SATISFACTION IN BLENDED LEARNING AMONG POLYTECHNIC STUDENTS

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Blended learning is a hybrid of classroom and on-line learning that incorporates a portion of the comforts of on-line courses without the total loss of face to face interaction. It has recently been introduced in polytechnic institutions. The aim of this paper is to examine the level of student satisfaction and to discover the preferred construct in the blended learning environment at the polytechnic. The research was conducted in the first semester, 2016/2017 session in Polytechnic Ibrahim Sultan. Results indicated that the level of student satisfaction towards blended learning environment is high with a mean of 3.99. The mean score for satisfaction with the interaction (SWINT) has a very high result which is 4.07 compared to other constructs. Further statistical tests showed that, there were also no significant differences in the perception of the level of satisfaction towards blended learning environment by gender ($p = 0.697 > 0.05$). A two-way ANOVA revealed that there is no significant difference between satisfaction based on program students ($p = 0.320 > 0.05$). In conclusion, this study has reported that blended learning for fourteen weeks could increase student satisfaction for engineering mathematics students at polytechnic environment by gender ($p = 0.697 > 0.05$). A two-way ANOVA revealed that there is no significant difference between satisfaction based on program students ($p = 0.320 > 0.05$). In conclusion, this study has reported that blended learning for fourteen weeks could increase student satisfaction for engineering mathematics students at polytechnic.

Keywords: Blended Learning; Satisfaction; Mathematic; Polytechnic

1. INTRODUCTION

Engineering courses have traditionally been delivered face-to-face for many years (Rahman, 2016). In recent years, there has been an increasing interest in blended learning. Blended learning is a mix of face to face with internet-based preparation, particularly of the second era, which permits members to collaborate in the educational setting (Matukhin and Zhitkova, 2015). There is a large volume of published studies describing the role of blended learning, such as, it accomplishes both virtual and live customary classroom assets, for example, internet libraries, content programming, recreations, teacher drove addresses, hands-on labs and ongoing field trips (Verrett and Mallette, 2015). In worldwide writing, it is additionally labelled as half-breed learning and blended learning and it is utilized as a part of altogether different courses by numerous analysts (Kazu and Demirkol, 2014). Blended learning occurs when learning takes place through several channels

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such as combining the internet and digital media with the procedures established in the classroom with physical co-presence of teacher and students (Moraño, Roselló, and Ruiz, 2015).

The term blended learning is a strategy for showing that joins the best face to face methods and online interaction (Krasnova, 2015).This definition is close to Herloa (2015) who define blended learning as interactive strategy, combining *e*-learning and face to face meetings. One advantage of blended learning provides opportunities for tertiary education organizations to improve the engagement, satisfaction, and achievement of students (Mackinven, 2015). An incredible assortment of assignments in the online segment of the blended course contributes both to the disposal of information crevices and significant material study (Krasnova, 2015). Another advantage of blended learning also improves student engagement and learning quality through online activities to the course curriculum (Chow and Chan, 2015). A further advantage of it is easily adaptable to learners' needs, flexible course and allows students to be independent (Buran and Evseeva, 2015). The increasing trend of online and blended learning, surely improves the access, efficiency, cost-effectiveness and quality of education (Trpkovska, 2011). High achievers likewise discovered blended courses more helpful, more captivating and they felt that they learn key course ideas superior to other conventional traditional (Owston, York, and Murtha, 2013).

2. PROBLEM BACKGROUND

The broad utilization of computerized innovation has changed the substance of training; in this manner, it is a time that advanced education consents to the developing desires to help students survive successfully in such an innovatively based world (Okaz, 2015). Blended learning has developed as an answer to address these requirements and has been embraced by different higher educations (Tshabalala, Ndeya-Ndereya and Merwe, 2014). ICT have a tendency to rule in teaching and learning forms at modern technical universities (Buran and Evseeva, 2015). Moreover, blended learning has been growing in demand (Alammary, Sheard, and Carbone, 2014). Recently investigators have examined the effects of blended learning where is has the capacity to change tertiary instruction through its capacity to give adaptable learning alternatives, cost diminishments and top notch instructive encounters (Mackinven, 2015). The blended learning initiative has been implemented in all Malaysian polytechnics and is mainly influenced by the high amount of hands-on or practical requirements (Ghani, Ahmad, Shah, and Fadzilah, 2015).

Highlights of previous studies have documented blended learning advantages including increased student satisfaction (Smyth, Houghton, Cooney, and Casey,

2012). Student satisfaction in blended learning is imperative since it can affect inspiration, student achievement and finishing rates (Naaj, Nachouki, and Ankit, 2012). It encourages enhanced learning results, is adaptable, successful utilization of assets and student satisfaction (Poon, 2013). The advantages far exceed the costs: higher quality learning, enhanced instruction, boosted assets, enhanced student achievement and fulfillment, enhanced degree of profitability, expanded faculty fulfillment, lessened withdrawal rates and a superior feeling of engagement (Moskal, Dziuban, and Hartman, 2013; Abdul Halim Abdullah, Mahani Mokhtar, Noor Dayana Abd Halim, Dayana Farzeeha Ali, Lokman Mohd Tahir and Umar Haiyat Abdul Kohar. (2017). The research found a sharp ascent in student satisfaction with the online course as a device for blended learning (Hsu, 2011). Research indicated that blended courses resulted in superior success and lower withdrawal rates and that student satisfaction levels were highest for this format (Norberg, Dziuban, and Moskal, 2011). At the point when blending is done well, learning results and students satisfaction can increment altogether (Gouri Banerjee, n.d.)

This research uses a model of blended learning as the basis to study the satisfaction in blended learning among polytechnic students as shown in figure 1. The student satisfaction content five constructs, which is course content, technology, instructor, interaction and teaching and learning approach.
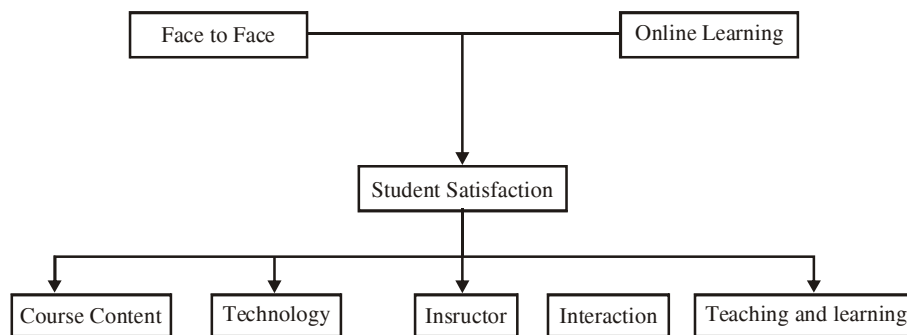
Figure 1: The Theoretical Framework

3. RESEARCH OBJECTIVE

The objectives of this paper are:

   (i)   To examine the level of student satisfaction after undergoing blended learning environment at polytechnic.

   (ii) To determine the preferred construct in the blended learning environment at polytechnic.

4. METHODOLOGY

A quantitative approach was employed since it uses a previously designed questionnaire by (Shojae Aldin Kalantarrashidi, 2014) with the Cronbach's alpha 0.86, which is high. Total student enrollment in this course was 206. The questionnaire was administered to the second-semester students enrolled in a engineering mathematics course at Polytechnic Ibrahim Sultan in the first semester of 2016, after 14 weeks study in the blended learning environment. The questionnaire contained 25 items on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Each construct consists of 5 items. The data obtained from the questionnaire were analyzed using the Statistical Package for Social Sciences (SPSS). The results are reported as means and standard deviations (SD). Student's *t*-test for independent samples was used to determine the differences in satisfaction between gender. It is statistically significant when $p < 0.05$. In addition, ANOVA was used to view a variable mean for more than two groups.

5. FINDINGS

The findings are presented based on the research objectives. In Table 1, 163 male (79%) and 43 female (21%) participated in this study. This suggests there is more male in the engineering program in polytechnic rather than female.

TABLE 1: DEMOGRAPHIC OF STUDENTS BY GENDER

Gender	Frequency	Percent (%)
Male	163	79.1
Female	43	20.9
Total	206	100.00

Table 2 presents the student demographic by program. There were 5 programs involved in this research in which the highest was DKM (35%), DTP (24.8%), DEE (14.6%), DMB (13.1%) and the lowest enroll is DEM (12.6%).

TABLE 2: DEMOGRAPHIC STUDENTS BY PROGRAM

Program	Frequency	Percent (%)
Diploma Kejuruteraan Mekanikal Bahan (DMB)	27	13.1
Kejuruteraan Mekanikal Pembuatan (DTP)	51	24.8
Diploma Kejuruteraan Mekanikal (DKM)	72	35.0
Diploma Kejuruteraan Mekatronik (DEM)	26	12.6
Diploma Kejuruteraan Elektrik and Elektronik (DEE)	30	14.6

Table 3 demonstrates the level of students' satisfaction towards blended learning environment is high which is 3.99 with standard deviation 0.72.

TABLE 3: STUDENTS' SATISFACTION TOWARDS BLENDED LEARNING ENVIRONMENT

Variable	N	Mean	SD	Level
Satisfaction	206	3.99	0.72	High

As shown in table 4, the constructs satisfaction with the interaction (SWINT) has a very high result compared to others which are 4.07 following by satisfaction with the teaching and learning approaches (STLA) and satisfaction with the instructor (SWINS) which has same resulted 4.04. While satisfaction with the technology (SWF) has the lowest recorded value which is 3.88.

TABLE 4: STUDENTS' SATISFACTION TOWARDS EACH CONSTRUCT

Constructs	Mean	SD
Satisfaction with the course content (SCC)	3.94	0.59
Satisfaction with the technology (SWF)	3.88	0.63
Satisfaction with the instructor (SWINS)	4.04	0.56
Satisfaction with the interaction (SWINT)	4.07	0.55
Satisfaction with the teaching and learning approaches (STLA)	4.04	4.04

It can be seen from the data in Table 5 that the mean and standard deviation for each item. The highest mean was 4.13 for item no 15 item no 15 and the lowest mean (3.77) for item no 4.

TABLE 5: MEAN AND STANDARD DEVIATION TOWARDS STUDENT CONSTRUCT

Constructs		
Satisfaction with the course content (SCC)	Mean	SD
1. The course content is suitable for facilitating my learning	4.12	0.674
2. I am satisfied with the presentation of the course content	4.00	0.677
3. The time is enough for communication with content in the online class	3.77	0.46
4. I am satisfied with the reading material in the online instruction	3.70	0.03
5. The course content is interested me for activating in the class	4.00	0.636
Satisfaction with the technology (SWF)		
6. I am satisfied with teaching tools used in the class	4.04	0.690
7. The instrumentation made learning flexible for better participation	4.02	0.632
8. The technology used in my class is appropriate	3.81	0.01
9. I am satisfied to usage internet for communication in the class	3.71	0.974
10. The infrastructure setting in my class is suitable	3.83	0.82
Satisfaction with the instructor (SWINS)		
11. The instructor encourages learners to ask questions	4.13	0.680
12. The instructor encouraged learners to Face to face discussions	4.07	0.709
13. The instructor initiates communication frequently in the online class	3.83	0.845
14. The instructor encouraged learners to actively engage	4.04	0.642
15. I am satisfied with the participation of learners and lecturers	4.13	0.653

Contd. table 5

Constructs		
Satisfaction with the interaction (SWINT)		
16. I am satisfied with the participation of learners and groups	4.10	0.648
17. I am satisfied with the communication between learners and groups	4.12	0.645
18. I am satisfied with the collaboration in this learning	4.04	0.697
19. The instructor gives feedback to appropriate interaction	4.05	0.686
20. The collaboration is suitable for learners and instructor	4.04	0.718
Satisfaction with the teaching and learning approaches (STLA)		
21. I am satisfied with forum discussion in the class	4.02	0.722
22. The teaching and learning approach made learners to more communications	4.11	0.693
23. Teaching and learning approaches are exhibited with my class	3.95	0.700
24. This method of teaching and learning is supported learning	4.12	0.606
25. I am satisfied with delivery methods used because helping learners to collaboration with the groups	4.00	0.722

Table 6 compares the mean and standard deviation for student satisfaction between gender in blended learning environment. It shows that for each component of satisfaction, female students has a higher mean rather than male students. The highest mean was 4.10 (female) for satisfaction with the instructor and the lowest 3.87 (male) for satisfaction with the technology.

TABLE 6: MEAN AND STANDARD DEVIATION FOR STUDENTS' SATISFACTION BY GENDER

	Mean	
Constructs	Male	Female
Satisfaction with the course content (SCC)	3.93	3.95
Satisfaction with the technology (SWF)	3.87	3.92
Satisfaction with the instructor (SWINS)	4.06	4.10
Satisfaction with the interaction (SWINT)	4.04	4.05
Satisfaction with the teaching and learning approaches (STLA)	3.93	3.95

The results of the study to determine whether there is or is not a different perception of the level of satisfaction towards blended learning environment by gender of the students. As table 7 shows, there is no significant difference ($t = -0.40$, $p = 0.697$) between the groups with male (mean = 3.99 SD = 0.54) and female (mean = 4.02 SD = 0.49).

TABLE 7: T-TEST ANALYSIS SHOWS THE DIFFERENCE BETWEEN GENDER TOWARDS SATISFACTION IN BLENDED LEARNING

Variable	N	Mean	SD	df	T	Sig.
Male	163	3.99	0.54	204	–0.40	0.697
Female	43	4.02	0.49			

*significant value at $\alpha < 0.05$

To see varying degrees of satisfaction based on students' program, one-way ANOVA (table 8) was used to view a variable mean for more than two groups. The result of differences in the level of satisfaction based on students program, $p = 0.320 > 0.05$. The null hypothesis is accepted that there is no significant difference between satisfaction based on program students. Therefore in this study, programs did not influence satisfaction.

TABLE 8: THE DIFFERENCE BETWEEN SATISFACTION BASED ON PROGRAM STUDENTS

Satisfaction	df	MS	F	Sig.
Between Groups	4	206.053	1.182	0.320
Within Groups	201	174.333		

*significant value at $\alpha < 0.05$

5. DISCUSSION

The discussion of the results with 79% are male and 21% female involved in this study. Which suggests there is more male in the engineering program in polytechnic rather than female. This study indicates that the level of student satisfaction towards blended learning environment is high which is 3.99 with standard deviation 0.72. The questions in the questionnaire regarding learner satisfaction in blended learning were classified into 5 constructs of student satisfaction with the content, instructor, interaction, teaching and learning approach and technology. Each construct corresponds with 5 items in the questionnaire. To accomplish this aim and to respond to a research question, table 4 shows satisfaction level for the student's satisfaction at the different construct of satisfaction in blended learning. Concerning interpretation of the findings regarding students' satisfaction, the results showed that the satisfaction with the interaction (SWINT) had the highest average scores which 4.07 compared to others.

The highest satisfaction in this construct showed mean = 4.13. All items in this group had a mean greater than or equal to 3.83, which is also high. It means student most like the interaction while in the blended learning environment. Furthermore, it shows that interaction factors influence student satisfaction in the blended learning environment. Students, in general, were satisfied with all constructs with mean greater than or equal to 3.88, which is also high. For all construct, female students have a higher mean rather than male students. The highest mean was 4.10 (female) for satisfaction with the instructor and the lowest 3.87 (male) for satisfaction with the technology. These findings further support the idea of (Naaj et al., 2012), that students were satisfied with all constructs, although the level of satisfaction varied according to gender. The lowest mean item was " I am satisfied with the reading material in the online instruction" (mean = 3.70). Our

finding revealed that there were no significant differences in the level of satisfaction towards blended learning environment by the gender of the student, ($t = -0.40$, $p = 0.697$) with male (mean = 3.99 SD = 0.54) and female (mean = 4.02 SD = 0.49). The most striking result to emerge from the data is that there is no significant difference between satisfaction based on student's program which is $p = 0.320 > 0.05$. This outcome was genuinely reliable with previously published studies which appear to demonstrate that student satisfaction in blended learning is high.

6. SUMMARY

Student satisfaction in blended learning is vital on the grounds that it can affect inspiration and, student achievement and finish rates. Estimation of satisfaction is likewise profitable to foundations since it can be utilized to assess courses and programs. Further research is expected to discover the purposes for the fluctuating levels of satisfaction in these zones in order to help comprehension and encourage enhancements in the nature of mixed learning courses advertised. Having the capacity to comprehend the requirements of students, to bolster students in blended learning courses, and to advance an effective learning background will be basic in the general accomplishment of blended learning in the polytechnic. In conclusion, this study has reported that blended learning for fourteen weeks could increase student satisfaction for engineering mathematics students at the polytechnic.

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