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Attitudes of Interior Architecture Design Students toward Computer Usage in Design

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ABSTRACT:
The success and effort to integrate technology with design education is largely affected by the attitude of students toward technology. This paper presents the findings of a research on the attitudes of interior architecture design students toward the use of computers in design. An instrument was developed and applied for the study. Interior architecture undergraduates of Kano state University of Science and Technology (KUST) participated in the survey. Result shows that Interior architecture students' attitudes toward the use of computers in design were found progressively positive.

Keywords: Interior Architecture, Computer-Aided Design/Drafting, Design Education.

المستخلص:
يتأثر نجاح الجهود المبذولة لتوظيف التكنولوجيا في تعليم التصميم إلى حد كبير بموقف الطلاب تجاه التكنولوجيا. تعرض هذه الورقة النتائج التي توصل إليها بحث أجري حول اتجاهات طلاب تصميم العمارة الداخلية نحو استخدام أجهزة الكمبيوتر في التصميم. تم استخدام المنهج الوصفي لإجراء الدراسة باستخدام الإستبانة كأداة لجمع بيانات الدراسة. وشارك في الدراسة الاستقصائية طلاب جامعيون في الهندسة المعمارية من جامعة ولاية كانو للعلوم والتكنولوجيا (KUST). وتُظهر النتيجة أن اتجاهات طلاب هندسة العمارة الداخلية نحو استخدام أجهزة الكمبيوتر في التصميم كانت إيجابية بشكل متدرج.

الكلمات المفتاحية: العمارة الداخلية، التصميم/ الرسم بمساعدة الحاسوب، تعليم التصميم.

Introduction

There is not much evidence on this specific topic, computer attitudes in general, constitute an ever – developing literature. The main concern for some of the researches is to develop computer attitudes scales. Identification of components of students' attitude toward computer usage constitutes the subject of many studies. Nevertheless, seems to be no agreement in literature on what constitutes computer attitude.

Chukwuli (2001), reported that computer attitude was related to math anxiety and computer experience among freshman students. Solanke and Uji (2001) employed path analysis to model the relations between computer attitude, computer experience and cognitive ability among design students. Ogunsote (2001) examined the relationship between attitudes toward computers and personality characteristics among design students' undergraduates.

Statement of the Study Problem

In the last few years, literature has vehemently advocated the negative effect of the use of computer in architectural design practice and education. It was discussed to have a retrogressive effect on the mental efficacy of contemporary students in

institutions and largely, interior architecture in practice. In the professional practice, however, paradoxical arguments exist in literature as to whether information technology has a bearing on increasing efficacy of the user or it is a mere compulsive tool compelled on the contemporary generation by this era of advancement. It was argued that the efficacy of computer instructor has been significantly low ever since the advent of technology and it is negative in relation to that of in students. Meanwhile the older methodology of drafting was position in a better light, against the status quo of the use of Computer Aided Design (CAD) in design process.

Study Objective

Considering the literature on computer attitudes as reviewed above, this research has been design around the formulated research question: What is the attitude of interior students toward the use of computers in the design phase of architectural design process?

Study Hypothesis

There is no significant relationship between interior architect students attitude toward the use of computer in design phase of architectural design process.

Significance of the Study

The finding will enable and informed students their strength and weaknesses in computer usage in design.

Scientific Terms

Attitude: A predisposition or tendency to respond positively or negatively towards a certain idea, object, person, or situation.

Interior Architecture: Is a design discipline that focuses specifically on interior environments and all aspect of their structural, social and material assembly.

Design Students: Is a student who studies how to create, fashion, execute, or construct according to plan.

Computer: An electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program.

Literature Review

Attitude is a social construct, which is not observable but can only infer from other human responses. However, there is no general agreement on a single definition of attitude. Nevertheless, there is a general agreement that is a mental state that pre – disposes a person to act in a certain way towards the attitude object (Oppenheim, 1992).

Oppenheim goes further by conceptualizing attitude as an entity comprising three attitude aspects, namely, the cognitive aspect, the affective aspect and the behavioral aspect (Oppenheim, 1992). According to Oppenheim, attitudes are reinforced by beliefs (cognitive component), often attracting strong feelings (affective component), that lead to a particular form of behavior (the action tendency component). This viewpoint is known as the tri – componential viewpoint and is illustrated in figure 1 where the three aspects are shown to constitute the concept of attitude.

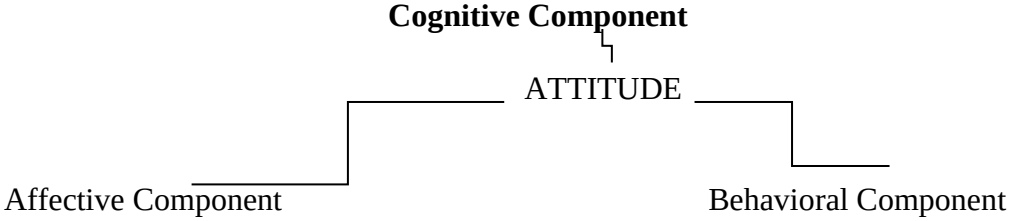

Figure 1: Components of Attitude

The cognitive component consists of ideas and beliefs of the attitude holder about the attitude object, For example: Design with computer is for draftsman.
The affective component consists of feeling and emotions of an attitude holder towards the attitude object, For example: I like design.
The behavioral component consists of an attitude holder's action tendencies towards the attitude object. For example: I tend to use computer design to communicate.
The three aspects may interact in the following way: an interior design student who believes that design with computer is for draftsman will most probably have a low preference for computer design and will not voluntarily choose to use computer for design.
In recent years, the developments in information technology have been changing the practice of both architectural profession and its education. Under competitive market conditions, Computer Aided Design (CAD) is a skill that is increasingly sought after in architectural offices, Practicing architects often value competence in the production of digital presentations, efficiency in the production of construction drawings and ability of collaboration through digital media (Shehu, 2007). Moreover, Dahiru (2010) claims that due to the massive increase in the number of architecture graduates, an occupation at the lower cadres of architectural jobs, namely, the manual drafter with no architectural education, is disappearing in recent times, They have been replaced by CAD operators probably about half of whom are qualified architects. As a result of all these developments, the profession is continuously forcing schools to enhance CAD teaching in their curricula.
CAD teaching is now a part of curricula in almost every architectural school: however, it seems that the rapid implementation of computers in design education has caught academia unprepared to develop pedagogy for a digital practice. Studies which focus on the use of CAD in design education are mostly theoretical and/or descriptive in their research approach. Few empherical studies – which test their hypotheses statistically – have been reported in the literature as noted by Shehu(2002),An attitude of design students toward the use of computers in design is one of the neglected issues in that respect. Most of the descriptive studies in this field imply that students have positive attitudes toward computer usage in design, a systematic examination of this attitude.
The relation between the students' and teachers' attitude toward computers is one of the controversial issues in computer attitude research. Some researchers have suggested a relation between the student and teacher attitudes toward computers. For example Mamman (2001) reported that a good role model, in the form of a classroom teacher who uses computers, leads to more positive attitudes toward computers for secondary school and teachers in their attitudes to information technology. Ogunsote (2001) showed that teacher computer efficacy scores are significantly and negatively related to that of students. Then they commented that as students' confidence went up with more exposure to computer classes, apparently teachers' confidence went down. Previous research revealed that studio instructors 'of the Department of Interior Architecture and Environment Design (IAED) are not very willing to use computer technology in their professional studies Ogunsote (2003). They are also reluctant to accept computer drafts in design courses Bognet(2005). Thus, we would expect that at the university level, students attitudes toward the use of computers in design may not correlate with their perception of instructors attitudes, while their attitudes toward computers in general is a strong correlate of the attitude toward computer use in design.

Many researches on gender differences in computer attitudes showed that male students have more positive attitudes compared to females. For examples, Ahmad (2005) found that females held more negative attitudes toward computers, scored lower in computer aptitude, and had less prerequisite math ability and math coursework. Mamman(2013) revealed that male students have more favorable attitudes toward computer than female students. Mbina (2007) reported that females were less interested in computer and less confident than males among college students.

Previous Studies

1. Study of Abubakar Y.M (2007). Titled: *Attitude of Students towardComputer*. Aimed of the study is to examine the attitude ofstudents toward usage of computer. The researcher used survey research method, and the instrument used for data collection is closed questionnaire. The sample method used is random sampling method. The most important results are:

1. The student's attitude correlates with their attitude toward computer.
2. There is no correlation between this attitude and students perception of their instructors

2. Study of Dahiru (2013). Titled: *Effect of the use of Computer Aided Design (CAD) on Architecture.* Aimed of the study is to find out the effect of use of Computer Aided Drafting/Design (CAD) on Architecture: A quantitative approach. The researcher used Quantitative research approach and the instrument used for data collection is by open ended interview method. The sample method for the study is random sampling method. Results are:

1. The use of Computer Aided Drafting/Design (CAD) has overriding advantages over the traditional Drafting/Design construct
2. Computer Aided Drafting/Design is a mere tool that assist the Drafting procedure
3. Physical tangible tool which transforms the obstruction of the user into reality on the paperless board just like the old traditional methodology of Drafting does too

3. Study of Bognet (2014) Titled: *Achieving Computer Aided Drafting/Design (CAD) proficiency by Architecture Graduate in Nigeria.* The researcher used survey research method and the data collected is by closed form questionnaire. The sample method used for the study is random sampling method. Results are:

1. Several schools of Architecture already have large computer laboratories, while practically all schools have computers
2. Problem of Computer Aided Drafting/Design (CAD) illiteracy in lecturers is also gradually becoming a thing of the past with most lecturers now having their own computers.
3. Students have started buying their own computers.

Methodology

To test the validity of the hypothesis above, a descriptive survey method was conducted in the Department of Interior Architecture and Environmental Design (IAED) of Kano state University of Science and Technology Wudil, (KUST).

Population of the Study

Since senior students have taken most of the CAD related courses offered by the department; their knowledge on CAD was assumed to be sufficient for evaluating CAD terminology (See Appendix (A) for the list and content of CAD courses offered in the department).The target population of the study is 35 senior students of the

Department of Interior Architecture and Environment Design, but the accessible population is only 20 senior students.

Sample

Samples were randomly drawn from the senior students to obtain the reasonable possible sample size.

Tool of the Study

A closed form questionnaire was used in this study. A five point Likert scale was used for the evaluation of the statements in the questionnaire, and the responses to the statements were coded as follows: Strongly disagree = 1, Disagree = 2, Undecided = 3, Agree = 4, and strongly agree = 5.

The questionnaire contained 10 items, before the application of the questionnaire to the whole sample a pilot study with 10 students was conducted to test the instrument.

The survey was carried out by the researcher. The questionnaire was applied in one session in the class to prevent bias and communication between students. Instructors did not take any part in the research arrangement also to avoid bias. Students were given sufficient time to complete the questionnaires and they were assured that they would remain anonymous.

Data Analysis Technique

The data were analyzed using percentage and chi – square statistical distribution. The SPSS statistical software package (Version 16.0) was used in the statistical analysis. The Alpha reliability coefficients for Students attitude toward the use of computer in design, is 0.81. These coefficients indicate high reliability of the results.

By using the equations below the chi - square value is computed as

H_0: $W = W_0$ ……Equation (1)

Where, W and W_0 represent the Chi – square statistic and the hypothesized value of the Chi – square statistic respectively. Eq (2) defines W:

$$W = \chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\left(o_{ij} - e_{ij}\right)^2 / e_{ij} \quad \text{……Equation (2)}$$

Whereas:

$e_{ij} = \frac{ri \ x \ cj}{Grand\ total}$

r_i represents total of row (i)

c_j represent total of column (j)

When n is the number of interval i (i = 1, 2…n) and o_i and e_i the observed and expected frequency for each interval i.

Where o_{ij} and e_{ij} are the observed and expected frequency values in row *i*and column *j* of the table the number of rows (r) and columns (c). Setting *ij* = *i*, then $o_{ij} = o_i$ and $e_{ij} = e_i$.

The test was conducted as follows:

Step 1: Select a hypothesized distribution for the given sample and depict the sample space used.

Step 2: Select a specified significant level α. α =0.05 was used in this work.

Step3: The rejection region was set as $R \geq \chi^2_{1-\alpha}(n-m-1)$, where $\chi^2_{1-\alpha}(n-m-1)$ is the $(1 - \alpha)$ 100 percentile of the Chi – square distribution with (n-m-1) degrees of freedom, m is the number of parameters estimated from the sample.

Step 4: The chi – square statistic W was calculated using Equation (2).

Step 5: The null hypothesis is rejected if W >R; otherwise it is not rejected.

Data Analysis and Presentation

Table (1): Questionnaire Items Analysis

Questions	SD	D	U	A	SA	Total
I enjoyed work with computers.	5	10	4	1	0	20
Computers do not interest me.	1	9	7	2	1	20
I would like to learn more about computers.	1	11	7	1	0	20
I use computers only when I must do so.	2	3	9	4	2	20
Computers are exciting.	3	9	2	1	5	20
Computers can help designers only for drawing purposes.	2	11	3	3	1	20
Design process can be automated by the use of computers in futures.	2	10	2	4	2	20
The use of computers in design will cause architecture to lose their job.	1	9	4	4	2	20
I look forward to use computers while producing design concept.	4	7	6	3	0	20
Computers cannot help designers while making decision.	4	14	1	1	0	20
Total	**25**	**93**	**45**	**24**	**13**	**200**

Table (2): Chi – square Distribution Test

oij	eij	$(oij - eij)^2$	$(oij - eij)^2/eij$
5	2.5	6.25	2.5000
10	9.3	0.49	0.0527
4	4.5	0.25	0.0556
1	2.4	1.96	0.8167
0	1.3	1.96	1.3000
1	2.5	2.25	0.9000
9	9.3	0.09	0.0097
7	4.5	6.25	1.3889
2	2.4	0.16	0.0667
1	1.3	0.09	0.0692
1	2.5	2.25	0.9000
11	9.3	2.89	0.3108
7	4.5	6.25	1.3889
1	2.4	1.96	0.8167
0	1.3	1.69	1.3000
2	2.5	0.25	0.1000
3	9.3	39.69	4.2677
9	4.5	20.25	4.5000
4	2.4	2.56	1.0667
2	1.3	0.49	0.3769
3	2.5	0.25	0.1000
9	9.3	0.09	0.0097
2	4.5	6.25	1.3889
1	2.4	1.96	0.8167
5	1.3	13.69	10.5308
2	2.5	0.25	0.1000
11	9.3	2.89	0.3108
3	4.5	2.25	0.5000
3	2.4	0.36	0.1500
1	1.3	0.09	0.0692
2	2.5	0.25	0.1000
10	9.3	0.49	0.0527
2	4.5	6.25	1.3889
4	2.4	2.56	1.0667
2	1.3	0.49	0.3769
1	2.5	2.25	0.9000
9	9.3	0.09	0.0097
4	4.5	0.25	0.0556
4	2.4	2.56	1.0667
2	1.3	0.49	0.3769
4	2.5	2.25	0.9000
7	9.3	5.29	0.5688
6	4.5	2.25	0.5000
3	2.4	0.36	0.1500
0	1.3	1.69	1.3000
4	2.5	2.25	0.9000
14	9.3	22.09	2.3753
1	4.5	12.25	2.7222
1	2.4	1.96	0.8167
0	1.3	1.69	1.3000
		W	**53.0904**

Hypothetical Test: The null hypothesis represented by equation (1), states that "There is no significant relationship between Interior architecture students attitude toward the use of computers in the design phase of architectural design process".

The value R = $\chi^2_{0.95}$ (14) from the standard chi – square distribution table is 23.6848 while the calculated chi – square statistic value W is 53.0904 as shown in Table 2. Since W > R, the null hypothesis which states that "There is no significant relationship between interior architecture students attitude toward the use of computer in the design phase of architectural design process is rejected.

Table (3) showsthe value of chi – square run by the SPSS software package (16.0) which read:

Table (3): Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	53.090[a]	36	0.033
Likelihood Ratio	55.859	36	0.018
Linear-by-Linear Association	00.164	1	0.686
N of Valid Cases	200		

a. 40 cells (80%) have expected count less than 5, and the minimum expected count is 1.30.

Table 4: Frequency and Percentage

	opinion	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	25	12.5	12.5	12.5
	D	93	46.5	46.5	59.0
	U	45	22.5	22.5	81.5
	A	24	12.0	12.0	93.5
	SA	13	06.5	06.5	00.0
	Total	200	100.0	100.0	100.0

12.5% strongly disagree, 46.5% disagree, 22.5% undecided, 12.0% Agree and 6.5% strongly agree, which represent 100% respondent's opinion.

Results

The result of this study shows that Interior architecture design students' attitudes toward the use of computers in design were found progressively positive despite the challenges students facing in handling the programs.

In fact, unlike most design offices which depend only on computerized drafting after the preliminary design stage – largely due to its time and energy saving nature – there seems to be a tension between traditional design tools and CAD in schools. Besides the financial and technological limitations, the situation also stems from the studio instructors' reluctance to incorporate computers with design teaching. Possible reasons for this reluctance include the lack of proficiency of the instructors in computers, focusing only on the 'conceptual' phase of architectural design process and seeing the existing CAD tools as merely drafting rather than design tools and fearing that supporting CAD in design education will lead to the loss of hand drawing skills in time.

Conclusion and Recommendations

As a result of the findings, the researcher recommends that institutions of (interior) design education should regard the use of computers as a socio-cultural rather than merely a technical issue. This approach may lead to create more positive attitudes toward the use of computers in design among both the instructors and students.

In order to bridge the gap between the educators and students in terms of computer attitudes, the researcher also suggest that design instructors, not necessarily being

experts on the subject, should understand the potentials of computer use in design studios. Previous experience showed that team teaching and parallel exercise can be helpful for such integration.

Finally, it should be emphasized that the scope and meaning of the use of computers in design is subject to rapid change due to development in computers technology.

Suggestion for Further studies

1. Problem and prospects of design students toward computer usage in design
2. Assessment of design students toward computer usage in design.
3. Achieving CAD proficiency by interior Architecture Graduates in Nigeria.
4. Polytechnic Design student's attitudes toward computer aided Drafting.

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