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TOWARD COLLABORATIVE VIRTUAL ARCHITECTURE DESIGN STUDIO

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TOWARD COLLABORATIVE VIRTUAL ARCHITECTURE DESIGN STUDIO

Abstract

The application of Virtual Reality (VR) is important on higher education level; it is also imperative to explore how this style of interaction could be used to help students in understanding and exploring more proper mental models of complex systems and processes, abstract models and other non-intuitive material. The hypothesis is that VR can successfully be used to support such complex understanding by stimulating and exploring all human senses whereas traditional notions of learning tend to focus on purely intellectual skills. The study will examine the constructive philosophy of learning and discuss how it may be supported by the use of VR to provide examples of different classes of VR applications that, for educational purposes, focus on learning. The research subject which is the impact of information of communication technology (ICT) on architectural form of higher educational spaces focus on the future of architectural Educational studio and the new generation of paperless design studio. The purpose of the paper is expecting the transformation in the form of architectural educational spaces with response to the wide range of ICT and use of VR applications especially in Architecture Design Studio (ADS). It is also identifying the new configurations and characteristics of (ADS) in Communication Era.

Keywords

Virtual learning environments, Virtual reality in architectural, Virtual Architectural space, Virtual Education, Educational Environments, Virtual world

Towards Collaborative Virtual Architecture Design Studio

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ABSTRACT

The application of Virtual Reality (VR) is important on higher education level; it is also imperative to explore how this style of interaction could be used to help students in understanding and exploring more proper mental models of complex systems and processes, abstract models and other non-intuitive material. The hypothesis is that VR can successfully be used to support such complex understanding by stimulating and exploring all human senses whereas traditional notions of learning tend to focus on purely intellectual skills. The study will examine the constructive philosophy of learning and discuss how it may be supported by the use of VR to provide examples of different classes of VR applications that, for educational purposes, focus on learning.

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1. INTRODUCTION

Authors are asked to submit their abstracts. It is a fact that human communication plays an important role in how one develops an intellectual mind and the way knowledge is transferred to the next generation. From this point of view the increasing use of learning technologies in higher education has to be critically reviewed. The main concern in this research is: How can one create an academic learning environment for architectural students' based on online course material with Virtual Reality (VR) as their only communicative tool?

During the past three decades, a radical and transformative technological revolution has unfolded that has resulted in fundamentally new ways of doing education, conducting research, communicating, and seeking and exchanging information.

1.1 Potentials of (VR) communication in architectural Education

Advances in learning theory have clear implications for the ways in which learning most likely takes place. The emphasis today is on active construction of knowledge by the learner. The importance of prior experience, the fitting of knowledge into existing schema or the

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establishment of new schema, and the active processing of information are all components of this model that emphasize high learner involvement. Environments that provide experience, stimulate the senses, encourage the exchange of information, and offer opportunities for rehearsal, Feedback, application, and transfer are most likely to support learning (Oblinger, 2006).

A learning space (as sown as Fig. 1) should be able to motivate learners and promote learning as an activity, support collaborative as well as formal practice, provide a personalized and inclusive environment, and be flexible in the face of changing needs. The part technology plays in achieving these aims is the focus of this study (Knight, 2006).

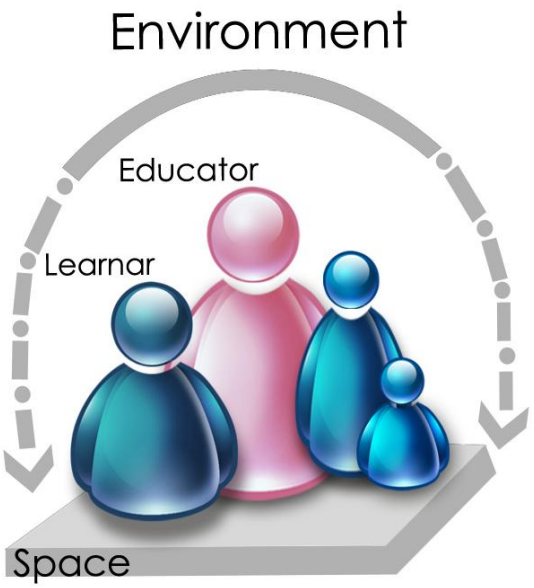


Fig. 1 Educational environment elements
Reference: The Author

Each has advantages and disadvantages: synchronous communications are somewhat similar to traditional classrooms, but they constrain learners to a specific time, which may be inconvenient if learners are from different time zones; asynchronous communications overcome this time constraint, but can result in a lack of coordination and synchronization of discussions, and may result in learners not feeling part of the class (Anderson, 2004a).Though textual discourse or chat has been a popular feature of the Internet for several years, due to these recent advances in communication technology, audio chat and Internet telephony or voice over Internet protocol are becoming increasingly popular (McGreal & Elliott, 2004).

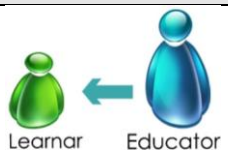
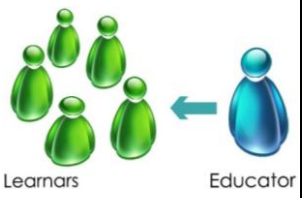
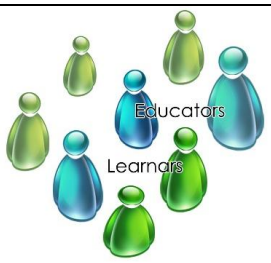
2. TYPES OF ARCHITECTURAL EDUCATION SPACES

Learning takes place everywhere inside the college campus, in fact, learning arguably happens everywhere— on city sidewalks, in airplanes, in restaurants, in bookstores, and on playgrounds. Human beings—wherever they are—have the capacity to learn through their experiences and reflections. Institutions of higher education are charged with fostering specific kinds of learning: higher-order thinking abilities, communication skills, and knowledge of the ways of disciplinary experts, to name a few.

2.1 Based on Learning Process

Depends on many elements such as educator, learner, and the educational space.. Space can have a powerful impact on learning; we cannot overlook space in our attempts to accomplish our educational goals (Oblinger, 2006).Three styles of educational spaces can be classified according to the educational process types (as indicated in Table 1).

Table 1: Types of Learning Process
Reference: The Author

Learning Types		Space consideration.	Relationship
1	**One-to-one space**	The connection here is between one educator and one learner, so the educational space isn't connected to a definite place, but appears where a teacher appears, disappears when he leaves, and transforms according to teacher's behaviors	
2	**One-to-group space**	This style is based on one educator is teaching a group of learners a specific curriculum.	
3	**Group-to-group space**	Based on relationship of educational foundations that consist of organized groups of educators who deal widely with different categories of community. This process generates a group of attached; semi attached or detached spaces in one campus, which is directed by one administration.	

2.2 Based on the Level of Educational Space Formality

The terms formal, non-formal and informal learning result from the necessity to draw distinctions in order to attain a deeper understanding of the complex term 'learning'. For this reason as shown in (as indicated in Table 2), the learning process needs to be examined with respect to its organization, regulation, and support by teachers or trainers. It also needs to be explored with regard to its contents, structure, form and context. Some important contrasts appear when one does this.

Table 2: Levels of Educational Space Formality
Reference: The Author

Level		Description	Space	Time
1	**Formal Learning**	Formal learning is planned learning that derives from activities within a structured learning setting	**Defined & fixed**	**Limited**
2	**Non-formal learning**	Non-formal learning consists of learning embedded in planned activities that are not explicitly designated as learning, but which contain an important learning element. Non-formal learning is intentional from the	**Defined & dynamic**	**Limited**

		learner's point of view			
3	**Informal**	Informal learning is defined as learning resulting from daily life activities related to work, family, or leisure. It is often referred to as experiential learning and can to a certain degree be understood as accidental learning and a learner control objective	**Undefined & dynamic**	**Unlimited**	

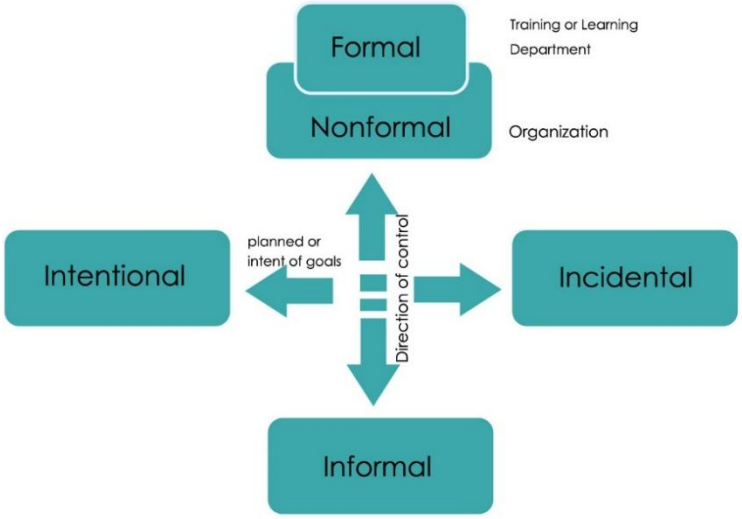


Fig. 2 Formal and informal learning chart
Reference: http://www.knowledgejump.com/learning/informal.html

Informal learning is semi-structured and occurs in a variety of places, such as learning at home, work, and through daily interactions and shared relationships among members of society (as sown as Fig. 2). For many learners this includes language acquisition, cultural norms and manners. Informal learning for young people is an ongoing process that also occurs in a variety of places, such as out of school time, as well as in youth programs and at community centers (as shown as Fig. 3)

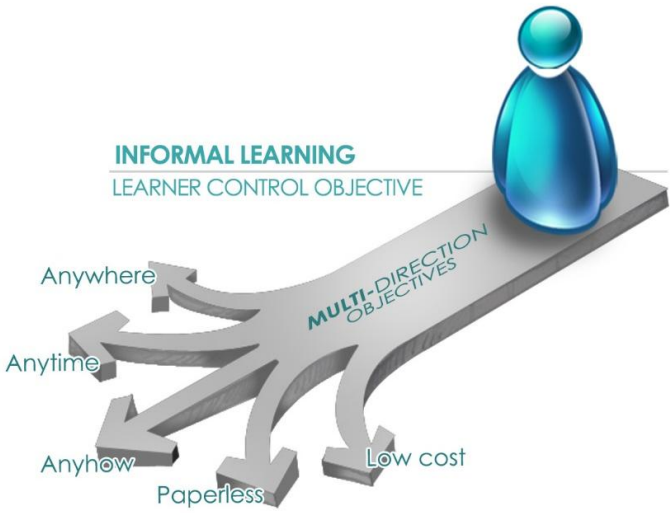


Fig. 3 Informal Educational Process
Reference: The Author

3. THE VIRTUAL UNIVERSE

The term virtual universe denotes the database defining a static three-dimensional model and the other components needed to simulate and generate the interactions which take place in a virtual environment. The data sets can describe a physical model based on the real world as well as more abstract phenomena. Geographical terrains, data from satellite photographs, or multidimensional database describing financial transactions can be simulated in a virtual universe. The universe is comprised of many different elements, containing not only the models to be simulated, but also the conditions under which these models are perceived. Variables such as lighting, material texture, and relative viewing position can be manipulated in the VR database.

3.1 Virtual Reality

The key advantage to use a virtual learning environment (VLE) is the ability to use it anywhere and anytime. Virtual reality could add a whole new dimension to the learning process. Compared to the traditional strategies of lecture, drilling, reading and testing, virtual reality offers entirely new formats for learning. Virtual reality has been introduced to many fields of specialization such as training, education, communication, scientific simulation, engineering, industrial production, architecture, historic preservation and archaeology medical operation, media art presentation, entertainment, game, virtual reality experiences, virtual tours and object visualization.

3.2 A Virtual Classroom (VCR)

Equations Virtual classroom is an advanced learning environment, created using internet and computers supplicated video conferencing devices, in which either teacher is not physically present (for remote learning) or students are not present (distance education) in VCR (as sown as Fig. 4).

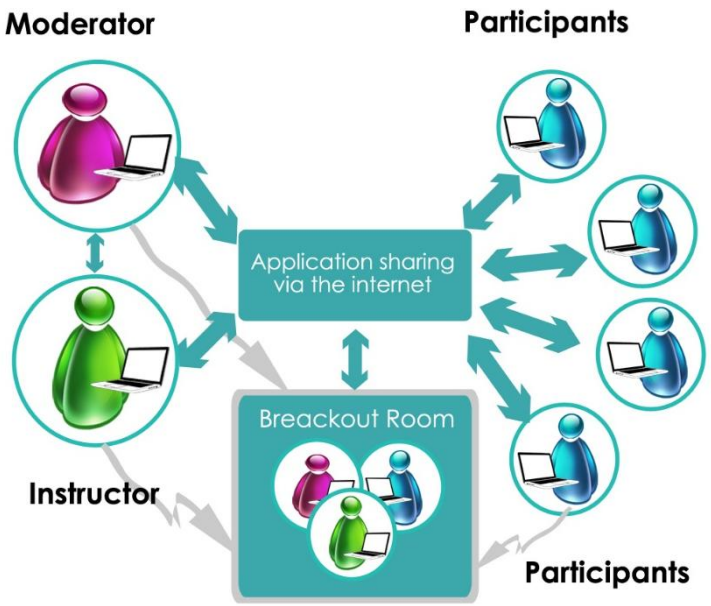


Fig. 4 Virtual Classroon
Reference: The Author

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4. THE VIRTUAL DESIGN STUDIO (VDS)

The Virtual Design Studios (VDS) explores the asynchronous and synchronous techniques in remote design collaboration. By using technologies, such as video conferencing, Internet publishing, e-mail, Web3D, and digital modeling, students gain an increasing understanding of the new modes of collaboration and media integration in design practices. The VDS also enriches the architectural experience by exposing studios to different design cultures and to a larger context of design feedback. The first Virtual Design Studio was attempted at the University British Columbia, during the early 1990s, in collaboration with other schools of architecture such as Harvard, MIT, Washington University, Cornell University, and Hong Kong University (Wojtowicz, 1994).

4.1 Traditional Architectural Design Studio

The classical design process is summarized into two steps sketching (concept) and drafting to prepare the classical documentations. In today`s design studio the first step of sketching still in the manual technique but the second step evolves into digital process of drafting and visualization. Traditional design studio consists of four main stages (as sown as Fig. 5).

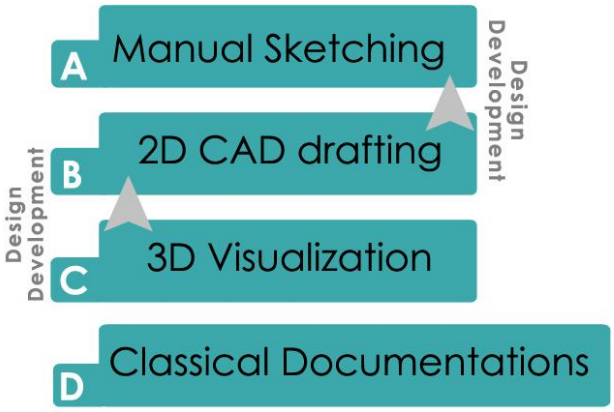

Fig. 5 The porcess of Traditional Design Studio
Reference: The Author

4.2 Digital Architectural Design Studio

In the other side, the experimental virtual design process contains three main steps, digital sketching, Virtual studio design process and dynamic product in the real time of CAD drafting and 3d modeling, like ARCHICAD and RIVITE application which enhance the speed of design production process and manipulate the designer perception (as sown as Fig. 6).

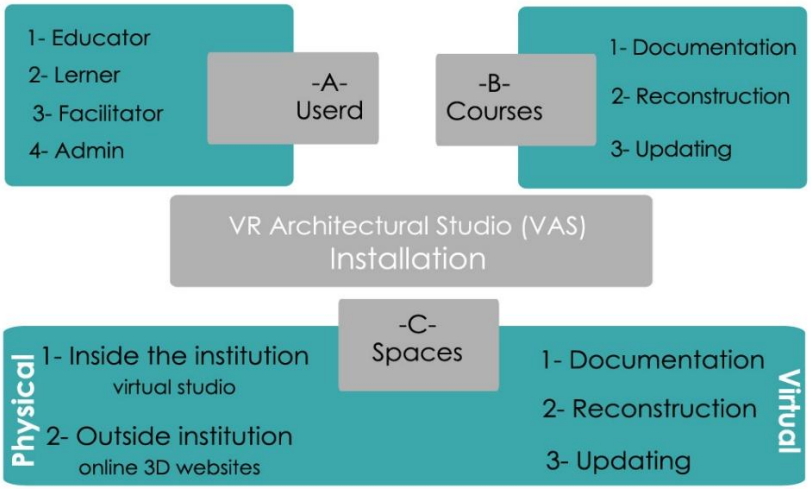

Fig. 6 The porcess of Virtual Design Studio
Reference: The Author

4.3 Virtual Architectural Design Studio

One of the principal aims of architects is to have all the information visually disposed all the time during the designing process. Architects want to see their products before they are actually constructed; they want to see them in an interactive way; they would like to walk through them, etc. Simply, they want to know whether the proposal is correct or modify it repeatedly until the desired shape/form is reached. This kind of visualization is not only important for designers, but is useful also for clients, who can easily communicate with architects and might change some undesired things before they are actually constructed. All of the above-described aspects are native to VR applications.

The virtual architectural studio (as sown as Fig. 7) is an exercise which stimulates creativity, increases the sense of community, the interest for the problems of society, increases and satisfies the need for knowledge overcoming the language, geographical, cultural or political barriers. This implies a community in comparison with the traditional face-to-face way of transmitting information.

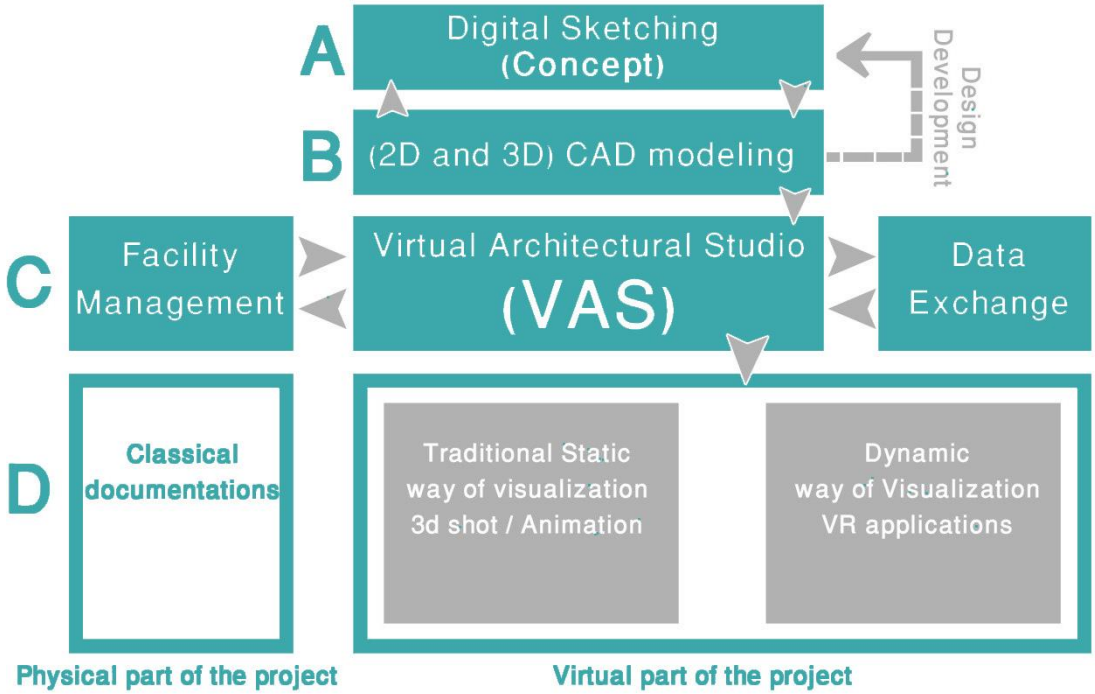

Fig. 7 The porcess of Virtual Design Studio
Reference: The Author

5. CONCLUSIONS

5.1 Advantages of Virtual Architectural Studio

The futuristic vision of architectural design studio is based on virtual educational studio that deals separately with every learner regardless of time or location of both educator and learner. This generates a flexible virtual learning environment and gives the educational process more potentials than the physical educational environment.

A. Multi-feature flexible educational space, more flexible schedule and unlimited teaching hours.
B. Indirect connection, depends on the student and provides a multiplicity of use.
C. Whatever the number of the students is, it does not need to increase the cost.

5.2 Difficulties in the Virtual Architectural Studio

D. Lack of face-to-face interaction is an obvious disadvantage in this context of the online studio.

E. Technological problems, as for example the rate of data transmission or connections, the information media that every participant has may appear and cause difficulties in the development of the project resulting in periods of stagnation

F. The limitation of the security and privacy of architectural education evaluation process in the virtual world.

G. The real educational spaces still carrying more emotional education behaviors greater than the virtual spaces. Because of the unsecure relationships which give unreal feelings

6. RECOMMENDATIONS

- Designers and developers of integrating VR with architectural education courses should direct their attention to consider the personal and individual differences among students according to their range of age.
-The cultural and social background as well as the traditions of the society of the students, to which the architectural courses integrated with VR will be oriented, should be considered and respected the planners and developers of these educational programs.
-Lecturers should be very accurate and sensitive in choosing and utilizing the VR programs which can enrich and develop each educational situation in accordance with its requirements and aims.
- VR learning situations should be developed to be integrated with the traditional learning student g situations. The human interaction within the learning environment between both lecture–student and student-student should be the major consideration

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