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FRAME MODEL: RELATIONSHIP STUDY ON MOBILE LEARNING EDUCATION

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Abstract

This study conducted in order to evaluate the effects of learner aspect, social aspect, device aspect, device usability, interaction learning, social technology towards mobile learning (DLS) in the undergraduate study program for commerce students. A total of 117 students participated in this study. These students are who had enrolled fulltime online learning and applying mobile learning to complete their course requirement during the pandemic. Mobile learning is a method of obtaining learning materials from anywhere and at any time by using personal devices and wireless technology. In this study, mobile devices which are smartphones, laptops, notebooks and equip with internet access or apps are regarded as tools to support ubiquitous learning. The results showed that most student used smartphones and accumulated time spent for online learning in hours are between 5 hours to 8 hours per day. Next, learner aspect is having the strongest relationship, while the social technology element having a weak but still significant relationship with mobile learning. Therefore, the study suggests that even though the mobile learning is known for intrinsic ability to encourage the process of socializing through online community or within their classmate, but still, the students showed certain barrier to perform effective communication between them. As a result, this paper can be used on how each element of FRAME Model can be incorporated in today mobile teaching and learning more effectively. As well to gain understanding towards improving students' experience and mobile learning performance in higher education

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Key-word: - FRAME Model, Mobile Learning, Higher Education

1. Introduction

An outbreak of COVID-19 has become a pandemic in Malaysia in this 2020/2021. The pandemic not only affected Malaysia educational systems but also affected educational systems worldwide. This leads to closure of most universities and educational systems changing to where learning and assessment or examination were moved hundred percent through online learning. The current situation has impacted the whole learning system for Commerce Department's student, Polytechnic Port Dickson. This action is too minimal the community spread among students by creating social distancing where all students arranged to go back to their hometown. By performing distance online learning, the students are able to continue their study, taking assessment and complete final examination in order to complete the semester. Therefore, in this study, I use Koole (2009) Venn diagram which consist of learner aspect (L), the social aspect (S), and the device aspect (D) and see the relationships between them. Meanwhile, Koole (2009) describes each element and intersection between device aspect (D), learner aspect (L), social aspect (S), device usability (DL), interaction learning (LS), social technology (DS), and mobile learning (DLS). The FRAME model is chosen because this framework or venn diagram became main source and reference by most researcher for mobile learning.

Firstly, physical hardware qualities which are size, weight, touchscreen and storage and software usability are referred to device aspect. Secondly, the learner aspect outlines how students apply prior knowledge to their abilities and concepts of mobile learning. Thirdly, communication, cooperation, and interaction are all addressed by the social aspect. Fourthly, device usability (DL) intersection encompasses both the device and the learner. This point of intersection brings together the physical characteristics of a mobile device with the mobility, on-the-go access to information, and comfort of a learner, all of which are vital for usability.

Next, the interaction learning (LS) intersects the social aspect and learner aspect which focusing on interaction between learners, instructors, content as well as computers. And lastly, social technology (DS) intersection that represents the interchange of information and collaboration in communication amongst numerous users of a mobile device learning.

2. Problem Statement

The traditional method of learning involves students and lecturer in classroom and having blended learning which certain parts of assessment been doing online for students in Commerce Department, Polytechnic Port Dickson. Instantly, since an outbreaks of COVID-19, learning methods was automatically switch to hundred percent online learning whereby all students taking classes from home. Due to this circumstance, the instant change affected both students and lecturers in switching the mode of study in order to fulfil the course requirement and complete to the semester. Now, the students rely on flexibility of mobile learning in allowing them to access the education through their mobile devices and applying mobile learning anywhere at any time. As such, commencing this study is very crucial and necessary to ascertain the extent to which elements of (D, L or S) and intersection elements of (DL, LS, DS) that effectively increase and have severe relationship towards mobile learning (DLS). We aimed to evaluate the student perspective towards mobile learning (DLS) in the undergraduate study program at the Commerce Department, Polytechnic Port Dickson. As a matter of fact, it is not clear if students can effectively use the mobile learning or its ability in supporting interaction between the instructors and students in this context.

3. Research Objective / Research Question

The study's goal is to determine the association or relationship between the FRAME Model elements of device aspect (D), learner aspect (L), social aspect (S), device usability (DL), social technology (LS) and interaction learning (DS) on mobile learning towards students. The research question addressed in this study is there any relationship between elements of FRAME model and mobile learning towards students.

3.1 Scope of Study

This study will cover about the FRAME model framework that consists of the three main aspects which are device aspect, learner aspect and social aspect and intersection element of device usability, social technology and interaction learning. This will venture into their effect on the mobile learning as measured by their results. Under this study, group of students will be assessed. The study will be applicable for those students that had studying or applying fully online methods in their mobile learning and enrol as Commerce Department's student. This study is focused in higher education student located at Polytechnic Port Dickson, Negeri Sembilan. The respondents of the study are the students who had enrolled fulltime online learning and applying mobile learning to complete their course requirement. This study focusing those Commerce Department's students which studying through online throughout the semester.

4. Literature Review

4.1 FRAME Model Elements

The elements in this study discuss on determinants by using the FRAME model. According to Koole (2018), stated that this model is widely used by 208 publications. It is as a term to characterise the process of mobile learning as a result of the convergence of mobile technologies, human learning capacities, and social interaction. The FRAME model elements stand for device aspect (D), learner aspect (L), social aspect (S), device usability (DL), interaction learning (LS) and social technology (DS) that may help leveraging the benefits to have a deeper understanding of the complexities of mobile learning.

4.2 Mobile Learning (DLS)

The Kukulska-Hulme & Traxler (2005) stated mobile learning, according to the definition, is the use of mobile or wireless devices for the goal of learning while on the go. Walker (2006), on the other hand, noted that mobile learning has been widely acknowledged as encompassing not only the usage of portable devices but also learning across contexts. Peter (2007) sees mobile learning as a beneficial component of the flexible learning paradigm, while Pea and Maldonado (2006), sees it as incorporating "transformative advances for learning futures."

4.3 Device Aspect (D)

Koole (2006) stated that, the physical, technical, and functional description of mobile devices is referred to as the device's usability aspect. These qualities, according to Koole (2009), are a product of the device's hardware and software design and have a substantial impact on the users' physical and psychological comfort levels.

4.4 Learner Aspect (L)

The learner's cognitive capacity, memory, emotions, prior knowledge, and potential motivation are all reflected in the learner's aspect. This will justify how students apply what they've learned, encode, store, and transfer data (Koole, 2009). Driscoll (2005) argued that combining several pedagogical approaches (constructivism, behaviourism, and cognitivism) with web-based technologies (live virtual classroom, self-paced teaching, collaborative learning, streaming video, audio, and text) can result in better learning.

4.5 Social Aspect (S)

People receive feedback from one another through interaction, which promotes social and cultural views and behaviours (Kearsley 1995). Research by Driscoll (2005) emphasize on once a learner be in a new community, they must devise their own sign systems and learn the new community's as well. Furthermore, if participants in a conversation are constrained, it is critical to give norms and predictability for behaviour that permit effective communication.

4.6 Device Usability (DL)

According to N. Bevan (1995), the term "usability" was coined in the early 1980s to replace the imprecise term "user-friendly," which had a subjective connotation. Meanwhile, ISO (2010) stated "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" is defined as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use".

4.7 Interaction Learning (LS)

Moore (2007) suggested distance learning in three types which are learner-content, learner-instructor, and learner-learner. It refers to the cognitive changes that occur as a result of a learner actively engaging with course materials in learner-content interaction. Learning communities and cognitive apprenticeships are two examples of highly social learning approaches that allow learners to have varying degrees of control according to a prior study by Reigeluth and Squire (1998). Learning communities, in this sense, can be thought of as groups of learners who collaborate to achieve common goals and, thanks to technology, can engage in discourse and problem-solving activities with learners in other locations.

4.8 Social Technology (DS)

The main advantage of mobile learning, according to Kim (2013), is its intrinsic ability to encourage the development of learning as an active process through a group or community. According to Koole (2009), mobile devices facilitate communication and collaboration between numerous persons, groups, and systems. According to Sharples (2005), for mobile learning to be effective, it must put knowledge, the learner, evaluation, and the learning community at the centre of its foundation.

4.9 Framework and Hypotheses

By testing the hypothesis and conforming the conjectured relationship, it is expected that researcher may further investigate the needed use of mobile learning for communication and interactive purposes. There are six hypotheses were built from the theoretical framework which are:

- H1-There is a significant relationship between device aspect (D) and mobile learning.
- H2-There is a significant relationship between learner aspect (L) and mobile learning.
- H3-There is a significant relationship between social aspect (S) and mobile learning.
- H4-There is a significant relationship between device usability (DL) and mobile learning.
- H5-There is a significant relationship between interaction learning (LS) and mobile learning.
- H6-There is a significant relationship between social technology (DS) and mobile learning.

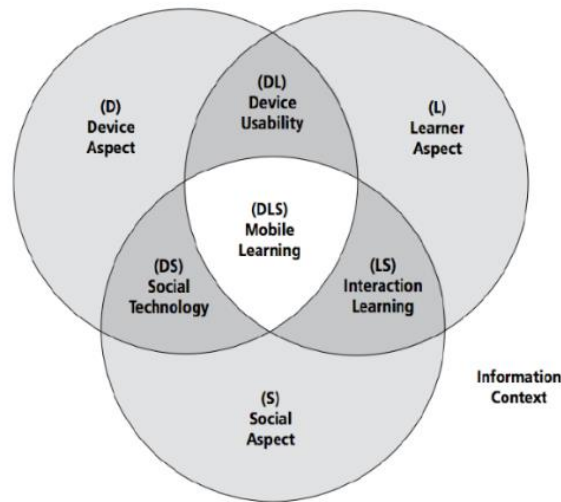


Figure 1: Venn Diagram of FRAME Model (Koole, 2009)

5. Methodology

5.1 Research Design

This study covers on the areas of the research design whereas categorized under the cause-and-effect study as the main purpose is to determine the magnitude of effect on mobile learning for communication have on higher student education specifically from Commerce Department, Polytechnic Port Dickson (DPR, DSK and DAT students).

5.2 Data Collection / Sampling Design

The data collection data have been gathered from two main sources which are primary data from survey questionnaires and secondary data from external sources such as books as well as articles and journals. In reference to this study, taking 200 of sample size out of 1,104 undergraduate students (DPR, DAT and DSK Programme, Commerce Department) from semester 1 to semester 5 as suggested by Krejcie and Morgan (1970) seems acceptable.

5.3 Measurement and Scaling

In data measurement and scaling for questionnaire design, the items have been measured using a five points Likert Scale from 1 to 5. Data preparation and data analysis is retrieved using SPSS to carry out the Reliability Analysis, Correlation Analysis and Multiple Regression Analysis so that the association and relationship between the independent variables of FRAME model elements and dependent variable of mobile learning can be figured out.

5.4 Questionnaires Design

This study involved two main variables, FRAME model elements and mobile learning. The questionnaires are designed based on the six dimensions of independent variables to highlight the area of the study to be researched on. The dimensions based on the FRAME Model Elements which stated six dimensions that influence the mobile learning which are the section C (C1-C5) device aspect (D), section D (D1-D5) learner aspect (L), section E (E1-E5) social aspect (S), section F (F1-F5) device usability (DL), section G (G1-G5) interaction learning (LS) and section H (H1-H5) social technology (DS). The items in the questionnaires have been amended in term of its wording and suitability with the study.

6. Finding / Analysis and Discussion

6.1 Frequency Analysis

In this research, a frequency analysis is done to obtain a count of number of respondents associated with the different value of one variable and to express these counts in percentage (%) terms. Below, the analysis on demographics profile of respondents is tabulated.

Sex :
177 responses

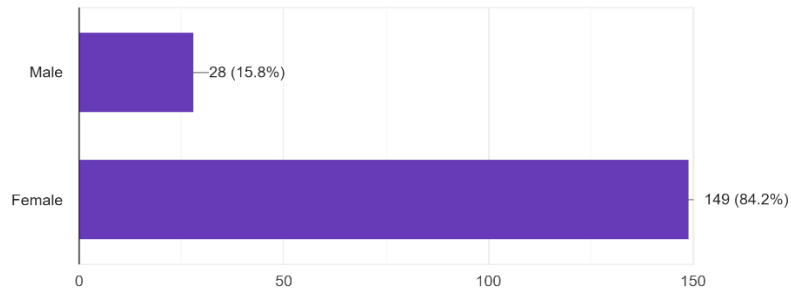


Figure 2: Gender

Course :
177 responses

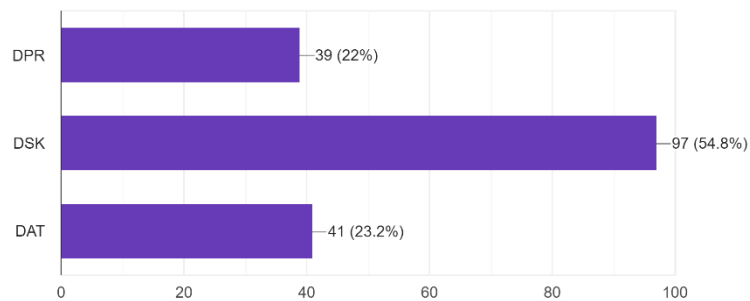


Figure 3: Course

Race :

177 responses

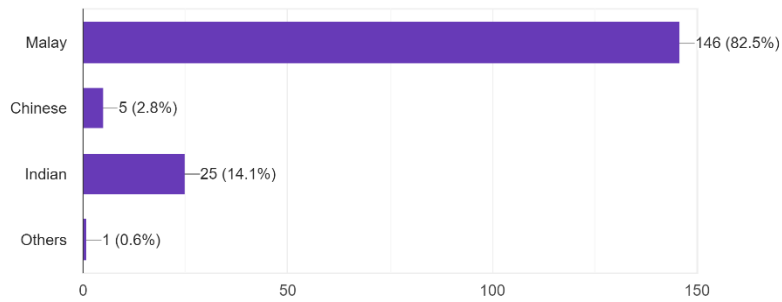


Figure 4: Race

Semester :

177 responses

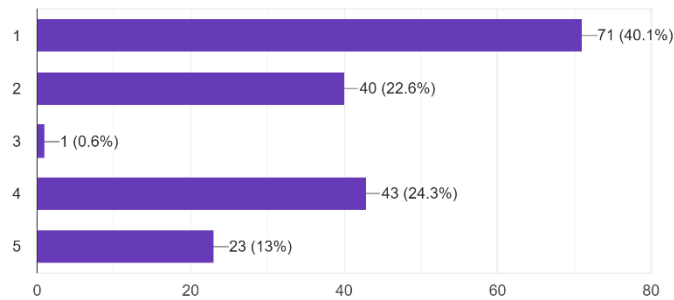


Figure 5: Semester

Type of devices you use for online learning :

177 responses

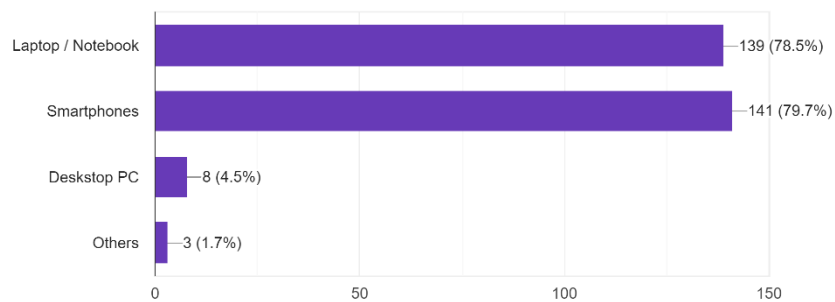
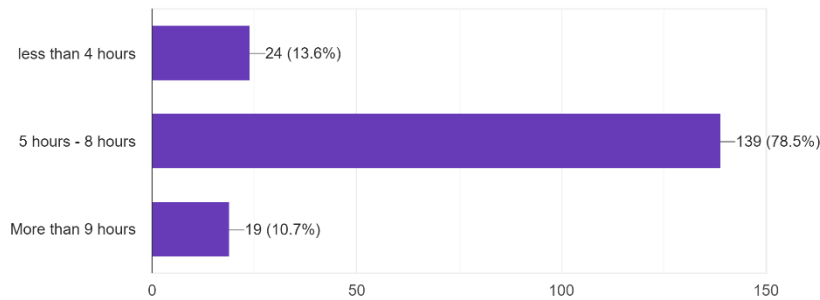


Figure 6: Type of devices use for online learning

Accumulated time spend for online learning per day (hours)

177 responses

**Figure 7:** Accumulated time spend for online learning per day (hours)

Based on above Figure 6.1 to Figure 6.6, questionnaires are distributed to 200 students via google form link, however, there are 177 students answered or replied to the questionnaires link given to be analysed. For gender distribution, the male respondents are represented by 15.8% of the sample population and the remaining 84.2% are female respondents. Based on the courses, majority of the respondents from DSK programme represented by 54.8%. The largest group of respondents are Malays represented by 82.5%. Based on the semester of enrolment, majority of the respondents are from semester 1 by 40.1%. Next, most student used smartphones by 79.7% and accumulated time spent for online learning in hours are between 5 hours to 8 hours per day by 78.5%.

6.2 Reliability Analysis

The value of Cronbach's Alpha for dependant variable (Mobile Learning, DLS) is 0.877 that shows the level of relative internal consistency and reliability excellent and thus acceptable for this study. As a summary, the Cronbach' Alphas for all independent variables are considered to be very good and acceptable with device aspect (0.923), learner aspect (0.935), social aspect (0.942), device usability (0.933), social technology (0.920) and interaction learning (0.954).

6.3 Correlation Analysis

	Device Aspect	Learner Aspect	Social Aspect	Device Usability	Social Technology	Interaction Learning
Mobile Learning	.611**	.774**	.729**	.721**	.587**	.740**
	.000	.000	.000	.000	.000	.000

Note: **. Correlation is significant at the 0.01 level (2-tailed) and N = 177.

Table 1: Correlation Analysis

There is a significant positive association between device aspect ($r=0.611++$), learner aspect ($r=0.774++$), social aspect ($r=0.729++$), device usability ($r=0.721++$), social technology ($r=0.587++$), interaction learning ($r=0.740++$) and mobile learning. The correlation coefficient value ($p=0.000$) indicates a weak association for social technology and moderate association for the others variables according to Burns and Bush (2000). Therefore, all hypotheses H1-H6 is answered to have significant relationship.

6.4 Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836 ^a	.699	.689	.42839
a. Predictors: (Constant), MeanH_LSintLearning, MeanC_Device, MeanG_DSsocTechnology, MeanD_Learner, MeanF_DLdevUsability, MeanE_Social				

Table 2: Multiple Regression Analysis: Model Summary

Based on the above model summary, the R square value is 0.699, which indicates 69.9% of the variability of dependent variable (mobile learning) can be explained by the six independent variables used in the model (device aspect, learner aspect, social aspect, device usability, social technology and interaction learning). The remaining of 30.1% of the dependent variable (mobile learning) is explained by other factors that have not been considered in this study.

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	72.547	6	12.091	65.884	.000^b
	Residual	31.199	170	.184		
	Total	103.746	176			

a. Dependent Variable: MeanB_DLS

b. Predictors: (Constant), MeanH_LSintLearning, MeanC_Device, MeanG_DSsocTechnology, MeanD_Learner, MeanF_DLdevUsability, MeanE_Social

Table 3: Multiple Regression Analysis: ANNOVA

The table shows that the independent variables statistically significantly in predicting the dependent variable, $F(6, 170) = 65.884, p < .000$ which also means that the regression model shows a good fit of the data. The significant F-statistics of the model shows that at least one of the independent variables (device aspect, learner aspect, social aspect, device usability, social technology and interaction learning) is significant in explaining the variation of dependent variable (mobile learning).

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.623	.164		3.802	.000
	MeanC_Device	.142	.064	.156	2.223	.028
	MeanD_Learner	.311	.067	.363	4.646	.000
	MeanE_Social	.095	.073	.117	1.294	.198
	MeanF_DLdevUsability	.234	.085	.243	2.768	.006
	MeanG_DSsocTechnology	-.188	.064	-.218	-2.948	.004
	MeanH_LSintLearning	.229	.080	.257	2.880	.004

a. Dependent Variable: MeanB_DLS

Table 4: Multiple Regression Analysis: Coefficients

Learner aspect is the highest predictor based on standardized coefficient and significant at 95% level of confident from the multiple regression analysis ($\beta = 0.363$), followed by interactive learning ($\beta = 0.257$), device usability ($\beta = 0.243$), social technology ($\beta = -0.218$), device aspect ($\beta = 0.156$) and social aspect ($\beta = 0.117$) of mobile learning. The significant coefficient with value of β provides evidence that 1% increase in any of independent variables caused the dependent variable to increase by β %. Thus, H1-H6 are supported.

7. Conclusion and Recommendation

In this study, the research objective to determine or ascertain the extent to which elements of FRAME model (D, L or S) and intersection elements of (DL, LS, DS) that effectively increase and have severe relationship towards mobile learning (DLS) for students. The results show, each independent variable has significant positive relationship towards mobile learning. Learner aspect is having the strongest relationship, while the rest are having a moderate but still significant relationship. Thus, it shows that any contribution and effort being put into any aspects into FRAME model elements would significantly increase mobile learning experience for students. Therefore, research objective in this study is achieved. Thus, the changes in roles, transition to mobile learning education will construct changes on knowledges in reflect to new thought, experiences and ways of learning in learner-centred constantly according to M. Ahonen, B. Joyce and H. Turunen (2003).

Despite of enthusiasm of innovative mobile learning technologies, commerce students showed certain issues to socializing between them through social technology. This related to different region, amount of data, internet speed and security that the students possessed or acquire while transferring data, joining class and group discussion. Therefore, students mobile learning can be enhanced through providing certain appropriate methods of relevant communication among them to meet the needs. Meanwhile, the social aspects are related to communication, learning with others, collaboration, interaction and participation are barrier which happened to distance learning communication. Therefore, an accurate guideline will help students to minimise miscommunication and facilitate ideal mobile learning. Thus, future study in these elements findings will contribute to refining each elements in details. It is hope that higher education institution able to use this research as one of the guidelines to strengthen their mobile learning experience for students. Thus, able to channel right resources into the areas where they can contribute the most and creating their own effective distance learning platform.

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