Blended learning in economics and finance courses at business school

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Abstract.

The study aims at evaluating the teaching and learning effectiveness of micro-modules in macroeconomics and finance at undergraduate and postgraduate levels in CUHK Business School. Using micro-modules in the flipped classroom strategy has attracted lots of attention from educators and pedagogical specialists. It is believed that this ‘flipped’ approach can enhance students’ learning experience and also improve their motivation and engagement in class.

Built upon the micro-modules developed since 2015, the study aims to investigate the impacts of flipped classroom in Business School, and at the same time identify the differences in impacts of flipped classroom for students with different background.

Keyword: Blended Learning; Business education

1. Introduction

The advancement in technologies has had great impacts on teaching and learning in last few decades. Among various applications of technology in education, the blended learning approach has been one of the most popular pedagogies adopted at different levels of education in the globe (e.g., Picciano, Seaman, Shea, & Swan, 2012; Staker et al., 2011; Parsad & Lewis, 2008; Eklund, Kay, & Lynch, 2003; Collaboration for Online Higher Education Research, 2011; Sharpe, Benfield, Roberts, & Francis, 2006; Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Lim & Wang 2015; Norberg et al., 2011). The term “blended” suggested a combination of learning activities happened in both face-to-face and online settings (Luz Adriana Osorio Gómez and Josep M. Duarte; Reay, 2001; Rooney, 2003; Sands, 2002; Ward & LaBranche, 2003; Young, 2002).¹ Watson (2008) suggested that “blended learning was deemed likely to emerge as the predominant model of the future – and to become far more common than either online or face-to-face instruction alone”. Given its popularity and potential enormous impacts in the process of teaching and learning, the blended learning received great attention from academics and educational professionals.

In blended learning research in higher education, more studies focused on undergraduate studies, while postgraduate studies were given less attention. Yet postgraduate studies, especially Master of Business Administration (MBA), are predominantly important in business school around the world. Each year, universities in US enrolled more than a quarter of a million students in MBA programs and awarded more than 100,000 MBA degrees annually, at least 66% of all graduate business degrees conferred in the US in 2008 (Murray, 2011). For some top business schools in US, including Harvard Business School and Chicago Booth School of Business, only offer postgraduate programs but not those for undergraduates. There are several studies focused on evaluating benefits of e-components in MBA courses (Salmon, 2000; Murphy and Tyler, 2005; Wresch, et al., 2005; Driver, 2000, 2002). Some studies investigated the performance of full-online/ distance-learning MBA courses, and compared with their traditional face-to-face counterparts (e.g. Anstine and Skidmore, 2005; Arbaugh, 2004; Arbaugh and Rau, 2007; Berry, 2002; Drago and Peltier, 2004; Dunbar, 2004; Grandzol, 2004; Hollenbeck, Zinkhan and French, 2005; McGorry, 2003; Smith, 2001; Skidmore, 2005). Despite the importance of MBA in business education and the popularity of blended learning in MBA, the study on the effectiveness of blended learning on MBA students are still limited. For example, Clouse and Evans (2003) found that, in an MBA-level information systems course, the combination of asynchronous content delivery and synchronous chat session produced the poorest performance on discrete exam questions, but that the combination of face-to-face content delivery and asynchronous discussion produced significant improvement on open-ended exam questions. In an MBA-level managerial accounting course, Chen and Jones (2007) found that students in the blended courses reported higher levels of learning, but that students in the classroom courses thought that course instruction had more clarity. Further, Jones and Chen (2008) found that students in blended-

¹ Duarte et al. (2008) further distinguished the difference between the “blended” and the “hybrid” learning; for the latter, the face-to-face and online components are fully integrated and inseparable.

mode had more positive group work experiences and had more positive perceptions of the instructor's feedback and responsiveness to questions outside of class.

It is noted that there is lack of studies to study blended learning in economics and finance education, as well as those on MBA. Thus, this study aims evaluating the effectiveness of blended learning in for economics and finance courses in MBA Programs. Section 2 provides a literature review, and Section 3 will describe the methodology. Section 4 will discuss the study results. Section 5 will be concluding remarks.

2. Methodology

We plan to measure the effectiveness of flipped classroom in three dimensions, namely students' readiness, quality of teaching materials/ micro modules, and pedagogical design. It has been well documented in the pedagogical literature that flipped classroom can enhance both the effectiveness of teaching and learning and students' motivation (e.g. Tune, Sturek & Basile 2013, Enfield 2013, McLaughlin et al. 2014). However, most of such research studies usually rely only on self-reported survey results or focus group meetings, and lack direct measurement of the impacts of such pedagogical strategy. Our study filled this gap by adopting instruments to measure the impacts directly, complemented by self-reported survey results.

The following map outlines the structure of this research by summarizing into five main components: Goals, Conceptual Framework, Research Questions, Methods, and Validity.

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In the study, we investigated the T&L effectiveness of 12 courses (with 7 traditional teaching-mode courses as control).

2.1. Quasi-experimental setting

The main objective of this study is to investigate the effectiveness of using blended learning as a teaching medium to improve the learning outcome. Following Chen and Jones (2007) and Lape et al. (2014), a quasi-experimental setting is developed by comparing student performance in blended learning sections with that in tradition classroom instruction.

To create such an environment, this study follows Lape et al. (2014) approach to assign the same instructor to all classes in the same courses. To minimize time-varying effect (learning curve effect), the course structure is the same across classes in the same course, including teaching materials, difficulty of examinations, and class activities. Also, this study requires that instructors (instructor A and instructor B) in this study to have more than 10 years teaching experience, so that their teaching method can be kept the same.

2.2. Courses:

The sample of this study includes 12 classes from 2015 to 2018 taught in Chinese University of Hong Kong. All classes are conducted for MBA students, who have an undergraduate degree with several years of working experience. 8 classes from the course Macroeconomics for Business Executives (henceforth, Macroeconomics) are selected for this study: 5 of them are blending learning classes and 3 of them of traditional classes. Another course, Investment Analysis and Portfolio Management (henceforth, Investment) is also a focus in this study. There are 3 blended learning classes and 1 traditional class selected for the analysis.

Both classes aim at providing related academic theories, while emphasizing their application in the real world. Macroeconomics provides a basic knowledge of the state of the global economy and macroeconomic policy, including national income accounting, unemployment, inflation, monetary and fiscal policies, and international economic interactions. Applications of economic theories to current macroeconomic phenomena will be emphasized. On the other hand, the purpose of Investment is to provide a comprehensive introduction to fundamental analysis of securities,

including equity, fixed-income security, and derivatives. Students can understand the theoretical foundation and practical implementation of widely used asset pricing theories.

2.3. Method of course delivery

In this paper, blended learning class is referred to the FLEX MBA course in the Chinese University of Hong Kong. Since 2015?, the business school provides two study format to part-time students: Face-to-face course and Flex MBA course. Face-to-face course (traditional classroom instruction) normally has 13 regular scheduled 3-hour classes Students. Most of the classes are conducted in the daytime on Saturday, while few of elective courses may be offered on weekday evenings. Flex MBA course offers 50% classes on-campus, with another 50% classes is presented online. Students are required to complete weekly pre-recorded lectures conducted by instructor and other online actives. 3-hour Intensive classes are conducted on weekend daytime every few weeks. A summary of courses being investigated in this analysis is provided in Table

2.4. Measures

Literature on blending learning usually focus on the effectiveness of blended learning along two dimensions: student performance and student perception. For example, López-Pérez at al. (2011) find that use of blended learning significantly lowers the dropout rate of student and improves their examination performance. They further find that this change is closely related with their perception on blended learning. In the same vien, Pierce and Fox (2012) report that flipped classroom not only improve student performance but also change the student perception to be more favorable on the “new” teaching approach.

Three measures are used to assess these two learning outcomes: test score, course and teaching evaluation, and two-stage surveys. Test score is widely used as a mean to measure the change in student performance (Lopez-Perez et al. 2011; Pierce and Fox, 2012; Lape at al; 2014). Instead of comparing the difference in the score between pre-test and post-test, this study focuses on analyzing the examination score between blending classes and traditional classes (Lopez-Perez et al. 2011), which is useful in investigating the impact from blended classes. Thus, instructors are reminded to design the exam questions at the same level of difficulty across different classes, controlling for the possible influence from non-teaching style element.

Another metric of student performance is a course and teaching evaluation (henceforth, CTE) which is conducted at the university level. CTE includes 10 multiple choice questions about student background, 18 6-points scaled questions for the perception on the classes, and three open-end questions for other information that can be provided by students. Scaled questions, such as “The course was stimulating” and “subject knowledge is enhanced”, can provide another measure (other than objective test score) for the impact on student performance. The full list of the questions in CTE is provided in Appendix I. CTE is conduct at the university level, which is conducted nearly the end of the class in the classroom. Student are not required to provide any identity in the form, so the response can be expected to be unbiased.

3. Study Results

The difference in result between this study and their papers may provide insight to explain why empirical evidence is mixed in evaluating the effectiveness of blended learning. The rationale is as following: The effectiveness of flipped classroom element in blended learning relies heavily on whether BL students are willing to watch the video online. Previous literature (i.e., Chen and

Lin, 2008; Credé et al., 2010) has shown a strong correlation between class participation and examination performance. Although this relationship can be argued by endogeneity argument (i.e., ambitious students are more willing attend classes and working har on examination), it is generally believed that attending (or watching) lectures has positive effect on the examination performance. As MBA students is likely to have a busy schedule (i.e., family reason or job concern), their opportunity cost of watching online lecture is higher than that of undergraduate students, so some MBA students in blended learning mode may spend lesser time on lecture than those in traditional mode. Thus, lower performance in blended learning is found in MBA students but not in undergraduate students.

The large dispersion of examination result in blended learning for both courses can further support this conjecture. The standard deviation of economics BL classes and finance BL classes are 4.7 higher and 1.6 higher respectively. Given that there is attendance requirement in traditional teaching classes, the higher dispersion of examination results in blended learning can be explained by the variation of time spent on video lectures. In sum, results suggest that the effectiveness of blended learning may be higher for undergraduate students than master students, further investigation can be conducted to examine this conjecture.

Several studies (i.e., Padilla-Meléndez et al., 2013; Price, 2006) report that there is gender difference in the effect of blended learning. Thus, gender difference in effectiveness of blended learning will also be examined in this paper, and the result is provided in table 2. For economic classes, relative to male students, female students perform better in traditional teaching (-1.4) than in blended learning (-5.4). However, for finance classes, relative to male students, female students perform worser in traditional teaching (-6.2) than in blended learning (-4.7). The implication of this result is mixed. Although overall result suggests that there is no gender difference in the effectiveness of blended learning, the large difference in economics classes suggests that subject effect is in play in explaining gender differences.

Table 1.

Comparison between traditional instruction and blended learning by courses

	Mean#	SD	Min	Median	Max	Skew	N
Economics – Traditional							
- Male	81.7	8.3	55.0	82.5	95.0	-0.7	69
- Female	80.3	10.1	50.5	82.5	96.5	-1.0	61
- Difference	1.4 (0.89)						
Economics - Blended							

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- Male	75.3	13.8	49.0	78.0	92.5	-0.6	14
- Female	69.9	13.7	48.5	67.8	87.5	0.0	10
- Difference	5.4 (0.95)						
Finance – Traditional							
- Male	70.9	16.4	9.0	73.0	97.0	-1.6	46
- Female	64.7	11.4	42.5	64	95.0	0.6	23
- Difference	6.2 * (1.84)						
Finance – Blended							
- Male	61.4	17.1	19.0	62.0	93.0	-0.4	43
- Female	56.7	15.9	30.0	56.5	89.0	0.5	25
- Difference	4.7 (1.14)						

Examination performance is measured in a scale of 100.

Numbers in parentheses represent the t-statistics

* Significance at 0.1 level.

Other than academic performance, the learning experience of students is also an important dimension to assess the effectiveness of blended learning. Table 3 provides the result of course teaching evaluation for students in all the classes. The results of CTE between BL students and TT students are similar, except in a few dimensions: “The course was interesting”, “The course was stimulating”, “Subject knowledge is enhanced”, “Content difficulty appropriate”, “Supported by library resources”, and “Supported by library resources”.

Table 2.

Result of course teaching evaluation

	BL#	TT#	Diff
Presentation is clear	5.52	5.62	-0.10
Examples relevant to learning	5.65	5.71	-0.06
Teacher was enthusiastic	5.73	5.80	-0.07
Class participation encouraged	5.56	5.56	0.00
Communication was effective	5.65	5.65	0.00
The course was interesting	5.28	5.50	-0.22**
The course was stimulating	5.32	5.58	-0.26**
Subject knowledge is enhanced	5.42	5.62	-0.19**
The course was well-organized	5.32	5.43	-0.12
Clear learning outcomes	5.38	5.50	-0.12
Appropriate assessment method	5.27	5.38	-0.11
Appropriate workload amount	4.87	4.83	0.03
Recommended readings useful	4.83	4.99	-0.16
Content difficulty appropriate	4.79	5.07	-0.28**
Supported by library resources	4.75	5.11	-0.37**
Supported by IT resources	4.78	5.14	-0.37**
Satisfaction with course	5.44	5.50	-0.06
Satisfaction with teacher	5.62	5.64	-0.01

N	85	159
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Scale of 1 (strongly disagree) to 6 (strongly agree).

Numbers in parentheses represent the t-statistics

** Significance at 0.05 level.

Thus, these results suggest that classroom teaching can make the learning experience more interesting and simulating. The lower score in “Subject knowledge is enhanced” can explain the lower performance in examination shown in Table 1. It implies that students can learn more from in-person teaching over online video. However, the reason behind this phenomenon is still worth for further investigation. As BL students are less confident on “Subject knowledge is enhanced” than TT students, BL students are less likely to agree that the content difficulty is appropriate. Lastly, the lower score in “Supported by IT resources” implies that BL students have a higher expectation on IT supports than TT students.

Table 3.
Result of course teaching evaluation by courses

	Economics			Finance		
	BL	TT	Diff	BL	TT	Diff
Presentation is clear	5.68	5.59	0.09	5.46	5.68	-0.22
Examples relevant to learning	5.77	5.72	0.05	5.60	5.68	-0.08
Teacher was enthusiastic	5.73	5.77	-0.04	5.73	5.87	-0.14
Class participation encouraged	5.45	5.55	-0.09	5.60	5.60	0.01
Communication was effective	5.59	5.62	-0.03	5.67	5.72	-0.06
The course was interesting	5.36	5.42	-0.06	5.25	5.68	-0.43***
The course was stimulating	5.36	5.57	-0.20	5.30	5.62	-0.32**
Subject knowledge is enhanced	5.59	5.59	0.00	5.37	5.68	-0.32**
The course was well-organized	5.45	5.30	0.15	5.27	5.74	-0.47***
Clear learning outcomes	5.50	5.42	0.08	5.33	5.68	-0.35***
Appropriate assessment method	5.27	5.26	0.01	5.27	5.66	-0.39***
Appropriate workload amount	4.95	4.58	0.38	4.84	5.46	-0.62***
Recommended readings useful	5.00	4.75	0.25	4.77	5.52	-0.75***
Content difficulty appropriate	5.15	4.95	0.20	4.68	5.35	-0.67***
Supported by library resources	4.80	4.88	-0.08	4.73	5.56	-0.82***
Supported by IT resources	4.92	4.92	0.00	4.74	5.59	-0.86***
Satisfaction with course	5.55	5.41	0.14	5.40	5.70	-0.31**
Satisfaction with teacher	5.64	5.60	0.04	5.62	5.72	-0.10
N	22	112		63	47	

Scale of 1 (strongly disagree) to 6 (strongly agree).

** Significance at 0.05 level

*** Significance at 0.01 level.

Consistent with our conjecture, Table 3 shows that course specific factors are in effect in affecting the effectiveness of blended learning. For economics classes, there is no significant difference in response between blended learning and traditional teaching, that BL students give higher scores in some questions and lower scores in other questions. However, for finance classes, the difference is significant – score of students are significantly lower in 12 out of 18 questions. This results strongly support the difference in effectiveness of blended learning is highly affected by course specific factors.

The last part of empirical analysis focuses on understanding student's perception on the blended learning elements. Pre-survey and Post-survey are then conducted to collect students attitude at the beginning of the course and at the end of the course respectively. Table 5 provides results from both surveys. On average, respondents spend around 2 hours online per day for non-working purpose and 2 hours on their mobile phone. More than half of them have experience on attending online courses. As they are familiar with the e-learning environment, it is not surprised that the e-learning experience in this study does not make significant change in their attitude towards e-learning elements, that can be shown from the insignificant change in responds between pre-survey and post-survey.

The relatively low scores in Q4 (2.42) and Q5 (2.45), comparing to other questions, show that the main barrier of e-learning is still the lack of interaction between students and peers (and teacher). Combining with the relatively low scores in Q1 (3.12) and Q6 (3.18), the results imply that students prefer classes with more interaction with others and can be motivated with more interaction peers. Thus, it suggests that future direction of improving blended learning is to enhance the interaction between students and others. On the other hand, high score in Q2 (3.60) has shown that blended learning does help students to save the learning time (i.e, less traveling time). Thus, it can further support that each method does have its own advantage.

Q7 – Q12 indicates student's attitude towards the specific online activities in the courses. The scores from each question are quite close to each other. Also, they are all about 3.0, suggesting that students are satisfactory with the e-learning element, and more e-learning elements are suggested to be incorporated into even the traditional classes to increase the teaching effectiveness. In relative comparison, it suggests that instructor helps to improve the e-learning experience (3.81 for Q11 and 3.82 for Q12), while e-learning experience still has room for improvement (3.59 for Q8 and 3.39 for Q10).

In previous analysis, respondents are not the same in pre-survey (103 samples) and post-survey (62 samples). Therefore, it is difficult to control for the endogeneity factors caused by different respondents. To preserve privacy and matching need, respondents are told to write a 4-digit code in each survey for matching purpose. Unfortunately, there are only 24 successful pair-up, and their results are provided in Table 5. After controlling student difference, the difference in responses from Q1-Q6 is still insignificant

Table 4

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Result of pre-survey and post-survey

	Pre	Post	Diff
Gender (Female%)	38		
Hours spent online	1.90		
Hours spent on mobile	1.99		
Online course experience (%)	58		
Q1: E-learning can motivate me to learn.	3.18	3.12	-0.06 (-0.40)
Q2: E-learning can save my time in learning.	3.68	3.60	-0.08 (-0.41)
Q3: I enjoy learning by using electronic device.	3.54	3.54	0.00 (-0.03)
Q4: E-learning increases my interaction with peers.	2.41	2.42	0.01 (0.09)
Q5: E-learning increases my interaction with teachers.	2.45	2.45	0.00 (-0.02)
Q6: Overall, I prefer class with e-learning elements.	3.21	3.18	-0.03 (-0.19)
Q7: I completed all online learning activities.		3.76	
Q8: Video help me preparing for face-to-face meeting.		3.59	
Q9: Online activities help learning subject knowledge.		3.62	
Q10: I am satisfied by the e-learning experience.		3.39	
Q11: Good connection between online and face-to-face.		3.81	
Q12: I am satisfied with the instructor's performance.		3.83	
Expected time spent on online learning activities.	13.52		
Actual time spent on online learning activities.		13.59	
Q13: I am interested in the course subject.	4.13	4.07	-0.06 (- 0.44)
Q14: I expect to get an above-average score.	4.15	3.94	-0.21 (- 1.49)
N	103	62	

Q1 – Q14 are scale questions scaling from 1 (strongly disagree) to 5 (strongly agree). Numbers in parentheses represent the t-statistics

Table 5

Pairwise comparison of result of pre-survey and post-survey

	Pre	Post	Diff
Gender (Female%)	50		
Hours spent online	1.54		
Hours spent on mobile	1.88		
Online course experience (%)	50		
Q1: E-learning can motivate me to learn.	3.05	2.92	-0.13 (-0.38)
Q2: E-learning can save my time in learning.	3.65	3.38	-0.27 (-0.72)
Q3: I enjoy learning by using electronic device.	3.46	3.29	-0.17 (-0.51)

	2.27	2.25	-0.02 (-0.06)
Q4: E-learning increases my interaction with peers.			
Q5: E-learning increases my interaction with teachers.	2.61	2.25	-0.36 (-0.98)
Q6: Overall, I prefer class with e-learning elements.	3.34	2.92	-0.42 (-1.19)
Q7: I completed all online learning activities.		3.45	
Q8: Video help me preparing for face-to-face meeting.		3.31	
Q9: Online activities help learning subject knowledge.		3.43	
Q10: I am satisfied by the e-learning experience.		3.03	
Q11: Good connection between online and face-to-face.		3.60	
Q12: I am satisfied with the instructor's performance.		3.43	
Expected time spent on online learning activities.	7.67		
Actual time spent on online learning activities.		13.07	
Q13: I am interested in the course subject.	4.20	3.92	-0.29 (-1.06)
Q14: I expect to get an above-average score.	4.27	3.85	-0.43* (-1.68)
N	24	24	

Numbers in parentheses represent the t-statistics

Q1 – Q14 are scale questions scaling from 1 (strongly disagree) to 5 (strongly agree).

To further explore how personal factors, affect e-learning attitude, this study identifies four variables that use for explaining difference in response from different questions. Variables “Male” is a dummy variable which equals to 1 if respondent is male, and 0 if respondent is female. Variables “OnlineExp” is a dummy variable which equals to 1 if respondent has online course experience, and 0 if respondent does not have. “OnlineHrs” and “MobileHrs” represent the hours spent online for non-working purpose and spent on mobile respectively. Results of regression on post-survey response are provided in Table 6

Table 6

Regression analysis of post-survey responses (n = 24)

$$DV_x = \alpha_x + \beta_{1x}(\text{Male}) + \beta_{2x}(\text{OnlineHrs}) + \beta_{3x}(\text{MobileHrs}) + \beta_{4x}(\text{OnlineExp}) + \varepsilon_x$$

Dependent Variable	Regression Coefficients				
	α_x	β_{1x}	β_{2x}	β_{3x}	β_{4x}
Q1: E-learning can motivate me to learn.	1.99	0.65 (1.49)	0.71** (2.49)	-0.30 (-1.32)	0.13 (0.27)
Q2: E-learning can save my time in learning.	2.69	0.53 (0.96)	0.50 (1.39)	-0.38 (-1.30)	0.70 (1.17)

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Q3: I enjoy learning by using electronic device.	2.48	0.73 (1.55)	0.35 (1.13)	-0.21 (-0.86)	0.62 (1.23)
Q4: E-learning increases my interaction with peers.	1.80	0.59 (1.24)	0.44 (1.40)	-0.46* (-1.88)	0.71 (1.38)
Q5: E-learning increases my interaction with teachers.	1.22	0.93** (2.17)	0.76** (2.71)	-0.53** (2.38)	0.77 (1.66)
Q6: Overall, I prefer class with e-learning elements.	2.35	0.91* (1.95)	0.52 (1.68)	-0.52** (-2.14)	0.59 (1.16)
Q7: I completed all online learning activities.	3.34	0.56 (1.20)	0.59* (1.91)	-0.56** (-2.29)	-0.05 (-0.09)
Q8: Video help me preparing for face-to-face meeting.	2.29	0.78* (1.83)	0.50* (1.79)	-0.20 (-0.89)	0.45 (0.97)
Q9: Online activities help learning subject knowledge.	2.80	0.57 (1.24)	0.38 (1.27)	-0.29 (-1.20)	0.58 (1.16)
Q10: I am satisfied by the e-learning experience.	2.37	0.63 (1.25)	0.30 (0.90)	-0.17 (-0.65)	0.42 (0.76)
Q11: Good connection between online and face-to-face.	2.60	1.11** (2.52)	0.34 (1.16)	-0.17 (-0.75)	0.50 (1.05)
Q12: I am satisfied with the instructor's performance.	2.43	1.02** (2.16)	0.19 (0.61)	-0.09 (-0.36)	0.73 (1.42)
Q13: I am interested in the course subject.	4.17	-0.15 (-0.37)	0.32 (1.16)	-0.50** (-2.28)	0.39 (0.86)
Q14: I expect to get an above-average score.	3.22	0.13 (0.26)	0.57* (1.79)	-0.35 (-1.39)	0.84 (1.60)

Numbers in parentheses represent the t-statistics

* Significance at 0.1 level.

** Significance at 0.05 level.

In general, male respondent give higher score in all sort of questions (except Q13), with significant difference in Q5, Q6, Q8, Q11, and Q12. These results provide strong evidence that male students are more welcome for blended learning. This result can be explained by phycological explanation, that male is usually self-learner while female usually learning with others. The implication of these results is that there is a gender difference in learning perception, and tailor-made e-learning elements may be needed for different gender. Same with the male effect, respondents with longer time spent on online are positive in all sort of questions, with significant difference in Q1, Q5, Q7,

Q8, and Q14. It is understandable as they are more familiar with using internet to collect information, so they are more likely to feel comfortable to learn with e-learning experience.

However, results of mobile usage are quite surprising that students with longer time spent on mobile are relatively negative on all sort of questions, with Q4, Q5, Q6, Q7, and Q13. One possible reason is that people with longer time spent on mobile are usually those who prefer to interact more with people. As e-learning in this stage is relatively individual, they may feel relatively less preferred. Lastly, previous experience does not contribute to the difference in response, which suggests that personal factors (or concerns) are more influential than experience effect.

In the last part of empirical analysis, this paper compares responds of post-survey between undergraduate and postgraduate. The objective of this comparison is to examine whether age and working experience effects play a role in determining the effectiveness of e-learning. Result of comparison is provided in Table 8.

Results from the regression analysis provides a strong evidence that undergraduates are more positive on e-learning elements than postgraduates. Undergraduates give higher score in most scale questions, except for Q7, Q11, Q13, and Q14, which are not related to attitude towards e-learning. Moreover, most differences are statistically significant. This result can explain why the evidence in this paper is different from many previous studies, as those studies focus more on undergraduates, so more positive results are found. However, why this difference exists is still an open question, and further investigation may be needed to explore it. In sum, we can see that students, both undergraduates and postgraduates, are generally positive to the e-learning elements. To further evaluate the response of undergraduate, we provide a correlation matrix to understand the relationship between each dimensions and are provided in table 8. For the correlations of Q6 and other variables, we can find that whether a student prefer e-learning elements depending on four dimensions: whether e-learning motivates student engagement (Q1: 0.68), time saved (Q2: 0.69), existing attitude towards electronic device (Q3: 0.69), and the interaction between peers/teachers (Q4: 0.62). Thus, university can strengthen along these four dimensions to increase the effectiveness of FLEX mode.

Table 7

Result of post-survey between undergraduate and postgraduate

	UG	PG	Diff
Q1: E-learning can motivate me to learn.	3.62	3.12	0.50*** (3.36)
Q2: E-learning can save my time in learning.	3.78	3.60	0.18 (1.07)
Q3: I enjoy learning by using electronic device.	3.67	3.54	0.13 (0.80)
Q4: E-learning increases my interaction with peers.	3.27	2.42	0.83*** (5.40)
Q5: E-learning increases my interaction with teachers.	3.19	2.45	0.74*** (4.64)
Q6: Overall, I prefer class with e-learning elements.	3.62	3.18	0.44*** (2.67)
Q7: I completed all online learning activities.	3.19	3.76	-0.57***

			(-3.59)
Q8: Video help me preparing for face-to-face meeting.	3.76	3.59	0.17
			(1.13)
Q9: Online activities help learning subject knowledge.	3.79	3.62	0.17
			(1.16)
Q10: I am satisfied by the e-learning experience.	3.78	3.39	0.38**
			(2.48)
Q11: Good connection between online and face-to-face.	3.77	3.81	-0.05
			(-0.32)
Q12: I am satisfied with the instructor's performance.	4.04	3.83	0.22
			(1.49)
Q13: I am interested in the course subject.	3.77	4.07	-0.32
			(-2.41)
Q14: I expect to get an above-average score.	3.76	3.94	-0.17
			(-1.21)
N	156	62	

Q1 – Q14 are scale questions scaling from 1 (strongly disagree) to 5 (strongly agree).

Numbers in parentheses represent the t-statistics

* Significance at 0.1 level.

** Significance at 0.05 level.

*** Significance at 0.01 level.

On the other hand, the correlations of Q10 and other variables suggest that whether an e-learning element can provide a satisfactory learning experience to students depending mainly on whether it is helpful for learning (Q8: 0.68, Q9: 0.72, and Q10:0.67). Nowadays, many online materials focuses on the outlook, while this result suggests that the content should be the most important elements in designing the e-learning element. In other words, the results suggest that online materials should be closely related to the in-class discussion, so that it can provide motivation for students to participate in the online activities.

Lastly, when we study the correlations of Q12 and other variables, we find that the satisfactory of e-learning elements, even though they are online elements are affecting student's attitude towards the instructor. This observation can be implied from the moderate correlation from Q8 to Q11 (Q8: 44, Q9: 49, Q10: 58, and Q11: 65). Also, e-learning elements affect the student interest as well, as the correlations of Q12 and Q8 to Q11 (Q8: 39, Q9: 42, Q10: 39, and Q11: 54) are also moderate. Thus, e-learning elements are affecting different aspects in the course. As a result, more teaching sessions can be conducted to make instructors to understand how to incorporate e-learning elements into their classes.

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