

Mobile Learning: A Bridging Technology for varying Learner Entry Behavior

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Abstract
The use of technology in teaching and learning processes has brought a major shift in the way instructors have to design instructions. The cost of mobile devices has declined with time making the devices affordable. All undergraduate learners own a mobile device and their expectations and demand for access of learning content on these devices has increased. While learner's entry skill levels into a course unit have been a great concern to instructors, the use of a mobile learning system can bridge this concern. The instructors need to focus on making the mobile learning experience more exiting to the learner. This paper has explored how varying learner entry behavior is bridged through an experiment by using a control group and a treatment group. The treatment group was instructed through mobile learning system while the control group was instructed using traditional face to face with no support of mobile learning technology. The results have shown that varied learner entry skills do not determine the intended learning outcome. The learners with or without prior skill and instructed using the support of mobile learning system performs without bias of prior skills.
Keywords: Mobile Learning, Learner Entry Behavior, instructional design model

1. Introduction

Mobile Learning can be defined as use of mobile technology ranging from simple Short Message Service (SMS) messaging, Multimedia Messaging (MMS) live classroom sessions, web and podcasting to audio-to-text or text-to audio applications for purposes of teaching and learning (Florence G.P & Lauren D., 2012).

Every Technology used for purposes of teaching and learning must meet pedagogical objectives otherwise it can be obstructive. The researchers and writers of this paper own observations are that small technological hitches caused by technology failure in class can waste a lot of teaching time. Mobile devices in class can be obstructive to learning especially when not well managed in a class lesson. Christensen in his paper *Disruptive Technologies: Catching the Wave* argue that mobile learning can only be successful in corporate world and not in mainstream educational setting (Christensen C., 1995). The researchers disagree with his argument since literature on mobile learning has shown that mobile learning is gaining success in higher education. The instructors that use the technology need to have instructional design skills so that learning can be systematic and organized. Technology alone without the instructor cannot deliver learning to the level as intended by the curriculum. When mobile learning is used well it can provide enriching learning experiences and promote computational, logical and critical thinking reasoning aptitude.

> *"Technology doesn't teach. Teachers teach and people teach. The pedagogies that steer mobile learning will only be as good as the Pedagogies of the best educators."*11

There are many instructional design models that describe the process of instructional delivery (Gustafson& Branch, 2002b, cited: Ryder, 2006). The way they are used depends on the pedagogical interpretive ability of the instructor and the suitability of the design model for that technology.

Learner Entry Behavior (L.E.B) has been emphasized by some instructional design models as an important factor to consider although some disregard it. Dick and Carey model has a component of analyzing learners and context which require the instructor to collect information about the learner entry behavior which involves prior knowledge, skill and attitude, academic motivation and learner preference (Dick, Carey & Carey, 2001). Morrison, Ross & Kemp (Kemp Model) also has a component of instructional strategy and learner characteristics which focuses on learner entry behavior (Morrison, Ross & Kemp, 2004). These model imply that the instructors need to shape learner entry behavior if they are to achieve the intended learning outcomes. They are among most widely used models for technology based instructional design. Instructors that use mobile learning technologies may choose to use some of these instructional design models that advocate learner entry behavior for lack of better model.

Some researchers like Kirkpatrick argue that previous learnt skills and knowledge in classroom may not translate to better performance at work. In his experiment, he demonstrated that even though some workers could show having learnt some skills in the classroom, the same workers did not necessarily demonstrate the same skills in a different work setting (Kirkpatrick D., 1996). This therefore implies that their performance had no relationship to knowledge learnt in classroom. Their entry behavior at work had no effect on job performance (Walter Dick, 2001).

A well designed curriculum has set goals and objectives to be achieved. It also clearly set out previous knowledge required before taking the course. When preparing lessons the instructors need to develop short term goal or objective popularly known as learning outcomes that build on knowledge (Omwenga, 2004). The curriculum does not regard nor disregard other knowledge acquired but emphasizes on the basic pre-requisite.

The entry of mobile learning has shown a great deal in motivating learners to learn in sub-Saharan Africa(UNESCO, 2012), however from the review of literature, no resent research in use of mobile technology for achieving optimum intended learning outcomes or instructor expectations has been done. This argument concurs with the argument of Rajasingham four years ago in his paper entitled: Will Mobile Learning Bring a Paradigm Shift in Higher Education? (Rajasingham L., 2011).

2. Research Question

The question the researchers of this paper have endeavored to answer is: Does Learner Entry Behavior influence the intended learning outcome when mobile learning technology is used for instructions? Or does mobile technology bridge it?

In order to answer this question, the researchers formulated four hypotheses:

Ho: The Learner Entry Behavior (L.E.B) does not influence the intended learning outcome when mobile learning technology is used for instructions.

H1a: The effect of L.E.B is moderated by gender.

H1b: The effect of L.E.B is moderated by age.

H1c: The effect of L.E.B is moderated by the interaction of gender and age.

3. Method

The research was conducted in a higher learning institution. It employed an experimental approach where random replication design method was used. A unit course was randomly selected from an undergraduate course. The course unit that was selected had to have it's offering in two different campuses and taught by same lecturer. A course unit known as Programming 1 was successfully selected. The class on main campus had 23 students and the one in another 26 students. All students in both groups were studied since the sample was small Kothari (2011). Both groups were in same mode of study i.e. regular day. One was the control group and the other received treatment. The treatment was to be taught using face to face coupled with a mobile learning system with downloadable mobile learning application, mobile web, interactive voice recognition and Unstructured Supplementary Service Data (USSD). The control group was taught using the traditional methods face to face with no mobile learning technology support. Data about prequalification and skill level prior to the unit apart from normal pre- requisites, gender and age of learners was collected. A pretest was done by both groups and after Ten weeks of instruction, a final test (post-test) was done again by both groups. Figure 1 show the experimental design diagram used.

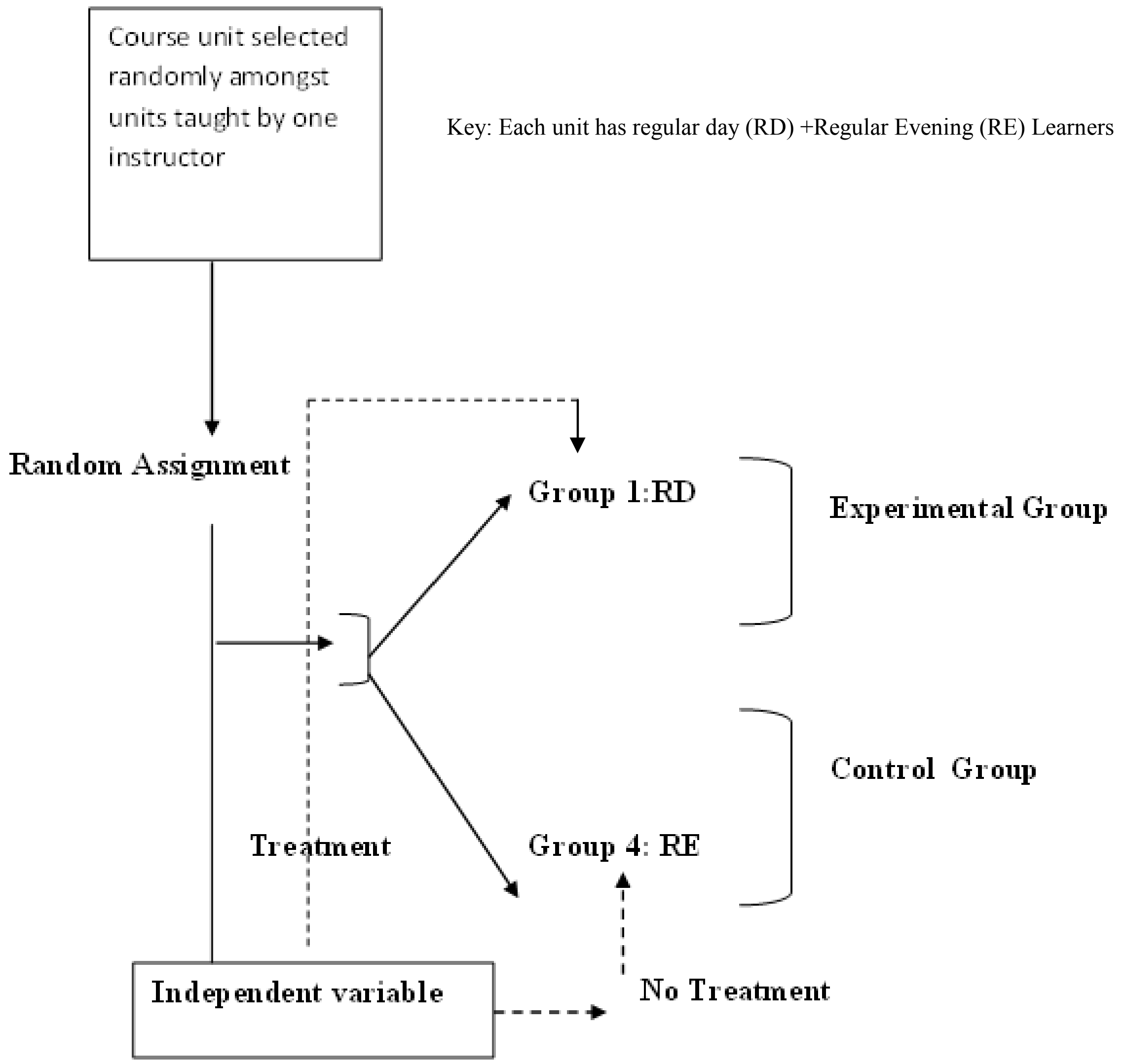

Fig 1: Random Replication design diagram

4. Results

All students in both groups owned at least a cell phone. 73% owned a smart phone, 24% a feature phone and 3% a simple phone. In the treatment group 77% owned more than two mobile devices. Either they own a cell phone and a laptop or a cell phone and a tablet. 100% could access internet on their mobile devices through campus Wi-Fi.

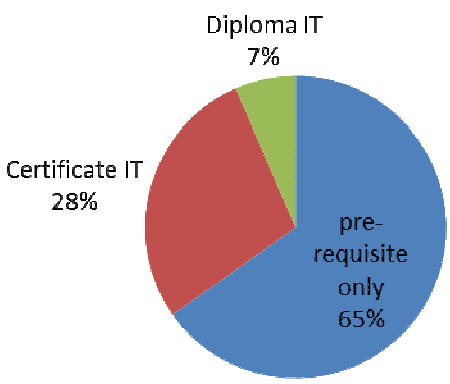

Fig. 2: Pre Qualification Status

Data on prequalification as shown on fig.2 indicate that in both groups 7% had a diploma in IT, 28% had a certificate in IT and 65% had only the pre-requisite. The researchers analyzed the results of the pre-test and post-test to find out if there was a significant difference in both test for the performance between both groups.

Table 1: An ANOVA analysis on performance between control and treatment groups

Final score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5573.526	25	222.941	17.031	.000
Within Groups	261.800	20	13.090		
Total	5835.326	45			

From Table 1 that shows the ANOVA results, the deviations between the two groups was (25) greater than within the group (20). The F value from the analysis is 17.031(F=17.031) and since it is greater than 10 (F>10) we can therefore deduce that the effect size large enough to conclude there was a significant difference between the two groups. While data shows that the treatment given had a significant positive effect on leaner performance, it is difficult to tell what level of statistical chance this was. By plotting the graph for this data it is evidence the relationship is linear as shown by fig.3.

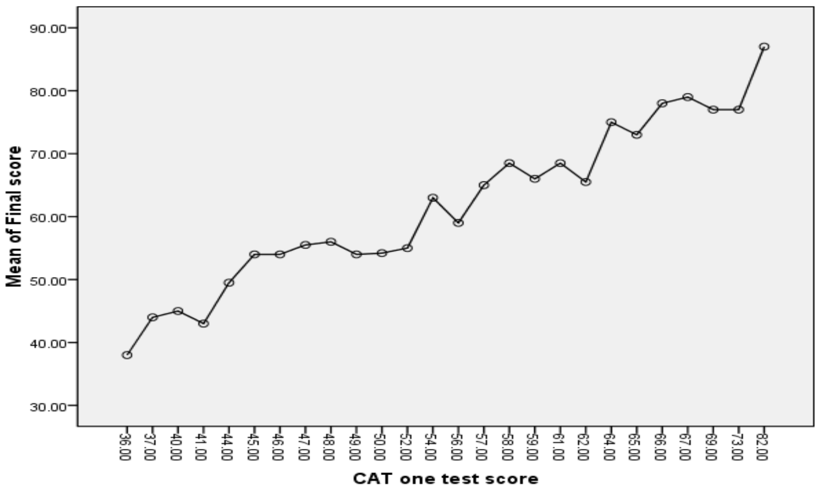

Fig 3: A Mean graph between post-test and Pres-test score

To get the level of statistical chance a bivariate analysis between pre-test and post-test for both groups was done. After performing a bivariate analysis between prequalification and pre-test scores the results are shown on table 2. The chi-Square test results on pre-test has an asymptotic significance for control group (p=.031) while for the treatment group (p=.029). In both cases the asymptotic significance is less than .05 (p<.05), therefore the null hypothesis is rejected. The data from both groups provide sufficient evidence to conclude at 95% confidence that there is low chance of getting result by random chance at 3.1% for control group and 6.8% for the treatment group. This implies that before learners are subjected to mobile learning, the Learner Entry Behavior (L.E.B) does influence the intended learning outcomes.

Table 2: Chi-Square Tests prequalification and pre-test

Control or treated group		Value	df	Asymp. Sig. (2-sided)
Control	Pearson Chi-Square	46.000[a]	30	.031
	Likelihood Ratio	42.246	30	.068
	N of Valid Cases	23		
Treated	Pearson Chi-Square	20.638[b]	18	.029
	Likelihood Ratio	25.495	18	.042
	N of Valid Cases	23		

Another bivariate analysis between prequalification and post-test scores was performed and the results are shown in table 3. The chi-Square test results on post-test has an asymptotic significance for control group (p=.017) while for the treatment group (p=.698). In the case of control group the asymptotic significance is less than .05 (p<.05) while the asymptotic significance of the treatment group is greater than .05 (p>.05). The data from control groups provide confirmatory evidence to conclude at 95% confidence that there is low chance of getting result by random chance at 1.7%. This confirms that when mobile learning is not used learner entry behavior has a significance influent on learner performance and in turn intended learning outcomes. For the treatment group, the data provide confirmatory evidence to conclude at 95% confidence that there is high chance of getting result by random chance at 69.8%. This implies that when learners are subjected to mobile learning, the Learner Entry Behavior (L.E.B) does not influence the intended learning outcome.

Table 3: Chi-Square Tests prequalification and post-test

Control or treated group		Value	df	Asymp. Sig. (2-sided)
Control	Pearson Chi-Square	46.000[a]	28	.017
	Likelihood Ratio	42.246	28	.041
	N of Valid Cases	23		
Treated	Pearson Chi-Square	13.554[b]	17	.698
	Likelihood Ratio	17.177	17	.442
	N of Valid Cases	23		

In order to find out if age, gender affect the LEB in influencing the intended learning outcome, a univariate analysis was done and the results are presented on table 4. From the table the univariate test analysis between age, gender and final score on post-test show that the p values are Age (p=.293), Gender (p=.926) and the interaction between age and gender (p=.885). All these values of p are greater than .05. It is therefore evident from data that there is no significant effect that these factors have on post-test results.

Table 4: Univariate Tests of Between-Subjects Effects of Age and Gender on Final score

Dependent Variable:Final score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	660.326[a]	6	110.054	.829	.554
Intercept	48197.081	1	48197.081	363.224	.000
Age	511.488	3	170.496	1.285	.293
Gender	1.157	1	1.157	.009	.926
Age * Gender	32.661	2	16.331	.123	.885
Error	5175.000	39	132.692		
Total	178591.000	46			
Corrected Total	5835.326	45			

5. Conclusion

In conclusion, the data provides enough evidence that mobile learning can bridge the differences between learners when they are joining a course unit. It is also clear from the data that when mobile learning technology is not used to support learning, the learner entry behavior will always affect the learner performance. The learner who joins a course unit with extra skills above the mandatory prerequisite will always show better performance.
The researchers recommend that mobile learning be used to support instructional delivery to learners and further research is required to determine factors that lead to the bridging of different learner entry behavior when mobile learning is used as an instruction delivery method.

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