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# Towards an Online Based Design Critique Framework for Design Education

**Tilanka Chandrasekera***

Department of Design Housing and Merchandising, Stillwater, Oklahoma, USA

## Abstract

Architectural education has considerably deviated from the process oriented nature to being product oriented due in part to the proliferation of digital tools which provide one step solutions. In this view it is necessary to discuss the relevance of design critiques which in nature have been seen as product oriented. There have been many studies conducted on the architectural critique process and its relevance to architectural education which have been mainly based on the traditional physical space settings. These studies mostly focus on the salient features of design critiques and aim to provide a guideline in conducting such critiques. The practice of architecture, while becoming global in scope, is constantly exploring emerging technology for effective distance communication. . There have been a number of studies conducted on the viability of online tools for online design studios, which are the core components in design education. Previous studies have often considered the online environment as supplementary to the physical setting and in most studies online environments are considered to have the same properties as the physical environment when the online environment offers more possibilities in enhancing architectural education. *In* this study we consider the architectural critique process as an educational procedure and investigate if an online virtual environment can facilitate the traditional architectural critique. The purpose of this study is to develop the knowledge base guiding the planning and design of online virtual collaborative environments that can achieve effective learning outcomes through an architectural critique process by initiating a framework for online based design critiques.

## Keywords

Virtual Reality, Design Critiques, Design Education

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## 1. Introduction

The roots of the Design Studio format in Architectural education stem from the early 19th century Ecole des Beaux-Arts in Paris (Chafee, 1977) where it was called an atelier, being the French term for the word studio. This model was later developed by the Bauhaus school which is still being used in architectural schools around the world (Franciscono, 1971).

The Design Studio learning format is molded through a constructivist ideology where students are encouraged to learn by doing, and in this process design is thought of as an ill structured or ill-defined problem (Simon, 1973). In ill structured problems the answers are unclear and sometimes require the student to reformulate the question in order to provide a solution. The studio setting affords the student to experiment and analyze different facets of a design problem and come to design conclusions.

The derived solutions are then reviewed through a critique process which is often done at different stages of the design process. The design critiques have been an integral part of design education from the beginning and forms an invaluable part of the student's design process. It is the main pedagogical tool used in design education and appears in many forms through the entirety of the students design

* Corresponding author
E-mail address: tilanka@okstate.edu

process manifesting as deskcritiques, group critiques, peer critiquesetc., as formal or informal in nature.

The practice of architecture while becoming global in scope is constantly adopting tools of technology for its progress. There have been a number of studies conducted on the viability of using online tools for design education; more specifically for online design studios (Wojtowicz, 1995; Schnabel, Kvan,Kruijff and Donath, 2001; Maher, Simoff, andCicognani, 2000; Kvan, 2001), and there have been some studies concentrating on conducting online design critiques(Moloney, Amor,Furness,andMoores, 2003; Bender,and Vredevoogd, 2006).

To better understand the inferences of the online critiquing process in design education, its pedagogical implications needs to be analyzed under two specific disciplines.

- Design critique and the educational process
- Online collaborative educational environments

Previous studies have identified how online design critiques can be used for a successful design reviewing process. However, there are no studies currently which focus on developing a framework of novel methods in design critiques. Therefore there is a critical need to periodically update the existing body of knowledge as technology progresses. This study provides a framework as to how online design critiques can be explored in the design studio pedagogy.

# 2. Design Critiques

## 2.1. Overview

The concept of critiques beyond the context of Architectural education can be traced to 18th century Cambridge University where one of the graduates of the college was appointed to sit on a stool and dispute with new bachelors. Originally called the “tripos” or bachelor of the stool, this was intended to guide the students and foster learning (Anthony, 1991).

Design critiques, sometimes referred to as design juries or design reviews, are used both as an educational exercise as well as an evaluation tool and have been used in design education for more than a century. The inception of the constructivist approach to Architectural education which promotes the concept of learning through experience is credited to the Ecole des Beaux Arts School in Paris, even though less formal Architectural education techniques might be traced further to mediaeval times. Earlier, the chief craftsman- master builder “arkitekton” – learnt his profession through apprenticeships and practice. The currentiteration of the master builder (Architect) learns his profession similarly through the use of tutorage and evaluations of simulations of real situations.

The critiques which took place in the school of Beaux Arts were carried out behind closed doors by design tutors with no input from students. The basis of the critique system is the learning process between the mentor and the apprentice which has its roots in the history of the profession where the students of architecture gained their education through tutorage of a master. The connection between the master and apprentice needs to be clearly understood in order for the design critique to be productive. Currently, there are a number of variations to the original critique process which is mostly conducted publicly. The main difference between the original format and the models which have followed is that the critique process now is considered as an educational tool rather than an evaluative one.

## 2.2. Taxonomy of Design Critiques

According to Utaberta,Hassanpour, Zaharin,andSurat(2010), critiques can be divided into two main categories (see Fig 01 below).

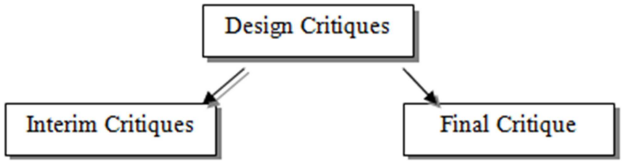


**Fig. 1.** Design critiques: a taxonomy.

The final critique serves an evaluative purpose and the interim critiques serve an educational purpose (Utaberta, Hassanpour, Zaharin, and Surat, 2010).The authors also cited variations for the interim critiques.

a) Individual critique - One to one discussion tutor and students

b) Formative critique – a type of interim critiques which provide feedback during any stage of the design process for the student to improve their designs

c) Peer Critique – (Student led) Run by student groups and a tutor is generally present who acts as a facilitator

d) Group Critique – (Tutor led) Students will present their work in front of their tutors and peers and receive feedback which can be from tutors only.

e) Public Critique –Invited professionals take part in the critique process

f) Written Critique -The criteria for comments have to discuss before criticizing.

g) Seminars –Informal critique sessions in a round table format

h) Panel Discussion – A participatory discussion session

through a critique panel regarding students design

While often, students find the interim critiques to be helpful in improving their design as well as learning different techniques, they tend to find the final critiques frustrating due to its evaluative nature. Utaberta,Hassanpour, Zaharin,andSurat(2010) present an alternate viewpoint on final critiques suggesting that these types of critiques provide the opportunity for students to evaluate and reflect on their own work and develop their own critical judgment.

### 2.3. Nature of the Design Critique

Giving consideration to Dewey's (2005)theoretical base regarding criticisms, Daracott, (1991), states that criticisms are formed through three general stages; Description, Interpretation and Evaluation. Description is defined as the general narrative of the design project and the reviewers response to the presented work which is based on their (reviewers) own subjective perceptions. Interpretation allows for the understanding of the presented work and provides different views based upon culture, myths, history, and recognizable symbols. Evaluation is a summation of the entire process and allocation of a grade to the student.

While design critiques help to define a student's design language it is also known to provide novel avenues in design thinking and evaluating (Meyer,1991). Design critiques are seen as a medium to improve students confidence about their design abilities which provides a solid base in becoming a confident professional. The collaborative nature of the design critique allows students to learn from each other and provides a two way educational modality rather than the conventional classroom educational system.

As the main pedagogical tool used in design studios, design critiques allows students to see their work in comparison with other students work which allows the tutors to evaluate students according to a scale established specifically to the standard of that particular class. The review feedback does not merely provide a grade rather it gives the students a chance to improve their design techniques and identify their strengths and weaknesses and also allows the student to explore the academic environment more freely. The concept of deadlines established through the critiquing process allows the students train in becoming efficient and to work on time, which is an important trait of a designer. A design critique can also be seen as a spontaneous problem solving exercise where in the students need to address issues raised by the reviewers instantly, that trains the students in problem solving (or problem framing) which is an important aspect of design education.

By observing the design critique process some salient features that facilitate educational opportunities can be identified.

- Majority of Design critiques are collaborative and involve multiple parties (students and tutors)
- Interaction among parties
- Design critiques takes place in controlled learning environments
- A major component in design critiques is communication modality. Different techniques such as 2D presentation drawings, 3D images, 3D walkthroughs, physical models, written communication, verbal communication etc. are used to communicate between student and tutor.
- Nonverbal communication/body language

## 3. Education and Virtual Environments

### 3.1. Overview

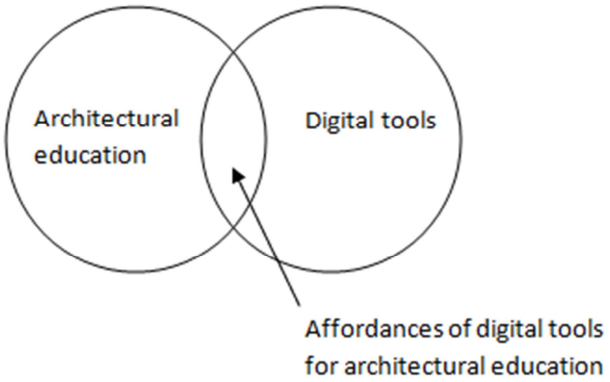


**Fig. 2.** Using digital tools in architectural education.

Traditionally, design critiques have taken place in physical settings, but due to needs such as reaching a larger audience, ease of material access, independence of place and time and lower overhead costs compared to traditional learning environments, online architectural education is becoming widely accepted.As the main pedagogical tool of Architectural education the design critique needs to address these new modalities. Virtual environments have been used in Architectural education for form finding/developing purposes, communication/collaboration, and presentation of ideas (Schnabel and Kvan 2002). Focusing on the same affordances of technology, this study attempts to retrofit the critique process into these new digital mediums. In doing so the study looks at how these mediums afford the salient features of design critiques.

### 3.2. Online Educational Mediums

Online learning has its roots in the domain of distance education which became a phenomenon in the USA during

the 17th century (Nasseh,1997). Since then the medium of distance education has evolved from mail based to audio/video based to online based. This evolution in distance education is documented by Nipper (1989) through three generations.

- The First Generation: correspondence study,
- The Second Generation: multimedia distance education,
- The Third Generation: computer-mediated distance education.

The first generation of distance education involved the use of printed material often distributed through the post. In the second generation the print medium was supplemented by broadcast media (Radio and Television) and recorded media (Video and Audio). The third generation starts at the beginning of the 21st century, centering on the computer and the internet. This third generation can be considered as the era of online education.

Even though the medium of dissemination has changed, most of the basic characteristics of the first two generations are unchanged in the third generation online educational mediums. Keegan (1980) identifies six major characteristics which are common to the three generations.

- Separation of teacher and learner
- Influence of an educational organization
- Use of media to link teacher and learner
- Two way exchange of communication
- Learners as individuals rather than grouped
- Educators as an industrialized form

According to Keegan (1980) these characteristics are seen in most online educational programs of which some are seen as problems needing to be addressed in order for the medium of communication to be successful.

With regard to addressing some of these questions many distance educators have begun to adopt an educational model based on constructivist epistemology (Jegede, 1991) which can be applied to online educational environments. As opposed to the objectivist paradigm that considers an objective reality, the constructive paradigm considers reality as a resultant of the interaction with the environment and peers (Vrasidas,2000). Interaction is thought of as an important factor in considering online educational environments. Many authors have acknowledged the need of interaction in online educational environments stressing on the connections between student – environment and student – peers/teachers (Stubbs, 1976; Chickering and Gamson,1987; Fulford, and Zhang,1993; Kearsley,1995).

In this regard Gunawardena and McIsaac (2004) believed that theoretical challenges for distance education will center on issues related to learning and pedagogy in technology mediated learning environments. One such issue is understanding and evaluating knowledge construction in online collaborative learning communities (Gunawardena and McIsaac, 2004)

### 3.3. Collaborative Virtual Environments

Interaction is thought to be one of the most important factors in learning (Dewey,1938; Vygotsky, 1978) Simpson and Galbo (1986) defined interaction as a behavior in which individuals and groups act upon each other. The essential characteristic of interaction is reciprocity in actions and responses in an infinite variety of relationships: verbal and nonverbal, conscious and non-conscious, enduring and casual. In the context of online environments interaction can also be thought of as interaction between student and environment. In this context Moore provides us with three types of interactions in learning environments, learner-teacher, learner-content, and learner-learner (Moore, 1989). To fill the gap in the interaction types Moore suggested, a fourth type of interaction proposed by Hillman, Willis, and Gunawardena (1994) which they term as learner-interface interaction.

Affording these different types of interaction results in a more comprehensive learning experience, and it is therefore pertinent that online environments which provide interaction are developed. It is in this context that Collaborative Virtual Environments (CVE) become important.

The term “Virtual Environment” is used very loosely in most context to denote an artificially created digital environment. These environments can be immersive or non-immersive. It has been accepted that in educational virtual environments the more important aspect is interaction rather than immersion (Youngblut, 1998; Sutherland, 1968). A collaborative virtual environment is defined as connected computer systems aimed at the fulfilling a certain collaborative task within a generated 3-D virtual environment, where interaction between users and this 3-D virtual environment is possible in real time (Bouras, Triantafillou,Tsiatsos, 2001). Another definition states that Collaborative Virtual Environments (CVEs) are computer-enabled, distributed virtual spaces or places in which people can meet and interact with others, with agents and with virtual objects (Redfern andNaughton, 2002). Both these definitions emphasize the importance of interaction in Collaborative Virtual Environments.

A collaborative virtual environment entails the interaction of members within that environment. Studies have been conducted on the sociological aspects of individuals in these

spaces which have included Communication etiquette, Privacy/Territoriality, Identity, Group interaction, Social position and intimacy (Becker and Mark, 1999). Some researchers have looked at these communities through Common Identity and Common Bond Theories (Ren, Kraut and Kiesler,2007) to provide a theoretical basis in constructing social connections. In order to create a successful CVE, it is pertinent to discuss the sociological issues and provide solutions.

Some studies provide formulas for successful CVE's in elaborating the necessary elements of a CVE. Leigh, Johnson, andDeFanti (1997) state, Avatars, Suitable Interfaces for Collaborative Manipulation and Visualization, Audio/Video Teleconferencing, Flexible Support of Various Data Characteristics, Scalable and Flexible Topological Construction, Synchronous and Asynchronous Collaboration, Persistence in Collaborative Virtual Reality are necessary characteristics of a CVE. In an age where social media has become an omnipresent fact of life, it is important to consider the sociological implications of the CVE's in education since the users of these environments will be the younger generation. With regard to online design studio environment (which are also CVE's) Craig and Zimring (2000) states that achieving a sense of community around the work of the studio is not trivial, moreover, a sense of community is not guaranteed by opportunities for interaction but, rather, must grow out of interaction itself.

Architectural design is essentially a collaborative endeavor between the designer, client, builders and other consultants. In this context effective collaboration becomes an essential part in a successful design process. Reffat (2005) discusses the collective nature of architectural design and state that it is important to establish the virtual design studio as a collaborative endeavor.

# 4. Online Design Studios and the Virtual Critique Process

## 4.1. Overview

In the first section we have discussed the traditional design studio and its critique process, and there after we have discussed online educational environments and specified on the collaborative virtual environments as a subcategory which is more suited for online design studios.

There have been a few studies conducted on online design studios (Schnabel andKvan, 2001; Anderson, Esser andInterrante, 2003; Kvan, 2001; Broadfoot and Bennett, 2001; Chastain and Elliott, 2000) which emphasize the importance of conducting collaborative virtual design studios. These studies stress the importance of using virtual reality for design students where they can explore alternative solutions to those achieved in conventional design methods through collaborative means. The importance of team work is often emphasized as offering new ways to explore, design, interact and communicate spatial constructions (Schnabel, 2002).

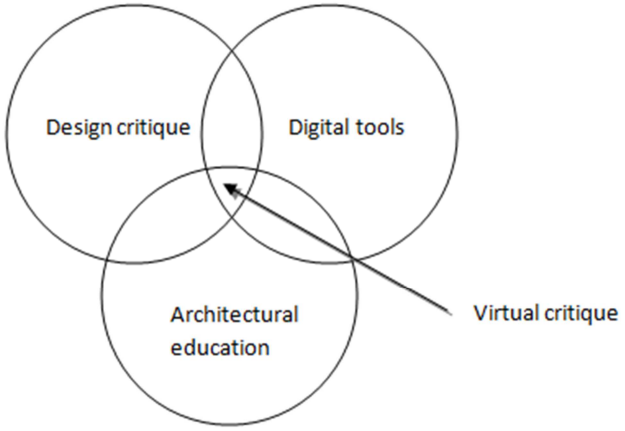


**Fig. 3.** Virtual critique as an outcome of traditional Architectural educational pedagogy, design critique metaphor and usage of digital tools.

The term "online design studio" may refer to a networked studio, distributed across space and time (Whitford, 1984) and the participants of these online studios may or may not be in various locations. According to Harasim (2000) there are three modes of education delivery in online education.

- Adjunct mode uses networking to enhance traditional face-to-face or distance education.
- Mixed mode employs networking as significant portion of a traditional classroom or distance course.
- Totally online mode relies on networking as the primary teaching medium for an entire course or program.

Presently most educational programs employ a mixed mode where a portion of the class continues in the physical environment another potion of the class takes place online. These studios are often referred to as 'Virtual Design Studios' (Wingle, 1969), and allow students to be located anywhere yet still participate in collaborative work (Wojtowicz,1995).

- This study is more focused on the online design critique process than the design studio process. But it is impossible to discuss the critique process without briefly introducing the context in which it occurs. Blair, Blythman and Orr (2007) discusses the main principles of critiques as a reflection on their own learning in relation to their peers. Design students may work with their peers in, Learn from their peers
- Clarify ideas
- Practice presentation skills
- Develop their critical awareness through evaluation and

reflection

- Receive feedback from their tutors and peers
- Test ideas in a supportive environment without the pressures of the 'real world'

Many digital platforms have been used for online design critiques, such as second life, gaming engines, and privately developed software. Each of these modes has their own strengths and weaknesses. The questions that need to be raised are if these online critiques should follow the same format as the traditional critiques? Should they be paralleled with its counterpart in the physical world? Should they proceed with the same routine as in the real world critiques? For example Abdellatif, (2008) provides a study of a second life design critique where the student presents the design scheme in the conventional pin up system to a jury while in a different study (Okeil, 2002) a virtual platform is presented where the student is able to take the jury on an interactive journey through the building while presenting 2D drawings as well. In this study we attempt to examine design critiques in both virtual and physical setting and to understand how effectively the physical metaphor can be used in the virtual setting.

## 4.2. A Taxonomy of Online Critique Environments

Giving consideration to the available platforms for online education and virtual design critiques the study presents a taxonomy for online virtual critique environments.

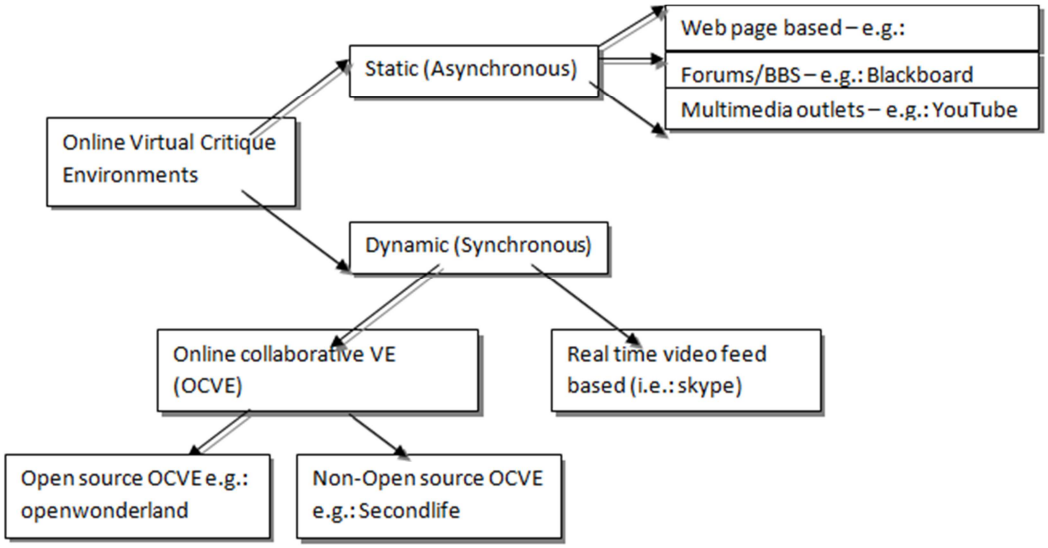


**Fig. 4.** Taxonomy of online virtual critique environments.

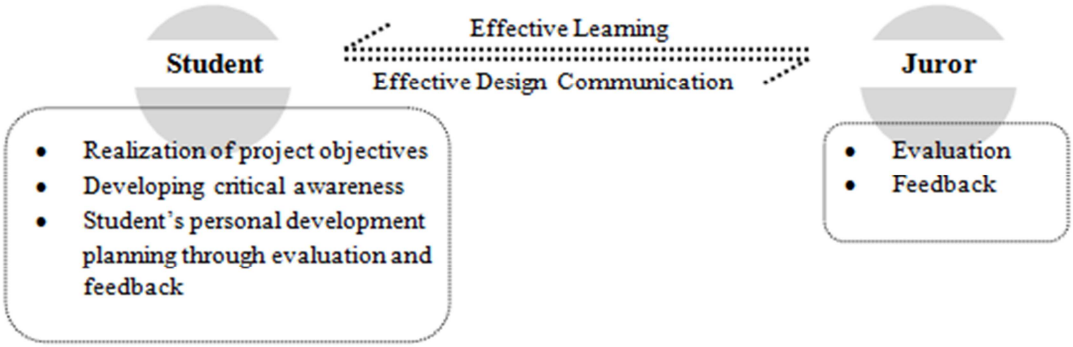


**Fig. 5.** Criteria for a best case design critique (adoption and modification on Doidge's Model).

In our taxonomy, online virtual critique environments are divided into two main sections based on being real time or not. The static or asynchronous environments are considered non real time, which include websites (Archollective), forums, BBS, multimedia outlets such as youtube etc. Archollective is a website where students can post their projects through images, documents etc. collaborators can log in and make comments on these projects. In forums and BBS's students can post their projects and forum members are able to make comments on the projects. The websites are often better designed for the purpose of critiquing than the forums or bulletin boards. For example there are options where the websites can be integrated with online social

media which provide a larger collaborative effect. Multimedia outlets provide ways of presenting different media types towards the target audience. Since there is minimal interaction between collaborators in real time. These asynchronous environments provide the salient features of the online design critique to a certain extent. There is a certain amount of collaboration and multiple parties are involved, the design critiques takes place in controlled learning environments and different communication modalities such 2D presentation drawings, 3D images, 3D walkthroughs, physical models, written communication can be used. But real time interaction among parties, which is one of the major features of the critique process (as mentioned in a previous section the critique process emulates the connection between mentor and apprentice) is limited.

Dynamic or synchronous critique environments are again divided into two sections; Real time video feed based virtual environments such as using skype or google hangout(together with other supportive tools), and online collaborative virtual environments. The major difference between these two types is that the video feed based critique model resembles a physical critique as much as possible while the online collaborative environment uses a computer simulated environment. The online collaborative virtual environments are again divided giving consideration being open sourced and non-open sourced. Non open sourced environments are generally not available to the general public free of charge and there are limitations in developing the environment. There are limited tools which the administrator can use and in most cases there is a fee associated with using such tools. For example to build something in second life one needs to lease out second life real estate. There is even a charge associated with adding textures to 3D objects. The open source environments are more flexible for development and there is less or no charge associated with building in these environments. Since the software is developed through a developer community most of the tools are provided free of charge. However the open source environments may lack some qualities such as graphic richness which are seen in non-open source environments.

Online collaborative virtual environments provide the general requirements of online learning environments such as:

- Collaboration across regions/Wider audience
- Professional input
- Time and place independent
- Comparatively low cost
- Multi modal presentation capabilities

The environments have the capability of providing opportunity for multiple users to congregate at a single given time where they are able to collaborate in real time. The environments are generally configurable according to the needs of the facilitator and contain built-in collaborative instruments, Such as white boards, voice and text chats etc. These environments are controlled environments where the user autonomy is somewhat restricted. Comparing with non-open source massive meta verses such as second life where user autonomy may pose a threat to the using of the environment as an educational environment (since Secondlife is not designed as an educational environment, it is designed for social interaction) open source environments provide the facilitator with control over the environment where the facilitator can control certain aspects of the environment (the facilitator could be running the server).

These environments offer a large number of tools for communication purposes, especially with regard to conducting a design critique. In most open source collaborative virtual environments there are built in pdf viewers, and slide show viewers, as well as interactive functionalities such as white boards. Some of these worlds offer direct import of sketchUp models, which allows the facilitator to create a more immersive virtual environment.

There is a significant amount of immersion in these environments. The use of avatars provides a human dimension and a certain amount of embodiment which lets the user become engaged in the environment. Since there is a time component associated with the environment it provides the environment with a sense of place. These environments generally offer psychological immersion (offering various tools that simulate its real world counterparts), physical immersion (embodiment) and social immersion (collaboration).

### 4.3. Assessing Online Collaborative Virtual Design Critiques

It is important to understand if an online collaborative virtual environment is capable of facilitating the qualities of a traditional critique process in order to provide evidence on the possibility of using these virtual environments for design critiques. In order to assess online collaborative virtual design critiques, we need to create an assessment criteria, and for this purpose we use the following criteria which Doidge (2000) proposes for a best case scenario of a traditional design critique.

Doidge (2000) states that a design critique should provide an opportunity for evaluating work, where the student is evaluated in relation to their peers and the juror provides the grade or evaluation criteria. This allows a student to understand their position relative to the rest of the class and provides an opportunity to review reasons on achieving the grade. Another facet of the evaluation process is the feedback

from the juror. Often the jurors provide reasoning for the grade obtained, or by the feedback provided the reasons for the grade becomes evident. In providing feedback jurors provide a SWOT analysis of the design, which allows for the students to understand their weaknesses as well as their strengths. According to Doidge another criteria is how well the student fulfilled the project objectives. This can be assessed throughout the process of conceptual, interim and final critique. Another important criterion is developing critical awareness in the student where the student develops skills in critical thinking. Reflecting on what the student has done well and their weaknesses will help the student make improvements to achieve their goals, which Doidge terms personal development planning (PDP)

Apart from these criteria another important aspect is communication throughout the critique. Communication may take many forms, from aural, drawings, two dimensional images, three dimensional images, and walkthroughs etc.

These evaluation criteria can be used as a guide in assessing the design critique process.

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