Blended Learning Behavior of University Students and Academic Performance in Thailand

Darrin Thomas

Department of English, Faculty of Arts and Humanities, Asia-Pacific International University,
Saraburi 18180, Thailand
Dtsac18803@gmail.com

Abstract

Blended learning has emerged as an important aspect of higher education in the 21st century. Research in Thailand has focused on language acquisition and learning skills when examining the benefits of blended learning. Therefore, the purpose of this study was to determine the association of blended learning with academic performance while controlling for gender, study program, and class level. A cross-sectional design was employed by extracting data from the learning management system of the study site. The analysis included t-test, ANOVA, and multiple regression with a sample size of 181 students from 13 different courses offered at the university. Results indicated that there is a weak association between blended learning behavior and academic performance. Absences was significant but tardies and click use of the learning management system were not significant. This implies that any benefits of blended learning are found in other ways than in their association with academic performance.

Keywords: blended learning, learning management, academic performance, Thailand

1. Introduction

ELearning appears to be a part of the wave of the future for education (Strauss, 2013). Approximately 33 percent of college students will take at least one online course during their studies (Center for Digital Education, 2014). In addition, it is predicted that half of all classes will be offered online at the K-12 level by 2020 (Strauss, 2013). With this growth, many educators are trying to determine how to integrate eLearning into their educational institutions.

Despite the growth in eLearning, many educational institutions still require some form of seat time and traditional instruction. This has led to the use of eLearning concepts to augmented traditional education. This mixing of traditional education with eLearning is known as blended learning. Blended learning has the benefits of being interactive, cost effective, and a method for improving the learning management experience (Cenejac, 2017).

Within Thailand, several studies have been conducted that examine blended learning and its influence (Banditvilai, 2016; Banyen, Viriyavejakul, & Ratanaolarn, 2016). However, the focus has been primarily on English acquisition and learning skills and not on general academic performance (Wichadee, 2017, 2018). Therefore, the purpose of this study is to determine the relationship between the use of blended learning with academic performance through the use of a learning management system and traditional teaching.

With the advent of eLearning, teachers need to understand if the use of online communication technologies is beneficial. Furthermore, if there are potential challenges

with blended learning, adjustments can be made in order to improve the deployment of eLearning across an institution.

There are several definitions of blended learning. Okhwa and Lm (2012) define blended learning as a combination of face to face instruction with the use of information communication technologies. Ng (2010) definition includes Okhwa and Lm's (2012) views but includes the added characteristic that blended learning should develop creativity and critical thinking skills. As such, blended learning is not just mixing instructional activities but also should deepen cognitive abilities.

There are several models or designs of blended learning. Alammary, Sheard, and Carbone (2014) propose three different models which are low, medium, and high impact. Low impact models simply add online experiences to the current teaching methods while high impact are the development of a new course with eLearning activities. Blended learning models also are frequently paired with the use of the flipped classroom, which involves studying the lecture material before class and focusing on activities in the classroom (O'Flaherty & Phillips, 2015).

There are also several models of blended learning that are specific for a discipline. For example, there are several blended learning models for science (Bidarra & Rusman, 2017; Klentien & Wannasawade, 2016). One of the main concerns with the development of a blended learning approach is to consider interactivity, technology knowledge of users, as well as feedback for students (Dias & Diniz, 2014; Sophonhiranrak, Suwannatthachote, & Ngudgratoke, 2015).

Several studies have focused on the psychological influence of blended learning. Blended learning has been found to have a positive influence on motivation to learn (Banditvilai, 2016; Vanslambrouck, Zhu, Tondeur, & Lombaerts, 2015). In addition, students who have experienced blended learning often have a more positive view of the subject they studied (Brook & Beauchamp, 2015; Cheng & Chau, 2014; Lin, Tseng, & Chiang, 2016). Lastly, studies have found that the use of blended learning encourages the utilization of self-regulated learning strategies (Broadbent, 2017; Cheng & Chau, 2014).

Academic performance is a major area of research for blended learning. However, there is little agreement as to the effectiveness of blended learning when associated with academic performance (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Kwak, Menezes, & Sherwood, 2014; Tsai, Tsai, & Wang, 2011). Generally, studies fall into one of three categories which are that blended learning is beneficial, blended learning is not beneficial, and context determines if blended learning is beneficial.

In terms of instances in which blended learning was beneficial several studies confirm that blended learning is superior to classroom only instruction (Bernard et al., 2014; Sarıtepeci & Cakir, 2015). In a study focused on STEM disciplines it was found that blended learning enhanced performance (Vo, Zhu, & Diep, 2017). In addition, one study found that blended learning had a positive effect on exam results of adult learners (Deschacht & Goeman, 2015).

Several studies have also concluded that blended learning is ineffective. Li, Tsai, Tao, and Lorentz (2014) found no significant difference when employing a blended

learning model and this is confirmed by at least on other study (Wisneski, Ozogul, & Bichelmeyer, 2017). In addition, one study found that if didactic teaching is removed than the blended learning model will not show a positive difference in performance (Page, Meehan-Andrews, Weerakkody, Hughes, & Rathner, 2017). Finally, another study found a small difference when employing blended learning when employing clickers for in-class interaction (Shin, Park, & Lee, 2018).

Many studies have found that the effect of blended learning is complex and depends heavily on context. One factor to consider is the cumulative effect, if blended learning is short-term it is successful but loses power over the course of a semester (Kwak et al., 2014). Weaker students do better with traditional teaching while stronger student do better with blended learning (Asarta & Schmidt, 2017). Henrie, Bodily, Manwaring, and Graham (2015) found that the teacher is the main factor in that clarity of instruction was more important than the actual platform of the instruction. Lastly, race is another context dependent factor for narrowing achievement gaps between races (Luna & Winters, 2017).

Attendance is another factor that has mixed results when considered during the use of blended learning and academic performance, however, the majority of the studies indicated a positive effect when considering attendance (Klinkenberg, 2016; Pardo, Han, & Ellis, 2017; Schulmeister, 2017). Schulmeister (2017) found attendance more important than self-study while Pardo et al. (2017) found that observation of attendance should be considered. Other studies found that students can be group into high performance high attendance, low performance low attendance and that discussion related to the personal lives of students encourages participation (Harrak, Bouchet, Luengo, & Gillois, 2018; Shu & Gu, 2018). In at least one study, it was found that blended learning improved classroom attendance rather than performance as students now had clear expectations for completing assignments (Collins & Daly, 2014). Lastly, differences have also been found by major and gender when considering blended learning and academic performance (Chen, Yang, & Hsiao, 2015; Wicks, Craft, Mason, Gritter, & Bolding, 2015).

In Thailand, studies involving blended learning focus on English acquisition and the development of learning skills (Banyen et al., 2016; Rattanawongsa & Koraneekij, 2015; Tananuraksakul, 2016; Wichadee, 2018). Banditvilai (2016) found that blended learning enhanced all four language skills and this was confirmed by Wichwadee (2018). However, Tananuraksakul (2016) found that Thai EFL students are motivated by blended learning and have a positive attitude towards it but that it may not be an appropriate tool for actual learning. Among K-12 Thai students blended learning contributed to superior academic performance (Rattanawongsa & Koraneekij, 2015).

Blended learning has also been found to develop learning skills among Thai students. Some of the skills blended learning has been known to improve include self-directed learning and communication skills (Sriarunrasmee, Techataweewan, & Mebusaya, 2015). Blended learning has also been found to support students in comprehension of content as well (Banyen et al., 2016). However, the role of attendance has not been look at closely in Thailand. In addition, a closer look at study program and gender may provide insights into the influence of demographic variables. Lastly, a better understanding of how blended learning was measured may be useful as well.

2. Research Objectives
The following research objectives have been developed based on the review of literature.
1. To assess the students' use of learning management system, their academic performance, and their attendance.
2. To determine if there are differences based on the demographic profile of the students for learning management system use, academic performance, or attendance.
3. To examine the relationship between the use of the learning management system and academic performance when controlling for other variables.

3. Research Methodologies
This study was conducted at a university located in Thailand. A total of 13 courses at the university participated in the study with a sample of 181 total participants. Class sizes ranged from as small as six students to as large as 33. In the sample 73% were female and 27% were male. In addition, 45% were sophomores, 14% were juniors, and 41% were seniors. Lastly, 67% of the sample was in the international program and 32% were in the Thai program.

A cross-sectional design was employed in this study. Attendance was measured through recording absences and tardies for the face-to-face instruction. The learning management system used by the university was Moodle. ELearning activity was measured by determining the number of clicks a student made during the semester while using Moodle within the course. The learning management systems database logged all click activity within the system. The use of the eLearning system was left at the discretion of the teacher. However, all courses were required to record attendance, record grades, use the calendar, and post course resources in Moodle. The collection of attendance and eLearning activity in Moodle are what comprise the concept of blended learning in this study. The metrics used in this study measured actual behavior rather than a latent construct measured with Likert scales therefore, internal consistency metrics were not necessary.

4. Data Collection and Data Analysis
Data was extracted from the university's learning management system by the researcher. The data extraction included the demographic information of class level, gender, study program and the main variables of the study which were attendance, eLearning activity, and final course grade (academic performance). Data was collected at the conclusion of the semester.

Descriptive statistics were assessed. T-test and ANOVA was employed to compare subgroups from the sample based on the demographic variables. When ANOVA results were significant a Tukey Post-Hoc test was conducted to determine which groups were significantly different from each other. Regression was used to assess the association between blended learning and academic performance.

5. Results
Table 1 indicates the descriptive statistics of this study. Table 2 reports the t-stat results. In terms of differences by groups for tardies, no difference was found by gender but differences were found by class level and program. For absences, no differences by class, gender, or program. For clicks, differences were found by class, gender, and

program. For academic performance there was no difference by class, differences by gender, and program. Table 3 reports the ANOVA results. In table 3, difference is found by class level for clicks and tardies.

Table 1: Descriptive Statistics

Variable	Mean	SD	95%CI
Tardies	3.60	3.07	3.09 - 4.11
Absences	2.43	2.38	2.08 - 2.78
Clicks	558.90	315.08	512.56 - 605.24
Grade	70.92	8.61	69.65 - 72.19

Table 2: T-test Results

Variable	Group	T-Stat	Pvalue	Mean & 95%CI	95%CI of Difference
Tardies	Gender	-0.24	.81	Not sig	Not sig
	Program	4.19	< 0.01	International: 4.23 [3.59, 4.89] Thai: 2.25 [1.58, 2.94]	1.04 - 2.91
Absences	Gender	-0.95	.34	Not sig	Not sig
	Program	0.59	.55	Not sig	Not sig
Clicks	Gender	3.16	< 0.01	Female: 596.27 [538.87, 653.67] Males: 456.13 [388.87, 523.38]	52.50 – 227.80
	Program	-6.84	< 0.01	International: 455.70 [408.56, 502.85] Thai: 775.97 [695.28, 856.65]	-413.14 – 227.37
Grade	Gender	2.17	< 0.05	Female: 71.59 [69.99, 73.21] Males: 69.05 [67.38, 70.74]	0.23 – 4.84
	Program	2.61	< 0.05	International: 72.13 [70.71, 73.55] Thai: 68.37 [65.89, 70.86]	0.91 – 6.60

Table 3: ANOVA Results

Variable	Group	F-Stat	P value	Mean & 95%CI	Difference	95%CI of Difference	Pvalue of Difference
Tardies		14.45	< .001	Soph 5.01 [4.16, 5.86] Junior 2.85 [1.88, 3.81] Senior 2.30 [1.68, 2.92]	Senior – Junior = 0.54 Soph – Junior = 2.17 Soph– Senior = 2.71	Not sig 0.45 – 3.88 1.48 – 3.94	< 0.01 < 0.01
Absences		1.67	.19	Not Sig			
Clicks		5.22	< .001	Soph 426.11 [377.6, 474.6] Junior 619.04 [492.99, 745.0] Senior 684.82 [603.2, 766.4]	Senior – Junior = 65.78 Soph – Junior = -192.92 Soph – Senior = -258.71	Not sig -348.49 -- 37.36 -258.71-- 370.09	< .01 < .01
Grade		1.64	.19	Not Sig			

The Pearson Product correlation was calculated for tardies, absences, clicks, and grades. Most of the relationships are statistically significant. Academic performance did not have a significant relationship with tardies or clicks. Tardies had a positive relationship with absences and a negative relationship with clicks. Clicks had a negative relationship with both absences and academic performance. Table 4 is the correlational matrix.

The regression analysis indicated that there is a weak non-significant relationship between clicks and academic performance when controlling for tardies, absences, program, and gender. The model explained 24% of the variance of academic performance. Tardies, clicks, and gender were not associated with academic performance. Table 5 is the regression results.

Table 4: Correlational Matrix

Variable	1	2	3
1. Tardies			
2. Absences	.26 [.11,.39]**		
3. Clicks	-.23 [-.36, -.08]**	-.37 [-.48, -.23]**	
4. Grades	-.05 [-.09, .19]	-.39 [-.51, -.25]**	.07 [-.08, .21]

** p < 0.05

Table 5: Regression Results

	Estimate (*b*) 95%CI	Std. Error	T	Pvalue
(Intercept)	75.18 [70.52, 79.84]	2.36	31.85	< .01
Tardies	-0.005 [-0.36, 0.35]	0.18	-0.02	.98
Absences	-1.50 [-2.03, -0.96]	0.27	-5.50	< .01
Clicks	-0.001 [-0.004, 0.005]	0.002	0.27	.79
Program: Thai	-8.10 [-12.58, -3.62]	2.27	-3.57	< .01
Gender: Male	-2.18 [-4.81, 0.44]	1.32	-1.65	.10
Class: Sophomore	0.58 [-3.00, 4.17]	1.81	0.32	0.74
Class: Senior	4.87 [-0.04 ,9.78]	2.49	1.95	0.05
	Adjusted r^2 0.21		r^2 = 0.24 [0.13, 0.34]	

6. Discussion

This study has revealed several valuable findings. Perhaps the most important finding is that there was no relationship between eLearning activity and academic performance. This lack of a relationship was found for the bi-variate relationship in the correlational matrix and also in the regression model. This finding is consistent with several other studies (Li et al., 2014; Wisneski et al., 2017). This indicates that the benefits of an online learning management system may not be observed in academic performance but may benefit students in other ways such as motivation, satisfaction, and or self-regulation (Banditvilai, 2016; Lin et al., 2016; Vanslambroucket al., 2015).

A second finding was that the relationship that was found between eLearning activity and absences and tardies. It would seem counter-intuitive that a moderate negative relationship would exist because an absent or late student can keep up with the class through the online materials and communication. However, the results indicate that as eLearning activity increases absences and tardies decrease. Therefore, students who come to class are also more likely to be active in the eLearning platform. This means that in a blended learning environment active students are often active in both domains of learning. These results affirm the work of other studies (Harrak et al., 2018; Shu & Gu, 2018).

A final important finding is that eLearning use increased by class level but there was not difference in academic performance. This indicates that older students are much more active in the blended learning context but there is no corresponding payoff in terms of academic success. Often educators assume that maturer students are better students.

These findings find evidence to the contrary. Maturer students, who are demonstrating additional activity online had no better academic performance than students who were less diligent. This finding is in disagreement with Asarta and Schmidt, (2017). These same findings are found when comparing the Thai program with the international program. Thai program students are much more active online but are not seeing a corresponding increase in academic performance. Indicating active but not effective behavior in the online context.

Several recommendations can be derived from these findings. One blended learning should be considered as a platform for improving organization and not necessarily academic performance. The benefits of blended learning are mixed indicating that it is not a cure all (Page et al., 2017; Henrie et al., 2015). However, blended learning's track record for developing learning skills is less murky (Banyen et al., 2016; Rattanawongsa & Koraneekij, 2015; Tananuraksakul, 2016; Wichadee, 2018). Therefore, educators should consider using a blended learning model as a tool for managing learning rather than boosting performance. Organization and communication are useful supporting mechanism for helping students that may not always show up in improved performance but rather decrease anxiety over expectations (Mahmoud, Staten, Hall, & Lennie, 2012).

A second recommendation is that for further research other factors need to be considered for measuring blended learning. It is possible that the click rate may not be an adequate measure of online activity (Paruthi & Kaur, 2017). In addition, it would be beneficial to study other benefits of blended learning than just academic performance. For example, performance may not have been influenced by clicks but it may be possible that a well-organized online platform could alleviate anxiety about performance expectations. Therefore, exploring the role of blended learning with performance anxiety may share valuable insights into the true benefits of a blended learning approach (Lepp, Barkley, & Karpinski, 2014).

Limitations include how the teachers used eLearning as this was not controlled. All courses had online activities and a strong online presence but it varied from course to course. This may have had an effect on the results. In addition, this was a correlational study so causation was not established. Lastly, the results are from one context so the generalizability is limited.

7. Conclusion

This study examined blended learning's association with academic performance. The results indicate that there is little relationship between the two. This indicates that the benefits of blended learning may be found in other ways rather than just through academic performance. Helping students to improve academically involves more than just using a learning management system. It is critical that educators consider strategies for the beneficial employment of a learning management system. As the world continues to move towards an online platform, learning management systems use will continue to grow and perhaps become almost mandatory of tertiary institutions.

8. The Author

Darrin Thomas is a lecturer in the Department of English, Faculty of Arts and Humanities at Asia-Pacific International University.

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