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## The Integration of CiDOS in Design Process for Producing Creative Product

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### Abstract

The purpose of this research is to examine the effect of integrating CiDOS on teaching architectural design process for Malaysian polytechnic architectural students in producing a creative product. The web based information is set up based on Caroll's minimal theory, while the integration is based on Brown and Campione's technology of learning theory. This study utilized a quasi-experimental method. Final semester students from two (2) classes being used as research samples where sixty (25) students are in the treatment group and another sixty (25) students are in the control group. The final products being evaluated by the experts in architectural field using an instrument based on Creative Product Analysis Model (CPAM). The inferential statistics namely T-Test and Pearson Correlation Analysis with a significant level  $p = 0.01$  were utilized. Research outcome shows that there is a significant difference between the treatment group product ( $M=79.1$ ) and control group product ( $M=70.5$ ). This research contributes to the use of real case in the development of an architectural website, in the use of mobile technology as media information sources and in the construction of validated instrument which is used to evaluate creative architectural products.

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*Key-word:* - web mobile, design process, creative product

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## **1. Introduction**

Web based learning has been considered as the new future in an educational process. There is a lot of work and research that is going on the digital learning. People try to understand how the digital devices will help us in having a better education. In this paper some suggestions will be given on how to build information using CiDOS in the Internet. This web based information will be used as a reference where students in the design class can get the information needed through any digital devices to help them in the design process. Finally this paper will discuss challenges and limitations in CiDOS and the future work.

## **2. The Purpose of The Research**

This paper offers a new approach in architectural education, through a medium other than the traditional methods used in polytechnic. The case study is an important tool in architectural education. This paper shows that an application on the web through mobile device that allows the user to study buildings and their different parts, see how the parts integrate together, study how this whole or the individual parts relate to other note-worthy architectural works in a hypermedia environment, has the potential to be a very valuable learning and teaching tool. This application takes the form of a case study collection on the web that is interactive. For this paper the nursery being used as a case study in developing the web. The web used in the design studio to help the architectural students to get the information they need in the design process. The purposes of this research are as follow to identify the interest of the student in finding information need in the design process through web mobile or conventional method, to study the effect of integrating mobile technology at the analysis stage in the design process, to get the student perceptions in searching information activity during design process and to study the effect of integrating web mobile in producing the final product of architectural design.

## **3 Research Design**

Research has been made on final semester students of diploma architecture December session 2014 from two (2) classes in POLIPD. Research duration is for six (6) weeks involving fifty students (50) students as research samples. In this research, research samples have been asked to design a small scale building. Twenty fve (25) students from section one were selected to design with the integration of CiDOS and they are used as treatment group while the other twenty five (25) students are from section two perform the design process using conventional method that they used before. This group used as control group. This research has been conducted by two lecturers from each section selected. The process for treatment group and control group has been conducted simultaneously. Design information from searching information activity and final design product from both of the design processes has been evaluated.

## **4. Research Instruments**

To evaluate the product for each activity in the design process four instruments have been developed by the researcher. For information analysis product instrument for analysis activity being developed based on requirements being put by Laseau (2001) and Ching (1979). The evaluation instrument for the final product is developed by researcher based on Creative Product Analysis Matrix (CPAM) model (Besemer dan Treffinger 1991). Researcher

has been using CPAM model as a guide to evaluate the creative architectural design product. To strengthen the finding of this research at the end of the whole activities, questionnaire being given to get the samples' perceptions upon the design activities that they have gone through.

**5. Findings**

**i. Student interest in finding information**

In identifying student interest to find information needed in designing process whether it is via mobile technology based website or via conventional method, research outcomes show in Table 1.

Table 1 Frequency in finding information activity

No	Name of polytechnic	Finding information activities (Frequency)
1	Treatment	188
	Mean	7.53
1	Control	80
	Mean	3.20

Research outcomes shows that the total number of student searches in treatment group is 188 (M=7.53) and total searches in control group is 80 (M=3.20). This outcome clearly shows that student searching activities increased with website integration related to real case based on mobile technology.

**ii. Comparing the product of analysis activity**

This outcome comparing the quality of designs' information being created from analysis activity consists of two methods which are design information created through conventional method and design information created through integrated method. Research outcome shows in the Table 2.

Table 2 Finding on comparing design information produced in analysis activity

t-test	n	mean	s.d	t	p
Analysis Activity					
Treatment	25	81.2	5.13	18.4	0
Control	25	65.5	4.19	9	

In analysis stage, inferential data shows that there is a significant difference between the digital technology integrated data (M=81.2) and conventional method (M=65.5),  $t(118) = 18.4$ , significant. The significant different on the product being produced in analysis activity proves that the integration of CiDOS helps the students to produce a quality product in analysis activity.

**6. Comparing The Product**

In this research the creativity of the design product being determined based on CPAM model which are unique, practicality and detail. This inferential data will determine whether there is a significant different between the final product being produced by treatment group in the design process compare to the final product being produced by control group in the design process. The inferential finding data for comparing design product between treatment

group and control group are shown in Table 7. This finding can prove positive effects on the integration of CiDOS in the design process for producing creative product.

Table 7 Finding on comparing final product based on CPAM model

t-test	n	mean	s.d	t	p
Unique Aspect					
Treatment	25	78.0	7.0	7.134	0.00
Control	25	68.5	7.6		
Practical Aspect					
Treatment	25	78.0	4.6	6.901	0.00
Control	25	73.1	5.9		
Detailing Aspect					
Treatment	60	81.5	4.5	11.07	0.00
Control	60	71.9	4.8		
Overall Creative Aspect					
Treatment	60	79.1	4.2	10.61	0.00
Control	60	70.5	4.6		

Inferential data shows that there is a significant difference between design process integrated with digital method (M=78.0) compared to conventional method (M=68.5) in producing unique design product,  $t(118) = 7.134$  significant. Inferential data also shows that there is a significant difference between design process integrated with mobile (M=78.0) compared to conventional design process (M=73.1) in producing a practical architectural design,  $t(118) = 6.901$  significant. Inferential data also shows that there is a significant difference between design process integrated with mobile technology (M=81.5) compared to conventional design process (M=71.9) in producing high details architectural product,  $t(118) = 11.076$ , significant. As a conclusion, final product comparison from creativity aspect between treatment and control group show significant differences. Research outcomes also show that there is a significant difference between final product produced through the design process that being integrated with digital technology (M=79.1) compared to final product produced using conventional method (M=70.5) from creativity aspect,  $t(118) = 10.610$  significant. Overall, inferential outcomes show that there is a concrete effect on CiDOS integration in producing a creative architectural design.

## 7. The Products

From this research, the integration of CiDOS helps the students to produce quality product of architectural works. The final students' products from the treatment groups had its own identities. The products from the treatment group also show qualities of creative products based on CPAM model. Some samples from the student products are shown in the figures below.

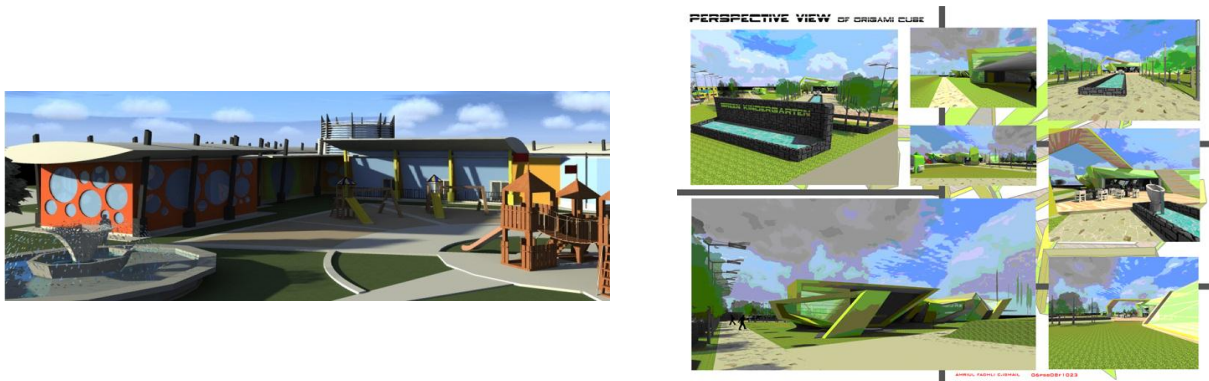


Figure 1 Sample products

## Conclusion and Discussion

In this research, positive research results for CiDOS based information shows that learning approach using digital technology can be a good replacement for conventional learning approach. Students and lecturer can gain benefits from easier and faster access of information sources. When it is easier for the students to get the design information it will create interest to them to involve actively in the searching information activity. Web site being built by a real case approach also will make the students activity to search for design information become focus and easier. As a conclusion the integration of web site built on a real case based on mobile device will make the searching information activity in the design process become focus and occur at anytime and anyplace. Rapid development in digital technology has contribute in growth of faster and higher memory digital devices such as iPad, so that these digital equipment can be used to download data faster than before and it can also save a lot of information in the memory. CiDOS offers a creative educational approach in providing a unique learning community based on technology for the betterment of future polytechnic. Still, there has to be a lot more qualitative and quantitative research to obtain suitable guidance for CiDOS integration in learning process. In the future, graphic resolution and screen size for digital devices is expected to be better build. Furthermore, if internet surfing cost can be cut to a lower price, this CiDOS will definitely be useful for polytechnic students or out-campus students. Overall, CiDOS integration in design process is proven to have increased the quality of the final product designed by architectural students which has been achieved in the learning process via digital device. As a conclusion this research contributes to the use of real case approach in the development of an architectural website, in the use of CiDOS as media information sources, and in the construction of validated instrument which is used to evaluate creative architectural products.

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