups, developing your design strategies. This is an important part of the design process. Please keep in touch with the tutors, and let them know how your ideas are coming along. When you come back you should be ready to submit your project. During your time off please explore the Emirate to find relevant materials which support and facilitate your design ideas*

**Activity:** Choose one person from your group to create a Facebook group using your group name. This is a private forum to discuss and develop your design ideas. **You must invite all of the tutors to be members of the group**. Feel free to share ideas, materials and developments of your design strategies in your Facebook group. You can also use links to SketchUp, Cad and Whiteboard to communicate drawings and ideas, or upload videos and pictures.

**Feedback (Cont. Overleaf):**

**Conclusion:**     Again, there are no right or wrong answers here, but it is imperative that you invite all tutors to your groups, because they must be included in your design process as a guiding force if anything. The tutors will be monitoring the usage of your Facebook profiles and groups, and you will be expected to partake in the Facebook blog. Please remember that when you come back next week your ideas need to be finalised for the final film presentations.

# Day 3

# 1. Submissions

*You must submit your film presentations and all relevant material to your tutors by 11am on the final day.*

# 2. Porosity: Success Story

*The VDS website has many examples of projects from the Porosity studio. Log onto: for some inspiration.*

**Activity:** Using the examples from the Porosity Studio, in particular the methods of delivery the students used, you should have a better understanding of how your final presentation to look. Think about how you can present your ideas. Think about how many speakers you'd like (or perhaps you won't want a speaker) which pictures or video clips you'd like to include and other materials you could use to engage your viewers.

**Feedback (Cont. Overleaf):**

**Conclusion:**     You should use the Porosity studio as merely an example of how to deliver your presentation. Please **DO NOT** copy any of the design ideas from the Porosity

Studio as they will not be relevant to Sharjah, and your tutors will be looking for original design ideas.

Please remember that you have a relatively short time to make your final films. After you've submitted your films at 11am on the final day, they will be shown to your fellow groups and tutors and will be open to discussion during studio time.

# 3. Crunch Time

*You have now seen and discussed all of the films, think about what worked well in terms of relaying of information and engaging the audience.*

**Activity:** Think about the films you have seen, discuss within your groups and write your criticisms and feedback in the space below.

**Feedback (Cont. Overleaf):**

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**Conclusion:** Please do not be inhibited by expressing your opinion, your feedback is confidential and will only be seen by the tutors.

**University of Sharjah**
**College of Engineering**

**October 2009**

**Approved by The University of Glamorgan**

## e.    Virtual Design Studio Programme

## Contents

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## 1.0 Factual Summary

### 1.1    Aim of Studio

The Virtual Design Studio aims to educate future designers through the use of computer supported collaborative design environments, using both synchronised and unsynchronised digital technology.

The studio intends to channel and develop students' existing philosophical beliefs as a basis for their design strategies.

Ultimately, the studio endeavours to provide innovative creative learning methods and push existing cultural boundaries to encourage collaboration between both male and female students in the pursuit of developing original design strategies for the architectural future of Sharjah.

### 1.2    Content Statement

The framework of the multi-disciplinary Virtual Design Studio Environment is based on four key concepts:

- Creativity

- Innovation

- 3D Design Technology

- Collaborative Design

Within this framework, students are required to embrace the VDS technology and 3D digital tools to devise, plan and develop their design strategies. The students will be encouraged to adopt an un-inhibited, free mode of thinking which is instrumental to the key concepts consistently repeated throughout the duration of the studio. Students are expected to obtain a coherent and systematic body of knowledge facilitating the multi-technological tools and applications available.

### 1.3 Outcome Statement

Students are expected to embrace all aspects of the virtual design process including prolonged and extended use of the VDS technology in order to achieve the best possible results through intensive collaboration.

Students are required to prepare for the studio through a means of set texts and tasks given prior to the actual studio in order to familiarise themselves with the philosophy and expectations of the project.

Students must begin the studio with a clear idea of their own philosophical and political beliefs which will be encouraged by the tutors and built upon throughout the course of the studio.

## 2.0 Introduction

### 2.1    Preamble

An introduction to the Institute, the school and the programme.

### 2.2    The Institute

Founded in 1997, by Supreme President and Chairman Dr. Sultan bin Mohamed Al-Qasimi, the University of Sharjah is a semi-governmental higher educational institution. The University of Sharjah aims to meet the Emirate of Sharjah's educational and cultural needs within its Islamic values and tradition. The university is divided into two campuses according to gender.

#### 2.2.1    Vision:

- To become a pioneering academic institution in the Middle East and be well recognised world-wide, offering comprehensive academic and professional programs of the highest quality.

- To provide a distinctive style of learning that engages and prepares students for leadership roles in the society.

- To become a major international centre of study and research in the quest to improve human life.

- To fulfil its obligations and responsibilities towards its students by adding to human knowledge and scientific research.

- To meet the needs of society and enhance higher education in the country in coordination with other institutions of higher education.

The University of Sharjah is committed to providing its students with an education and learning experience of the highest quality, offering a comprehensive platform of academic and professional programs; promoting the personal, social, academic, and career growth of all students; adding to human knowledge; contributing to the cultural, social and economic progress of society; preserving, fostering and promoting the Arab and Islamic culture, heritage and history; and contributing to the advancement of learning and to the development of human resources in the Emirate of the Sharjah and the UAE.

### 2.2.2 Goals and Objectives

The goals and Objectives of the University of Sharjah include:

- Providing its students with an education and learning experience of the highest quality in several disciplines and fields, including the humanities and liberal arts, culture and social sciences, engineering and basic science, fine arts, communications, and medical and health sciences.

- Promoting the personal, social, academic and career growth of all students in a proactive manner to prepare and qualify them to be leaders in their chosen careers and professions.

- Adding to human knowledge through discovery and scientific research in full cooperation and collaboration with leading academic and research institutions around the globe.

- Contributing to the cultural, social and economic progress of society through social responsiveness and effective engagement and collaborations with public and private organizations and institutions.

- Preserving, fostering and promoting the Arab and Islamic culture, heritage and history through strengthening and fostering its educational programs and scholarly research in these fields and maintaining strong links and connections in these disciplines among academic and cultural institutions in the Arab World and all Islamic countries.

- Enhancing the quality and reputation of higher education in the country through cooperation with other institutions of higher learning to promote quality standards and the adoption of best practices in learning and teaching, and

- Contributing to the advancement of learning and to the development of human resources in the Emirate of Sharjah and the UAE through linking academic and professional programs to the future needs of the job market and by providing continuous educational and training programs to update and upgrade the knowledge, professional qualifications, and skills of people in the workforce.

### 2.2.3   Core Values

The University of Sharjah endeavours to achieve its mission through a set of core values, which include:

- **Ethical and Civic Responsibility**: The primary value is the university's commitment to ethical and civic responsibility in accordance with Islamic teachings and universal humanistic ideals.

- **Learning Environment**: The University is committed to learning which is student-centred and supportive, in a modern learning environment which promotes critical thinking, independent thinking and the mastery of advanced technologies.

- **Quality**: The University adheres to a high standards and continuous improvement in teaching, scholarship and service.

- **Creativity**: In the pursuit of academic excellence, the University promotes and rewards creativity and innovation.

- **Outreach**: The University is dedicated to community outreach, emphasizing service, transference of knowledge, and positive contribution to social welfare.

- **Global Outlook**: Although rooted in Islamic and Arabic traditions, the University promotes an international outlook and respect for other individuals and cultures.

- **Intellectual Freedom**: The University promotes open thought, diversity, fairness and academic freedom.

- **Leadership and Collegiality**: The University promotes teamwork, tolerance and leadership by example.

- **Accountability**: Personal and institutional responsibility and accountability are necessary conditions for the accomplishment of the University's mission and goals.

### 2.3 The College of Engineering – Department of Architecture

The College of Engineering offers unique undergraduate and postgraduate courses from one of the best engineering schools in the region. Engineering at the University of Sharjah strives for excellence in teaching and learning, research and scholarship, and community service. It has exceptional facilities to support the students. It aims to achieve a rich and balanced university experience, both in and out of university. The College of Engineering at the University of Sharjah was inaugurated in 1997 and has grown rapidly since. More than 1000 students are currently enrolled in the following degree programs; Architectural Engineering; Civil & Environmental Engineering; Computer Engineering; Electrical & Electronics Engineering, and Industrial Engineering & Management.

### 2.4 The Programme

The Virtual Design studio is designed to achieve the best possible design strategies and results in accordance with the UOS philosophy, and facilities in accordance with Islamic and Arabic gendered cultural restrictions. The programme serves to corroborate students in their design ideas through the integral use of new technology and digital media and encourage them to fully collaborate through this.

## 3.0   Justification

In an unstable global situation, engineering and architectural design is a fundamental necessity for the development of Sharjah, as well as other cities around the world. This programme aims to extract the best possible design concepts from its students to facilitate and enhance the heritage and expanding landscape of Sharjah. It will look to Dubai's rapid progression over recent years to inspire the students' innovative strategies for the future of architecture in the Province of Sharjah. The project will facilitate the latest technology and 3D techniques to promote complex skills.  The skills believed to be the demand for the future.  the studio will relay on the student centred mode of learning.

## 4.0   Philosophy

Universal risks of global warming, population growth, epidemic diseases and natural disasters presently encroach upon us. Times when nature was analysed from a lab have disappeared as man-made environments and nature have fused. It is in this uncertain climate that we request the students to project their strategies for the year 2010. The concepts and work produced during the programme will be intrinsically intertwined with the VDS Technology and its work to redefine the urban landscape of Sharjah through transformation and adaptation. The studio will apply existing armatures of architectural structures from neighbouring Dubai. The programme ultimately seeks new answers to areas of Sharjah's future, in terms of both the physical and social construction in addition to architectural design and planning.

The core precept of the Virtual Design Studio philosophy is concerned with innovation, and aims to inspire students through digital design practices and intensive collaboration. The studio employs a balance between virtual design pedagogy and traditional creative collaborative practices in an attempt to pioneer future developments in architecture and design.

The Virtual Design environment promotes multi-disciplinary collaboration past and present through a mixture of both traditional (physical) and digital (new media) practices in order to extend both the boundaries and the potential reach of the studio's focus.

## 5.0 Studio Aims & Student Profile

### 5.1 Studio Aims

The studio's main aim is to congregate design students and tutors to produce, develop and juxtapose design ideas for the future development of Sharjah. The participants responses will then be exhibited in 3 minute digital film version on the final day.

The Virtual Design Studio also aims to:-

- Educate future designers through the use of computer supported collaborative design environments.

- Provide new learning methods, materials and practices, utilising design technology through digital media synchronised and unsynchronised.

- Ensure an understanding of current global polarisation, economic and ecological climate to initiate change in architecture and urban design, thereby creating a sense of architectural urgency, urging students to facilitate available digital media when creating design concepts.

- Ensure the students obtain an understanding of the current political climate which is fundamentally embedded in design concepts.

- Encourage students to embrace the studio's technological tools through the VDS website, including social networking website Facebook, to supplement physical, in-studio workshops and forge working relationships both online and off.

- Enhance collaborative creative practice in the realm of architecture and urban planning, through the use of real-time interactive graphics including Sketch-up, Autocad, and Whiteboard.

- Produce students who facilitate the Virtual Design process through the use of digital media, social networking tools, multi-disciplinary intensive workshops and metaphorical thinking, in order to forge strong working partnerships.

- Encourage the creation of innovative architectural design concepts to re-shape the future of urban planning in Sharjah; combating the global issues of climate change and devolving architecture from a capitalist centric perspective to more socially-focused constructions.

- Juxtapose a plethora of strategies and place in an immersive technological atmosphere for final exhibition, through the use of film.

- Tackle cultural restrictions and cross gender boundaries through the use of digital media and technological resources provided by the VDS.

### 5.2    Student Profile

Participants must be in the process of undergoing either an undergraduate or postgraduate course at the UOS.

## 6.0  Student Development

The framework of the multi-disciplinary Virtual Design Studio Environment is based on four key concepts.

- Creativity

- Innovation

- 3D Design Technology

- Collaborative Design

Within this framework, students are required to embrace Virtual Design Technology and develop an un-inhibited mode of thinking instrumental to the key concepts repeated throughout the course of the studio. Students are expected to obtain a coherent and systematic body of knowledge facilitating the multi-technological tools available before, during and after the studio.

The rate of student development will depend on the extent of which they choose to embrace the digital media and technological tools provided; how they conduct self-directed study/observations and their individual contribution to the collaborative design workshops. Student development will be monitored, assessed and documented using traditional and technological methods by the project tutors.

## 7.0 Studio Analysis

### 7.1 Studio Summary

The studio will bring together a diverse range of experience in relation to design. Most societies believe that a mix of people, uses, opportunities and facilities are crucial for a sense of identity and self-sufficiency, all of which are characteristics which deem a good place to live. The studio will analyse large new neighbourhoods either under construction, planned as prototypes or relatively new, namely Dubai. Each neighbourhood, brought by participants will be presented, discussed and will form the basis of their chosen group collaborations.

The subtext of these dissections is the spectre of Sharjah 2010, and will attempt to create solutions, on the scale of the small province, to problems such as climate change, sea-level fluctuations, energy, conflict and displacement. Solutions discussed will address human survival, in terms of physicality, sociality and psyche.

Ultimately, the participants and collaborative groups must choose both the scale and location of their enquiry.

The summary of area character and development opportunities for Sharjah will be available on the Municipality website where The Province of Sharjah Strategy can be found. These areas will be explored throughout the duration of the studio.

### 7.2 Off-Site Components

Due to cultural restrictions regarding mixed gender groups, the participants will explore and observe Sharjah during free periods. A virtual tour will be provided during the studio.

### 7.3 Technological Components

The studio will rely heavily on technological applications and tools, and 3D digital media to maintain a collaborative design environment.

The VDS technological Tools will be available on the VDS website and will include:

- Real-time interactive graphics: Whiteboard.

- Virtual Communication: Social networking website, Facebook.

- 3D Visualisation: Sketch-up & AutoCAD.

- Virtual Communication: Video Conferencing Link-Up, Email and Facebook.

- Virtual Tour.

The students' personal devices will used for the recording of observations and film making.

## 8.0 Methods of Studio Delivery

### 8.1 The Task

The studio consists of 20 participants and is condensed into three days resulting in a final installation of the output in the form of 3 minute digital films. The participants are encouraged to collaborate, overcoming any differences in the name of design. Participants must have an awareness of Sharah's cosmopolitan population and the problems relating to its future development. Participants must approach the project in the knowledge that their design strategies cannot solve such problems within the designated time-scale, but could be considered and developed further.

Although new perspectives may challenge the fixed views of others, the studio's main aim is to think metaphorically in terms of Sharjah's infrastructure, in particular the linkage between the Old Sharjah and the new cosmopolitan Sharjah. Participants will enter the studio with their own special intelligence and specific identity which be encouraged as valued qualities and ingredients for the Virtual Design Studio. Each participant is required to research the history, geography and statistics of the province which is crucial to the creation and development of design strategies.

Within the 10 day between the first and second session, after the initial group formation, research and observations must be collected and collated as participants will be required to prepare a 2 minute individual presentation on their return. The participants should summarise the urban conditions and the issues Sharjah faces, finding similarities with other cities in The United Arab Emirates and overseas. They will then carry out further research into the history of Sharajah specifically looking at how they could redesign Sharjah whilst retaining the emphasis on heritage.

The final presentations will consist of drawings, a physical model, performance or digital display which will capture the essence of their idea. At this point, the research has to be cited rather than explained. The ideas must be clearly articulated in 2 minute presentations which will be critiqued, then shown in a 4 minute film in a final installation on the final day of the studio. The studio insists on the use of metaphor, naming, and philosophical background as crucial tools. Feedback and discussion are reserved for tutorials and collaborative workshops.

The final day will present the opportunity for everyone to witness and discuss all presentations before the installation. This will be made possible by the reformation of the groups therefore reducing the number of ideas to be presented. Throughout the development of the design strategies, participants will be exposed to a broad range of technologies, software, digital mediums and applications. Each participant must work with physical as well as data models where appropriate, the date of which will be collected by tutors for a catalogue of future material.

During consultation with the tutors the participants must decide on the outputs for their presentations. Each participant must produce a 3 minute digital film version of their strategy and provide the appropriate material in the form of evidence such as texts, photographs and films. The participants must accompany this with a document of 100 words outlining their idea.

With the assistance of the project tutors the participants are required to express their own briefs and formulate an appropriate outcome to tackle the problems facing Sharjah. Together with the intensive nature of the studio, this pertains to the combination with all participants to make the VDS. Tutors and participants will meet throughout the studio to discuss projects in progress, and tutors are not permitted to enforce their own philosophies on the participants but instead to encourage participants to think in a different way, but ultimately make up their own minds.

At all times participants are required to justify their response and design strategies which should show an understanding for the philosophical and historical lineage of their ideas and why they now have the permission to think and act in a particular way. Ultimately, participants are responsible for their final designs and installations.

## 8.2 Outcomes

The outcome for this virtual design studio is to juxtapose visions for the future of Sharjah. The participants are asked to redesign the province linking the old heritage of Sharjah with the new cosmopolitan Sharjah, with the goal of producing original, innovative design ideas.

Via collaboration groups or individual work, the final design strategies must redesign a segment of Sharjah in relation to its Islamic heritage and the issues it faces today. Each participant will be responsible for a 3 minute digital film version of their strategy and the appropriate material to convey their design strategy. Project tutors will collect all material for a VDS Sharjah catalogue which will be compiled and published after the studio, and will include images of each design which will cover at least four pages within the collection of texts, photographs and CDs of the VDS.

Participants will:

- Prepare for the studio in the form of research i.e. reading set texts, researching historical origins of Sharah and full profiling on social networking site Facebook, which will act as a key tool throughout the studio.

- Embrace the virtual design processes, including the technological design applications and tools as a means of the creation of collaborative innovative thinking.

- Embrace social networking website Facebook as a means of virtual communication, collaboration, personal expression and socialisation.

- Facilitate the Virtual Design Environment as a means of communication and collaboration to develop and sustain a teamwork culture crucial to the Virtual design pedagogy of the studio.

- Develop virtual design pedagogical practices and models which aid in the promotion of collaborative

creativity through participatory design methodology and technological design pedagogy.

- Develop methods for applying 3D visualization, real-time interactive graphics and animation for design concept evaluation.

- Acquire and learn new methods and approaches to design by thinking in a freer, less formal way.

- Use the studio as either an integral part of their university design program or part of a research postgraduate stream

## 8.3 Assessment

### 8.3.1 Rationale

The assessment philosophy of this studio places value on the collaborative aspect of the studio, therefore assessment will take place throughout the duration of the studio, and students will be assessed on their level of participation. The final film installation will also be assessed.

### 8.3.2 Assessment Methods

Participants will be assessed in the following methods:

- **Continual Assessment:** Due to the nature of the studio, the tutors will be responsible for continually assessing the students both online and off. Students will be assessed through critique, debate and discussion; verbal and visual presentations during studio time, and through their use of the Digital media provided, namely Facebook. Tutors will focus on status updates, and contribution to individual Facebook groups. Students will also be assessed on their contributions made to the daily discussion board and blog available on the VDS website and the VDS group on Facebook.

- **Self Assessment:** Students will also be subject to self assessment which will be provided in the form of a questionnaire, found in the open learning work-book.

- **Peer Assessment:** Students will be subject to peer assessment, which will be recorded on the VDS group Facebook page wall. Individual Facebook groups will also be monitored and assessed.

- **Project Assessment:** Students will be assessed on their final film presentations at the installation, along with their 100 word written brief.

Students will also be required to assess the studio, and tutor performance and input, using a questionnaire provided in the open learning workbook.

## 9.0 Studio Descriptors

The Virtual Design Studio aims to engineer creative collaborative design, employing multi-technological applications and digital media tools to excel connectivity and collaborative practice in architecture and design. Coordinated by Computer Science Lecturer, and technological design visionary Amal Al-Ali, the project aims to encourage students from the University of Sharjah's School of Engineering to collect, collaborate and rethink Sharjah as a developing city. With the guidance of specifically selected expert tutors, the participants must redesign the future province of Sharjah with its heritage and religion placed firmly at the root of design. The students will take part in revolutionary studio-based workshops, with tasks taken from a multitude of disciplines. The intensive three day studio will require students to complete online and hardcopy open learning workbooks. They will consistently update and share their findings, make observations and present material both verbally and via designated digital mediums. The participants will be expected to work collaboratively for the production of design ideas linking the old Province to the new developing, cosmopolitan Sharjah.

The studio's focus is firmly placed on creative collaboration and will include intensive, inter-disciplinary workshops to encourage quality work regarding the role of art and design when redefining design and architecture through the promotion of virtual design pedagogy. It will embrace a diverse range of experience as students from the United Arab Emirates (UAE) will study the urban and suburban conditions of Sharjah. Students from Architecture, Urban Planning and Design disciplines will work collaboratively to explore the possibilities for innovative design solutions through the use of virtual design tools and practices. The organisers will coordinate and document the project, and closely tutor the students. They will prepare all essential materials and technological tools to facilitate and enhance the production of innovative design concepts, culminating in a final installation of film presentations.

To combat the prevalent cultural restrictions the essential technological tools rely heavily on digital media sources including: the social networking website Facebook; real-time interactive graphics such as Whiteboard; 3D Visualisation programmes such as Sketch-up and Autocad; and other forms of online communication such as video conferencing via MSN Messenger and email. A VDS website will also be available with all relevant links for reference and collaboration. Essential materials for the project consist of mainly key texts fundamental to the philosophy of the project itself; the VDS website; lectures from field experts and academics; studio-based work including informal and formal meetings with project tutors. Due to cultural restrictions the project will run parallel for male and female students in separation.

Prior to the VDS, participants will be fully equipped with all the necessary technological tools via the VDS website, Facebook and MSN messenger. Students will be required to create a Facebook page where they will be expected to complete the profile requirements; they'll also have an MSN identification, where they will be encouraged to network and collaborate with fellow participants and they will have instant access via a desktop icon to the VDS website where all relevant links will be available.

## 10.0 Studio Schedule

Below is a timetable of the three day intensive VDS. Please note that the free days and periods are intended for the participants to socialise, reflect and relax which is in compliance with David Schon's theory of reflective practice.

| DAY | 9.30-10.30hrs | 10.30-11.30hrs | 11.30-12.30hrs | 12.30-13.30hrs | 13.30-14.30hrs | 14.30-15.30hrs | 15.30-16.30hrs | 16.30-17.30hrs | 17.30 |
|---|---|---|---|---|---|---|---|---|---|
| 12.10.09 | | Introduction Lecture: Amal Al-Ali | Virtual Tour / Ice Breaker | Pucha Kucha Presentations | Pucha Kucha Presentati / Studio: Initial | Free Period | | Studio Work | |
| 17.10.09 | Lecture: Randah Taher | Lecture: Visions for the Future of Sharjah | Explore & Observe | Initial idea Formation | Flexible Lunch/Prayer | Presentation | Presentation | Studio: Re-mix n re-Match | Lecture: Gemma June Howell |
| 21.10.09 | Project Deadline | Free Period | Free period | Free Period | Studio: Presentation & Critique | Studio: Presentation & Critique | Final Installation | Final Installation | Final Installation |

## 11.1   Academic Staff

**Studio Director**

**Amal Al-Ali. BA, MSc.** Lecturer in Computer Science and a Ph.D student at the University of Glamorgan.

Amal Al-Ali is the founder and Director of the Virtual Design Studio (VDS) and has undergone extensive training and development in the field of Computer Science. She is currently a Ph.D student in at the University of Glamorgan where she is pursuing a PHd concerning the *Uses of Visualisation Techniques in Design Education.* Al-Ali's area of expertise surrounds the internet, in particular multimedia and it's utilisation in education

Whilst studying for her MSc at the University of Wales, College of Cardiff, Al-Ali spearheaded research for modules *Software I* and *Software II,* creating the first *Open Learning Material* for both modules. The material developed enhanced student understanding by 40%. As project leader for course module *Materials Media and Presentation* with the Arabian Gulf University, Al-Ali introduced a computer-based simulation program to enhance teaching and student understanding. The project proved a success with improvement of the participating students' grades up by 40%.

Al-Ali also has valuable practical experience, from when she worked as an IT Manager at Etisalat Company in Dubai (UAE) and achieved the highest performance targets since the department emerged. As an Executive Office Manager for the Ambassador Office with the UAE Embassy in Manama, Al-Ali introduced a database which among other benefits, reduced paper usage from 100% to 20% a year. As a Technical Administrator with the UAE Embassy, Al-Ali also created the Embassy website to support Visa applications.

**EDUCATION**

> PhD. Computer Science, *The Use of Visualisation Techniques in Education,* University of Glamorgan UK**,** *Present.*

> Computer Science MSc. *Web & Multimedia Utilisation in Education,* University of Wales College of Cardiff, UK, English Literature & Language BA. *British Literature,* United Arab Emirates University (UAE)

> **TRAINING**

> *CIW Certified Internet Web Master,* New Horizon ,Bahrain.

> *Using AutoCAD,* Informatics Institute, Dubai.

*How to be Effective Research,* **Cardiff University, Cardiff.**

**PUBLICATIONS**

*Readiness for the Use of Technology for Effective Learning via the VDS: The Case of the United Arab Emirates.* ASCAAD 2007.

*Technology, Adoption and Architectural Education: The Case of UAE Universities.* Archcairo 2006.

## 11.1    Teaching Staff

Supplementary tutoring is greatly accepted especially within the disciplines embraced by the studio and outside the expertise of the tutors.

## 11.2         Tutor Profiles

**Studio Director. Amal Al-Ali. BA, MSc.** Lecturer in Computer Science at University of Glamorgan.

Amal Al-Ali is the founder and Director of the Virtual Design Studio (VDS) and has undergone extensive training and development in the field of Computer Science. She is currently a reader and lecturer in Computer Science at the University of Glamorgan where she is pursuing a PHd concerning the *Uses of Visualisation Techniques in Education.* Al-Ali's area of expertise surrounds the internet, in particular multimedia and it's utilisation in education

**Studio Facilitator. Pradeep Sharma, BA. MA.** Head of Art and Design, School of Creative & Cultural Industries University of Glamorgan, Wales

Mr Sharma gained a BA in Electrical & Information sciences from Tripos, Cambridge University and an MA in Industrial Design Engineering at Teeside University. Now the Head of Art & Design at the Cardiff School of Creative & Cultural Industries at the University of Glamorgan in Cardiff, Mr Sharma is one of the project's expert tutors. He is a prolific contributor to design projects around the UK, including assignments for the Ministry of Defence, BP Research and BT Research. Mr Pradeep has also taught Product Design & Development in New Zealand and was the founding director of the Design Management Masters programme

**Studio Coordinator, Glamorgan University. Gemma June Howell, BA, MA.** Performance Poet and Freelance Writer.

Ms. Howell gained a BA in Political communication from the University of Wales Swansea, and an MA in Creative Writing. Since then, Hafan Books has published her debut book of short fiction entitled Inside the Treacle Well which has been has been long listed for Wales Book of the Year 2010. At the University of Wales, Swansea, Ms. Howell founded and was President of the experimental Creative Writers' Coalition and produced a bi-monthly Daoist-style magazine, Think Allowed. As a prolific writer, Ms. Howell has published many articles online and in culture magazines, and also writes then performs her often radical poetry at various open mic nights around Wales. Currently, Ms Howell is editing Cardiff poetry magazine, The Square. She also organizes literary and music events promoting raw talent in Wales. Her areas of interest include; Post-feminist Theory; Political Science; Social Policy; Contemporary Poetry and Creative Writing & Practices. Her specialties include Journalism; Poetry; Script Writing; Contemporary Film and Writing Fiction.

**Studio Coordinator, Sharjah University Dr. Randah Taher**. Lecturer, Architectural Engineering at [University of Sharjah](#). Educator, Facilitator, and Coach at Contagious Creativity

Dr. Taher is a lecturer in Architectural Engineering at [University of Sharjah](#). Educator, Facilitator, and Coach at Contagious Creativity. Her work is grounded in creativity, human-centered design, social innovation, and sustainable development.

Dr. Taher's main areas of interest are design thinking including Ethnography and Prototyping, Creative Thinking, Idea Generation Tools, Facilitation Skills, and Integrative Thinking. Dr. Taher's expertise include; Creativity & Design Methods & Processes; Architecture & Sustainable Development, Creative Environments; Teams & Social Innovation; Multi-dimensional, multi-disciplinary Design Studios; Complexity Theory and Problem Solving Tools; Cross-cultural Design & Creativity; Idea Visualization & Production; Art-based Learning & Evaluation; Social Enterprises & Sustainable Management; Innovation and Change Leadership.

Dr. Taher is the Founder and President of My Arabic Story (2003-2007),a non-profit project which promotes Arabic culture through its folktales. Later, My Arabic Story grew into a warehouse of stories, in which story collecting, researching, learning, training and producing excelled. She was also Program Development Manager and Youth Leader for United Way Greater Toronto (2007-2008). The Creative Institute for Toronto's Young Leaders (CITY Leaders) initiative was affiliated with the University of Toronto.

**Director of Studies. Dr. Richard Randall, BSc (Hons), MSc, PhD, CEng, MICE**. Senior Lecturer in Design, [Cardiff School of Creative & Cultural Industries](#), University of Glamorgan. VDS Project Coordinator**.**

Dr. Randall is a senior lecturer in design at the Cardiff school of creative & Cultural Industries at the University of Glamorgan. For sixteen years, he was a commissioned officer in the Royal Navy, retiring with the rank of Lieutenant Commander. During his time at the RN Engineering College, Dr. Randall instructed Engineering Officers and was a course leader of MSc in Advanced Marine Engineering and at Admiralty Underwater Weapons Research Establishment, Portland on various R&D projects Dr. Randall has ten years experience working with consultants and contractors on marine civil engineering contracts in UK and overseas.

Dr. Randall also spent seven years with Pembrokeshire College as curriculum leader for marine studies, and won successful bids for ERDF, ESF and Interreg funding to enhance training in Wales and Ireland which enabled the construction and equipping of a marine training establishment in Milford Haven. His main teaching subjects and course leadership include Applied Mechanics (Statics & Dynamics), 2D & 3D CAD and FEA, and is an Award Leader in Boat Design. Dr. Randall's specialist research subjects include: Stress Analysis , Vibration Monitoring & Modal Analysis and Noise attenuation, and he is widely published and accredited.

**Head of the Department of Architecture at the UOS. Dr. Hassan Radoine. Bc.Arch., Msc., M.Phil., Ph.D.** Head of Architectural Engineering Department, University of Sharjah, Sharjar Emirate, UAE.

Dr. Hassan Radoine is the Head and Chairman of the Architectural Engineering Department, University of Sharjah. As a fully licensed Architect and Urban Planner, Dr. Radoine specialises in Islamic Architecture and Urbanism. Other areas of interest include Architecture and Design, Urban Design and City Planning Historical Architecture, Contemporary Architecture, Indigenous Building & Design Traditions, Vernacular Architecture, Traditional Environments, Urban Development & Squatter Settlements, City & Regional Development, Architectural Education, Planning Education, Restoration and Conservation. Dr. Radoine has written prolific articles and book chapters on the above topics.

Dr. Radoine's extensive knowledge and experience makes him the Virtual Design Studio's most accomplished expert tutor, with his research interests including Architecture and Design, Urban Planning, in particular  Sustainable Urban Design, and Urban Conservation,  and lastly, Islamic and Middle Eastern Architecture and Cities.

Dr. Radoine's professional experience encompasses a mass of consultancy work including his involvement as; an Expert Consultant and Project Manager, ADER-Fès & Millennium Challenge Corporation in the USA (2006-2007); Country Director in Fisher Institute, Wharton School, University of Pennsylvania (2005-2006); Teaching and Research Assistant, PennDesign, UPenn (2002-2005); Director of Community Development Unit  World Bank & ADER-Fès (1999-2001). He has also worked as a Lecturer and Professor at Al-Akhawavn University in Ifrane, Morocco (1996-2001), and from 1993-1996 was the Chief Architect and Projects Manager, ADER-Fès, Fez, Morocco.

Dr. Radoine has also delivered lectures and training workshops both nationally and internationally for public and private institutions, universities, and NGO's. He provides consultancy in Urban Planning and Development, Urban Design, Architectural Design, Historic Preservation, and Islamic Architecture & Design. His honours and awards include: The Fulbright Grant, USA (2001-2005); The Prince of Wales' Award (1997); The Foreign and Commonwealth Scholarship, UK (1996); The Festival Trust Award, Exhibition, Rebecca Hassak Gallery,UK (1996); Best Student Award, Ecole Nationale d'Architecture, Morocco (1991).

# Appendix B

## f.   Observations and Analysis of Cardiff Chimera Case Study

**Staff Profiles**

The following profiles illustrate the variety of academic backgrounds, ages, interests and attitudes of the contributors which lent to the diversity of perspectives and variation of teaching methods. The contributors served to lead the students in new directions; exposing them to new ideas which at times caused confusion, but ultimately stimulated creativity. Each contributor guided the students towards different ideas which provoked the students' determination to champion their specific design ideas.

**Professor Richard Goodwin, College of Fine Art, University New South Wales, Australia**

Practicing for over 30 years as an internationally exhibiting artist and architect, Goodwin has sustained a prolific professional practice of art and architecture.  His work, ranging from freeway infrastructure, to gallery installation, to "parasitic" architecture / public artworks, is held at major collections including: the Art Gallery of NSW, the National Gallery of Victoria, the Nuremburg Museum and numerous Regional Gallery and private collections.

Winner of numerous prestigious art awards for his work, Prof. Goodwin is one of Australia's most prominent sculptors. Concerned with the 'neighbourhood', rather than design aspects of urban planning, he adheres to the notion that a city must be a functional social neighbourhood for its inhabitants.

Originally trained as in Architecture, Goodwin graduated in 1977 then continued to gain a Master of Architecture in 2000. In 2008 he was awarded his PhD from the University of New South Wales, and is currently a Professor of Design Studies at the University of New South Wales College of Fine Arts (COFA), and remains 0.5, enabling him to practice within his own studio through which he continues to exhibit and to pursue public art and "parasitic" architectural projects.

Goodwin established the *Porosity Studio* at COFA in 1996.  The studio blurs the boundaries between art and architecture and uses the city as a laboratory.  Since 2004 the studios were run as intensive, international, multi-disciplinary workshops. In 2007, the British Council began sponsoring students from around the world to participate in a series of 3 Porosity Studios within the United Kingdom because of the quality of the work produced and diversity of networks

established. Goodwin's practice continues to evolve and remains at the forefront of the debate regarding the role of public art in redefining both art and architecture.

## John Punter, Professor of Urban Design, School of City and Regional Planning, Cardiff University

John Punter is a Professor of Urban Design at the school of City and Regional Planning at Cardiff University. Prof. John Punter's interests range from contemporary urbanism, in particular aspects of urban planning, urban form, urban design, and architecture to all aspects of contemporary planning practice especially the comparative analysis of planning systems, having completed such studies of France, USA, Canada and Australia. For twenty-five years he's been working on aspects of design control and the design dimension of planning, and this has included major studies in British cities, Wales, Europe, the USA and Canada, and most recently in Australia. John Punter is an expert member of the Royal Town Planning Institute's (RTPI) Urban Design Network Steering Group, a member of the Urban Design Group and a Director of the Design Commission for Wales. He is one of the Chairs of the Design Review Panel and is heavily involved in design training with Welsh Local Planning Authorities and other development and planning agencies. He contributed to the recent Department of the Environment Transport and the Regions (DETR) advice By Design, the UDG advice on Design Guidance, and the RTPI advice on design policies in development plans (From Design Policy to Design Quality). He is on the Editorial Board of five planning, urban design and property journals (TPR, JUD, UDI, JPR, IPS) and has guest edited for four more journals. He serves on the RIBA's Planning Panel and the former ODPM's Planning Research Network. He is a Board Member of Resources for Urban Design Information (RUDI).

## Emma Price, College of Fine Art (COFA), University New South Wales, Australia

Emma is Sydney based artist who teaches at COFA, UNSW but is also one of the members of *The Kingpins.*

*The Kingpins* play with the gaps in and between with an infinite series of transgressive drag acts. Materialising from Sydney's drag scene, the female foursome utilize the aesthetics of remixing, with elements taken from mainstream media, pop culture and art history. They address issues of gender, sex, public space, consumerism and corporate branding. Their performances mix music, video and costume, and are presented as public interventions, sometimes in the form of 'surprise' actions. Gallery installations with posters, projections and soundtracks accompany their performances. Described as 'humorous,

spectacular, grotesque and colourful,' their work engages the audience in a subversive politics of pleasure.

**Allison Dutoit, Lecturer and First Year Chair, Welsh School of Architecture, Cardiff University**

Allison Dutoit holds a Masters Degree in Architecture from the University of California at Berkeley and studied with Lars Gemzoe in Copenhagen. She is an Architect and Senior Consultant at Gehl Architects in Copenhagen. Practicing and teaching in the US, Denmark and the UK, she is also a Lecturer at the Welsh School of Architecture, Cardiff where she convenes the Master of Urban Design course. Dutoit is significantly involved with public realm consultation work in the UK and Europe.

Her research includes Urban Design and the Public Realm, Scandinavian Architecture and Design, Drawing and Representation, Foundation studies. Dutoit's responsibilities include: the Chair-ship of First Year Studies B.Sc Program, Co Scheme Convener of the MA Urban Design (With Marga Munar Bauza). She is also Module Leader for the MA Urban Design studio, Urban Block and Public Space Design, and a contributor to BSc Architectural History and Architectural Technology courses and BSc and MArch design studio. Dutoit is a dissertation supervisor for MArch, MA Urban Design, Second year Design Studio (Spring 2004) and World Architecture: determinants of form Lecture course (Autumn 2004) .

Dutoit is Co-Editor (with Adam Sharr) of Made, the Journal of the Welsh School of Architecture. She was invited Design Critic/Lecturer at the University of California Berkeley, Bath ACE, California College of Arts (CCA), University of Michigan, and DIS Copenhagen. She is the Chair of the Board of Studies and the IT Strategy Group

**Margarita Bauza, Professional Tutor, Welsh School of Architecture, Cardiff University**

Margarita takes teaching as an experimentation and research process to achieve personal development for both herself and her students. Entailing design and developing teaching methods, she specifically tailors modules to achieve specific outcomes. In the MA UD the use of precedents has been incorporated as way of learning, exploring and designing - encouraging the students to develop their own critical thinking and understanding of specific issues and enabling a common platform for discussion among students from different cultures and backgrounds.

Her interest lies in understanding the morphology of the city as a result of many different layers of interventions through time and how economics, specific events and culture has determined the urban fabric and its transformations. Through design, she explores the relationships between the spatiality of a location and the inhabitation and social interaction and how the physicality of a location encourages inhabitation enabling social relations transforming a location into a place and a neighbourhood into a community.

In particular she is fascinated with the shift between public and private domains in cities. These two domains are sometimes defined in terms of ownership, use, management, appropriation or others. Her research aims to establish a representation system in accordance with the complexity of urban boundaries. This would be based on and influenced by the approaches to the subject of authors such as Meleau-Ponty, Sennet, Trías, Heidegger, Land, Seamon and others. Part of her methodology relies on the understanding and exploration of existing studies of boundaries in the discipline of architecture and the translation of this knowledge into urban boundaries.

**Student Profiles**

The studio attracted an array of students (aged between 20-30) world-wide from Tokyo, China, Europe and Australia from a wide spectrum of academic disciplines. The featured degree disciplines were not only expected, mandatory Architecture and Urban Planning based, but spanned from Landscape Planning to Exhibition Design; from Graphic Media and Textile Design to Ceramics and Product Design. The dynamic of multi-disciplines and diversity of backgrounds and ages of the students and staff enriched the *Porosity* experience and bolstered creativity amongst the participants.

**Six Zones**

As part of the *Porosity Studio's* aim to immerse the students in Cardiff's history and infrastructure, the participants were required to produce two minute presentations regarding at least one of the zones visited during the tour. Here, the research was cited rather than explained and the presentations were delivered with clarity and academic precision.

Before the tour, the students were informed that Cardiff has two centres: the city centre and the bay, both of which are intensely developed. Between the two centres are the older residential areas and the newly developed areas. In this 'lost space' the building of more than 6,000 houses are planned over the next ten

years. They were asked to consider whether this was a small city, or big neighbourhood, a large district or whether a neighbourhood even exists. Through the students' observation and interrogation they deemed it a district with neighbourhoods and identified nine vacuums, holes in the city's fabric, potential development sites and opportunity spaces. Issues explored amongst the students included the city's connection or disconnection with the rest of the UK, fragmentation, healing the city, t splintering urbanism, diversification, consolidation and animation. It was here that the metaphorical ideas of the students emerged.

Considering the impact of distinctive neighbourhoods nearby, consolidation into larger neighbourhoods, the necessary requirements for livability, how small neighbourhoods could be encouraged to grow and how a single district could be created with smaller sub-centres, the students were required to intervene and reinterpret their observations in an attempt to alter perceptions and meaning.

Required to create new dynamics when considering the connection and disconnection aspects of Cardiff, the students were had to think about particular modes of interrogation when considering which network, what cues and markets they'd explore, what public realm and what form and focus would the networks have.

The six zones visited on Day Two: Cardiff Bus and Walking Tour were not only chosen to give the students a basic overview of Cardiff's historical origins, but it served to stimulate the students' creative thought process. Through fundamental research of Cardiff's history and geography, the students could summarise the urban conditions and problems of Cardiff's infrastructure in relation to other small cities in the UK and Europe. All students were required to read the key texts and overseas students were advised to make use of Google earth at point of entry to their studies.

1. At the **Eastern Fringe**, an area cut off from the city centre by railway embankments, the students observed the area for possible re-development. The area, having several re-development sites, one containing an important historic building, is split by the London-Cardiff line. The students were asked to consider how the sites could be re-developed/re-furbished in accordance with the requirements of a quality district including worth-while uses and amenities. One of the ideas was to create a student village around the nearby Atrium another was to design a pedestrian bridge for over the railway line.

2. **South Station & Callaghan Square** has been developed at a slow pace, and is the new office quarter south of the city centre. Although the back of Central station is mainly derelict, it is still largely accessible. Here, the students were asked to consider what could be done to this area in relation to zone 3, Dumballs Road and Butetown. Emerging ideas concerned a south station transport link interchange, a new commercial area with a riverside view and even rethinking the connections throughout the station.

3. **Dumballs Road & Butetown** is subject to the City Development Framework and is earmarked for a new 'urban village'. The students were required to think about how the two communities could be joined considering how they'd interact and which new facilities could be installed to satisfy both. An East-West link for cyclists and pedestrians has been planned and students were asked to specifically look at how Mount Stuart Square could be revived and connected.

4. **Lloyd George Avenue, Atlantic Wharf and County Hall.** The avenue is the main link to the bay but is hardly used and at the south-eastern side there is a huge vacuum behind the cultural and government buildings. The students were asked to explore ways to improve connections and how to encourage habitation of the area. They looked at: ways to make the bay-walk more pleasurable; how to give the Avenue and Florish new dimensions and character; the routes of the bendy-bus, considering the old railway and tram route, and again, how Mount Stuart Square could be revived.

5. For the Welsh government-owned area **Roath Basin**, an ethical developer has been appointed to produce a multi-use development which meets the standards of sustainability in the docklands area. The draft plans exist, but the students were encouraged to think about what temporary plans could be used, drawing particularly it's the mix of uses and forms e.g. waterfront development and uses, a cruise ship terminal and/or BBC studios/offices, attempts to make a lively dockside and the relationship between the barrage and larger docks.

6. The remediated land owned by Cardiff Council, **Ferry Road Peninsula**, is where the new Sports Village has been promoted. The area has bisecting fast roads and is a target for high-rise apartment developer. The sports village has had limited success but this area has massive potential. The students were required to question how this area could be exploited. Many ideas concerning a

'leisure' theme arose including: a white water canoeing installation; an eco-waterfront and green network along the Ely River; a beach and outdoor pool and a mega-leisure project with attractions.

**Pecha Kucka**

Pecha Kucka presentations serve to give the group a snapshot of each participant. They were quick, brief introductions of cultural and academic background. The purpose of the Pecha Kucka presentation was for students to affiliate themselves with others, based not on gender, age or ethnicity, but on particular philosophies and ideas. The presentations were quick, short and were designed to give the group some brief information about each student without them sounding long-winded and boring.

**The Brief**

With assistance from the tutors, the students were required to produce their own brief. Implied by the project name: *Cardiff Chimera 2020 ,* the students had to devise appropriate outcomes for the problems facing Cardiff. Prof. Goodwin visualised the emergence of the Chimera 2020 through a collective process of reflection, intensive studio sessions and multiplicity of participants.

Goodwin's use of multi-disciplinary practitioners for lectures and tutorship (typified in Post-modernist multi-disciplinary studios) formed the core of this project as practitioners' personal histories, expertise and spatial intelligence were vital ingredients in the Chimera project. Students speculated the scale, territory and content of the territory of their choice were then required to express their vision through a physical mode, in this case: presentation. The presentations served as a tool to form groups. According to Prof. Goodwin, 'once the groups were decided the multi-disciplinary process begins.'

At this point, the studio encouraged the use of metaphor and philosophical background as key tools. The initial presentations included drawings, data, photographs, performance and digital display which aimed to capture the essence of Cardiff's direction as a developing city. Due to the volume of ideas, feedback and discussion were reserved for studio tuition and interaction at a later date. In accordance with the studio's PEST analysis approach, the students were asked to explore Cardiff and think metaphorically in terms of what the city needs. The students' political beliefs had to be established early on to provide a solid basis for their contributions.

Following the film screening with *Neutral* Film-makers Tapio and Christian, the students were encouraged to embrace filmic language. The brief was to form groups then collectively produce a three-minute film to convey their projected strategy and encapsulate their design concept.

**Facilitation: Small Cities /Big Neighbourhoods**

From the outset Prof. Goodwin instilled a sense of community within the students and focused on the social neighbourhood as a platform for their ideas. To begin, he gave a broad overview of the small cities and big neighbourhoods, advocating that the mix of people, opportunities, sense of identity and facilities are the most important aspects of any social neighbourhood. As the project progressed he became more specific, encouraging the students to enquire and create solutions to problems such as climate change, sea level fluctuations and conflict. He asked them to remember that these solutions must address human survival both socially and physically as well as psychologically.

The project lent to multi-dimensional, multi-cultural and multi-disciplinary viewpoints to broaden both the discourse and the video juxtaposition exhibitions. The *Neutral* workshop taught the students how to communicate through an accessible medium which added an authenticity to the project, allowing the students to develop their ideas using filmic language and thought.

In particular, Prof. Goodwin exercised a PEST (Political, Economical, Social and Technological) in every aspect of the project to encourage the students to shed their initial preconceptions and consider every aspect of Cardiff's infrastructure in terms of its development. The lectures were delivered with the PEST analysis at their core. This enabled the students to get an overview of the city and focus the concentration their own ideas and belief systems.

Observers and supporters included Cardiff Council, Cardiff University and the Welsh Assembly. First Minister Rhodri Morgan's attendance to the initial informal lunch gave the project a sense of prestige, which is crucial when attracting a variety of industry experts, lecturers and students world-wide

Prof. Goodwin's goal to encourage multi-disciplines within each group not only served to achieve original, fresh ideas, but also to create tension. By intersecting different age groups, cultural backgrounds and academic disciplines, the groups were not only exposed to surface tensions such as communication boundaries and conflicts of interest, but were also stimulated creatively. Although there were some dramatic moments when one of the students refused to continue with the project, the students appreciated the method of learning and found the space to

work sufficient. With consistent support from the tutors, the students managed their projects successfully and felt the deadlines were fair.

Through the use of 'free time' the students were required to socialise, relax and above all reflect upon their projects. Donald Schön's innovative theory surrounding notions such as 'the learning society', 'double-loop learning' and 'reflection-in-action' has come to typify theoretical academic thought. The students were encouraged to become reflective practitioners and embrace the relationship of 'reflection-in-action' to professional activity.

Notions of reflection-in-action and reflection-on-action are integral to Donald Schön's philosophy in 'The Reflective Practitioner'. The former, at times described as 'thinking on your feet', involves using experiences, connecting with feelings, and attending to our theories in use. This involves building renewed understanding to inform action in a particular situation which is unfolding.

The practitioner must experience something alien in an uncertain or unique situation to reflect on the phenomenon. Drawing on previous innate understanding of the practitioner's behaviour, the practitioner then experiments with these new-found behaviours which ultimately serve to generate a fresh take on the phenomenon and therefore initiates change within the current situation.

In accordance with the delivery of the project the students were required to employ reflective analysis throughout the project; the alien environment acting as a stimulus for their design ideas. The idea was to encourage the students to: get an understanding of the self; to clarify any previous preconceptions; to be able to grasp the theory and make sense of the data. This stripping of the students encouraged them to be inductive. Their understanding was gradually built through the emersion and reflection of the project stimulated by a combination of participatory observation, lectures and studio based sessions. The aim was for the students to identify and build on new dimensions which ultimately challenged their original perceptions.

Throughout this reflective process, Goodwin operationalised a metaphorical, collective approach to urban design; employing the city's historical origins and functional importance as a basis for the design projects. Chosen specifically to give the project a rich sense of diversity, the contributors stimulated creativity, and through Goodwin's emphasis on metaphor the students could freely develop their projects in accordance with the suitability of Cardiff's history and identity.

**Final Installation**

To give the project a sense of finality the films were then screened at the finale installation. Serving to boost creativity, the films aided the students' storytelling, allowing them to exhibit the material they'd gathered over the course of the project. Based on the student's original metaphors, the films were silent to cross the language barriers. The films explored metaphors including a pomegranate and soap bubbles. With regards to the segregated diverse, ethnic groups on the outskirts of Cardiff, one of the students saw the pomegranate as a metaphor to 'bring the outside in.' Another student suggested that soap bubbles represented small businesses in Cardiff, and that they should be joined together just like soap bubbles.

The installation took place at the National Westminster Bank on Bute Street and served to: encourage public critique; create a sense of achievement and pride within the students and to give the project closure. The project also received press attention, adding to its prestige for future projects. I

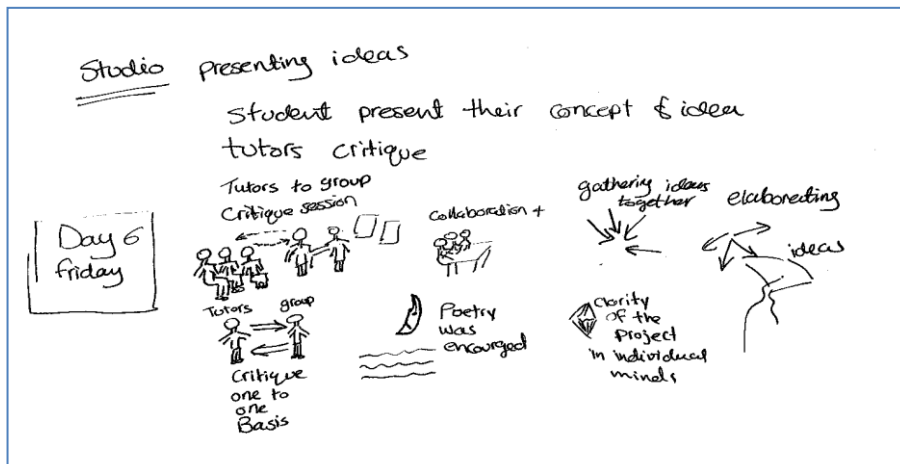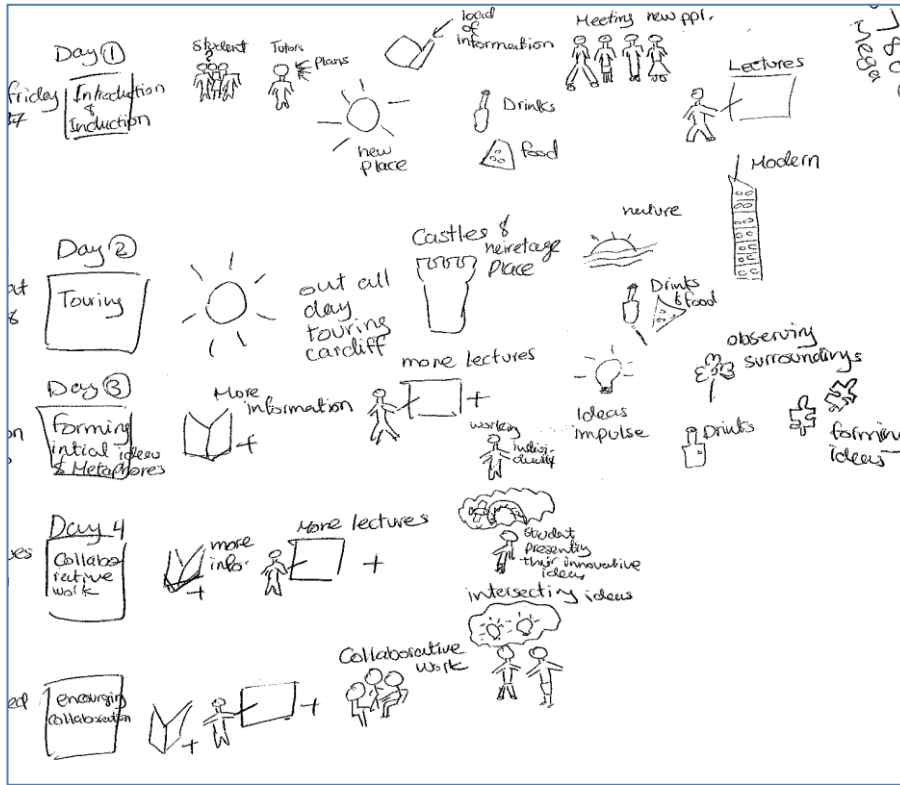## g.  Interviews Guide for participants of Cardiff Chimera

| No. | Questions about collaboration in Cardiff Chimera case study |
|---|---|
| 1 | The project aim was clearly stated? |
| 2 | Did all members shared the same vision |
| 3 | Did all team member took ownership of the project and were keen for its success. |
| 4 | Did all members took ownership of the project as a whole |
| 5 | Did other members contributed successfully to the completion of this project |
| 6 | Was Communication formal or was it open and the ideas flew? |
| 7 | Was the communication mainly verbal? |
| 8 | Was there written communication? |
| 9 | Did team members communicated outside the design studio room? |
| 10 | Was the concept shared and clear for all of the team members despite the ideas variation? |
| 11 | Did you as a team shared the same outcome? |
| 12 | Was there a shared goal? |
| 13 | Were you fully involved and committed throughout the whole project |
| 14 | To what extent you felt that you were committed to the project? |
| 15 | How important is this project to you personally |
| 16 | Do you agree that sharing ideas is important? |
| 17 | Do you agree that sharing your thoughts and ideas with others contributed toward the success of this project? |
| 18 | How easy was it to communicate and share ideas with people from different background and culture? |
| 19 | Were other members willing to share their ideas with you? |
| 20 | Were all team members encouraged to participate in the decision making process? |
| 21 | Were all team members invited to all meetings? |
| 22 | Were all team members aware of the role they had to do? |
| 23 | Was easy to adapt to the changes occurred in the project? |
| 24 | Was the team successful in meeting the deadlines? |
| 25 | Was the goal for the project reasonable? |
| 26 | Did you have confident in that the work done by other members will be the same standard as yours? |
| 27 | Were you willing to accept that the ideas of others could be better than yours? |
| 28 |  |

| No. | Questions Guide bout creativity use in Cardiff Chimera case study |
|-----|---------------------------------------------------------------------|
| 1   | Were you encouraged to see and analyse problems? |
| 2   | Did you use techniques such as min mapping to communicate your ideas? |
| 3   | Did you use brainstorming to provoke ideas? |
| 4   | Were new and unique ideas encouraged and provoked? |
| 5   | Was there a flow of different ideas? |
| 6   | Did you have the chance to think freely in this project? |
| 7   | Were you able to adapt and build on other ideas? |
| 8   | Were others able to adapt and build on your ideas? |
| 9   | Was curiosity encouraged? |
| 10  | Did you use problem solving technique in this project? |

## h. Creativity Check List

| Creative dispositions: | Description of what happened – what has been said or done. |
|---|---|
| Identify and solving problems. | |
| Asking questions, being curious. | |
| Generating and extending/refining ideas. | |
| Suggesting hypotheses. | |
| Applying imagination. | |
| Thinking divergently - looking for alternative outcomes. | |
| Experimenting with ideas, materials, and techniques. | |
| Being challenged and learning new skills. | |
| Taking risks. | |
| Work independently and collaboratively. | |
| Developing criteria for judging the value of work or ideas. | |

## i. Samples of Rich picture method used for Cardiff Chimera Case study

Day ① Friday 27 — Introduction & Induction · Student · Tutors · load of information · Meeting new ppl. · Lectures · Drinks · Food · new place · Modern

Day ② Sat 28 — Touring · out all day touring cardiff · Castles & heritage place · Nature · Drinks & food · more lectures · ideas impulse · observing & surroundings · Drinks · forming ideas

Day ③ Mon — Forming initial ideas & Metaphors · More information · workers individually

Day 4 Tues — Collaborative walk · more info · More lectures · student presenting their innovative ideas · intersecting ideas · Collaborative work

Wed — encouraging collaboration

Studio Presenting ideas
Student present their concept & idea
tutors critique

Day 6 friday — Tutors to group Critique session · Collaboration + · gathering ideas together · elaborating ideas · Tutors group · Critique one to one Basis · Poetry was encouraged · Clarity of the project in individual minds

VIRTUAL DESIGN STUDIO: PROCESS DIAGRAM

DAY 1 (THURS)
INTRODUCTION & INDUCTION
STUDENTS TUTOR (CHAIR) LEARN
NEW PLACE
VIRTUAL TOUR
MEETING NEW PEOPLE
LUNCH FILM PECHA KUCHA STUDIO IDEAS
COLLABORATIONS IMPULSE
PRESENTATIONS (INITIAL IDEAS)
MORE INFO IN STUDIO
OBSERVATION OF SURROUNDINGS
SOCIALISE REFLECT & RELAX
IDEAS IMPULSE
SOCIALISE REFLECT & RELAX
DEADLINE FOR FINAL PROJECTS
COLLABORATION IDEAS INTERSECT

DAY 2 (FRI)
LECTURE
PRESENTERS & SOCIALISING (REFLECTION)
STUDIO
COLLABORATION
TUTORS MIX (N) MATCH GROUPS
COLLABORATION IDEAS INTERSECT
TUTORS GUIDE & ASSIST
MORE INFO IN STUDIO
COLLABORATION

DAY 3 (SAT)
LECTURE
FILMS SHOWN
STUDIO CRITIQUE
INTRODUCTION TO EXHIBITION
FINAL EXHIBITION

DAY 4 (SUN)
LECTURE

DAY 5 (MON)
FINAL PRESENTATIONS OF FINAL FILMS

75

Wed 1-9/09

Richard 3 has setting here

British Council

Richard

John

John

Tutor.

Richard + home in

close observation
of the
discussions

Richard →



77
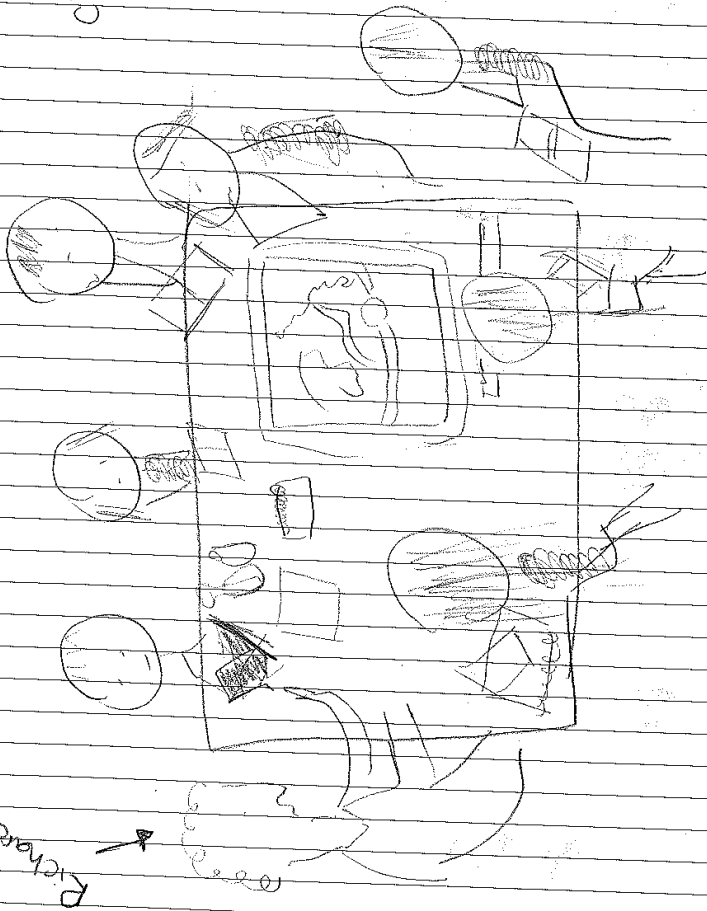
## j. Samples of Students Interview

Cummings.

Email: kojimarika2007@gmail.com

FIRST DEGREE.

Name: RIKA KOJIMA. - Product Design.

MASTERS : KYUSHU UNI / JAPAN

DESIGN STRATEGY NEW

PRODUCER

DESIGN MANAGER NOT KNOW DESIGN.

DESIGN TEAM SHOULD KNOW.

STRATEGY SURROUNDING DESIGNS

METAPHORE : NO EMPHASIS - NO METAPHOR - ONE SENTENCE.

= ORIGINAL IDEA - ATTITUDE - GO WILD -

ESCAPISM - BUBBLES.

- DON'T KNOW CARDIFF. - HARD FOR SOLUTION IN TWO

WEEKS & FOREIGN CITY.

- CITY CENTRE TO BAY.

ITS NOT WHAT - CARDIFF CASE STUDY OF CITY
WE WANT.

| 1. SD | 2. SA | 3. A | 4. SA | 5. A | 6. SD |
|---|---|---|---|---|---|
| 7. SA | 8. A | 9. D | 10. A | 11. SA | 12. SA |
| 13. A | (14. A) | 15. A | | | |
| 16. SA | | 17 SA | | | |
| 18 SA | | 19 SA | | | |
| 20 A | | 21 A | | | |
| 22 A | | 23 A | | | |
| 24 A | | 25 A | | | |
| 26 D | | 27 D | | | |
| 28 N | | 29. A | | | |
| 30 A | | 31 A | | | |
| 32 D | | 33 A | | | |
| 34 A | | 35 A | | | |
| 36 A | | 37 A | | | |
| 38 A | | 39 A | | | |
| 40 D | | | | | |

MAIL: Nataliearni@gmail.com

2 PEOPLE

JOURNEY                                          Projection

NAME: NATALIE MINASIAN. — HETTI

SYDNEY — ARCHITECTURE.

METAPHOR— STITCHINGS — CARDIFF — LANDSCAPE — FABRIC —

MANY IDENTITIES — FOLD OF FABRICS & DIFFERENT

CULTURES.

— JOURNEY — JUNCTIONS — SEEMS — SOFTEN

THE EDGE OR ELSE.

DISUSED BUILDING — PROJECTION.

| | |
|---|---|
| 1. SA | 2. A |
| 3. SA | 4. SA |
| 5. SA | 6. SD |
| 7. SA | 8. SA |
| 9. N | 10. SA |
| 11. SA | 12. SA |
| 13. SA | 14 SA |
| 15. SA — WILL TAKE FURTHER | 16. SA |
| 17 SA | 18. SA |
| 19. A | 20. A |
| 21. SA | 22. SA |
| 23. SA | 24. SA |
| 25. A | 26. A |
| 27. SA | 28. SA |
| 29 SA | 30 SA |
| 31. D — SKETCHING | 32. A |
| 33. SA | 34. A |
| 35 SA | 36. A |
| 37 A | 38. SA |
| 39. A | 40 SA |

Communication

PRACTICAL PROBS -
LAND PARCELS.
/ REALITY.

NAME: MANAS MURTHY.
STUDENT ARCHITECTURE - CARDIFF - URBAN DESIGNER.
AIM - MASTERS - URBAN DESIGN.
- BUBBLES - GIRLS TOETS. - PEOPLE FLOW - CATCHMENT AREAS -
BAD WATER - DRAINAGE - CHANNELS - LIQUID MEDIUM -
BUBBLES :
PEOPLE   GO WILD - SLOWING LIFE PACE - ENJOY PLEASURE
NATURE - WORKED ON FINAL VISION.
PLAN How MAP OVER CARDIFF - BUBBLES & FOAM.
- GIVING - INTENSION & BEING TO LITERAL - Natural
                                                   Progression -
JOHN - CLEAR INTENT. / - STUCK BETWEEN CONCEPTS.
                         USE MORE INSTINCT - LITERAL
                         AGAIN. - WENT BACK TO MAP -
                         DOES IT FIT.
RICHARD - NOT CANNOT UNDERSTAND EVERYTHING - BE
             CAREFUL.

1. SD
3. SA
5. A
7. D
9. O
11. N
13. A
5 D - AT BEGINNING
7 SA
19. SA - 3 PEOPLE
21. N
3. A
5. A
7 A          28. SA
2. A         3 0. SA
5 A          34. A
A            37 A
A

2. D - NOT IN BEGINNING - RIGHT AT
       END -
4. SA - STRONG DEBATES - DESIGN APPROACH
        This lead to FIGHTS.
6. SD
8. D
10. D
12. A
14. D
16. A
18. SD - 3 People
20. A
22. SA
24. A
26. SA
29. A
32. SA
35. SA
38. A

80

NAME: PETER REASON
EDUCATION: PRODUCT DESIGN – UNDER GRAD – 2ND YEAR.
– WORK EXPERIENCE
– BYCYCLE PROJECT.

| | |
|---|---|
| 1. SA | 2. A                                        FOUNTAIN AS FLOW. |
| 3. N – IN IT TOGETHER | 4. SA |
| 5. A | 6. A – URBAN DESIGN – START ) INDIAN CIRCLES – FORMAL – |
| 7. SA | 8. SA |
| 9. A | 10. A |
| 11. SA | 12. D – OUTCOME } BYCYCLES. GOALS } DIFFERENCE THE CITY & BYCYLL |
| 13. A – TWO TEAMS – MANY PROJECTS TIME. | 14. A. |
| 15. SA | 16. SA |
| 17 SA | 18 A – No ROAD Problems. |
| 19. A | 20. D |
| 21. SO | 22. SA |
| 23. SA | 24. A |
| 25. A | 26. SA |
| 27. SA | 28. SA |
| 29. SA | 30. SA |
| 31 A | 32. D |
| 33. SA | 34. FLOW D |
| 35. SA | 36. SA |
| 37 SA | 38. SA |
| 39. SA | 40. SA. |

EMAIL   DIRKYATES@GMAIL.COM —

NAME : DIRK GATES — (ON OWN)
STUDY. BRISBAN AUSTRALIA
       : VISUAL DEGREE — CONTEMPORARY ART —
         CATALOGUES — LOCAL ART MAGAZINE.
     — MASTERS OF ARCHITETURE..
     — ART & ARCHITETURE = INTEREST.
     — CHALK — MATERIAL — TRANSPORTABLE.
       — SPEED BUMPS — ACTS RATHER THAT WHAT
         IT LOOKS LIKE.

| | |
|---|---|
| 1. A | 2. N. |
| 3. A | 4. A |
| 5. SA | 6. N |
| 7. A | 8. A |
| 9. D | 10. A |
| 11. N | 12. A |
| 13. N | 14. A |
| 15. A | 16. SA |
| 17. N | 18. A |
| 19. A | 20. A |
| 21. N | 22. N. |
| 23. A | 24. N. |
| 25. A | 26. A. |
| 27. A | 28. N. — IF WITH CROWD. N. |
| 29. A | 30. A |
| 31. D | 32. A |
| 33. SA | 34. A |
| 35. SA | 36. A |
| 37. A | 38. A |
| 39. N | 40. N. |

**k. Pictures of Cardiff Chimera is enclosed in the CD attached.**

# Appendix C

## l. Exploratory survey at the UAEU

There are two computer labs at the Male campus. The first lab is equipped with twelve Pentium IV IBM Net Vista computers. The second lab is equipped with seven Pentium III IBM 300GL computers and four Pentium IV IBM Net vista computers. The lab also has three IBM 300PL Pentium II computers. The first lab is also equipped with one 9600 power Macintosh and one P IV Dell tower.

The second lab on the other hand is equipped with one PIII Compaq desk pro, and there is also a lab-server with one high speed P III IBM Net Vista. There is also one lab in the women's campus that consists of twelve PIV IBM Net Vista and seventeen PIII IBM Net Vista. The lab also contains nine PIII IBM PC300GL and one PIII Compaq Deskpro.

The women's lab also contains two HP laser printers, one canon printer, one HP scanner scan jet, one HP plotter and one Infocus LCD projector. The males' lab is also equipped with one HP Plotter Design Jet, HP laser printer and HP Scan Jet.

CAVE is abbreviation of Computer Animated Virtual Environment. The CAVE is considered to be the most advanced and sophisticated technology in applying the virtual reality techniques in architecture and design.

The investigation started with drawing a random sample of twelve students from the class list of each of the five cohorts in the architecture school. An equal number of students was selected from each of the male and female campuses. A preliminary meeting was held with each of the male and female students separately. In this meeting, the researcher informed the students of the purpose of her research and told them that she needs to collect information about their perceptions of the teaching and learning practices in the design courses. She, then, explained the procedure that will be followed and the time they need to devote to this work. The researcher also assured them that the collected information will be confidential and participation is voluntary. Small pieces of paper were then distributed in which each student wrote his/her name and indicated whether he/she was willing to participate. Only one male student from the first year cohort and one female from the third year cohort indicated they were not willing to participate. Both of them indicated that they could not devote the time needed because of personal reasons. The two students were replaced with randomly selected colleagues.

Prior to the focus group meetings, the researcher prepared an interview guide, the questions of which flowed from the general to the specific. However, this guide was not intended to be faithfully followed. The researcher decided to refrain from interfering if the general question was sufficient to lead the students to cover all the aspects of the information needed. The questions were meant to be used as triggers when needed, and to turn the students back to the issues under consideration when the conversation strays away from these issues. The researcher also decided from the outset that she will

allow the conversation to flow naturally by encouraging students to tell stories, and by ignoring student's tendencies in such situations to go back to an issue, interrupt each other, or even contradict themselves. This plan was necessary to strike a balance between the need to preserve the natural features of conversation and the need to keep the discussion focused without exceeding the limit of two hours in any session.

The investigation was carried out in ten sessions. In each session, the participants were a group of students from the same cohort and gender. Homogeneity of the group members was necessary to ensure that younger students would not censor their ideas in the presence of older students. In addition, it was necessary to organise separate meetings for the male and female students in observance of the traditions of the UAE community. As mentioned earlier, the male and female UAE University students attend their classes in separate campuses.

In the group sessions, the researcher faced two contradictory situations in the younger and older students groups. It was very easy to get male and female students in levels three to five to open up and work together in a social atmosphere to the extent that it was relatively difficult to get the students back to the issues under consideration. Moreover, male students showed no objection to the researcher's suggestion to audio tape the sessions. However, this was not true for the female students in levels three to five. On the contrary, the researcher had to make some effort to get students in levels one and two to open up. In addition, when the researcher suggested to audio tape the session students felt uneasy. This was apparent from the silence that prevailed and the looks exchanged between the students. To ensure credibility of the collected information, the researcher made extensive written notes of the discussions of all female sessions and of levels one and two male sessions. As for the lecturers, the researcher made written notes of all interviews since these interviews were short. All audio taped sessions were transcribed. The written notes were reviewed immediately after each session to ensure completeness by adding notes recoded mentally.

Data analysis of the transcribed students' notes proceeded in several steps. For each session, the notes were read several times. A search for preliminary themes was conducted in the first reading. These themes were recorded. In a second reading, discussions, stories, views, and ideas that were consistent with these themes were noted. At the same time, the researcher made effort to discover any additional themes that she missed in the first reading. The above procedure was repeated in the third and fourth reading of the notes. In three cases, a fifth reading was necessary. A further step taken was to compare the themes discovered in the various sessions. In general, it was considerably easier to discern the themes underlying level three to five data. In fact, the researcher found it easier to interpret the levels one and two data in the light of the themes discovered in the higher levels data. The data collected from the lecturers was easy to interpret. In the following paragraphs, the findings from the exploratory interviews are presented.

Exploratory Interviews

The focus group methodology was conducted to identify students' perspectives of the current teaching and learning practices in the design courses offered in the architecture school of the UAEU.  The aim of this investigation was first to gain a preliminary understanding of the difficulties, approaches, attitudes, perceptions, and motivation related to the learning of design in architecture schools.  Second, the investigation was designed to assess the extent to which the students would be interested in the use of sophisticated technology in the teaching and learning environment in the UAE architecture education schools in order to achieve effective learning.  The study was conducted in the UAEU because it is the largest university in UAE, and because other universities that house an architectural school or department follow a similar educational system.  In addition to the focus group interviews with the UAEU students, unstructured individual interviews with lecturers from this university and the AUS were carried out.

These interviews were conducted after the focus group session.  The purpose of the interviews was merely to validate the information collected from the students.  For this reason, the interviews took the form of casual conversations whenever the researcher found an opportunity to talk to a lecturer in the UAEU after one of the focus group sessions.  AUS lecturers were interviewed to ascertain that the learning environment in this university was not disparately different from that of the UAEU.  For more details about this see appendix A.

Findings from the interviews

To summarise, there were three major issues that persistently emerged during the group discussions: First, the differences between students' preferred methods of learning and teachings methods employed by the lecturers; second, the contribution of prior knowledge towards learning and understanding; and third, learning methods of students. The issues are discussed below

Preferred learning methods

Three main problem areas came under constant discussion and were continuously referred to with regard to learning methods, learning preferences and motivation. These problems were brought up by both students and lecturers. Students indicated that present methods of teaching are not positively contributing to understanding the subject. It was found from the interviews that effective learning on the part of the students can be improved by using the following methods:

Interactive and Simulated Real World Imitation:  Students seemed to be critical of the lecture method, the current method of teaching. They have difficulty learning through just one sense, the sense of hearing. It was found that most students favoured learning through real time imitation. They believed they can understand better through imitating real life projects characterised by a design process involving a full team working together in one project.  When one of the fourth level students offered a summary of the discussion about the topic by saying "it offers us the experience which we cannot get from reading books", the other students in the group expressed an overwhelming

approval.  This view was expressed more clearly by older than by younger students. One can conclude that the older students believed that collaboration helps them in appreciating and understanding the subject much better.  Younger students did not express this idea with such clarity. Quite a number of times younger students mentioned that they normally seek advice or discuss design problems with their friends or seniors. They indicated that they felt more comfortable and achieved better understanding when they discussed design problems with their peers.  It would thus seem that students, in general, were ready to adopt the social constructivist approach to learning the design subjects.

Hands-on experience:  Students in the third to fifth levels agreed that the models which they built were simple and unsophisticated at the beginning, but with experience, support, and reflection, they became increasingly complex.  On the basis of this, they argued that the tutors' role should not be to do the job on their behalf, but rather to facilitate learning.  They clearly indicated that tutors should not only communicate the important facts and concepts in the discipline but also, and more importantly, help in bridging the gap between the structures of the discipline and the structures in their minds.  These views are consistent with the cognitive learning theory.  Recent researches suggest that each person has a particular set of learning characteristics that determine the ways and means by which he/she learns.  However, these innate learning preferences are almost immediately modified and developed by activity and experience. This continues over time and in relationship to context, through the variety of learning experiences encountered (Wolf and Kolb, 1984).   Learners integrate new ideas with prior knowledge in order to make sense or make meaning or reconcile a discrepancy, curiosity, or puzzlement. They construct their own meaning for different phenomena. For this reason, the tutor must engage students in active dialogue around learning and using learning materials. He/she must set a range of tasks and strategies which will facilitate and involve students in active processing (for example discussion, debate, questioning, explaining) so that they transform, translate and own the learning as personal knowledge

Visualisation:   Students in all levels emphasised that they can understand and communicate in the design process better when visual aids are used.  Many of them commented on the current practice as:

"very superficial" …

"lack of visuals"..

"blurry and lack in-depth information"...

"too much theory... ".

One of the level two students commented that:

"I am not happy with the way we are taught here. I can't get the essence of learning construction [...] may be lack of visual contact as I learn faster (better) through visual,

especially 3-D like videos or slides [...]. I prefer video better than slides as slides are lifeless and still using two dimensional illustrations".

Students' attitudes towards learning were considerably influenced by the need to visualise three dimensional illustrations (3-D illustration) such as designing in 3D on the assembling of building components, axonometric drawings, exploded forms and videos on the problems and difficulties faced during the process of designing. In fact, perception towards three dimensional drawings were highly favoured by them and perceived as one of the best methods to better understand applications in design. The majority of the students interviewed pointed out that they would understand the subject much better with appropriate visual aids. Many of them were not satisfied with the present teaching methods.

Students' Learning Methods

It was apparent that the main method of learning adopted by students was rote learning. However, it was found that students also used repetitive sketching, especially on detailing of various construction techniques so as to help them to pass in examinations. This method of learning could partly be due to the assessment procedure used by the university to evaluate students' progress where 60 to 70 percent of the assessment was based on their examination results (AUS, 2005 ; UAEU, 2005). The serious consequence of this method of evaluation is that it results in surface learning. The subject matter would most probably not be understood in depth (Nicol and Pilling, 2000). Students need to learn design in construction related subjects through understanding not memorising. The need for deep subject understanding is the main objective of the present research.

Attitudes and motivation

Despite heated discussions on students' learning problems; there was hardly any mention of their antipathy towards design. All students agreed that they are motivated to learn the subject but are faced with problems in understanding it, probably in relation to the design process. The most significant issue related to this problem is the underlying learning motivation towards this subject. Students are motivated to learn to achieve goals that they consider relevant to their needs. This to some extent is explained by Maslow's Hierarchy of Needs where a learning goal is an instructional purpose, aim or objective that is set before students as a means of encouraging learning (Maslow, 1987) .These learning goals by themselves serve to motivate students to achieve a certain level of competency in a particular area. Such goals can be a short term (when lecturers ask students to complete a short assignment or just to pass the examination) or long term (as when we ask them to study a principle in order to understand its usage in design that may be used repeatedly over a long period of time). The effective lecturer will be able to set meaningful and relevant goals that encourage learning.

Discussions of students around this issue indicated that long term goals would provide for the most effective motivation to learn design. Three other factors that would affect motivation were highlighted during the discussions in almost all groups, namely:

Lecturer's enthusiasm for the subject (dedicated lecturer); positive relationship between lecturer and student; and well organised system of communication and instruction.

Additionally, students criticised the assessment of design projects which according to them, heavily emphasised the presentation aspect. To accommodate this, less effort is put into the process and teamwork. In the statement below, one student expressed regret towards remarks made by one, of his lecturers.

"In my opinion, the school emphasise too much on presentation (colour, drawings, etc.).

In summary, the learning and teaching problems that surfaced in the interviews can be dealt with via the intermarriage of learning theories and technology. As indicated in the review of the literature, the cognitive and constructivist approaches emphasise collaboration and learning by doing to achieve construction of meaning and transfer. The tools provided by technology can facilitate the implementation of these approaches.

# Appendix D

## m. Case Studies for Phase 1 Stage 3

### i. Case of Sydney University:

Sydney University has a history of experimenting with the VDS since the 1991 when the famous book "understanding virtual design studio" was published. In the collaboration side Sydney university has experimented and practiced an cross discipline VDS as well as cross universities VDS with some other worldwide universities. This enables the student to gain experience with dealing with different cultures (multicultural VDS).

The use o media in Sydney University has included the use of digital course materials as well as digital media for drawing and sketching.

The use of advanced 3D tools in Sydney's VDS is obvious by the use of software such as virtual world for communicating in both synchronous and asynchronous modes as well as using avatar technology for representing participant in the studio. The use of WebCT course management tools is also present for managing student progress and monitoring their participation in the studio activities.

Duration of VDS at Sydney varied according to course requirement from as little as two weeks to as long as three or four semesters.

Student at Sydney has been practicing with VDS in different sets of design briefs according to the course requirements. Some complex problems have been tackled as well as short term single problems.

At Sydney university the interest was on the technology side as well as the educational side, in another words the university competed to integrate the highest technology as far as VDS is concerned such as the use of avatars and 3D objects as well as the use of course management systems to be able to manage the students progress and contribution to the course.

### ii. Case of Strathclyde University

In Strathclyde University the experiment with VDS started as early as the 1996 when the ICON project (Institutional Collaboration Over a Network) which was a joint project between the Department of Design, Manufacture and Engineering Management (DMEM) at the University of Strathclyde and the Department of Product Design Engineering at Glasgow School of Art (GSA). Third year undergraduate students work in pairs, one from each institution, on an intensive eight/nine-day-long collaborative design task. All stages of the activity involved in this task, from initial generation of ideas through to final presentations, are coordinated by means of remote interaction between members of a pair, supported by a range of communication technologies. These include shared whiteboard and workspace, email and chat facilities, and audio and video links. The ICON project was then developed into ICON 1 in June 1997 and ICON 2 in September 1998. This project web sight was the precursor of the Clyde Virtual Design

Studio (CVDS), developed by Clyde Virtual University in conjunction with DMEM and GSA, an online virtual environment created to facilitate a wide range of collaborative design projects, available only to institutions connected to the ClydeNet Metropolitan Area Network.

The use o media in Strathclyde University has included the use of digital course materials as well as digital media for drawing and sketching.

The main concern in Strathclyde University's VDS was in the use of networking technology to support the design process.  As the project emphasised the importance of multidisciplinary interaction and decision making as the fundamental requirement of teams in the design process.  Emphasising the importance of industrial globalisation that meant design teams are drawn form a pool of talented that is geographically distributed.

Technologies such as synchronous and asynchronous was used accordingly for communications.

Duration of VDS at Strathclyde varied according to course requirement from one semester to a whole year.

As the case in Sydney student at Strathclyde University has been practicing with VDS in different sets of design briefs according to the course requirements.  Some complex problems have been tackled as well as short term single problems.

At Strathclyde University the main objective was to provide a platform for investigating the feasibility of using computer networks as a means of communication in educational design.

## Appendix E

### n. Published Papers

iii.     1st paper READINESS FOR THE USE OF TECHNOLOGY FOR
        EFFECTIVE LEARNING VIA THE VDS: the Case of the United Arab
        Emirates. Proceeding of 3rd Int'l ASCAAD Conference on
        Em'body'ing Virtual Architecture [ASCAAD-07, Alexandria, Egypt]

iv.     2nd paper Implementing a Virtual Design Studio Model in
        Architecture Education in the United Arab Emirates. Proceedings
        of the 6the international conference on e-Learning Applications.
        American University of Cairo 2009 – Cairo, Egypt.

 v.     3rd paper Creativity and collaboration in architecture education
        in the United Arab Emirates', Proceedings of the 5th ASCAAD
        conferenceon  Digitizing Architecture Formalization & Content,
        Bahrain.

# Appendix F

## o. Al-Sada Magazine Press Release of the VDS