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## Digital Studio vs. Conventional in Teaching Architectural Design Process

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### Abstract

The main objective of this paper is to present an action research conducted in a polytechnic in determining the effect of using digital studio on architectural diploma students for teaching the design process compared to the use of conventional studio. For the past three years part of the semester six students had been exposed to the use of digital studio for the design process in helping students to produce creative design and more alternative ideas. The semester six students were selected for this study because all of these students already had basic skills to produce three-dimensional digital model using AutoCAD which they learn in semester five. The creativity of the design products for this study had been evaluated using an instrument developed based on the Creative Product Analysis Matrix (CPAM) (Besemer and Treffinger 1981). The strength of the design products was not affected by the quality of students' drawing, but depended a lot on the characteristics of creative products that were based on CPAM model. Students were involved with the use of a digital studio in the design process using AutoCAD, SketchUp, 3D Studio Viz and Lumions. This study involved architectural students with 12 different design projects in the period of three years. For the research purposes students were divided into two groups, one group involved in design activities using digital studio and the other group involved in design activities using conventional method. In this study no new digital studio was built physically, but every student was involved with the use of a digital studio in the design process required to carry out design activities in CAD lab, or students were asked to use their laptop in the studio. This study shows that students from groups that used digital studio in the design process produce more alternative ideas. Study also shows the digital design method can produce more complex and dynamic design ideas.

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*Keywords:* digital studio, architectural design process, design activities, computer simulation

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## **1. Problems in Teaching Architectural Design Module**

Architectural design is a complex and dynamic process. Designers start from something that is abstract and has progressively developed a problem that can be produced in the form of products. According to Lawson (1997), the architectural design is a process in which architects create spaces, places and buildings that have a major impact on the quality of human life. For this study the design process is a systematic process that has several levels to produce new products that can be evaluated physically and has many benefits. According to Kalisperis and Pehlivanidou (1998), the main problems faced by students in the design process is the limited ability of conventional media to produce a good visual presentation of more complex space. The conventional media also does not have the capability to evaluate the performance of any design space in a real situation. The past experiences of the researchers showed the lack of sensitivity of the students to manipulate the elements such as light, scale, finish and proportion in the design process. The students gave high priority to the production of accurate drawing and to the selection of graphic techniques suitable for use in producing interesting drawings. More time spent and effort had been given in producing presentation drawing rather than producing creative design products. Another problem of the conventional method is that the design activity relied heavily on a static graphic image without taking into account the effect of movement in a space, the effect of light in a space and the effect of finishing material in a space. The visual effects by moving images can facilitate designers to create the effective and creative interior design. Computer animation can help the designer to study the interior space based on the effect of light, color, texture and scale. One of the greatest advantages of AutoCAD is its capability to understand the weaknesses of the design of buildings and spaces before the building is constructed (Kalisperis & Pehlivanidou, 1998).

## **2. CAD Technology Built in Design**

According to Husain (2007), CAD now known as computer-aided design is a technology that can actually do more than just a sketch. CAD technology has also been able to produce a digital model of three dimensional objects. This digital model has a good visual impact and gives freedom to the architect to think about objects, space and form on the same screen.

The fast development of CAD technology today has created a lot of software that can be used for drawing of two dimensional and three dimensional models. The digital model can be used easily for simulation activity. The development of CAD technology today has opened up new opportunities to assist the development of architectural education, especially in learning the design process.

## **3. Computer Simulation**

Simulation is a method to bring the actual situation in a process or activity during the learning process (Humphreys, 1990). Computer simulation can be described as a method involving the use of a computer to replicate events, processes or situations into learning activities (Michael, 2000). The integration of computer simulation in the architectural design process can help students to study the physical impact of building finishes and colors in the actual situation on the building designed using CAD software. Two methods based on CAD technology can be used to help students in simulation activities. Three dimensional digital models can help students to carry out static simulation to study the effects such as texture and finishes of finishing materials on the architectural design. The computer animation can be used in performing a dynamic computer simulation. Computer animation being integrated in the design

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