March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

Technology Enabled Learning Experience Among International Baccalaureate Students Through Experiential Mobile Learning App

Dr Ravichandran [1]; Ms Ho Yen Fen [2]; Mr Ariel Schatenstein [3]; Ms Valerynne Chang [4]

[1,2,3,4] University College Fairview, Malaysia
[1]Ravichandran.ucf@fairview.edu.my

Article Info
Volume 83
Page Number: 5278 - 5288
Publication Issue:
March - April 2020

Article History
***Article Received**: 24 July 2019*
***Revised**: 12 September 2019*
***Accepted**: 15 February 2020*
***Publication**: 27 March 2020*

Abstract

In today's world of digital technologies, the number of mobile apps used from the billions of users around the world appears to be increasing. However, keeping track of all these mobile apps on their efficiency and effectiveness becomes inevitable for any educational institutions that wishes to incorporate mobile apps as an avenue for Blended teaching and learning. During the process of implementing Blended learning, it is quite often for pedagogical community to decide on the best pedagogical approaches for the delivery of their teaching content to their students. Technology-Enabled Learning is one such feature that is taken to refer to the application of some form of digital technology to teaching and/or learning in an educational context. In this research study an attempt has been made to examine the BeEd Experiential Mobile Learning App for its acceptance among the two International Baccalaureate Schools with a population of 510 students. Students from Grade 5 until Grade 9 were asked to respond to the online survey questionnaire. Findings of this research study reports on the responses based on quantitative analysis received from the 275 students who had responded the survey questionnaire. The results of the analysis showed the student's satisfactions towards the usage of the BeED Mobile App to be positive with respect to the three variables, Knowledge, Activity and Reflection.

I. INTRODUCTION

According to Global E-Learning Market Analysis and Trends (2017), the global eLearning market is poised to grow at a compound annual growth rate (CAGR) of around 7.2% over the next decade to reach approximately $335 billion by 2025. This projected rapid advancement in the field of eLearning seem to have triggered various stakeholders who are involved integrating technology to bring innovative teaching and learning among the pedagogical community. However, there are issues and challenges that are encountered by practitioners and policy makers in implementing technology in the teaching and learning among the pedagogical community. Groff and Mouza (2008) rightly points this and highlights six central factors, each with its own critical variables, that interact with one another to produce barriers to implementing technological innovations in the classroom. They are (a) Research & Policy factors, (b) District/School factors, (c) factors associated with the Teacher, (d) factors associated with the Technology Enhanced Project, (e) factors associated with the Students, and (f) factors inherent to Technology itself. However, these technical factor and teacher competencies needs to be also seen in the context of the end users, who are ultimately to be tested upon in this triangulation process of Technology, Pedagogy and Content. Technology-Enabled Learning is one such entity that encapsulates all these three components namely, Technology, Pedagogy and Content together, which is taken to refer to the application of

Published by: The Mattingley Publishing Co., Inc.

some form of digital technology to teaching and/or learning in an educational context.

Therefore, the connection between technology and learning can be seen as multifaceted phenomena, but research indicates that particular uses of technology can improve students' learning (Moeller &Reitzes, 2011). Thus we see there is a need for a particular use of technology which can show evidence of improving students learning. In this study, an attempt has been made to examine if the BeEd Experiential Mobile Learning App has potential to embrace and improve the digital learners who are using this Technology-Enabled Learning platform for its acceptance among the students of the two International Baccalaureate (IB) world schools in Malaysia.

II. LITERATURE

Several evidence from literature shows that there are positive mind set across the pedagogical community towards adoption of technology-enabled learning. This is evident form these pasting findings where there seem to be a positive relationship between self-efficacy and technology-enabled learning (Ertmer and OttenbreitLeftwich 2010; Inan and Lowther 2010; Shin 2015). Although, this findings are not in the context of Asian countries, still this findings can be seen in the light of the fact captured form the outcomes of the Bett Asia Leadership Summit 2015 conducted in Singapore during the same period. In this inaugural survey conducted by Bett Asia Leadership Submit (2015), respondents included teachers from across all levels from preschool to postgraduate, as well as policy makers involved in education from across 18 countries in the Asia Pacific. The outcome of the results showed that most schools in Malaysia have adopted teaching and learning via technology as many teachers are well-equipped and readily progressing towards 21st century skills for students. Although, there are such evidence of literature where mostly the respondents were the implementers (teachers) rather than from end-users (students), still it provides an opportunity to investigate and relate these findings to that of the students preference in the context of Technology-Enabled learning. There are recorded evidence of literature that Technology-Enabled Learning was positively associated with technology-enabled learning among teachers in countries like US and Korea even after controlling for other variables, which is consistent with that of some of the previous literature (e.g., Tondeur et al. 2017). Technology-Enabled Learning is one such feature that is taken to refer to the application of some form of digital technology for teaching and/or learning in an educational context.

Curriculum development must also take account of wider societal and technological changes, including the growing significance of the internet and mobile technologies to children and young people's lives both inside and outside of school. Research shows that children in Europe are going online in increasing numbers from an earlier age, with more widespread access to mobile technologies and social media membership, and that this has profound implications for their peer relationships, social norms and identity formation (DfE, 2016). Thus, this also calls for a need for an age and contemporary pedagogical responses to be administered across all levels of Education.

Why BeEd Experiential Mobile App for Learner's engagement

Since its official Launch in May 2017, BeEd became the first Asian applicant to graduate from xEdu, Europe's leading Helsinki-based accelerator for EdTech. The Experiential Learning Platform is amongst a handful of products from Asia to have been certified by the Education Alliance Finland Standard. Aside from being recognised as a Malaysian shortlisted awardee at the 2018 Reimagine Education Awards and winning the MSC Malaysia – Asia Pacific ICT Alliance Award for Inclusions and Community Services. BeEd's impact has also been recognized at the ASEAN Business and Invest Summit.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

According to the CEO of the company Michael, among the other myriad of features of BeED includes improvement of content retention of over 26% through dynamic collaboration, deeper learning creativity, problem solving and logical reasoning. He further states, an ultimate potential of crowdsourced material from educators around the world will be made available for educators on the marketplace, enhancing and spreading best practices recognised around the world. To ensure the quality of all learning content, each contributor's work will undergo a strict vetting process for an initial period, with continuous monitoring done subsequently through a customer review/ rating process.

Figure 1: Features of BeED Mobile Learning platform

BeEd's offline feature allows students to continue learning even when they are travelling abroad or to remote areas, unhampered by poor Wi-Fi connections / speeds. Learner's progress (logs) will automatically be saved and uploaded once the application re-establishes an internet connection. This features need to be viewed in the context of Taylor and Vavoula (2010), wo says "…learning outside of the classroom brings advantages for different interactions". Thus, with all loaded features BeED seem to be a right choice as an learning platform to influence experiential learning across the global learners, who are keen to use contemporary teaching and learning tools to engage digital learners of 21st century.

III. RESEARCH OBJECTIVES

The following are the objectives of this study:

1) Identify the students perception in the usage of BeEd mobile App as a Learning Engagement platform
2) Identify the students level of engagement during their learning process
3) Identify the Effectiveness of the content placed in the BeED mobile App for learners engagement.

Research Question

RQ1 : How far the student's gained knowledge in using the BeED mobile App?

RQ2 : To what extent do the Learning activities influence in students' satisfaction during the BeEd Mobile APP usage?

RQ3 : To what extent Learning Engagement (LE) has influence in students satisfaction during the BeEd Mobile App usage?

The corresponding codes and description of the research hypotheses are represented in Table 1.0

Table 1.0

Research Hypotheses

Code	Description	Path
Direct Effect of Variables		
H1	Knowledge (KNW) has significant effect on BeED Mobile APP Satisfaction (BeED)	KNW →BeED
H2	Action (ACT) has significant effect on BeED Mobile APP Satisfaction (BeED)	ACT →BeED
H3	Reflection (RFL) has significant effect on BeED Mobile APP Satisfaction (BeED)	RFL →BeED

IV. RESEARCH MODEL

In order to specify the research hypotheses targeted in Table 1.0 a research model was develop in this

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

study. The research model is intended to test the hypothesized direct effects from Knowledge (KNW), Action (ACT) and Reflection (RFL) as independent variables (IVs) on BeED Mobile APP Satisfaction (BeED) as dependent variable (DV).

Figure 2, illustrates the hypotheses in the research model and their relative hypotheses**.**

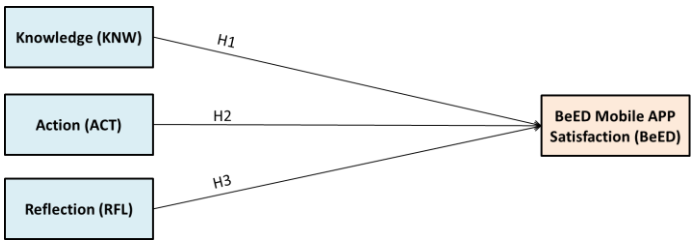

Figure 2: Hypotheses and the Research Model

V. RESEARCH METHODOLOGY

This study is a survey research in which both open ended and closed ended questions were used. The population of the students in the two IB schools were 510. The sample was drawn from this population and the successful respondents after distribution of questionnaire was 275, which is 54 percent of the total population of students. This sample was sufficient as according to Sekarn (2003, p.2 94) and Research Advisor table (2019). The minimum requirement sample size was 217 The survey used convenience sampling, which is a type of sampling where the first available primary data source will be used for the research without additional requirements (Sunders, Lewis &Thornhil, 2012). The survey questionnaire had 36 question items with 5 point Likert scale. Reliability and validity test were used and the data were considered to be reliable if a Cronbach' alpha was higher than 0.70 (DeVellis, 2003). The percentage of female and male students were 49.7 (%) and 51.3(%). Pearson correlation coefficient showed normality and linearity (Bryman& Cramer, 2001). Table 2.0 presents Pearson correlation Matrix of the independent constructs. All the correlation were less than 0,01 level of significance. A Sapiro-Wilk's test ($p>0.05$) (Shapiro &Wilk, 1965; Razli&Wah, 2011) showed that the data were normally distributed.

Table 2.0

Correlation Matrix

	App design	Knowledge section	Action section	Reflection
App design	1.000000	0.8695368	0.853109	0.87899
Knowledge section	0.869537	1.0000000	0.880831	0.874982
Action section	0.853109	0.8808311	1.000000	0.878921
Reflection	0.87899	0.8749823	0.878921	1.000000

VI. DISCUSSION AND FINDINGS

In this section the discussion will be about the findings based on each of the research questions that were intended to be addressed during the being of this study. This findings are based on quantitative study where the research questionnaire was divided into four sections. The first section of the questionnaire focused on demographics the second section focused on app design, the third section was used to capture Knowledge section from the respondents, the fourth section was used to capture Action section, and the last section captured Reflection section.

Data analysis and respondents' characteristics

Data was analysed using R software. Descriptive statistics such as median, frequency, and percentage are used for analysis. Furthermore, factor analysis was also performed to identify key factors that are likely to influence adoption. The desired sample size was 217 but the actual number of respondents who took part in the study was 275, which is much higher than the minimum sample size required for this research Research Advisor table (2019). The percentage of Male and Female were (48.7%) and male (51.3%).

Reliability and Validity of the Instrument

In order to determine factors likely to influence respondents' decisions in integrating technology into their teaching, principal factor analysis was

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

conducted to examine the underlying structure for 36 factors using R software. A Kaiser–Meyer–Olkin (KMO) and principal component factor analysis were performed (Figure 1). The value of KMO was 0.7, which suggests that the sample was adequate to proceed with principal component factor analysis. In addition, the value for Bartlett's test showed significance ($p < .000$) indicating high correlation among variables for factor analysis. Table 2.1 is the result of the exploratory factor analysis and reliability rest. All of the variables were consistent internally with an alpha value of more than 0.70 as the minimum point cut-off point (Nunally, 1978). All the 4 constructs had Cronbach's alpha of very high factor loading of .925. This shows that all the contracts were reliable in this research. Further the Factor analysis of the data was also examined via significance of the Bartlett test of sphericity while sampling adequacy was measured using Kaiser-Meyer-Olkin (KMO). While the Barlett test of sphericity was significant at p <0.0, the KMO was with a value of 0.95, which was very high above the adequate sampling value of 0.6 (Tabachnick&Fidell, 2007).

Table 2.1

Result of the Exploratory Factor Analysis and Reliability Scores:

Factors	Number of items	Mean	Cronbach's Alpha Score (rounded to 2 decimal)	Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.967
App design	13	3.3631	0.940	Bartlett's Test of Sphericity Approx. Chi-Square = 2.2 e-16
Knowledge section	5	3.4916	0.889	
Action section	8	3.4614	0.930	
Reflection	10	3.4582	0.944	
Total	36		0.925	

A Principal Component Analysis was conducted using the R software. The following graph of variables shows the relationship between all the variables as follows:

1) Positively correlated variables are grouped together

2) Negatively correlated variables are positioned on opposite sides of the plot origin (opposed quadrants)

3) The distance between variables and the origin measures the quality of the variables that are away from the origin are well represented on the factor map.

The principal Component Analysis (PCA) can be projected in a 2-dimentional graph. The two-dimensional graph generated from the R software is shown in the Figure 2. From the figure it is evident that the horizontal separation are more significant from the vertical separation. This signifies that the data are reliable and have no serious outliers.

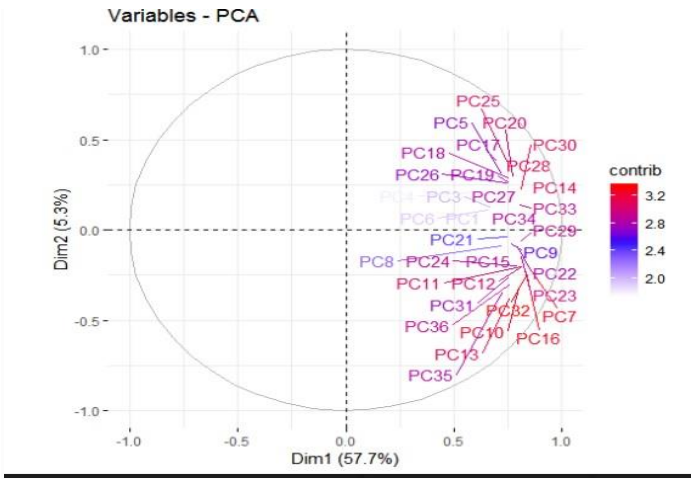

Figure 2: Principle Component Analysis Graph generated using R software

From the 275 students who had responded to the questionnaires, 141 responses were received from the male (51.3%) and 134 from the female (48.7%). Therefore, the sample of this study is equally dominated by male and female.

In specifying the **Grade Level** of the respondents, 23.6% of them had Grade 6, 18.5% had Grade 7, 19.6% had Grade 8 and 38.2% had Grade 9.

Responders were also asked to specify their **Technology Experience**. As the result, 32% of the

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

respondents stated that they are Professional, 9.8% are Advance, 46.9% are Intermediate and 11.3% are Beginner.

In specifying the **Internet Usage** of the respondents, 22.9% of them stated they frequently use internet, 6.5% use Couple of Times each day, 61.5% use Once a day, 5.8% use Few Times Each Week, 2.2% use once a week and 1.1% use less than once a week.

Finally the respondents were asked to specify on **Educational App**. As the results, 21.5% of them used 10 or more times, 41.1% used 5-9 times, 23.3% used 2-4 times, 9.8% stated this is the first time and 4.4% stated that they are unsure or don't know. This shows that almost 95.6% of the respondents have already had experience in using Educational Apps.

Descriptive Statistics

In this analysis, the descriptive statistic of the variables was examined. The mean was applied as a measure of central tendency while the standard deviation was applied as a dispersion index to indicate the degree to which individuals within each variable differ from the variable mean. Table 2.2 demonstrates the results of descriptive statistic of the variables.

Table 2.2

Results of Descriptive Statistics for Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Knowledge (KNW)	3.492	0.867	1	5	-0.452	0.094
Action (ACT)	3.461	0.865	1	5	-0.367	0.02
Reflection (RFL)	3.458	0.927	1	5	-0.514	0.144
BeED Mobile APP Satisfactio	3.363	0.858	1	5	-0.312	-0.145

As shown in Table 2.2, the mean values of all variables were above their midpoint level of 3. The phenomenon indicated that the consensus respondents' perception toward these variables were above the average.

The highest mean rating belonged to Knowledge (KNW) with the mean value of 3.492. The lowest mean rating BeED Mobile APP Satisfaction (BeED) with the mean value of 3.363. The standard deviation was applied as a dispersion index to indicate the degree to which individuals within each variable differ from the variable mean. Among the studied variables, the individual value of Reflection (RFL) deviated the most from its mean (SD = 0.927). This standard deviation suggested reasonably high variability in respondents' perception toward Reflection (RFL). In other word, the survey participants were most varying in this variable from each other. At the other side, the lowest deviation from mean belonged to BeED Mobile APP Satisfaction (BeED) with the standard deviation of 0.858. Figure 2-1 gives a good illustration for the mean of all variables together with their standard deviations.

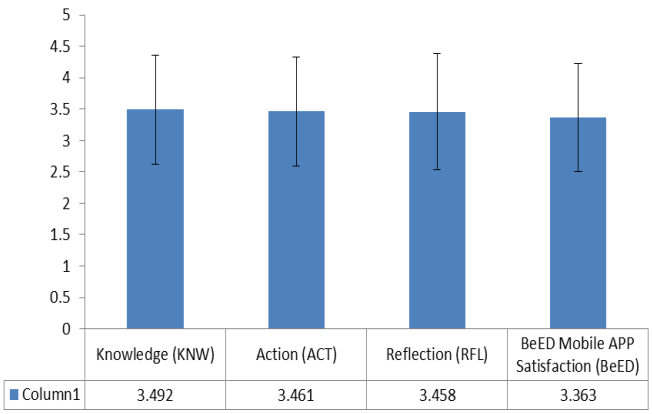

Figure 2-1: Means and Standard Variations of All Variables

Multiple Linear Regression

A linear regression method was used to determine the contribution of predictors on the dependent variable. Analysis was carried out using SPSS software. Regarding the research framework, the effects of Knowledge (KNW), Action (ACT) and Reflection (RFL) as independent variables (IVs) on BeED Mobile APP Satisfaction (BeED) as

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

dependent variable (DV) were examined. These effects refer to hypotheses H1, H2 and H3 respectively.

Validity of Multiple Linear Regression

Three measures of goodness to fit of the model were used to check the validity of using the regression model in this study to predict BeED Mobile APP Satisfaction (BeED). Table 2.3, represents the results of validity for the regression model in this study.

Table 2.3

Results of Validity of Regression Model

Fit Measure 1	Fit Measure 2		Fit Measure 3		
R Square	Std. Deviation of null model (DV)	Std. Error of the Estimate	F	Sig	Model Validity
0.822	0.857	0.364	416.520***	0.000	Valid

*p< 0.05 , **p< 0.01, ***p< 0.001

The first measure of goodness to fit of the model was to check the value of R-square. As shown in Table 2.3, the coefficient determinations (R square) of the multiple linear regression model to predict BeED Mobile APP Satisfaction (BeED) was 0.822. It means, 82.2% of variations in the BeED Mobile APP Satisfaction (BeED) was explained by its three predictors (i.e., Knowledge, Action and Reflection). As recommended by Quaddus and Hofmeyer 2007, the value of R-square should be greater than 0.30. As the R-square value of 0.822 to predict BeED Mobile APP Satisfaction (BeED) was above the cut-off 0.30, it was concluded that the regression model showed satisfy goodness to fit of the model.

The second measure of goodness to fit of the model was to compare the standard error of the regression model with the standard deviation of the dependent variable (i.e., BeED Mobile APP Satisfaction (BeED)) as the null model. The result indicated that without prior knowledge about the influence of the predictors on the dependent variable, the standard deviations of guessing the dependent variable in the null model was 0.857 which was higher than 0.364 as the standard error of the estimation in the regression model. This result supported the validity of all multiple linear regression model in this study.

The last measure of goodness to fit of the model was to check the F statistic and the p-value of ANOVA test. As Table 2.4 shows, the linear regression model to predict BeED Mobile APP Satisfaction (BeED) was statistically significant with the F statistic of 416.520 and the p-value of 0.000. This result indicated that the variation explained by the regression model was not due to chance, hence using the regression model to predict BeED Mobile APP Satisfaction (BeED) was better than using the null or intercept-only model which merely guess the mean of the BeED Mobile APP Satisfaction (BeED) as dependent variable.

The results of the three applied measures of goodness to fit of the model demonstrated that the regression model to predict BeED Mobile APP Satisfaction (BeED) could adequately satisfy the three applied measures of goodness to fit of the model. The phenomenon supported the validity of the applied regression model in this study. Thus the extracted results from the regression model were reliable and valid.

Results of Linear Regressions

Upon ensuring the validity of linear regression was adequately met, multiple linear regression analysis was used to examine the three developed direct effect hypotheses in this study. The significance of the regression coefficients of the hypothesized predictors was examined to determine support for the hypotheses. The following sub-sections explain the results in relation to the regression model. Table 2.4 shows the results of the multiple linear regression.

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

Table 2.4

Results of Multiple Linear Regression to Predict BeED Mobile APP Satisfaction (BeED)

Independent Variable (Predictor)	Unstandardized Coefficients		Standardized Coefficients	t	p-value	Hypothesis Result
	B	Std. Error	Beta			
(Constant)	0.212	0.094		2.268	0.024	
Knowledge (KNW)	0.335	0.060	0.339***	5.602	0.000	H1) Supported
Action (ACT)	0.186	0.061	0.187**	3.050	0.003	H2) Supported
Reflection (RFL)	0.386	0.056	0.418***	6.950	0.000	H3) Supported

*p< 0.05 , **p< 0.01, ***p< 0.001

As shown in Table 2.4, all paths from predictors on BeED Mobile APP Satisfaction (BeED) were statistically significant as their p-values were all below the standardized significance level of 0.05. Therefore the hypotheses H1, H2 and H3 were supported.

The extracted regression formula is as follow:

BeED = 0.212 + 0.335 KNW + 0.186 ACT + 0.386RFL

The following section discusses the results of multiple linear regression analysis in relation to the above hypotheses:

H1) Knowledge (KNW) has significant effect on BeED Mobile APP Satisfaction (BeED)

As shown in Table 2.5, the t-value and p-value of Knowledge (KNW) in predicting BeED Mobile APP Satisfaction (BeED) were 5.602 and 0.000 respectively. It means that the probability of getting a t-value as large as 5.602 in absolute value is 0.000. In other words, the regression weight for Knowledge (KNW) in the prediction of BeED Mobile APP Satisfaction (BeED) is significantly different from zero at the 0.001 level. Thus, H1 was supported. Further, the standardized estimate of Beta was 0.339, indicating a positive relationship. It means, when Knowledge (KNW) goes up by 1 standard deviation, BeED Mobile APP Satisfaction (BeED) goes down by 0.339 standard deviations.

H2) Action (ACT) has a significant effect on BeED Mobile APP Satisfaction (BeED)

The t-value and p-value of Action (ACT) in predicting BeED Mobile APP Satisfaction (BeED) were 3.050 and 0.003 respectively. It means that the probability of getting a t-value as large as 3.050 in absolute value is 0.003. In other words, the regression weight for Action (ACT) in the prediction of BeED Mobile APP Satisfaction (BeED) is significantly different from zero at the 0.01 level. Thus, H2 was supported. Further, the standardized estimate of Beta was 0.187, indicating a positive relationship. It means, when Action (ACT) goes up by 1 standard deviation, BeED Mobile APP Satisfaction (BeED) goes down by 0.187 standard deviations.

H3) Reflection (RFL) has a significant effect on BeED Mobile APP Satisfaction (BeED)

The t-value and p-value of Reflection (RFL) in predicting BeED Mobile APP Satisfaction (BeED) were –6.950 and 0.000 respectively. It means that the probability of getting a t-value as large as 6.850 in absolute value is 0.000. In other words, the regression weight for Reflection (RFL) in the prediction of BeED Mobile APP Satisfaction (BeED) is significantly different from zero at the 0.001 level. Thus, H3 was supported. Further, the standardized estimate of Beta was 0.418, indicating a positive relationship. It means, when Reflection (RFL) goes up by 1 standard deviation, BeED Mobile APP Satisfaction (BeED) goes down by 0.418 standard deviations.

The result of the multiple linear regression model is shown in Figure 2.2.

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 5278 - 5288

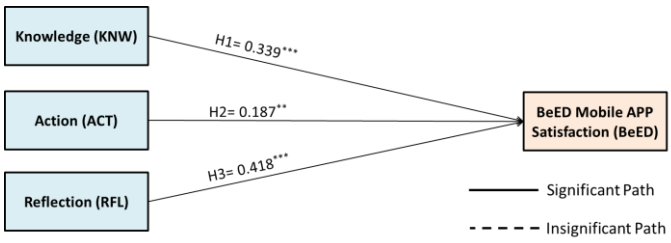

Figure 2-2: Results of Multiple Linear Regressions

VII. CONCLUSION

In this research, data analysis was conducted in three major phases. The first section represents the sample profile of the respondents in regard to Gender, Grade Level, Technology Experience, Internet Usage and Educational App. The second section evaluates the descriptive statistics of the variables. As the results of central tendency, the highest mean value belonged to Knowledge (KNW), followed by Action (ACT), Reflection (RFL) and BeED Mobile APP Satisfaction (BeED) respectively. From the results of dispersion index, it was found the highest standard deviation belonged to Reflection (RFL), followed by Knowledge (KNW), Action (ACT) and BeED Mobile APP Satisfaction (BeED) respectively. The third section applied multiple linear regression test to examine the direct effects of Knowledge (KNW), Action (ACT) and Reflection (RFL) as independent variables (IVs) on BeED Mobile APP Satisfaction (BeED) as dependent variable (DV). (i.e., H1, H2 and H3 respectively). The results indicated that all of the paths has significant positive effects, supporting hypotheses H1, H2 and H3. The most significant determinant of BeED Mobile APP Satisfaction (BeED) was Reflection (RFL), followed by Knowledge (KNW) and Action (ACT) respectively.

VIII. FURTHER RESEARCH

These differences in factors associated with technology integration across countries may have various causes, including variations in operational definitions of technology integration, target populations studied, and the statistical models used (e.g., Liu et al. 2017; Shin 2015; Tondeur et al. 2017; Wong and Li 2011). However, this mixed evidence across societies may also be attributable to variations in policy environments (e.g., technological infrastructure policy, ICT policy) in which technology is used. In other words, a country's policy environment may shape teachers' instructional decisions regarding technology integration. As such, a longitudinal study across different countries and or evidence across different school policy and learning environment may corroborate to this research findings.

REFERENCES

[1]. Al-Senaidi, S., Lin, L., &Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers & Education*, *53*(3), 575–590.

[2]. Bett Asia Leadership Submit (2015). Retrieved from : https://www.10times.com/bett-asia-leadership.

[3]. Bryman, A., & Cramer, D. (2001). *Quantitative data analysis with SPSS Release 10 for Windows: A guide for social scientists*. London: Routledge.

[4]. DeVellis, R. F. (2003). *Scale development: Theory and applications,* (2nd ed) Newbury Park, CA: Sage.

[5]. DfE (2016) Multi-academy trusts - Good practice guidance and expectations for growth, Retrieved from:

[6]. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576240/Multiacademy_trusts_good_practice_guidance_and_expectations_for_growth.pdf

[7]. Ertmer, P.A., &Ottenbreit-Leftwich, A.T. (2010). Teacher technology change: How knowledge, beliefs, and culture intersect. Journal of Research on Technology in Education, 42(3), 221-251.

[8]. Global E-Learning Market Analysis and Trends (2017, February 6). Retrieved from https://www.globenewswire.com/news-

Published by: The Mattingley Publishing Co., Inc.

release/2017/02/06/914187/0/en/Global-E-Learning-Market-to-Reach-325-billion-by-2025-Rapid-Growth-in-Online-Content-Digitization-Innovations-in-Wearable-Technologies-are-Flourishing-the-E-learning-Industry.html.

[9]. Groff, J., &Mouza, C. (2008). A framework for addressing challenges to classroom technology use. AACE Journal, 16(1), 21-46.

[10]. Inan, F. A., Lowther, D. L., Ross, S., &Strahl, J.D. (2010). Pattern of classroom activities during students' use of computers: Relations between instructional strategies and computer applications. Teaching and Teacher Education, 26, 540-546.

[11]. Johnson, L., Becker, S. A., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2016). *NMC horizon report: 2016 higher education edition* (pp. 1-50). The New Media Consortium.

[12]. Karasavvidis, I., &Kollias, V. (2014). Technology integration in the most favorable conditions: findings from a professional development training program. In C. Karagiannidis (Ed.), *Research on e-learning and ICT in education* (pp. 197–224). New York: Springer.

[13]. Kirkwood, A. (2015). Teaching and learning with technology in higher education: blended and distance education needs 'joined-up thinking'rather than technological determinism. *Open Learning: The Journal of Open, Distance and e-Learning, 29*(3), 1–16.

[14]. Liu, F., Ritzhaupt, A. D., Dawson, K., & Barron, A. E. (2017). Explaining technology integration in K-12 classrooms: A multilevel path analysis model. *Educational Technology Research and Development, 65*(4), 795–813.

[15]. Moeller, B., &Reitzes, T. (2011). *Integrating technology with student-centered learning. A report to the Nellie Mae education foundation*. Retrieved from http://www.nmefoundation.org/getmedia/befa9751-d8ad-47e9-949d-bd649f7c0044/integrating.

[16]. Nunnally, J.C. (1978) Psychometric theory. 2nd Edition, McGraw-Hill, New York.

[17]. Razali, N. M., &Wah, Y. B. (2011). Power Comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling Tests. Journal of Statistical Modeling and Anlytics, 2, 21-33.

[18]. Research Advisor Table (2019). Retrieved from : https://www.researhc-advisor.com/tools/ SampleSize.htm.

[19]. Samarawickrema, G., & Stacey, E. (2007). Adopting Web-based learning and teaching: a case study in higher education. *Distance Education, 28*(3), 313–333.

[20]. Saunders, M., Lewis, P. &Thornhill, A. (2012). "Research Methods for Business Students" 6th edition, Pearson Education Limited

[21]. Sekaran, U. (2003). Research methods for business a skill building approach (Jil. 4th edition). United State of America: John Wiley & Sons, Inc.

[22]. Shapiro &Wilk. (1965). Approximation for the null distribution of the W statistics. *Technometrics.10,*861-8866.

[23]. Shin, N., Sutherland, L. M., Norris, C. A., &Soloway, E. (2012). Effects of game technology on elementary student learning in mathematics. British Journal of Educational Technology, 43(4), 540-560.

[24]. Shin, W. S. (2015). Teachers' use of technology and its influencing factors in Korean elementary schools. *Technology, Pedagogy and Education, 24*(4), 461–476.

[25]. Tabachnick, B. G., &Fidell, L. S. (2007). Using Multivariate Statistics (5th ed.). New York: Allyn and Bacon.

[26]. Tondeur, J., Scherer, R., Siddiq, F., &Baran, E. (2017). A comprehensive investigation of TPACK within pre-service teachers' ICT

profiles: Mind the gap. *Australasian Journal of Educational Technology*, *33*(3), 46-6.

[27]. Tondeur, J., van Braak, J., Ertmer, P. A., &Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development*, *65*(3), 555–575.

[28]. Wong, E. M., & Li, S. C. (2011). Framing ICT implementation in a context of educational change: A structural equation modelling analysis. *Australasian Journal of Educational Technology*, *27*(2), 361–379.