Usefulness of Google Classroom for Management Students of a Thai Private University

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ABSTRACT

The aim of this study was to explore the acceptance of the use of Google Classroom in the Department of Mathematics in a Thai private university. Google provided a free web paperless knowledge-sharing environment with schools and later with individuals. The data were collected in four Statistics II classes and six Mathematics for Business classes. The data analysis indicated that the students perceived the Google Classroom as a useful tool in learning which was also easy to use. Perceived usefulness (PU) or Perceived ease of use (PE) were not influenced by gender, nationality, GPA, credits earned, Facebook preference, or having some experiences with Google Classroom. The findings confirmed that Google Classroom is useful and easy for the students regardless of their demographics. However, the results from the open-ended questions revealed that some respondents had technical anxiety, suggesting that the teachers should pay attention to possible technical difficulties while using Google Classroom.

KEYWORDS: Google Classroom, Perceived usefulness, Perceived ease of use

Introduction

Google declared its Classroom to be a tool for teachers creating a paperless communication with students. The initial release was on August 12, 2014, as a free web service for schools. Since March 2017, Google has been providing individuals with the facility, also for free. The purpose was to provide teachers and students with a platform for teaching and learning without paper. Google Classroom allows teachers to create classes, post assignments, organize folders, and view work in real-time. The students will have access to all learning materials and records of attendance and grades in the form of text files, slides, images, videos, anytime from anywhere. They can post comments, submit assignments, and do quizzes online.

Teachers and students can use Google Classroom in connection with Google Drive, Google Docs, Sheets and Slides, and Gmail altogether. Google forms can also be used for creating feedback questionnaires and online quizzes. Later, Google gave calendar for

assignment, due dates, and activity schedules.

The aim of this research was to explore the acceptance of the use of Google Classroom in Department of Mathematics in a Thai private university. As it was an initial study, the researchers used a simple survey instrument. However, to see the amount of the difference in the opinion of the students, the researchers used quantitative data analysis.

Literature Review

As Google Classroom is free and paperless. If it is useful and if the learning to use it is not too difficult for teachers and students, they should naturally use it. Azhar and Iqbal (2018) studied teachers' perceived effectiveness of Google Classroom. They found that teachers perceived Google Classroom as only a facility for document management, basic classroom management, and no significant impact on teaching methodologies. They concluded that the responses of the teachers indicated the lack of user-friendly interface to be the main reason for its inefficiency. In other words, ease of use by teachers and students is important.

According to the researchers' experience, it was not very difficult to use Google Classroom as an aid and it is worthwhile for motivated teachers to learn. There are also video instructions on YouTube on how-to. Keeler and Miller (2015) provided instructions on a comprehensive use of Google Classroom. It has been naturally of a considerable interest for educational researchers to do research on Google Education facilities. Liaw, Huang, and Chen (2007) studied the teachers' and learners' attitudes toward e-learning. They found that the teachers perceived e-learning as an assisting tool for teaching. The perceived usefulness and self-efficacy influenced behavioral intention to use e-learning. The self-paced, teacher-led, and multimedia instruction were major factors that affected learners' attitudes toward the effectiveness of an e-learning tool. According to their findings, the students' side was of more concern.

Google Drive and Google Hangouts are other facilities provided by Google which are used in combination with Google Classroom. Kobayashi (2015) studied the usefulness and ease of use of Google Hangouts. She made some suggestions for how teachers could integrate Google Hangouts into online classrooms. Prasertsith, Kanthawongs, and Limpachote (2016) studied students' intention to use Google Drive. They concluded that message quality, digital literacy in terms of learning new technology, and IT skills positively affected the intended usage.

Iftakhar (2016) interviewed some teachers and students at Daffodil International University and found new evidence on the potential of Google Classrooms in teaching. Al-Maroof and Al-Emran (2018) attempted to examine, at Al Buraimi University College (BUC) in Oman, the factors that affected the students' acceptance of Google Classroom. They found that both perceived ease of use and perceived usefulness positively influenced the intention to use Google Classroom and thereby influenced the actual use. Tawafak, Romli, bin Abdullah Arshah, and Almaroof (2018) wrote a review paper on the impact of technology use upon the student performance. Sukmawati and Nensia (2019) conducted research interview and concluded that

Google Classroom had an important role in English learning and teaching. Soonthorntanapol (2019) studied the students' satisfaction towards learning through Google Classroom at Srinakharinwirot University. The students were found to be satisfied with Google Classroom use, and that the students requested to include more content.

Albashtawi and Bataineh (2020) found that Google Classroom improved the reading and writing performance of Syrian students and also found that the students had positive attitudes toward using Google Classroom in terms of its ease of use, usefulness, and accessibility. Syakur, Sugirin, and Widiarni (2020), by quantitative research, presented that the use of Google Classroom improved the achievement of students of English Education Departments. Tumma (2020) found the improved performance and satisfaction of accounting students at Suphanburi vocational college after the use of Google Classroom. Ansong-Gyimah (2020) studied PU and PE and continuous intention to use Google Classroom of students from Ghanaian universities and found that attitude towards use mediated the impact of PU and PE. Vongsrangsap, Tanphanich, Lapho, Poonsri, and Chalanon (2021) found the improved performance and student satisfaction in Physical Education using Google Classroom.

Although there are quite a few studies about Google Classroom since Google introduced Google Classroom in 2014, they are still in initial stage and there is a need to explore more in this issue.

Research Process

Data Collection

The respondents of the study were undergraduate management students of the two courses, namely, Statistics II and Mathematics for Business, in one semester. As the surveys were conducted in the sections of the researchers, the sampling was a convenient one. However, all management students must take these courses, and the researchers have taught the courses for over twenty years at the university. As the students had similar academic background and IT experience in the courses, the researchers were confident in that the sample represented the student body of the faculty of management. There were over three thousand management students a semester.

The sample size of 128 was regarded adequate to generate reliable factors for the twelve-item measures using Likert scale in measuring perceived ease of use and perceived usefulness as the ratio of 5:1 justified by the previous studies (Field, 2005: Hair et al., 2010; Ho, 2006). In addition to the above, as a rule, sample sizes equal to or over thirty are considered appropriate for the central limit theorem to hold.

In the beginning of the semester, the researchers opened a Google Classroom for each section. The first researcher checked attendance with Google sheets showing it live with an overhead projector to the class, posted course information and handouts as pdf files, created additional video on solving some exercises, posted them in the YouTube channel, and put links to them at Google Classroom, created some slide shows for solutions, Google docs for recording class activities and homework,

and Google forms for answering some questions to students in his Google Classrooms. The second researcher posted pdf files for solutions and power points on some lessons. The researchers did not use Google Classroom to its full extent or as a substitute for a part of instruction. The students were not yet used to online teaching and learning intensively. The university did not promote the use of Google Classroom yet, and, instead, installed its own Learning Management System (LMS).

Instruments

After the midterm exam, the surveys were conducted in the physical classes. The theoretical framework was the technology acceptance model (TAM) and the main part of the questionnaire was the perceived usefulness (PU) and perceived ease of use (PE) scales developed by Davis (1989).

There are extensions of TAM such as Lee, Hsieh, and Hsu (2011), Svendsen, Johnsen, Almås-Sørensen, and Vittersø (2013), Teo (2012), and Kamal, Shafiq, Shafiq, and Kakria, (2020) with added constructs. Lee, KozarKai, and Larsen (2003) wrote a survey paper on it. However, according to the purpose of the research, the researchers selected the simple original scales of Davis (1989).

This study used 7-point Likert scales where 1 = Strongly Disagree and 7 = Strongly Agree for all 12 item measures of PU and PE. The questionnaire included two demographic variables, two about academic status, one on Facebook preference, one on the experience of Google Classroom use, and then PU and PE questions, and lastly the open-ended questions.

Data Analysis

SAS Enterprise Guide 7.1 (64 bit) was employed for data analysis. There were originally 190 participants, 100 Stat II students and 90 Math students. Of 190 participants, 9 did not join Google Classroom. All obligatory teaching and learning material were distributed in physical class, although their digital copies were posted online in Google Classroom. Therefore, the students were not forced to use Google Classroom. After data cleaning, dropping cases with missing values and dropping cases of the students who did not join Google Classroom, the number of cases left was 128 without any missing value; 64 each from either of the courses, Statistics II and Mathematics for Business. Of 190 participants, 57 answered the open-ended question where twenty-nine of them joined Google Classroom and twenty-eight did not.

Frequencies and percentages of categories of demographic and other status variables were displayed in Table 1. From 128 respondents, 55 were males (42.97%) and 73 were females (57.03%), 75 were Thais and 53 were non-Thais, and so on.

Table 1: The main characteristics of respondent

Characteristics	Frequency	%
Gender		
Male	55	42.97
Female	73	57.03
Nationality		
Thai	75	58.59
Non-Thai	53	41.41
GPA		
Below 2.5	30	23.44
2.5-3.0	29	22.66
Above 3.0	69	53.9
Credits earned		
Less than 50	102	79.69
50 or more	26	20.31
Facebook preference		
Prefer	33	25.78
Nor prefer	95	74.22
Experiences in using GC		
Yes	85	66.41
No	43	33.59

As shown in Table 2, factor analysis with orthogonal varimax rotation resulted in two factors, as in Davis (1989), one for PU and another PE. The total variances extracted were nearly 80% which was much higher than the acceptable 60%. Shrestha (2021) suggested that the proportion of the total variance explained by the retained factors should be at least 60%. KMO **(Kaiser-Meyer-Olkin Measure of Sampling Adequacy)** score was 0.91, very close to 1.0, and **Bartlett's test of sphericity has p** < 0.0001. Therefore, the performance of factor analysis was valid. Cronbach's alpha in Davis (1989) was 0.98 for PU factor, and 0.94 for PE factor. The data of 128 cases gave 0.94 for both which were higher than the threshold at 0.70 (Ho et al., 2010). All item-total correlations were less than 0.90, but more than 0.75. It showed high internal consistency and reliability.

Table 2: Descriptive and Factor Analysis

	Item measures	Factor loadings	Means	SD
Perceived Usefulness (Variance extracted = 39.14%)	PU1	0.80690	5.0390625	1.4052900
	PU2	0.86093	4.7968750	1.3361089
	PU3	0.73916	4.8437500	1.4604362
	PU4	0.82229	4.7343750	1.3659779
	PU5	0.78147	5.0625000	1.4072366
	PU6	0.77156	5.1093750	1.5123345
Perceived Ease of Use (Variance extracted = 39.80%)	PE1	0.84377	5.3750000	1.3515812
	PE2	0.78094	5.1796875	1.2824288
	PE3	0.73476	5.2187500	1.3336204
	PE4	0.76415	5.1093750	1.3294625
	PE5	0.80318	5.0703125	1.3814496
	PE6	0.85536	5.3359375	1.4595725

Note: KMO = 0.91, Bartlett's test is significant at $p < .0001$

One-Sample t-test was conducted for each item measures of the PU and PE variables for H_0: $\mu \leq 4$. Each test had $p < 0.0001$. Thus, the means were all significantly higher than 4 (neutral): The students had positive opinion on the usefulness and ease of use.

The next study was about the relationship between PU and PE scores and the variables of gender, nationality, seniority, Facebook preferences, and experience in the use of Google Classroom. The results were presented in Table 3.

Table 3: Independent sample t-test and One-way ANOVA Results

Characteristics	Perceived usefulness	Perceived ease of use
Male	5.0303	5.3030
Female	4.8562	5.1484
p value	0.4351	0.4720
Thai	4.7556	5.0533
Non-Thai	5.1792	5.4434
p value	0.0722	0.0695
Less than 50 credits	4.8546	5.1961
50 credits or more	5.2308	5.2885
p value	0.1695	0.7271
Prefer using Facebook	5.0505	5.1364
Not prefer using Facebook	4.8895	5.2421
p value	0.5238	0.6641
Experience with Google Classroom	4.8627	5.1471
No experienced with Google Classroom	5.0659	5.3488
p value	0.3848	0.3703
GPA below 2.5	4.9167	5.1333
GPA 2.5 - 3	5.3506	5.3563
GPA above 3	4.7609	5.1908
p value	0.0999	0.7546

In Table 3, the results of independent samples t-test and one-way ANOVA showed no significant difference of demographics and other status variables on PU and PE where all p-values were higher than 0.05, meaning PU and PE were not perceived differently by gender, nationality, seniority, internet preference, Facebook preference, experience with Google Classroom, or GPA. However, the means for both PU and PE were rated high by respondents as confirmed from the results of one sample t-test previously found. Therefore, we can conclude that Google Classroom were perceived useful and easy to use by all respondents regardless of their demographics and preferences.

The Results from Open-ended Question

Together with our observation and occasional feedbacks from the students, the responses to open-ended questions were summarized in the Table 4.

Table 4: Summary of open-ended feedbacks from 57 participants

Classification	Number of students	Answers
Reasons to use Google Classroom	41	Happy to have access to records and learning material all the time. Absent students can learn. Easy communication with teacher. Save paper. Environment friendly. Save money. A good opportunity for revision at home. Extremely useful. Very helpful. Not easy to use. The best application for studying.
Suggestions to improve Google Classroom	6 (6/41 made suggestions)	Better organization and display of posts for easy finding. Frequently update. Post the original files instead of links. Upload more materials.
Prefer off-line	7	Prefer studying face-to-face teaching. Google Classroom is not necessary. Anxiety for technical difficulty. Explaining in class is better than using high tech.
Not using	9	Prefer face-to-face. Hard to join. Busy. Forgot.

Overall, the findings from open-ended questions were classified as follows:

1) Most comments were appreciative of the use of Google Classroom and how it helped them.
2) Some suggested for a better management of the use of Google Classroom, such as a simpler and nonduplicated posts, and more frequent and early uploads.
3) Some worried that face-to-face learning would be replaced with Google Classroom.
4) Some had technical anxiety.

Conclusion

The aim of this study was to explore the acceptance of the use of Google Classroom in Department of Mathematics in a Thai private university. The results showed that all participants in the study accepted the use of Google Classroom since they perceived the usefulness and ease of use of the Google Classroom, regardless of their demographic and preferences. In addition,

the results from the open-ended questions also confirmed the findings from quantitative results where majority of students expressed their positive opinion toward the use of Google Classroom.

Recommendations

This study was the first step at the university toward the use of online teaching facilities in general and Google Classroom in particular, to promote the service quality of the university or the faculty and improvement of student life and teaching environment. The findings encouraged the colleagues to use Google Classroom, and through action research, the university should develop three modes of teaching and learning, namely, traditional, hybrid, and online.

For more effective and efficient employment of Google Classroom, it is necessary to study instructors' side, more in-depth studies on students' side, and technical difficulties, further. Naturally, a student body can be divided into three categories by reference among three modes of learning: Traditional, online, and hybrid. The results suggest that most students are likely to accept a hybrid or full online courses if installed.

The next research projects at the institute and the university should be about the effect of the use of Google Classroom upon the academic performance and satisfaction of students, and about the approaches the instructors should use by discipline.

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