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The Role of Theoretical Framework on Academic Achievement Through E-Learning

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Abstract
The present study has great significance. First of all, the study findings provide an idea about the e-learning aspects and academic performance in order to provide key information to further research work in such areas. In the same way, the study provides knowledge and guidelines to that may be of help to policymakers. The research is therefore of importance for planners, and other social scientists. Finally, this study provides an input to the students, teachers and researchers in the areas of e-learning. Research works are embarked upon with a view to extending the frontier of knowledge. The present study was therefore carried out with this same objective, especially in the field of e-learning. It has therefore, contributed to the extension of the frontier of knowledge in the following ways. First, the study has shown the predictive power of the selected factors, especially socio-demographic factors, prior computer skills and time management status in the determination of the academic performance.
Keywords: *E-Learning, Academic Performance, IT Education*

1. INTRODUCTION

The present study reflects a number of limitations. Firstly, the student models of learning were identified on the basis of a specific sample comprising those under e-learning study model and those under the traditional study model. Secondly, the theoretical nature of this study limits its direct relevance for the educational praxis. Therefore, it is hoped that future research may additionally focus on how student cognitions about learning are influenced in the context of everyday learning environments. The results could enable educational practitioners to encourage the adoption of student learning models which invoke a deep oriented and self-regulated study strategy. This study did not consider all the aspects e-learning influences but instead was restricted to those elements of e-learning that affect performance in one way or the other. The study did not also consider all students studying through the e-learning mode but only focused on the Kenyatta University students and specifically those who benefited from the Computer Aid initiative.

2.0 BACKGROUND OF THE STUDY

Attitudes concerning e-learning, echoed by scholarly and academic reviews, range from neutral to positive. On one hand, it is noted that e-learning is at least as effective as traditional instructional strategies (Rosenberg, Grad and Matear, 2003), and that there are no major differences in academic performance between the more traditional and more technology-oriented modes of instruction (Cavanaugh, 2001). On the other hand, many reviews go further, reflecting a principally positive attitude towards the impact of e-learning (Mayer, 2003). The current piece sought to demystify e-learning by concentrating on how specific e-learning factors (socio-demographic characteristics, hours spent on-line and prior computer skills) influence individual academic performance. There is a considerable body of evidence to suggest that different teaching delivery styles can have different degrees of success; as measured in terms of academic results (Emerson & Taylor, 2004). In relation to online teaching, some studies indicate that this medium of delivery has a positive impact on performance, for example, Smith and Hardaker (2000). Other studies however, find that greater online teaching has a negative impact on performance (Johnson, 2005).

Benefits include offering a variety of new possibilities to learners (Breuleux, Laferrière, & Lamon, 2002), in addition to having a positive effect on students' achievement in different subject matter areas (Chambers, 2003). Other benefits of electronic education include increases in enrollment or time in school as education programs reach underserved regions, broader educational opportunity for students who are unable to attend traditional schools, access to resources and instructors not locally available, and increases in student-teacher communication. According to Barker & Wendel (2001) students in virtual schools showed greater improvement that their conventional school counterparts in critical thinking, researching, using computers, learning independently, problem-solving, creative thinking, decision-making, and time management. A study by Calderoni (1998) revealed that academic advantages over traditional classroom instruction were demonstrated by students in Mexico's Telesecundaria program, who were "substantially more likely than other groups to pass a final 9th grade examination" administered by the state; by students taking a chemistry by satellite course (Dees 1994); and by students learning reading and math via interactive radio instruction (Yasin & Luberisse 1998).

Electronic education is not the most effective choice in all situations. Students may feel isolated, parents may have concerns about children's social development, students with language difficulties may experience a disadvantage in a text-heavy online environment, and subjects requiring physical demonstrations of skill such as music, physical education, or foreign language may not be practical in a technology-mediated setting. Bond (2002) found that distance between tutor and learner in an online instrumental music program has negative effects on performance quality, student engagement, and development and refinement of skills and knowledge. Virtual school students show less improvement than those in conventional schools in listening and speaking skills (Barker & Wendel 2001). Highly technical subjects have also proven to be difficult to teach well online. The Alberta Online Consortium evaluated student performance on end-of-year exams among virtual school students across the province, and found that virtual school student scores in mathematics, and the sciences lagged significantly behind scores of non-virtual school students (Schollie, 2001).

Kearsley (2000) notes that given instruction of equal quality, groups of students learning online generally achieve at levels equal to their peers in classrooms. Equality between the delivery systems has been well documented over decades for adult learners. Evidence to date convincingly demonstrates that when used appropriately, electronically delivered education—'e-learning'— can improve how students learn, can improve what students learn, and can deliver high-quality learning opportunities to all children" (NASBE, 2001). A primary characteristic that sets successful distance learners apart from their classroom-based counterparts is their autonomy (Keegan 1996) and greater student responsibility as is noted by Wedemeyer (1981). A second characteristic that differentiates successful distance learners from unsuccessful ones is an internal locus of control, leading them to persist in the educational endeavor (Rotter 1989).

2.1 Theoretical Framework

The focus of this study is built upon the various learning styles theories of online learning, and how learners gain knowledge differently. Facilitation theory and constructivist theory are two popular learning theory concepts which are used as a representation as a taxonomy for learning (Etmer & Newby, 1993). According Eccles (1999) developing a system of best practices built around these learning theories can assist teachers in encouraging improved student preparedness and instruction presented within an online learning environment of higher education.

2.3 Constructivism Theory

Constructivism is the theory that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When learners encounter something new, they reconcile it with previous knowledge and experience. They may change what they believe, or they may discard the new information as irrelevant. To be active creators of their knowledge however, they must be able to ask questions, explore and assess what they know. In the classroom, the constructivist view of learning means encouraging students to use active techniques such as experiments and real-world problem solving using authentic data if possible, and to create knowledge and reflect on their understanding.

Constructivism modifies the role of the teacher so that teachers help students to construct knowledge rather than reproduce a series of facts. The constructivist teacher provides tools such as problem-solving and inquiry-based learning activities like in e-learning setup so that students can formulate and test their ideas, draw conclusions and inferences, and convey their knowledge in a collaborative learning environment. The teacher must understand the students' preexisting conceptions and guide the activities to address this knowledge and then build on it. Constructivist

teachers encourage students to assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students become expert learners as they learn how to learn, with the use of computers online and/or offline. The students then have the tools necessary to become life-long learners.

The teaching-learning method in e-learning is assumed to be self-directed learning (SDL), which is supported by the educational philosophy of constructivism. According to constructivism theory, e-learning is an active information process because knowledge generation is accomplished through individual experience, maturity and interaction with one's environment. Due to this point of view, the educational philosophy of constructivism is distinguished from objectivism in that the learner is regarded as a passive recipient of information (Rovai, 2004). Learning performance in regards to e-learning is possibly lower than a crammed educational style based on objectivist educational philosophy, with the exception of a strategic approach relating to the efforts and studies for the pleasure of the self-learner. Lee et al., (2007) point that the SDL teacher is available as an assistant and guide for learning, not as a unilateral knowledge source and messenger.

Learners take the lead in self-regulated learning for the development of a total learning process that involves problem perception, adoption, and assessment of alternatives (Lee, 2004). Learners play the same roles that the producers do by organizing or re-organizing knowledge like a consumer, by selecting knowledge and using it practically (Thatcher& Pamela, 2000). E-learning must be considered as one of many SDL strategies. The reason is that an e-learner attends a lecture only to register the time, place, subject, and to alter the order of attending lectures. Proper monitoring of the learner is difficult in comparison with the off-line education already being used, not only because the learning progress method of evaluation is being altered, but because personal meetings with the teacher are also no longer part of the process. Therefore, it is important to manage one's ability to organize self-learning time, process information, plan data, and control data.

2.3 Facilitation Theory (The Humanist Approach)

Learning theory developed by Carl Rogers. One of the basic premises of this theory is that learning is possible because human beings have a "natural eagerness to learn" and they are responsible for and at the center of the learning process (person-centered learning). E-learning is possible only because individuals signed up in it are self-driven and eager to learn despite their location in relation to learning institutions. The role of the teacher is to act as a facilitator- no amount of effort on the part of the teacher can guarantee success, unless the learner has a desire and predisposition to learn. An interesting contribution of Rogers's Facilitation Theory is the notion that learning involves changing one's self-concept. Such changes may involve discovering one's strengths or weaknesses. Learners in the e-learning setup have to perceive the possibility that there is in the e-learning system for knowledge acquisition. A freshly perceived self-concept has a consolidating impact on learning in that it allows the learner to attack a target skill with confidence or with an adjusted 'updated' approach.

Implicit in the non-direct facilitative approach is the assumption that learners can find the information by themselves (teachers merely *facilitate* that process), an assumption which downplays the role of information transmission and underestimates the contribution of teaching. Such a teaching model is obviously an idealization which is rarely found in its pure form in practice.

3.0 METHODOLOGY

This chapter describes the methods that were used in the study. It explains the research design, the study population, sampling method and procedures, data collection procedures and instruments, data analysis, reporting and ethical issues.

3.1. Research Design

The research design was an analytical survey. Analytical surveys also referred to as diagnostic studies attempt to describe and explain *why* certain situations exist. In this approach two or more variables are usually examined to test research hypotheses. The results allow researchers to examine the interrelationships among variables and to draw explanatory inferences. In this study, the researcher sought to establish the relationship between prior computer skills; socio-demographic characteristics; and level of student engagement effect on academic attainment.

3.2 Unit of Analysis

According to Mugenda and Mugenda (2003) units of analysis are units that are designed for purposes of aggregating their characteristics in order to describe some larger group or abstract phenomenon. Nachmias and Nachmias (1996) describe the units of analysis as the most elementary part of the phenomenon to be studied. To Singleton et.al (1988; 69) they are "what or whom to be analyzed". In this study, the unit of analysis was the different categories discussed in this paper as the 'study modes' (e-learning and conventional).

3.3 Unit of Observation

The unit of observation in this study was the individual students whose performance was aggregated to inform category performance.

3.4 Study Population

In this study, the population of interest is beneficiaries of the 1500 computers that were provided by ComputerAid international. Each computer was to be used by five e-learning students. The total population of the beneficiaries is (1500 * 5) 7500 students. An equivalent population was targeted for students under the conventional learning mode so as to avoid overrepresentation of one category. The total population in this study was thus fifteen thousand, (7500 * 2 = 15000) being seven thousand five hundred on the e-learning program and seven thousand five hundred on the conventional study mode. From the total population, a sample of one hundred and fifty students' constituting seventy-five on e-learning mode and seventy-five on the conventional study mode was targeted. This is a total sample population of 150 which is 1 percent of the total population. The sample 75 for each category was guided by Dr. John Curry Professor of Educational Research, North Texas State University (now retired), who provided his research students (fall, 1984) with the "rule of thumb" on sampling (Gay, 1987) presented in the table 3.1 below. The sample size was also deemed appropriate when it was noted that the beneficiaries of the group learning sets are spread across the country, time and finances did not allow for inclusion of a bigger number. On the same note, in the bid to have equal representation, the number seventy-five was settled for students under traditional learning mode.

Table: 3.1 Population sample size

Size of population	Sampling percent
0-100	100%
101-1,000	10%
1,001-5,000	5%
5,001-10,000	3%
10,000+	1%

Source Gay (1987)

3.5 Sampling Method and Procedures

Through a systematic random sampling procedure where a neutral start point was identified by the researcher where the first student was identified randomly, within the study location. It was key to consider gender parity in the study, as such for those under conventional study mode, if a male student was picked the next was to be a female respondent. Identification of the starting point was done at the gate of Kenyatta University, the data collection was done on one side of the road towards the administration block, upon reaching the administration block, and the other side of the road was taken towards the gate. After identification of the first respondent, five students were past then the sixth was included in the study, if the sixth student was not of the opposite gender, five more students were past till the opposite gender was found. The process was repeated until seventy-five respondents were interviewed.
To identify e-learning respondents, a list of students was obtained from the institution, systematic random sampling was then used to select seventy-five students. A starting point was first randomly picked then every fifth name in the list was included in the sample. Questionnaires were then sent online to the selected seventy-five students.

3.6 Data Collection Procedures and Instruments

The main instrument of data collection in this study was questionnaires. The items in the questionnaire were structured (closed ended) and unstructured (open ended). The structured questions measured the subjective responses

to clarify the objective responses and at the same time, enhance formulation of recommendations of the study. The researcher used trained research assistants to collect data.

3.7 Data Analysis and Reporting

According to Miles and Huberman (1994) data analysis is an iterative process. Data analysis consists of three activities: Data reduction, Data display, and Conclusion drawing/verification". Data reduction, this process is applied to qualitative data and focus remains on selection, simplification and transformation of data. In this continuous process the data is organized throughout the research to draw and finalize a conclusion (Miles and Huberman, 1994). In this research, the data was reduced from critical elements in implementation of E-learning to students' academic performance. In data display the data is displayed in an organized form or the data has to be put into an order to easily draw the conclusion. Tables and graphs are used to indicate distinct frequencies of various factors of E-learning implementation and academic performance.

4.0 DATA ANALYSIS
4.1 Inferential Analysis

The section below presents coefficient of correlation, coefficient of determination, ANOVA and regression coefficient. Coefficient of correlation shows the relationship between the dependent variable and the independent variables, coefficient of determination shows the contribution of independent variables to the dependent variable, ANOVA tests the significance of the regression model while the regression coefficient shows the effect of unit increase independent variable to the independent variable.

4.2 Coefficient of Correlation

To compute the correlation (strength) between the study variables and their findings the study used the Karl Pearson's coefficient of correlation (r). The findings as shown in Table 4.1 below revealed that there was a positive correlation between academic performance and hours spent online as shown by a correlation figure of 0.557, even though the correlation is positive, the relationship between academic performance and hours spent online is not significant. It was also clear that there was a positive correlation between academic performance and gender with a correlation figure of 0.512, even though the correlation is positive, the relationship between academic performance and gender is not significant. It was also revealed that there was a positive correlation between academic performance and location of setting with a correlation figure of 0.52, likewise even though the correlation is positive, the relationship between academic performance and location setting is not significant. Finally, a positive correlation between academic performance and subject with a correlation value of 0.538 was realized. Even though the correlation is positive, the relationship between academic performance and subject is not significant. This shows that there was a moderate correlation between academic performance and hours spent online, gender, location setting and subject. The lack of significance in the individual relationships could be due to interactive effects with the other variables.

Table 4.3 Coefficient of Correlation

		Academic Performance	Hours spent online	Gender	Location setting	Subject
Academic Performance	Pearson Correlation	1				
	Sig. (2-tailed)					
Hours spent online	Pearson Correlation	0.557	1			
	Sig. (2-tailed)	0.3079				
Gender	Pearson Correlation	0.512	.320	1		
	Sig. (2-tailed)	0.1855	0.0194			
Location setting	Pearson Correlation	0.520	0.1846	0.1107	1	
	Sig. (2-tailed)	0.0023	0.1857	0.4300		

Subject	Pearson Correlation	0.538	0.0072	0.2335	0.1027	1
	Sig. (2-tailed)	0.0422	0.9591	0.0925	0.4642	

4.2 Coefficient of Determination

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (academic performance) that is explained by all the five independent variables (hours spent online, gender, location setting and subject). From the findings, 54.5 percent academic performance is attributed to combination of the four independent factors (hours spent online, gender, location setting and subject) investigated in this study. A further 45.5 percent academic performance is attributed to other factors not investigated in this study. Therefore, there is a dare need for further research that should be conducted to investigate the other factors (45.5 percent) that contribute to the academic performance.

Table 4.4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.738	0.545	0.214	0.160

4.3 ANOVA

In trying to establish significance of the model the study employed ANOVA. From table 4.3 the significance value is 0.009 which is less than 0.05 thus the model is statistically significance in predicting how hours spent online, gender, location setting and subject impact to academic performance. The F critical at 5 percent level of significance was 2.70. Since F calculated is greater than the F critical (value = 9.793), this shows that the overall model was significant.

4.4 Regression Coefficient

Table 4.5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.624	4	3.156	9.793	.009
	Residual	30.616	95	.322		
	Total	43.240	99			

a. Predictors: (Constant), Action in-case of computer complication, Difficulty in using computers, Study hours in a day, Mode of study

b. Dependent Variable: Average score for college courses

Multiple regression analysis was conducted as to determine the relationship between academic performance and the four variables. As per the SPSS generated table 4.4 the equation
$(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon)$ becomes:
$Y = 1.180 + 0.0498 + 0.017 X_2 + 0.3209 X_3 + 0.2527 X_4$

The regression equation above has established that taking all factors into account (hours spent online, gender, location setting and subject) constant at zero, academic performance will be 1.180. The findings presented also shows that taking all other independent variables at zero, a unit increase in hours spent online will lead to a 0.0498 increase in academic performance; a unit increase in gender will lead to a 0.017 increase in academic performance; a unit increase in location setting will lead to a 0.3209 increase in academic performance and a unit increase in subject will

lead to a 0.2527 increase in academic performance. This infers that location setting contribute most to academic performance followed by subject then hours spent online while gender contributed the least to academic performance.

Table 4.6: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.180	0.3303		0.5449	0.5881
Hours spent online	0.541	0.1530	0.0498	0.3731	0.0201
Gender	0.507	0.1658	0.0170	0.1210	0.0262
Location setting	0.518	0.1502	0.3209	2.4461	0.0252
Subject	0.528	0.1398	0.2527	1.9406	0.0223

4.0 CONCLUSION

On comparison, students on conventional learning mode performed highly as compared to those on e-learning, of the students who scored A's, 83 percent were on the conventional learning system, those on e-learning program was only 17 percent of the total A's scored. Conversely, majority of the students who scored C's were those on e-learning (74 percent) mode of study. It was revealed that gender was a factor that influenced the number of hours the respondents studied. Majority (52 percent) of those who studied for 5- 9 hours were male while the majority (50 percent) of those who studied for 3 – 5 hours were female. It was revealed that male who studied for 3 – 5 hours were only 14 percent of the population. On comparing the study hours' students under e-learning and those on–school program spent studying per day, it was found that majority of 44 percent of the student on e-learning mode studied for less than 2 hours a day while the majority (74 percent) of those under the conventional learning program spent between 5 – 9 hours studying a day. It was further revealed that study hours per day significantly influence the academic performance of students, students who spent between 5 – 9 hours a day accounted for 83 percent of the total A's scored.

To measure the impact of prior computer skills on academic performance, the study sought to know whether the students were anxious while using computers, 1 percent of the respondents indicated that they were somewhat anxious, 10 percent of the respondents were found to be a little anxious, the majority 89 percent however indicated that they were never anxious while using computers. As for the extent of anxiety, only 2 percent of the respondents indicated that they are somewhat anxious, however 10 respondents are a little anxious whereby out of this 10, 9 scored an average score of B representing 9 percent of the total respondent who are a little anxious the remaining respondents scored an average score of C, hence all the 12 respondents who scored an average score of A are not anxious at all, and 40 and 37 respondents who are not anxious at all scored an average score of B and C respectively. The findings can be deduced to mean that the more anxious a student gets while using computers the higher the chances of not performing well for the students on e-learning mode.

The study sought to know whether students dramatized computer situation in their mind even when not using computers. This was intended to know whether the students had prior computer skill or not. Two percent and 7 percent of the respondents indicated they sometimes, and occasionally respectively dramatized computer situations in their mind, 91 percent of the respondents never dramatized computer situations in their mind, this indicate that the majority were comfortable with computers reflecting that they had previously used computers.

Further the study sought to know whether the respondents had any difficulty in using computers, two percent of the respondents indicated they had difficulty in using computers all the time, a similar percentage indicated they sometime had difficulty in using computers. Twenty-one percent of the respondents indicated that they had a little difficulty using computers. The majority (75 percent) of the respondents indicated that they never experience any difficulty using computers.

This research elicited and examined a number of extreme points of views about the impact of E-learning on academic achievement. Although it was discovered that certain issues have not yet been properly addressed to E-Learning implementation processes, as the prime focus of the research was on prior computer skills, number of hours individual spend studying and socio-demographic characteristics. The following are the recommendations of this study:

Critical factors such as institutional issue, management issue, pedagogical factors, technological issue, interface design issue, evaluation issue, and resource support issue and the factors within each issue have not yet been investigated with detail coverage.

The need to carry out detail research involving case studies based on survey questionnaires involving various learning institutions which will ultimately give a better understanding of impact of e-learning aspects within implementation process.

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