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Hoping our services are writer friendly and enhance the ecology of academic advancement. We value your contributions. Happy New Year 2022 to you all.

With best wishes,
Manit Boonprasert, Ed.D

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RESEARCH ARTICLE

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.

References

Albashtawi, Abeer Hameed, & Bataineh, Khaleel Bader Al. (2020). The effectiveness of Google Classroom among EFL Students in Jordan: An innovative teaching and learning online platform. *International Journal of Emerging Technologies in Learning, 15*(11), 78-88.

Al-Maroof, R. A. S., & Al-Emran, M. (2018). Students acceptance of Google classroom: An exploratory study using PLS-SEM approach. *International Journal of Emerging Technologies in Learning, 13*(06), 112-123.

Ansong-Gyimah, K. (2020) Students' perceptions and continuous intention to use e-learning systems: the case of Google Classroom. *International Journal of Emerging Technologies in Learning, 15* (11), 236-244.

Azhar, K. A., & Iqbal, N. (2018). Effectiveness of Google classroom: Teachers' perceptions. *Prizren Social Science Journal, 2*(2), 52-66.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–339.

Field, A. P. (2005). Is the meta-analysis of correlation coefficients accurate when population correlations vary? *Psychological Methods, 10*(4), 444-467.

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2010). *Multivariate Data Analysis*. Seventh Edition. Prentice Hall, Upper Saddle River, New Jersey.

Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. CRC press.

Iftakhar, S. (2016). Google Classroom: What works and how?. *Journal of Education and Social Sciences, 3*(Feb.), 12-18.

Kamal, S.A., Shafiq, M.I., Shafiq, M.I., & Kakria, P. (2020). Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society*, 60, 101212.

Keeler, A., & Miller, L. (2015). 50 *Things You Can Do with Google Classroom*. Dave Burgess Consulting. San Diego, CA.

Kobayashi, M. (2015). Students' evaluation of Google Hangouts through a cross-cultural group discussion activity. *Turkish Online Journal of Distance Education*, 16(2), 28-39.

Lee, Y., Hsieh, Y., & Hsu, C. (2011). Adding innovation diffusion theory to the technology acceptance model: Supporting employees' intentions to use e-learning systems. *Journal of Educational Technology & Society, 14*(4), 124-137.

Lee, Y., KozarKai, Kenneth A., Larsen, R.T. (2003). The technology acceptance model: past, present, and future. *Communications of the Association for Information Systems, 12*(50), 752-780.

Liaw, S. S., Huang, H. M., & Chen, G. D. (2007). Surveying instructor and learner attitudes toward e-learning. *Computers & Education, 49*(4), 1066-1080.

Prasertsith, K., Kanthawongs, P., & Limpachote, T. (2016). *Students' Google Drive Intended Usage: A Case Study of Mathematics Courses in Bangkok University.* 13th International Conference on Cognition and Exploratory Learning in Digital Age (CELDA), Bangkok, Thailand, 335-338.

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal ofApplied Mathematics and Statistics, 9*(1), 4-11.

Soonthorntanapol, N. (2019). A Study of Student Satisfaction in teaching management through Google Classroom Western music history course, *Journal Srinakharinwirot University, 21*(1), 73-86.

Svendsen, G. B., Johnsen, J. K., Almås-Sørensen, L., & Vittersø, J. (2013). Personality and technology acceptance: the influence of personality factors on the core constructs of the Technology Acceptance Model. *Behaviour & Information Technology, 32*(4), 323-334.

Sukmawati, S., & Nensia, N. (2019). The role of Google Classroom in ELT. *International Journal for Educational and Vocational Studies, 1*(2), 142-145.

Syakur, A., & Sugirin, W. (2020). The effectiveness of English learning media through Google Classroom in higher education. *Britain International of Linguistics, Arts and Education (BIoLAE) Journal, 2*(1), 475-483.

Tawafak, R. M., Romli, A. B., bin Abdullah Arshah, R., & Almaroof, R. A. S. (2018). Assessing the impact of technology learning and assessment method on academic performance. *EURASIA Journal of Mathematics, Science and Technology Education, 14*(6), 2241-2254.

Teo, T. (2012). Examining the intention to use technology among pre-service teachers: An integration of the Technology Acceptance Model and Theory of Planned Behavior. *Interactive Learning Environments, 20*(1), 3-18.

Tumma, O. (2020). Results from using Google Classroom financial report analysis course for undergraduate students Bachelor of Technology program department of accounting. *Vocational Education Central Region Journal, 4*(2), 37-44.

Vongsrangsap, S., Tanphanich, T., Lapho, T., Poonsri, W., and Chalanon, T. (2021). The development of teaching and learning by using Google Classroom in Physical Education course for students of Kasetsart University, Kamphaengsaen Campus. *Journal of Health, Physical Education and Recreation, 47*(2), 167-176.

Mental Health Education for College Students under the Pandemic of the COVID-19

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ABSTRACT

College students are a vulnerable group that battles mental health disorders due to the demand they face to succeed in their academic life, financial constraints, the pressures of finding a successful career path. The COVID-19 pandemic has served to exacerbate their levels of anxiety, depression, suicide ideation, eating disorders and even alcohol and substance abuse. The burden of the pandemic has increased stressors in their lives, such as financial stress, loneliness, social isolation, increased class workload that impede their mental health. The objective of this academic paper was to explore these challenges, their solutions and the role of education and awareness as a mitigating strategy and intervention for building resilience and promoting mental well-being.

Key Words: COVID-19 pandemic, mental health education, College students, Stressors

Introduction

College students from all over the world have marked over one year of disruption in their studies since the advent of the COVID-19 pandemic. These students have been dealing with uncertainty regarding opening of school campuses and their futures (Anderson, 2020). Research has shown that college students have been experiencing a rising rate of depression and anxiety. College students are said to worry about themselves, their loved ones, academic life, future careers and even the economy (Browning, et al., 2021). As a result of the pandemic, these students have been restrained physically due to social distancing restrictions and also have been denied social interactions that are a hallmark for majority of young people during this age. Earlier in 2020, 50% of students were optimistic about their futures and the end of the pandemic. However, as the pandemic soured in its third wave, 61% of these college students expressed feeling anxious, fear, worry, irritability, boredom, stigma, economic restraints, unmotivated and stressed about their studies, performance, loved ones, current and future economic and

social status (Keasberry, et al., 2020). Others also note that they are experiencing loneliness due to social isolation measures. Mental health illness is a serious issue that has been found to negatively affect students' academic performance. COVID-19 has highlighted this challenge showing that college students' performances are likely to suffer as a result. It is important that universities and colleges understand this challenge of mental health, its risk factors and possible effective interventions to ensure that they can educate their students and relevant stakeholders as well as take the necessary measures to create a healthy and safe environment (Dennon, 2020). This paper explored the challenge of mental health disorders experienced by college students as a result of the COVID 19 pandemic and the importance of creating awareness to mitigate the risks of these stressor.

The Challenge of COVID-19 Pandemic

Even before the COVID-19 pandemic took over the world, college students were already battling psychological challenges due to their experiences in school as well as other risk factors such as age and socioeconomic status (Mekonen, Workneh, Ali, & Muluneh, 2021). College students from the UK, US and other developed countries have been reported to struggle with depression, anxiety, stress and even suicide due to the increasing workload, financial stress and in some cases isolation and loneliness once they begin their college careers (Ghazawy, et al., 2020). In most cases, the college experience is a strange and unique experience and students struggle with adjusting to new environments, figuring out who they are, understanding their direction in school and future careers, struggling with classes and new independence as well as financial constraints. Therefore, the beginning of the pandemic has exacerbated the situation and worsened mental health conditions of many college students around the world (Oleniaczhttps, 2021).

Several studies conducted in 2020 published results showing how a majority of college students were experiencing mental health issues due to the COVID-19 pandemic, new routines and environments (Keasberry, et al., 2020). One of the factors that increased stress and anxiety were fear for their loved ones' and their own health and lives. Medical reports indicated that there were some members of society who are more vulnerable to the pandemic. These included; the elderly and those with underlying medical conditions. Therefore, college students found themselves worrying about their grandparents, family friends and relatives who had conditions that increased their vulnerabilities such as pregnancy and diabetes (Gupta, 2021). Some of the students also had parents or relatives working in vulnerable occupations such as health workers and therefore experienced anxiety and stress at the increased risks experienced by loved ones. Other students were also worried about their own health and their risk of contracting the disease (Wenjun, et al., 2020).

Secondly, college students have been experiencing mental stress due to lack of concentration in their academic studies. Most students have had to study from home virtually since the break out of the pandemic and closure of schools (Lai, et al., 2020). Even while other colleges opened temporarily, most of them closed again or

remain closed after the third wave of the pandemic was reported to be more aggressive. Most students noted that the home environment has not been a conducive environment for studying to high levels of distraction from technological devices, house chores and other family members who were also home due the social distancing restrictions (Anderson, 2020). Students were contending with the challenge of ensuring a high academic performance in an environment that is unstable and disruptive. Technological distractions comes from social media, TV and media devices and video games. Students also found it hard to concentrate on virtual classes due to those distractions and copious amount of time spent on computer screens. The monotony of everyday life in the home also made it difficult to concentrate on online learning (Browning, et al., 2021).

College students are also experiencing disruption of sleeping and eating patterns due to inability to maintain a consistent sleep and eating routine. Most of these students report going to sleep later and waking up later than before. Many others reported that their sleep quality has been compromised (Keasberry, et al., 2020). When it comes to diets, some students reported increasing the meals taken including more snacks while other students reported skipping meals leading to poor nutrition. Moreover, with the shutting down of many businesses, it has been difficult for many of them to access healthy meal options. Other individuals were also caught emotionally eating due to boredom and stress (Ghazawy, et al., 2020). Furthermore, the lack of access to physical activity was further damaging their health, consequently having negative effects on their mental health (Oleniaczhttps, 2021).

For the first time in history, college students had to contend with the challenge of social isolation and inability to participate in the usual social activities within college like they were used to (Oleniaczhttps, 2021). Most individuals going into college were usually excited about the social life experience of college life. However, the pandemic shifted and changed expectations of many college students. Many of them have been isolated from their friends for months and the toll of this isolation was negatively impacting their mental health. They were unable to have face to face interactions with their friends, go to parties, participate in sporting events or even engage in physical activities such as running and jogging (Mekonen, Workneh, Ali, & Muluneh, 2021). The condition has been exacerbated by their loss of independence since most of them have had to move back home. When in the college campus, students were usually used to having their freedom and independence. However, living back home means that they were answerable to their parents or guardians (Browning, et al., 2021). The change of primary living environment has also increased their levels of stress, depression and anxiety.

Research conducted showed that a majority of students have increased worry about their academic performance. Many of them have found it challenging to transition from traditional classes to online classrooms where they cannot physically engage with their instructors or fellow classmates (Son, Hegde, Smith, Wang, & Sasangohar, 2020).

Online classrooms posed unique challenges such as internet or Wifi challenges, lower quality of syllabus and inability to engage with others. Some of these challenges have forced students to feel unmotivated or even procrastinate on their daily school assignments. Other students with classes that required practical participation in projects were unsure how those classes would be completed and therefore experienced anxiety (Ghazawy, et al.,2020). Furthermore, the COVID-19 pandemic seems to have delayed graduations, internships and even career searches for many of the students. Therefore, some of them feel stress stemming from the uncertainty and increasing financial burden from late graduation and limited job opportunities (Browning, et al., 2021). Also, some of their parents have been laid off or received pay-cuts and the students are feeling the financial burden of their parents.

College students are said to be driven by a sense of possibility in life, therefore the pandemic creating uncertainty in their lives, overhauls their sense of purpose and drive in life. The stressors developed by the pandemic such as financial constraints, depression, anxiety, fear, loneliness and isolation have made college students lose hope while they question whether normalcy will return to their lives (Browning, et al., 2021). In 2020, students in the United States were under extreme stress worrying about climate change, election, pandemic and pending economic recession that would deter their future financial prospects and delay their careers or employment opportunities (Anderson, 2020). The situation was made worse by the fact that they had to struggle with these thoughts on their own while isolated. Furthermore, the internet and social media did not help the situation with the spread of propaganda and fear mongering by some media networks and individuals. Consequently, some students chose to withdraw further from their social circles, further worsening their mental health status (Keasberry, et al., 2020).

Many students are facing the risk of financial uncertainty. Minority students and students from low socioeconomic backgrounds who depend on aid from the government or other third parties as well as international students are experiencing increased risks due to the pandemic (Wenjun, et al., 2020). Financial uncertainty increases mental health challenges as the pandemic rails on. Many students have parents who have lost their income or had it reduced and are therefore struggling to take care of their basic needs as well as worry about their tuition fees. Since the pandemic negatively affected the retail and hospitality industry the most, it has been difficult for these students to secure part-time jobs to help at home. Students who had previously been able to secure work in their college campuses are also struggling to make ends meet as they lost their source of income (Son et al., 2020). Students from low socioeconomic backgrounds are unfairly disadvantaged because they are unable to secure the most efficient technological devices and faster wifi to enable them to quickly access their classes online or stream them. Some of them have had to lose exams and other important opportunities hence negatively affecting their academic performance and future prospects (Salimi et al., 2021).

International students tend to face mental health challenges due to the issues they encounter while studying in foreign countries. However, the pandemic has worsened their challenges as well. A study was conducted to check the mental health of international college students during the pandemic (Lai, et al., 2020). The study found out that at least 80% of these students were experiencing moderate to high level of stress (Son et al., 2020). Those who stayed in the foreign country expressed high levels of stress due to isolation and lack of support than those who returned to their countries. Female international students were also found to be more stressed than their male counterparts because of lower levels of resilience and higher rates of worry over the academic work. In this particular study, the researchers found that positive thinking and resilience were two factors that lowered the risk of the negative psychological impact of COVID-19 (Oleniaczhttps, 2021). Some of the unique challenges that these students faced included inability to acquire tickets back to their home country at affordable prices, travel risks and strict guidelines as well as the difficult quarantine process once they arrived home. Those staying in the foreign countries had to find ways of getting employment to help with living expenses which was a daunting process as the economy goes through a recession (Lai, et al., 2020). There were also differences between returnees and those who stayed with the latter experiencing higher levels of stress. This meant that the lack of social support from loved ones worsened the situation for those students who chose to stay in their institutional country (Browning, et al., 2021).

Research studies conducted in the United States showed that the levels of stress, anxiety, worry and depression differ from one ethnicity to another with Asians experiencing the highest rates of mental health disorders (Dennon, 2020). Findings from these studies showed that Asians have experienced online bullying during the pandemic due to the fact the virus originated from China (Keasberry, et al., 2020). Asian college students were not only at the receiving end of ignorant remarks by other students but were also unlikely to seek help from mental health professionals. Their inability to defend themselves has continued to increase the level of discrimination against different Asian ethnicities in the US and across other countries (Lai, et al., 2020).

Risk Factors for Development of Mental Health Disorders

A study was conducted across seven universities in the United States and showed that there were risk factors that increased the likelihood of development of mental health issues from the COVID-19 pandemic amongst the students (Browning, et al., 2021). These risk factors included age, gender, time spent on screen or online, academic status, socioeconomic status and academic level. The study showed that women were more likely to be negatively impacted by the pandemic than men (Gupta, 2021). Those younger in the academic level, Asian students, those from low socioeconomic backgrounds as well as students who spent a lot of time on their screens were more likely to develop worry, fears, stress, anxiety and depression. Younger students falling in the age bracket of

18-24 years were more likely to experience these negative emotions and hence young, female students who were also Asian were more predisposed to experiencing poor mental health from the pandemic (Browning, et al., 2021). Furthermore, those from a poor socioeconomic background who spent an average of 8 hours a day online also were at a higher risk of a negative psychological impact. Researchers of this study concluded that the findings could inform education or strategies for education or interventions that addressed mental health issues of college students at universities (Anderson, 2020).

A CDC report published in 2020 stated that the rates of suicide ideation amongst students between the ages of 18-24 has increased tremendously (Ghazawy, et al., 2020). Twenty five percent of those interviewed stated that they had considered suicide at least once in the last month. These statistics were alarming and frightening for stakeholders involved including parents and college administrators. Aside from the fact that mental health issues were rising amongst this demographic (Lai, et al., 2020). Most students reported that the pandemic has decreased access to mental health care from professionals. Due to restrictions on physical interactions, most mental health care professionals have taken their practice on the virtual platform also making it difficult to provide adequate and appropriate interventions that would enhance their health and well-being (Salimi et al., 2021). Mental health advocacy groups have also stated that the pandemic has made it increasingly difficult to access students and provide the right materials and provide the needed support.

The Challenge of Access to Mental Health

Another big challenge in colleges is that most of these institutions of higher learning are ill-equipped to handle this mental health crisis that is developing and increasing (Wenjun, et al., 2020). Universities and colleges around the world have not built the right structures to be able to adequately support students undergoing a mental health crisis. As the demand rises, many of these institutions might be facing challenges of being understaffed and long waiting times causing some of them to go without accessing the help they need (Son et al., 2020). The pandemic has created a problem which might have detrimental future effects. Therefore, colleges will need to increase allocation of resources to mental health departments and start providing help virtually while they prepare to open schools once the pandemic is over (Anderson, 2020).

The demand for mental health care has helped reduce the stigma that surrounds it amongst college students. However, it seems that most students seeking help during the pandemic for their anxiety and depression are choosing to ignore their need for help since their universities are not well-equipped to handle their challenges in large numbers (Keasberry, et al., 2020). Most of these counselling centers are also struggling with issues such as licenses to be able to provide virtual mental healthcare in the form of telepsychiatry or teletherapy especially across state lines. Counselors need to have the appropriate licenses and adhere to specific state regulations when providing mental health care to patients in different states. As students are currently at home,

these regulations need to be met before mental health care can be provided virtually (Gupta, 2021). In some states, the regulations were relaxed to accommodate the current situation. However, not all states have followed suit. However, since colleges are also experiencing economic challenges, their mental health clinics are struggling with small budgets which mean that they lack adequate resources and staff to fully help students struggling with mental health challenges (Lai, et al., 2020). Additionally, with our traditional physical therapy, there were gatekeepers that aided with helping students get to the school counselor's office but these gatekeepers lack the virtual platform and therefore there is another challenge that presents itself. Many counselors are worried that students might lack the initiative to individually seek help without being nudged by others such as friends or their professors (Oleniaczhttps, 2021).

Solutions

1. Mental Health Awareness

There is need for mental health education amongst educators and students to help mitigate the risks of the psychological burden of the pandemic that students are currently facing. Creating awareness through different strategies will help build resilience and help students be able to self-protect as well as help others safely transition during this difficult time (Mekonen et al., 2021). A mental health awareness campaign will therefore help empower students and educators with skills to cope. Researchers and other experts state that campaigns need to be holistic and inclusive of the relevant stakeholders to ensure that it is effective (Gupta, 2021). Due to social restrictions, such potential campaigns need to be conducted online and cover several areas such as family relationships, self, use of technology, physical and mental exercise as well as management of mental health disorders such as depression, anxiety and suicide ideation (Browning, et al., 2021).

The first aspect that awareness needs to cover is self-management during the pandemic. Some of the coping mechanisms that students are currently using are not only ineffective but damaging (Lai, et al., 2020). Reports have shown that students are using food, alcohol, drugs, social media, sex, sleep and sometimes even ignoring the news as a way to cope with the chaos surrounding their lives. All these mechanisms are not well-suited to addressing the challenge of COVID-19 pandemic and serves to delay the problem rather that solve it. Therefore, through teletherapy and a mental health campaign, students need to be educated to use healthy techniques such as speaking to a mental health professional, speaking to loved ones, exercise, yoga, meditation and breathing exercises (Ghazawy, et al., 2020). Additionally, employing spirituality and religion as well as a healthy routine in their everyday lives will help with self-management. Other activities that are healthy would include reading, drawing, playing with pets, and journaling (Mekonen et al., 2021).

In the Chinese school context, more awareness is needed to promote mental health recognition to facilitate not only the identification of these challenges but also help with training teachers and other faculty

members to empower them with the right tools to curb this challenge (Li, et al., 2021). Mental health awareness training is beneficial for students, teachers and even parents. Students also need to be empowered with knowledge and skills such as coping and mindfulness strategies. These skills will be able to give the students a sense of control over their lives and hence limit their development of depression and anxiety during crises like pandemic (Xiong, et al., 2021). Lastly, students also need to be informed to help them identify fake and real news on social media and therefore control what they read and what influences them.

2. Promoting Online Communication

Both international and domestic students need social support during the pandemic. Social support from friends, loved ones and family is important in helping build resilience amongst college students (Anderson, 2020). Continuous communication with family members and other loved ones helps with management of anxiety, depression and stress as it helps with providing assurance and reinforcing love and care. Asian students who are more likely to experience these challenges can benefit from support from their families to fight against discrimination and stigma during the pandemic (Lai, et al., 2020). Students are now living in close quarters with their families and therefore family functioning is imperative in the process of building resilience. Furthermore, support from a mental health professional through teletherapy is also helpful in helping students build their resilience (Dennon, 2020).

3. Virtual Mental Health Care

Additionally, barriers to seeking mental health care virtually from universities or third party counselors need to be eliminated (Oleniacz, 2021). There are students who feel less inclined to seek help virtually and there are also barriers of limited resources to cater to the rising demand (Browning, et al., 2021). Governments and interest groups need to provide financial support to mental health care clinics within schools to ensure that they can dispense the needed care to their students. Education and awareness in this area is important to help students realize the importance of mental health and get comfortable with speaking to unfamiliar but professional people online. Institutions need to continue advocating for teletherapy services for their students. Effective transfers to local mental health care providers can be facilitated by counselors from school clinics to ensure continuity of care and that students are still receiving care from trusted professionals (Lai, et al., 2020).

4. Management of Spread of Propaganda and Misinformation

Governments also need to control propaganda and misinformation concerning reports on the virus and the discrimination and hate that is perpetuated towards Asian people across the globe. The wrong information shared across social media and other platforms lead to distress and anguish further damaging students' mental health conditions (Browning, et al., 2021). Furthermore, international students in foreign countries rely on factual information to learn about the health and well-being of their family and loved ones back home. There

needs to be cooperation between governments, institutions and the media to foster accurate dissemination of information that is clear and easy to understand (Oleniacz, 2021).

5. Fostering Parental Care at Home

Parents and educators also need to pay close attention to college students during personal interactions. They can learn ways to identify changes in moods, behavior and attitudes to see how detrimental these mental health disorders are in their lives (Lai et al. 2020). College students who suddenly shift from conducting their normal routines, change their behavior and moods or alienate themselves from family and friends need to be paid attention to ensure that depression is not leading to suicide ideation or worse, causes suicide. Educators and parents need to be at the forefront of ensuring students have access to mental health care resources they need and that they are also able to build healthy social connections online to help with their new environments and guard against loneliness and depression (Gupta, 2021). Despite social guidelines that limit physical connections, researchers opine that social connections are instrumental to people's mental health and well-being and therefore students need to be educated and encouraged to turn away from screens and build these connections at home and hence they can build social support that helps them even after the pandemic is over.

Conclusion

This article explores the challenge of mental health amongst college students during the COVID-19 pandemic and solutions that need to be advocated for to ensure students' health and well-being being maintained. Through the analysis of several studies conducted in 2020, it was found out that there are risk factors that increase the susceptibility to mental health challenges for students. They include; gender, race and ethnicity, time spent on social media, socioeconomic backgrounds and presence of social support. The pandemic has been found to increase stressors such as economic constraints, loneliness and isolation consequently leading to mental health disorders such as depression, anxiety and suicide ideation. International students and female Asians students were found to bear the worst brunt of the psychological burden that is not being effectively handled by universities and colleges around the world. The paper suggests the promotion of awareness to ensure that students and educators are well equipped. Students need to have the proper tools and knowledge to self-manage their emotional and psychological health as well as build resilience. Institutions also need the right resources to be able to help their students and meet the rising demand for mental health care. Educators have a significant role to play to ensure that they manage mental health risks and meet the needs of their students.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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References

Anderson, G. (2020, September 11). *Mental Health Needs Rise With Pandemic*. Retrieved from Inside Higher Ed: https://www.insidehighered.com/news/2020/09/11/students-great-need-mental-health-support-during-pandemic

Browning, M. H., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., . . . Helbich, M. (2021). *Psychological impacts from COVID-19 among university* students: Risk factors across seven states in the United States. PLOS ONE.

Dennon, A. (2020, November). *Update on the College Student Mental Health Crisis.* Retrieved from Best Colleges: https://www.bestcolleges.com/blog/mental-health-in-college-students-during-covid-19-mental-health-crisis

Ghazawy, E. R., Ewis, A. A., Mahfouz, E. M., Khalil, D. M., Arafa, A., Mohammed, Z., . . . Mohammed, A. E.-N. (2020). Psychological impacts of COVID-19 pandemic on the university students in Egypt. *Health Promotion International, 1*-10.

Gupta, S. (2021, January 22). *The COVID-19 pandemic made U.S. college students' mental* health even worse. Retrieved from Science News:

https://www.sciencenews.org/article/covid-19-coronavirus-pandemic-us-college-students-mental-health

Keasberry, C., Ha, P. L., Hoon, C., Alam, M., Alas, Y., & Noorashid, N. (2020, December 5). *Facing the mental health challenges of COVID-19 in HE.* University World News.

Lai, A. Y.-k., Lee, L., Wang, M.-p., Feng, Y., Lai, T. T.-k., Ho, L.-m., . . . Lam, T.-h. (2020). Pandemic on International University Students, Related Stressors, and Coping Strategies. Frontiers in Psychology.

Li, Y., Zhao, J., Ma, Z., McReynolds, L. S., Lin, D., Chen, Z., . . . Liu, X. (2021). Mental Health Among College Students During the COVID-19 Pandemic in China: A 2-Wave Longitudinal Survey. *Journal of Affective Disorders, 15*, 281:597-604.

Mekonen, E. G., Workneh, B. S., Ali, M. S., & Muluneh, N. Y. (2021). The Psychological Impact of COVID-19 Pandemic on Graduating Class Students at the University of

Gondar, Northwest Ethiopia. *Psychology Research and Behavior Management , 14*, 109—122.

Oleniacz, L. (2021, January 12). *Study Finds Risk Factors Linked to COVID-19 Mental Health Impacts for College Students. Retrieved from NC State University*: https://news.ncsu.edu/2021/01/study-finds-risk-factors-linked-to-covid-19-mental-health-impacts-for-college-students/

Salimi, N., Gere, B., Talley, W., & Irioogbe, B. (2021). College Students Mental Health Challenges: Concerns and Considerations in the COVID-19 Pandemic. *Journal of College Student Psychotherapy* .

Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study. *Journal of Medical Internet Research, 22*(9).

Wenjun, C., Fang, Z., Hou, G., Mei, H., Xinrong, X., Jiaxin, D., & Zheng, J. (2020). *The psychological impact of the COVID-19 epidemic on college students in China*. Psychiatry Res, 287: 112934, 05.

Xiong, P., Ming, W.-k., Zhang, C., Bai, J., Luo, C., Cao, W., . . . Tao, Q. (2021). *Factors Influencing Mental Health Among Chinese Medical and Non-medical Students in the Early Stage of the COVID-19 Pandemic*. Frontiers in Public Health.

Factors Affecting the E-payment Adoption on E-commerce Platform System in Thailand

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ABTRACT

This research aimed to study factors affecting the adoption of E-commerce Platform System (EPS) in Thailand. Literature review on the topic revealed that the significant factors affecting the adoption of E-commerce Platform were perceived of risk, perceived trust, perceived of usefulness, and perceived ease of use. The researcher used the four factors to design a research tool for this study. The data were collected from 396 respondents. The result of the data analysis showed that only perceived of usefulness and perceived risk were significant factors affecting the adoption of EPS. All four variables, perceived of risk, perceived trust, perceived of usefulness, perceived ease of use, could altogether explain around 72.9% (R^2 = 0.729) the adoption of EPS. The customers tended to emphasize the benefit, or usefulness that they would receive from EPS usage. The research findings provided more information regarding the factors affecting the adoption of EPS in Thailand.

Key words: Adoption to use EPS, perceived of risk, perceived trust, perceived of usefulness, perceived ease of use

Introduction

The payment through electronic transaction is well adopted these days in doing financial activities. Electronic payment system (EPS) requires the sender and receiver of the transaction to proceed with the transaction using a system utilized by a bank, financial service provider. According to the Global Digital Report 2019, Thailand had around 92 million mobile subscribers and 55 million active mobile internet users. The Bank of Thailand reported in 2019 that over 90%

of transactions in Thailand use E-payment including e-commerce transaction. However, JP Morgan report (2019) showed that even if the EPS has been mainly used, cash is still being used in payment channels for E-commerce platform or Cash on Delivery channels. It reaches to a question that how people are affected by EPS. The researcher, therefore, is interested to find out the factors affecting the buyers from adopting electronic payment system. Thailand's e-commerce market is expected to grow by 13% in the next 4 years. And it is indicated that in 2020 at least 44% of Thailand's population have purchased products via online channels. From the literature review, it was found that the main factors that affect the adoption are perceived risk to use EPS, perceived trust to use EPS, and perceived usefulness of EPS, which the researcher aimed to find how these factors affect the intention to use EPS on e-commerce platform.

Research Objectives

1.To study the E-payment adoption on E-commerce Platform in Thailand

2. To study the factors affecting E-payment adoption on E-commerce Platform in Thailand

Scope of research

The target group of this research focused on the users who have been using mobile phones for online activities, living in Thailand, both male and female, and have an experience using EPS. The target group were chosen by using a random sampling technique which prevent target groups from defined membership requirements. The researcher used online-distributed questionnaire and surveys to collect data in Thailand.

Literature review

Electronic Payment System (EPS)

E-payment is linked between individual and cooperation, supports electronic transaction between bank and individual (Briggs and Brooks, 2011; Tan, 2004). Ogedebe and Jacob (2012) stated that electronic payment system is a platform of currency transfer using the internet. EPS also plays an important part in e-commerce as a payment platform when purchasing and selling the products or service on the internet. E-payment system in the research is related to its adoption.

Technology Acceptance Model (TAM)

TAM is used for modeling the user's adoption of technologies. TAM model has 2 main factors, perceived ease of use and perceived usefulness, Figure 1. TAM (1989) mentioned external variables that had an impact on the belief of user towards

the system. Social norm had weak relationship and no impact on user's behavior intention especially when the system is individual usage. TAM is specifically used for examining the factors of user's adoption on technology and system (Chau and Hu, 2002).

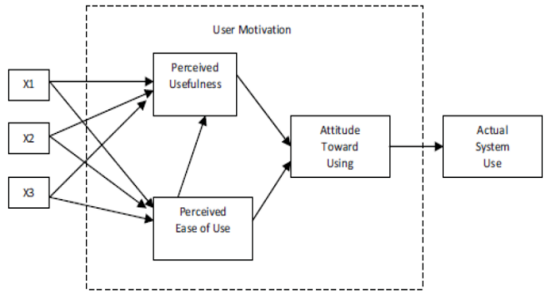

Figure 1 Technology Acceptance Model (Davis, 1986)

E-payment Adoption

E-payment adoption is defined as customer intention to use the electronic payment system (Fusilier et al., 2005). Intention to use e-payment system is stimulated by the simplicity of usage and low on transaction cost when compared with traditional cash transactions and secure to use in terms of privacy of user on e-commerce platform (Senthilvelmurgan M, 2015).

Perceived Ease of Use

Pikkarainen et al. (2004) stated that the website's interface, graphics, and use of proper images provide easy navigation for users of the bank's website. Abrazhevich (2004) indicated that capable design of the specific system in terms of user standpoint significantly attracts user's adoption of e-payment system. Previous studies found that technology would be perceived as valuable when it is simple to use and easy to deal with (Legris et al, 2003; Wang and Li, 2012). Guangying Hua (2009) indicated perceived ease of use as action that proceeded effortlessly. When the platform of e-payment system is easy to use, timeless, convenient to use, a customer tends to be prepared to adopt e-payment system. Guangying research (2009) concluded that perceived ease of use has a considerable influence on user adoption of online banking or EPS.

Perceived Risk

Perceived risk is defined as the feeling of uncertainty on something or awareness of the result from a situation that one couldn't control (Noor and Eaw, 2013). Perceived risk is created with uncertainty and increased by awareness of uncontrollable result (Schrank and Dubinsky, 2004). As the e-payment system had been determined as high perceived risk, it will result in decrease customer's intention to use the particular system. Perceived risk has a relationship with customer's adoption to use EPS (P. Pavlou, 2003). Pavlov (2003) stated that as online transaction has high vulnerability, it will raise the perceived

risk and decrease the customer's intention to proceed.

Perceived Usefulness

Consumers tend to create a positive perception of a new technology when they believe it will improve their occupational performance. Perceived usefulness has an impact on the perception of using a specific system because consumers tend to create a positive perception of a new technology when they believe it will improve their occupational performance (Davis, 1989). The perceived usefulness of e-payment system is stated as a transaction experience that resulted in saving time, received financial benefit from usage (Yanli Pei et al., 2015). Ming-Chi Lee (2008) found that perceived usefulness had significant relationship with internet banking's adoption. Usefulness is an important factor for e-payment system usage and adoption (Chou et al, 2004). Kim et al (2010) found that e-payment adoption could mean additional cost in terms of investing in learning time to use the new technology and e-payment system.

Perceived Trust

Trust is defined as a set of beliefs that customers have on a supplier including possible action of supplier in the future (Ganesan, 1994). Trust is defined as the personal belief in e-payment system that it will result in meeting the customer's expectations and ability to gain benefit from the customer's intention to use e-payment system for their financial activities (Ali Abdallah Alalwan et al., 2017). Many researches found that perceived trust has significant relationship with customer's adoption of e-payment system (Mehrad and Mohammadi, 2017). However, Said A. Salloum et al. (2019) stated that trust has no significant relationship with the sample's intention to use EPS. Gefen (2000) and Wang et al. (2003) indicated that trust has significant effect on consumer's intention to adopt internet banking and encourages them to proceed with e-commerce transaction. Perceived trust in e-payment is identified as the belief of the user that the transaction will proceed according to their expectation (Tsiakis and Sthephanides, 2005). Trust increases the perception concerning expectation on the EPS and reduces uncertain emotions when the process relates to the risk (Kim et al, 2009).

Research Framework

Based on literature review, the researcher decided to focus on 4 factors: perceived of risk, perceived trust, perceived of usefulness, and perceived ease of use, that

has significant trigger on adoption to use EPS which showed in to model as figure 2.

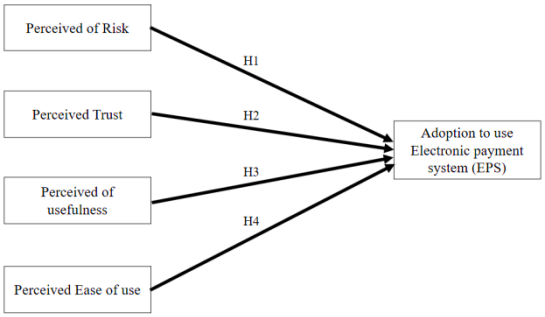

Figure 2 Research Conceptual Framework

Research Hypothesis

Based on the conceptual framework, the researcher utilized four variables and formulated four hypotheses in this research.

H1: Perceived risk has significantly affected adoption to use EPS

H2: Perceived trust has significantly affected adoption to use EPS

H3: Perceived usefulness has significantly affected adoption to use EPS

H4: Perceived ease of use has significantly affected adoption to use EPS

Research Methodology

The study focused on users who have used an E-commerce platform service and made an EPS payment.

The data from the questionnaires is analyzed using a quantitative methodology in this study. The total number of questionnaires gathered was 396 samples. The researcher selects Cochran's Sample Size Equation for this research due to the unknown population size or EPS user in e-commerce platform, even the bank of Thailand stated that there are around 1.6 million transactions via EPS but it is uncertain for the specific amount of target population, unknown population. To collect data from sample population, the research was conducted by randomly distributing the questionnaires via online form, google form. The researcher collected data in Mid-2021 covering around 1.5 months. As a result, the questionnaires were distributed to Thai respondents who were able to access and complete the survey.

This research has use statistical tools to process the data from the samples so that the primary data that the researcher received will be processed appropriately and accurately. The statistic to be used were descriptive analysis, and regression analysis.

Pretesting Questionnaire

The questions had been tested by using Cronbach's alpha and pre-test was conducted on 40 samples to find the alpha value, if the result of test is above or equal 0.6 it means it can be used in the questionnaire. For the result, Cronbach's Alpha shows these are acceptable with the

result being more than 0.60 which means all questions are consistent and therefore can be applied as the research instrument, the detail is shown in Table 1.

Table 1 The value of reliability analysis

Variables	Number of Items	Cronbach's Alpha	Reliability
Perceived Risk	6	0.83	Good
Perceived Trust	6	0.92	Excellent
Perceived of Usefulness	6	0.94	Excellent
Perceived ease of use	4	0.706	Acceptable
Adoption to use EPS	6	0.96	Excellent

Results of the Study

There were 396 respondents could be used or answer to the research scope. The demographic questions include gender, age, level of education, Monthly income, and frequency of EPS usage in order to show characteristic of research's sample and general information of samples and variable's question which will show statistics factor like mean, standard deviation, variance, and criteria that most of samples had responded to or what they have perceived of each variable.

Demographic

The sample of the research is comprised mainly of female at 220 samples (55.56%). The majority of the samples' age range is between 21 – 30 years-old, 270 samples or 68.18% out of total respondents. For Level of education, around 77.27% of respondents have a Bachelor's Degree. For monthly income, it is found that the greatest number of respondents is 168 samples receives a monthly income at range 15,000 - 30,000 THB, or 42.41% of total respondents, and the second group with 147 samples receives a monthly income of over 50,000 THB, or 37.14% of total respondents. Moreover, the greatest number of samples who have a behavior to use EPS at a frequency of 2 – 3 times a week is around 36.86% (146 samples).

The descriptive analysis of research variable showed that most variables are interpreted as "Agree" with maximum score of perceived usefulness at 4.22 and minimum score from perceived ease of use at 3.48, interpreted as "Neutral". For other variables, Adoption to use EPS, perceived risk, and perceived trust are having scores of 4.15, 3.77, and 3.71 respectively. (Table 2)

Table 2 Descriptive analysis of research variables

Variables	N	Mean	Std.Dev.	Interpretation
Adoption to use EPS	396	4.151	0.626	Agree
Perceived Ease of Use	396	3.487	0.656	Neutral
Perceived of Usefulness	396	4.224	0.640	Agree
Perceived Risk	396	3.737	0.462	Agree

Perceived Trust	396	3.719	0.633	Agree

Hypothesis testing

The researcher conducted regression analysis on data and found that the variable has R^2 0.729 meaning that the independent variables significantly affected the dependent variable, adoption to use EPS, and has a standard error 0.328. The adjusted R^2 is slightly less than R^2 which means the sample size of this research is adequate and acceptable. (Table 3)

Table 3 Regression analysis Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.854[a]	0.729	0.726	0.328

a. Predictors: (Constant), Perceived Risk, Perceived usefulness, Perceived ease of use, Perceived Trust

The coefficient analysis of each variable indicated that only perceived usefulness has significant level below 0.05 and has the highest coefficient value +0.788 with standard error 0.029. For the other variables, Perceived risk had significant level 0.015 and coefficient value +0.130, Perceived trust had significant level 0.254 and coefficient value +0.047. Perceived ease of use had significant level 0.514 and coefficient value -0.017. The Variance Inflation Factors (VIF) were all below 5 and all of the independent variables were not highly correlated with one another, indicating that there were no issues with multicollinearity. (Table 4)

Table 4 Analysis of Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.221	0.177		1.246	0.214		
	Perceived Risk	0.130	0.053	0.096	2.437	0.015	0.449	2.227
	Perceived Trust	0.047	0.041	0.048	1.142	0.254	0.396	2.527
	Perceived of Usefulness	0.788	0.029	0.806	27.420	0.000	0.804	1.244
	Perceived ease of use	-0.017	0.026	-0.018	-0.654	0.514	0.923	1.083

a. Dependent Variable: Adoption to use Electronic Payment System (EPS)

The hypothesis was tested by the results of the multiple linear regression analysis. The hypothesis testing indicated that hypotheses 1 and 3 were rejected and hypotheses 2 and 4 failed to reject. The hypothesis 1 was rejected with significant

value 0.015 which below is 0.05 at confidence level 95%. The hypothesis 2 failed to reject due to its significant value of 0.254 which is higher than 0.05 at confidence level 95%. The hypothesis 3 was rejected with significant value 0.000 which is below 0.05 at confidence level 95%. The hypothesis 4 failed to reject due to its significant value of 0.514 which is higher than 0.05 at confidence level 95%. However, to verify the result of first regression analysis, the researcher analyzed the result again (second analysis) by eliminating the variables that the hypothesis failed to reject. The result of second analysis shows that perceived risk and perceived usefulness affect the adoption to use EPS at R^2 0.727 and less error with adjusted R^2 0.726. The coefficient value of perceive risk and usefulness are +0.167 and +0.803 respectively in the second analysis, which higher than the first analysis. (Table 5 and 6). In summary, the second model which has perceived risk and perceived usefulness as independent variables have significantly affected adoption to use electronic payment system and has a better result in significant value, the unstandardized coefficient Beta, and collinearity statistics value when analyzed the second time.

Table 5 Regression analysis Summary (2nd)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.853[a]	0.727	0.726	0.328

a. Predictors: (Constant), Perceived of usefulness, Perceived Risk

Table 6 Analysis of Coefficients[a] (2nd)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.135	0.159		0.852	0.395		
	Perceived Risk	0.167	0.036	0.123	4.604	0.000	0.965	1.036
	Perceived of usefulness	0.803	0.026	0.821	30.635	0.000	0.965	1.036

a. Dependent Variable: Adoption to use EPS

Discussion and Conclusion

The result of this research showed that perceived usefulness and perceived risk affected adoption to use EPS. Perceived trust and perceived ease of use were found not significantly affected the adoption to use EPS with enough confidence level. The result that perceived risk affected adoption to use EPS was aligned with the study of P. Pavlou (2003). It was also consistent with the findings of Tsiakis and Sthephanide (2005) in that risk was one of the factors affecting the intention to use electronic payment system. The effect of perceived risk in this research had the

same level as that of Said A. Salloum et al. (2019) indicating that perceived risk has a weak relationship to adoption to use EPS.

Hypothesis 2 failed to reject, so Perceived trust did not significantly affect adoption to use EPS. The significant value of the data showed above confidence level that this research had limits. The result confirmed the study of Said A. Salloum et al. (2019), which stated that trust had no significant relationship to intention to use EPS. Mayer et al. (1995) also indicated that perceived trust had shown different results in many researches. Moreover, the result of perceived trust was found not significantly affected the adoption of EPS, even though it had a high measure of correlation and mean.

Although usefulness was the significant factor that affected adoption to use EPS with high coefficient, +0.788, and significant value at 0.00, so hypothesis 3 was rejected. According to research of Said A. Salloum et al. (2019) in literature review, perceived usefulness had the most significant effect on intention to adopt EPS. The result, however, aligned with the research of Chou et al (2004) that perceived usefulness was a significant factor that affected use of EPS and the EPS adoption. The researcher found that Thailand's population who use EPS on e-commerce platform, tend to focus on the perceived usefulness the most significant factor affecting the adoption to use EPS which has been proven by many researches in the literature review and statistics tools.

The hypothesis 4 failed to reject, so perceived ease of use has not significantly affected adoption to use EPS. The coefficient of perceived ease of use to adoption to use EPS showed a very weak relationship. Gefen and Straub (2000) showed that perceived ease of use was not affecting the adoption of IT. Only when the main objective for which the IT is installed is closely connected with fundamental IT features, such as ease of use, simplicity of learning, flexibility, and clarity of its interface, can perceived ease of use have a direct impact on IT adoption. Similar to Hua (2009) who stated that perceived ease of use was less affecting to users' perceptions of internet banking. Moreover, Gürler (2016) found that perceived ease of use did not affect the adoption of mobile payment system.

After processing the results of both the first and second analysis, the researcher has configured into a model (Figure 3) and could be determined by the equation as shown below (Figure 4). The samples

benefits that they are going to receive from using EPS more than the other factors.

However, Perceived risk still affects consumer decision to the adoption of EPS usage in small factor, which is not strange for online activity since the user has no interface with the service provider, hence, the user is expected to be aware of the risk for any particular online transaction. Uncertainty generates risk, which is amplified by knowledge of an unpredictable outcome (Schrank and Dubinsky, 2004). When the customer feel that the EPS is secure or has low level of risk, they tend to adopt EPS usage.

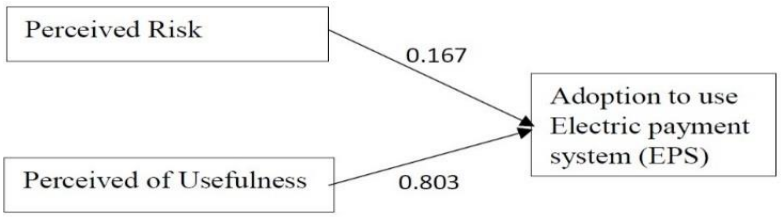

Figure 3 Research Analysis result model

Adoption to use Electric payment system equation = 0.135 + 0.167 (Perceived Risk)
+ 0.803 (Perceived of usefulness)

Figure 4 Research Equation

Recommendation

For Business, this research will help service providers to understand the factors that affect the adoption of user and how to deal with their customers. The research found that perceived usefulness of the EPS affects most the customer's decision or adoption to use EPS, followed by perceived risk, so the researcher recommends that the service provider to focus on these factors mainly on perceived risk because it has a highest coefficient. Since this research's scope is focused on the population that utilizes EPS in e-commerce platform so the result of this research will benefit the EPS provider and e-commerce Company. Hence, financial services who are going to engage in online transaction service can also gain benefit from this research. The usefulness of an e-payment system is defined as a transaction experience that saves time and money (Yanli Pei et al., 2015). So, making a faster process of online transaction, eliminating unnecessary steps, increasing customer satisfaction, and time-saving benefit for customers will increase customer usage on EPS. For perceived risk, the researcher recommends that the service provider to increase security of the EPS, reduce chance of cybercrime, and make sure that customers are aware of it. Wendy Ming-Yen et al. (2013) stated that

the more the confidence in e-payment systems, the lesser the perceived risk connected with them.

References

Ali Abdallah Alalwan, Yogesh K. Dwivedi, Nripendra P. Rana (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. Int. *J. Inf. Manage* vol. 37, 99-107.

Abrazhevich, D. (2004). Electronic Payment Systems: A User-Centered Perspective and Interaction Design. Technische Universiteit Eindhoven, Eindhoven, 24-26.

Austin Briggs, Laurence Brooks (2011). Electronic payment systems development in a developing country. *The role of institutional arrangement*s. Electron. J. Inf. Syst. Dev. Countries, 1-16.

Bank of Thailand (2019, January). Digitalization on Financial Services and

Implications for Monetary Policy in Thailand. Retrieved from https://www.bot.or.th/Thai/MonetaryPolicy/EconomicConditions/AAA/DigitalizationonFinancialServicesandMPinThailand_EN_final2.pdf

Changsu Kim et al. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic commerce research and applications*, 84-95.

Chou, Y. L. (2004). Understanding M-commerce payment systems through the analytic hierarchy process. *Journal of Business Research,* 1423–1430.

Davis, F. (1986). A technology acceptance model for empirically testing new end-user information systems: *Theory and results*. Massachusetts, United States: Massachusetts Institute of Technology.

Davis, F. D. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 982-1003.

Fusilier Marcelline (2005). An exploration of Student Internet Use in India (the technology acceptance model and the theory of planned behavior). *Journal of Marketing*, 233-246

Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationship. *Journal of Marketing*, 1-19.

Gefen, D. (2000). E-commerce: the role of familiarity and trust. Omega, 725-737.

Gürler, Ý. D. (2016). Factors Affecting the Adoption of Mobile Payment Systems: An Empirical Analysis. *Emerging Markets Journal Volume* 6 No 1.

Hua, and Guangting (2009). An Experimental Investigation of Online Banking Adoption in China. *Journal of Internet Banking and Commerce*.

JP Morgan (2019). E-commerce Payments Trends: Thailand. Retrieved from https://www.jpmorgan.com/merchant-services/insights/reports/thailand

Kim, D. F. (2009). Trust and satisfaction, two stepping stones for successful e-commerce relationships: A longitudinal exploration. *Information systems research*, 237-257.

Mayer, R. C. (1995). An integrative model of organizational trust. *Academy of Management Review*, 709-734.

Ming-Chi Lee. (2008). "Predicting behavioral intention to use online banking", Proceedings of *the 19th international conference on information management*. Taiwan.

Mohammad Auwal Kabir, Siti Zabedah Saidin and Aidi Ahmi (2017). Analysis of Factors that Influence Electronic Payment Adoption. *Journal of Engineering and Applied Sciences* 1 2, 6560-6568.

Noor Raihan Ab Hamid, Aw Yoke Cheng (2013). A Risk Perception Analysis on the use of Electronic Payment Systems by Young Adult. Retrieved from www.apu.edu.my/ E-ISSN: 2224-340226 Issue 1, volume 10, January 2013, 26-36

Patrick Y.K. Chau, Paul J. Hu (2002). Examining a model of information technology acceptance by individual professionals: An exploratory study. *Journal of Management Information Systems*, 191-229.

Pavlou, P. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 101-134.

Peter Ogedebe, B. P. (2012). E-Payment: Prospects and Challenges in Nigerian Public Sector.

Pikkarainen, T. P. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. Internet research, 224-235.

Said A. Salloum et al. (2019). An Innovative Study of E-Payment Systems Adoption in Higher Education: Theoretical Constructs and Empirical Analysis. *i JIM* – Vol. 13, No. 6, 69-83.

Schrank, H. and Dubinsky (2004). Effect of brand name on consumers' risk perceptions of online shopping. *Journal of Consumer Behaviour* 4, 40-50.

Seetharaman, D. R. (2015). E-payments problems and prospects. Retrieved from www. mmu.edu.my/%7Ebm/fbl/ ISSN: 1204-5357/2015

Tsiakis, T. S. (2005). The concept of security and trust in electronic payments. *Computers and Security*, 10-15.

Wendy Ming-Yen et al. (2013). Factors affecting consumers 'perception of electronic payment: an empirical analysis. *Internet Res.*, vol. 23, no. 4, 465–485.

Yi-Shun Wang et al. (2003). Determinants of user acceptance of Internet banking: an empirical study. *International journal of service industry management*, 501-519.

Yanli Pei, Shan Wang, Jing Fan, Min Zhang (2015). "An empirical study on the impact of perceived benefit, risk and trust on e-payment adoption: comparing quick pay and union pay in China". *Intelligent Human-Machine Systems and Cybernetics (IHMSC)*, 198-202.

Factors Affecting Work from Home Satisfaction in Bangkok, Thailand

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ABSTRACT

The aim of this study was to investigate factors affecting work from home satisfaction in Bangkok. The researchers used quantitative survey method to distribute 419 questionnaires to collect data via online surveys. After data cleaning, only 384 respondents were considered as the quality responses to use to classify the people who have experience with working from home with the company in Bangkok, Thailand. The researcher used statistic software program including descriptive statistics, Cronbach's Alpha, and Multiple Linear Regression in order to analyze data to evaluate the affecting level of variables consisting of work environment, work motivation, financial factor, physical factor, psychological factor, and technological factor on satisfaction of work from home. The results of analysis revealed that work environment, work motivation, financial factor, and psychological factor were important factors that companies need to redesign contingent of resource for maintaining the level of work from home satisfaction. All the four variables could explain around 57.0% (R^2 = 0.57) work from home satisfaction.

Keywords: work from home satisfaction, work environment, work motivation, financial factor, and psychological

Introduction

According to the current situation of the Covid-19 pandemic crisis, the number of cases each day are increasing highly. To prevent the rate of infection that could spread in the workplace is by keeping sick people away from well people. The companies, therefore, have adapted to the new normal by working from home policy rather than working at office. The motivation for Work from Home is to balance the employee's life and work performance. Avery & Baker, (2002) defined work from home on a household basis could ruin the indistinct between home and workplace. There are many determinants that will affect work from home satisfaction. Based on many research studies, they found that during the pandemic crisis, work from home decreased the number of case infections. It is helpful for employers' and employees'

safety (Engle, Stromme, & Zhou, 2020). The definition of work satisfaction is the positive emotional result from their professional experience involved with the predicate satisfaction of their work. Thus, work from home satisfaction including aspects of well-being and a positive of mental health (Int. J. Environ. Res. Public Health 2021, 18, 1903). Sousa-Poza & Sousa-Poza, 2000; Gazioglu & Tanselb, 2006; Skalli, Theodossiou, & Vasileiou, 2008 have focus on literary aspect of work from home satisfaction of working environment including work and context of physical working and social working. Spector (1997) investigated that the work environment effect on employee's performance. The working environment includes employee's safety, security of the job, and good relations with colleagues. Also realized that to emphasize the importance of employees will lead them to higher level commitment. Moreover, Lane, Esser, Holte, & Anne, 2010 identified the wage or salary Different factors within the working environment such as wages, working hours, organization structure, and communication of management to the employees are related to the work from home satisfaction. The researcher, Petterson (1998) discusses that the proper communication between employees in organization within a business is significant to accomplish the organizational goals.

Research objectives

1. To investigate of Work from Home satisfaction in Bangkok, Thailand
2. To study Factors Affecting Work from Home Satisfaction in Bangkok, Thailand

Literature Review

Work from Home Satisfaction

Herzberg et al. (1959) classified that work from home satisfaction and motivation are relevant which refer to source of satisfaction at work such as achievement, recognition, responsibility, advancement, and growth whereas differentiated with dissatisfaction of employees' attitudes of company policy and administration, supervision, salary, interpersonal relations, working conditions, status and security.

Financial factors

The empirical research of financial factors is involved with the cost side. To identify virtual work can save personal cost of living such as transportation expenses, and eating out expenses. On the other hand, the cost of living at home is increasing as a part of usage from working. Thus, financial factors are influenced by work from home satisfaction, especially the payment they get from the job are considered (Rezaei, Omidi, & Kazeroni, 2013).

Physical factors

The experience of workplace stress can have an impact on an individual's mental and physical health (Health and Safety Executive, 2001; Cooper et al., 2001). Moreover, Dewe (1991) found that physical health is linked to work from home satisfaction. In general, we can find that many occupations have high stress levels and are dissatisfied with their job. This paper of work-related stress 185 information is ranking order on identification of high and low stress of occupations in relation to work from home satisfaction.

Psychological factors

The psychological approach empowerment is relative to work from home satisfaction and result positive affective organizational commitment. Employee commitment can be identified vary from basic behavioral commitment of the employees who obey and respect the instruction of leadership in organization (Meyer and Allen, 1991; Mowday et al., 1979). In addition, Van Dick et al., 2004 indicated that work from home satisfaction is also relevant to an attitude into perspective of the job and task such as supervisor support.

Technological factors

The technological support is considered as important in virtual work. The good technical support could get rid of an uninterrupted influence to efficiently smooth exchange task-related knowledge with the co-worker and supervisors (Bosua et al., 2012; Bentley et al., 2016). An advanced technology has made effective support of telecommuters through technical tools such as Microsoft Teams, WebEx, Skype, Zoom and LogMeIn Rescue which are providing sufficient technical support leading to positive outcome of employees Baker et al., 2006; Bayrak, 2012. In an empirical analysis by Bentley et al. (2016), a negative relationship between technical support and psychological stress could impact work from home satisfaction.

Work Motivation

The Employees motivation approach can separate into intrinsic and extrinsic components. As an employee's behavior is motivated by the intrinsic rewards such as a good feeling of praise and the extrinsic rewards such as monetary bonus. Therefore, Gagne and Forest (2008) perceived that intrinsic motivation makes them find work interesting and satisfying which are differentiated from extrinsic make them work for rewards. Negash et al. (2014) believe that the work motivation of employees is strongly influenced by recognition, followed by monetary rewards such as bonus, benefits, pay and promotion.

Work Environment

The perspective of quality of the physical from the work environment including space, physical layout, noise, tools, and material are leading to work performance (Tyssen, 2005, p. 58). A work area where they can perform their ability of their activity which is bringing positive and negative outcomes. Also, Barry and Heizer (2001, p. 239) defined the working environment can affect employee security and quality which allows them to work effectively and optimally as it is relevant to their emotion of enjoying the environment of the workplace and their work performance will be high as well. Moreover, the physical environment involved with the relationship with colleagues due to the work environment is a place to perform a job Nitisemito (1992).

Research Framework

The conceptual model was come from the previous and relevant study about Factors Affecting Work from Home Satisfaction. There are six independent variables that was chose to study in this research which was work environment, work motivation, financial factors, physical factors, psychological factors, and technological factors. For dependent variable, it was Work from Home Satisfaction in Bangkok, Thailand

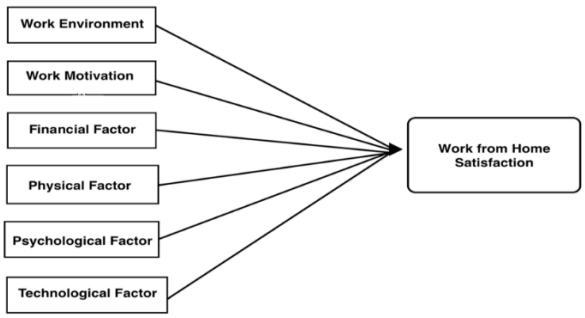


Figure 1 – The Research Conceptual Framework

Research Hypotheses

Based on the proposed conceptual framework, the researchers constructed six hypotheses to examine the Factors Affecting Work from Home Satisfaction in Bangkok, Thailand**.** The details of the hypotheses are as following:

$H1_a$: Work environment has a significant Affecting Work from Home Satisfaction in Bangkok

$H2_a$: Work motivation has a significant Affecting Work from Home Satisfaction in Bangkok

$H3_a$: Financial factors has a significant Affecting Work from Home Satisfaction in Bangkok

$H4_a$: Physical factors has a significant Affecting Work from Home Satisfaction in Bangkok

$H5_a$: Psychological factors has a significant Affecting Work from Home Satisfaction in Bangkok

$H6_a$: Technological factors has a significant Affecting Work from Home Satisfaction in Bangkok

Research Methodology

In this study, the researcher focuses on the Factors Affecting Work from Home Satisfaction in Bangkok, Thailand. Firstly, the researcher uses the quantitative method to collect primary data. The researcher distributes online survey of the questionnaire in a Google form. The research has been proceeded on employees who have experienced working from home in Bangkok, Thailand. This method is easy and jaunty to reach the respondents. Cronbach's Alpha was used to test the reliability of each variable in the research. The research used five-point Likert scale in online questionnaire, and the scale ranged from strongly disagree to strongly agree: Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree =5. Secondly, descriptive analysis was used to analyze and interpret the data of the respondents. The goal of descriptive studies is to cover all conclusions, specific events which are experienced by individuals or groups of individuals. Data which is collected for descriptive studies focuses to find out the common of the specific events under the research

Table 1: Reliability Test (Cronbach's Alpha) N=31

Variable	Cronbach's Alpha	Reliability
Work environment	0.68	Questionable
Work motivation	0.80	Good
Financial factors	0.78	Acceptable
Physical factors	0.80	Good
Psychological factors	0.79	Acceptable
Technological factors	0.70	Acceptable
Work from home Satisfaction	0.75	Acceptable

Table 1 presented the results of Cronbach's alpha for each all variables in this research. According to the rules of thumb, overall was above 0.6 which was in the level of questionable for value interpretation. So, no questions were cut off in this questionnaire.

Data Analysis and Results

A result showed that all respondents are people who has experienced on work from home and work

in Bangkok. For the age of 384 respondents. There were 251 respondents with the age between 18–28 years old (65.40%), followed by 110 respondents (28.60%) with the age of 29-38 years old, 17 respondents (4.40%) with the age 39–59 years old. The lowest proportion with the age 60 years old or older was 6 respondents (1.60%). Second, the gender from a total of 384 respondents, the majority of respondents were female by 219 respondents (57%)**,** and male were 165 respondents (43%)**.** Third, the nationality 384 respondents. For Thai were a majority of 383 respondents (99.70%), and other which is 1 person of American by 0.30%. Fourth, the status of 384 respondents. For a single status were 319 respondents (83.10%), followed by Married status were 60 respondents (15.60%), and divorced were 5 respondents (1.30%). Fifth, the education of 384 respondents. The graduated with Bachelor's Degree were 272 respondents (70.80%), followed by Master Degree were 73 respondents (19.00%), under Bachelor's Degree were 32 respondents (8.30%), and Doctoral Degree were 7 respondents (1.80%. Sixth, the occupation of 384 respondents. The employees were 191 respondents (49.70%), followed by the state employee were 93 respondents (24.20%), the business man were 86 respondents (22.40%), and other were 14 respondents (3.60%) who perform other jobs which was not in the questionnaire. Next, a frequency of work from home of 384 respondents. Work from home 5–6 days were 140 respondents (36.50%), followed by 3–4 days were 134 respondents (34.90%), 1–2 days were 66 respondents (17.20%), and 7 days a week were 44 respondents (11.50%). Last, the personally monthly income of 384 respondents. 115 respondents (29.90%) had a personally monthly income of 15,001 – 24,999 THB, followed by 25,000 – 35,000 THB were 92 respondents (24.00%), 35,001 – 54,999 THB were 79 respondents (20.60%), less than 15,000 THB were 53 respondents (13.80%), and 55,000 THB or more were 45 respondents (11.70%).

Table 2: Summary result of Mean and standard deviation of all variables

Variables	Mean	S.D.	Interpretation
Work Environment	3.92	.81	Agree
Work Motivation	3.65	.82	Agree
Financial Factor	3.80	.87	Agree
Physical Factor	3.56	.89	Agree
Psychological Factor	3.76	.83	Agree
Technological Factor	3.60	.84	Agree
Work from home Satisfaction	4.06	.87	Agree

Table 2 presented all seven of independent variables and dependent variables shown the result interpreted with agree consist of work from home satisfaction, work environment, financial factor, psychological factor, work motivation, technological factor, and physical factor at mean score 4.06, 3.92, 3.80, 3.76, 3.65, 3.60, and 3.56 respectively. The standard of dependent variables was at 0.87010 and other independent variables consist of physical factor, financial factor, technological factor, psychological factor, work motivation, and work environment were at the value 0.89, 0.87, 0.84, 0.83, 0.82, and 0.81 respectively.

Table 3: Model Summary from Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.76[a]	.57	.57	.56
a. Predictors: (Constant), Technologycal Factor, Work Motivation, Physical Factor, Psycological Factor, Financial Factor, Work Environment				

Table 3 presented the adjusted R square value was 0.57, indicated that 57% of work from home satisfaction can explain by the independent variables of this study, consist of Technologycal Factor, Work Motivation, Physical Factor, Psycological Factor, Financial Factor, Work Environment. Thus, another 43% of work from home satisfaction could be explained by other independent variable.

Tables 4: Model Summary from Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.55	.16		3.37	.00		
	Work Environment	.23	.05	.21	4.26	.00	.43	2.29
	Work Motivation	.13	.05	.12	2.54	.01	.46	2.15
	Financial Factor	.22	.05	.22	4.41	.00	.43	2.28
	Physical Factor	-.05	.04	-.05	-1.19	.23	.49	2.03
	Psycological Factor	.39	.05	.37	7.85	.00	.49	2.03
	Technologycal Factor	.00	.05	.00	.09	.92	.41	2.41
a. Dependent Variable: Work from home Satisfaction								

According to Table 4 presented the significant value of testing Work from Home Satisfaction is often P value. The significant value of the six variables were 4 variables which are work environment, work motivation, financial factor, and psychological were less than 0.05, indicating that work environment, work motivation, financial factor, and psychological had statistically significant effect on work from home satisfaction. Differently with physical factor and technological factor are not significant influence on work from home satisfaction. Besides, the beta of standardized coefficient or (β) of six independent variables. First, 1 addition unit is work environment shows the influence toward work from home satisfaction will increase by 21% at β= 0.21. Second, 1 addition unit is work motivation shows the influence toward work from home satisfaction will increase by 12% at β= 0.12. Third, 1 addition unit is financial factor shows the influence toward work from home satisfaction will increase by 22% at β= 0.22. Fourth, 1 addition unit is physical factor shows the influence toward work from home satisfaction will decrease by 5% at β= -0.05. Fifth, 1 addition unit is psychological factor shows the influence toward work from home satisfaction will increase by 37% at β= 0.37. Last, 1 addition unit is technological factor shows the influence toward work from home satisfaction will increase by zero at β= 0.00.

VIF- Variance Inflation Factor

Continued to Table 4, the variance inflation determinant is a statistical method to test multicollinearity, Walker & almond (2010). VIF should not be greater than 5, if greater than 5 mean the independent variables have high correlated with another variables. The results show that VIF indicator for psychological factor is 2.03, followed by physical factor is 2.03, work motivation is 2.15, financial factor is 2.28, work environment is 2.29, and technological factor is 2.41 which all less than 5. It means that all independent variables are not correlated to each other in

a sense, and there is no multicollinearity problem.

However, to verify the result of first regression analysis, the researcher analyzed the result again (second analysis) by eliminating the variables that the hypothesis failed to reject.

Table 5: Model Summary from Multiple Regression Analysis (2nd round)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.76[a]	.57	.57	.56
a. Predictors: (Constant), Psychological Factor, Financial Factor, Work Motivation, Work Environment				

From the Table 5, the second round show the adjusted R square value is at 0.57 which can explain that 57% of the influence effect on work from home satisfaction in Bangkok can be explained by four independent variables in this research which are Psychological Factor, Financial Factor, Work Motivation, and Work Environment. The result from the study indicated that work atmosphere and freedom of job scheduling have an influence on work satisfaction. Moreover, employees are more satisfied to save the travelling expense when compared to virtual meeting. Otherwise, the employees need socialize fulfillment for work life balance during work from home.

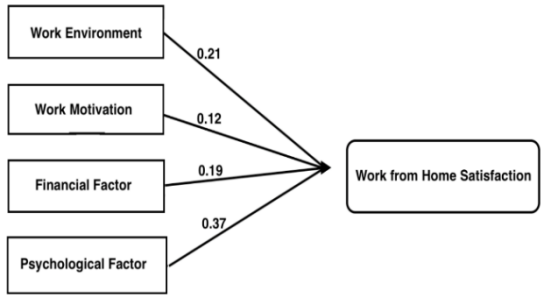
Table 6: Model Summary from Multiple Regression Analysis (2nd round)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.51	.16		3.17	.00
	Work Environment	.22	.05	.21	4.25	.00
	Work Motivation	.13	.05	.12	2.52	.01
	Financial Factor	.19	.04	.19	4.44	.00
	Psychological Factor	.38	.04	.37	7.96	.00
a. Dependent Variable: Work from home Satisfaction						

According to the Table 6, the second-round show that the significant value of the 4 variables indicating that work environment, work motivation, financial factor, and psychological were less than 0.05, had statistically significant effect on work from home satisfaction. Besides, the beta of standardized coefficient or (β) of four independent variables. First, every 1 addition unit is work environment shows the influence toward work from home satisfaction will increase by 21% at β= 0.21. Second, every 1 addition unit is work motivation shows the influence toward work from home satisfaction will increase by 12% at β= 0.12. Third, every 1 addition unit is financial factor shows the influence toward work from home satisfaction will increase by 19% at β= 0.19. Last, every 1 addition unit is psychological factor shows the influence toward work from home satisfaction will increase by 37% at β= 0.37.

Figure 2: Factor Affecting Work from Home Satisfaction in Bangkok model

From the results of study, the regression can be defined as an equation below



The Affecting Work from Home Satisfaction in Bangkok equation

= 0.51+ 0.22 (Work Environment) + 0.13 (Work Motivation) + 0.19 (Financial Factor) + 0.38 (Psychological Factor)

Discussion and Implication

The finding of this research can help the company while arranges employee to work from home to understand the influence factor to satisfy employee during work from home in order to develop the performance of work. Therefore, the results of this study can used to develop the strategies of company or providing better alternative to manage work from home satisfaction.

According to the hypotheses H1, H2, H3, H5, the findings indicates that work environment, work motivation, financial factor, psychological factor. Among these four variables, psychological factor has the highest of the beta value with 0.37 followed by work environment with 0.21 then financial factor with 0.19 and work motivation with 0.12 have a significant effect on work from home satisfaction significantly especially psychological factor which has a strongest influence on work from home satisfaction by providing good work life balance during experienced on work from home to the employee as well as sufficient of working equipment or resource must be also provide to employee during work from home. It could create the work performance to satisfy toward employee. Second, work environment one thing should improve on "You are satisfied with the working atmosphere at home" which has the lowest beta based on descriptive statistic. As far as working environment is the important thing to encourage work satisfaction and work performance. The workplace could increase work environment valued by decorate the proper work light, smell, and comfortable chair. Third, financial factor that company should provide an incentive to the employee during work from home because of the increasing of usage cost that employee have spent during work from home such as internet cost, electricity cost, and office resource cost which company should allocated to employee in order to meet the work from home satisfaction. Last, work motivation which has the lowest beta value, the company should remain the same amount of employee's salary due to some company had deducted wage during economic downturn of Covid-19 as well as salary can encourage employee to work more efficiency also increase work from home satisfaction.

References

Baker, E., Avery, G. C. & Crawford, J. (2007). Satisfaction and Perceived Productivity when Professionals Work from Home, *Research and Practice in Human Resource Management*, *15*(1), 37-62.

Batchelor H. J., Abston A. K., Lawlor Blaine K., Burch F. G. (2014). The Job Characteristics Model: An Extension to Entrepreneurial Motivation. *Journal of Small Business Institute , 10*(1), 1-10.

Bhattarai M. (2020) *Working from Home and Job Satisfaction During the Pandemic Times*. July 2020, Independent Publication.

Christopher C. (2020) Why You Should Continue to Work from Home If You Can During COVID-19. *Health News.* https://www.healthline.com/health-news/why-you-should-continue-to-work-from-home-if-you-can-during-covid-19

Ducharme, L. J., & Martin, J. K. (2000). Unrewarding work, coworker support, and job satisfaction: A test of the buffering hypothesis. *Journal Article Work and Occupations, 27*(2), 223–243.

Feng Z., Savani K. (2020) Covid-19 created a gender gap in perceived work productivity and job satisfaction: implications for dual-career parents working from home. *Gender in Management: An International Journal*. 35(7/8), 719-736.

Hee, O. C., Yan, L. H., Rizal, A. M., Kowang, T. O., & Fei, G. C. (2018). Factors Influencing Employee Job Satisfaction: A Conceptual Analysis. *International Journal of Academic Research in Business and Social Sciences*, 8(6), 331–340.

Jamal Tariq M., Anwar I., Khan Ali N. and Saleem I. (2021) Work during COVID-19: assessing the influence of job demands and resources on practical and psychological outcomes for employees. *Asia-Pacific Journal of Business Administration* 1757-4323.

Nakrošienė A., Bučiūnienė I. and Goštautaitė B. (2018) Working from home: characteristics and outcomes of telework. *Journal of Manpower* Vol. 40 No. 1, 2019 pp. 87-101.

Naqbi Ahmed Khamis Al R. & PROF. Dr. Yusoff Bin Md R. & Dr. Ismail Binti F. (2019). The Effect of Incentive System on Job Performance Motivation as Mediator for Public Sector Organization in Uae. *Journal of Engineering & Technology* 7 (4.7) (2018) 380-388.

Palumbo R. (2020) Let me go to the office! An investigation into the side effects of working from home on work-life balance. *Journal of Public Sector Management*. *3*3(6/7),771-790.

Pawirosumarto S., Sarjana Katijan P. and Gunawan R. (2016) The effect of work environment, leadership style, and organizational culture towards job satisfaction and its implication towards employee performance in Parador Hotels and Resorts, *Indonesia. Journal of Law and Management 59*(6),1337-1358.

Sarker Jalal S., Crossman A., Chinmeteepituck P. (2003) The relationships of age and length of service with job satisfaction: an examination of hotel employees in Thailand. *Journal of Managerial Psychology*. 18(7), 745-758.

Siengthai S. and Pila-Ngarm P. (2015) The interaction effect of job redesign and job satisfaction on employee performance. Evidence-based HRM: *A Global Forum for Empirical Scholarship*. 4(2), 162-180.

Suriyankietkaew S., Avery C. G. (2014) Employee satisfaction and sustainable leadership practices in Thai SMEs. *Journal of Global Responsibility*. *5*(1), 160-173.

Susilo D. (2020) Revealing the Effect of Work-From-Home on Job Performance during the Covid-19 Crisis: Empirical Evidence from Indonesia. *The Journal of Contemporary Issues in Business and Government. 26*(1), 23 – 40.

Taherdoost H. (2017) Determining Sample Size; How to Calculate Survey Sample Size. *Journal of Economics and Management Systems*. 2, 2017.

The Important Factors Influencing the Purchase Decision of Products via Online Application (Mobile Application) of Consumers in Bangkok

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ABSTRACT

The purposes of this research were: 1) to study the purchasing behavior of products via online application of consumers in Bangkok, 2) to study the important factors influencing the purchasing decision of products via online application of consumers in Bangkok. The factors in the study consisted of demographic factors, marketing mix factors and technology acceptance factors. The samples were 400 residents in Bangkok. The data collection used questionnaire The descriptive statistics, t-test, One-way ANOA, LSD., and Multiple Regression Analysis were used for data analysis. The results indicated that consumers in Bangkok used applications before bedtime most frequently. The average frequency of online shopping per month was 1-2 times. The most frequently used platform of purchasing online application was Lazada. The average spending per order was 300-500 Baht. The products and services purchased most online applications were clothing and costume. The marketing mix factors affecting consumers' online shopping behavior in Bangkok were product, price, place and promotion. For the technological acceptance factors that affected online shopping behavior with statistical significance level at .05 were security and reliability.

KEYWORDS: Online applications, Consumers in Bangkok, Factors affecting purchase decision.

Introduction

Based on e-commerce growth data from Electronic Transaction Development Agency or ETDA, from the ever-changing environment, as a result the lifestyle of people in today's society has to change as well, from technological developments, communication equipment including the network and various signals, making people get more convenience from technology that plays a role in daily life. The rapid advancement in technology makes the current trading system different from the one before. In the past, trading was only selling products through the storefront. and the store will be known and accessible by local customers only. But nowadays, technology is increasingly used in doing

business, using the internet as a medium of trade between traders and customers. makes trading business grow rapidly because it can help reduce many obstacles, especially the current situation under the epidemic of the COVID-19, which creates a high risk of being infected easily at all times. As a result, consumers do not like to leave their place of residence to shop for consumer goods like in the normal situation. As a result, buying products via online applications is increasingly popular.

Measuring the popularity of B2C e-Commerce businesses with the Google Trends Index, an index that indicates the search volume of Thai users. By using the data to search for terms related to B2C e-Commerce business in Thailand, there are 4 search terms, i.e "Kerry" "Lalamove" "Lazada" and "Mail & package delivery". All 4 search terms were created as trend indicators, meaning using a statistical method known as Principal Component Analysis (PCA). The result of the indicator analysis found that during the year 2020 - 2021, Thai people were more interested in online shopping during the government lockdown announcement (March – May 2020) and even after the lockdown lifted. Thai people opt for online shopping. more than the previous year, as reflected in indicators that were still higher than the average of year 2019. (Boonmet Wiwattananukul, 2021)

At the end of June 2021, the results of a study "Future Shopper 2021" in Thailand were revealed by Wonderman Thomson; Thailand, a creative agency. Unified information and technology pointed out that Thai consumers were becoming the trendsetter of online shopping around the world from a survey of 28,000 people in 17 countries. It was found that Thai people had the highest rate of online shopping. Especially during the COVID-19 pandemic, 94% of consumers said online shopping was their go-to channel in 2020 that was the highest percentage when compared to the global average of 72%. Thai consumers spend more online, averaging 1,000 – 8,000 Baht (TCIJ, 2021).

In addition to the above reasons, the researchers also wanted to know what other important factors affected online shopping decisions without actually seeing the product. Or how can you be sure that the product you buy is of good quality? or get a product that meets the price paid and what kind of goods or services meet the needs according to gender, age, education, occupation for people living in Bangkok.

In order to bring the content that has been published to create awareness and understand the behavior of shopping online in more detail, Bangkok was chosen as it is the capital of Thailand, most prosperous and with the highest population density in terms of demographic diversity.

From the above reasons, the researcher is interested to study the factors influencing the purchasing decision of products via online application of consumers in Bangkok.

Purposes

1. To study the purchase decision behavior of products via online application of consumers in Bangkok.

2. To study the important factors consisting of demographic characteristic factors, marketing mix factors and Technological Acceptance factors that influence the purchase decision of products via online application of consumers in Bangkok.

Literature Review

Samart Sitthimanee (2019) conducted a research study on Factors Affecting Decision Making on Purchasing Products Via Online Channels: A Case Study of Nan Province and Bangkok. The demographic factors were gender age, education level, occupation, and income. It was found that there was no difference among gender, age, education level factors.

Kotler, Philip cited in Siriwan Sereerat et al. (2009) said that marketing mix refers to the variables that can be controlled, including product, price, place and promotion, which businesses have used together to meet satisfaction of target customers. Jidapha Thanyaratanawanich (2021) discussed the factors of technology acceptance consisting of the following three indicators.

1.Technological Acceptance Model (TAM)

TAM means whether or not someone perceives that technology to be useful for what they want to do.

2. Security and Reliability

3. Personalization

Borwornluck Sanokham (2019) conducted a research study on Factors Influencing Shopping Decisions Through Social Networks of Undergraduate Students in Bangkok and discussed the purchase decision process of consumers. The one step before the purchasing decision was made after considering the factors, it would be the level of consumers' decision about the purchase as follows: definitely buy, likely to buy, not sure, not likely to buy, and definitely not buying. Buying behavior that can be observed from frequency, cost of each purchase, the type of products ordered the most, etc.

Research Framework

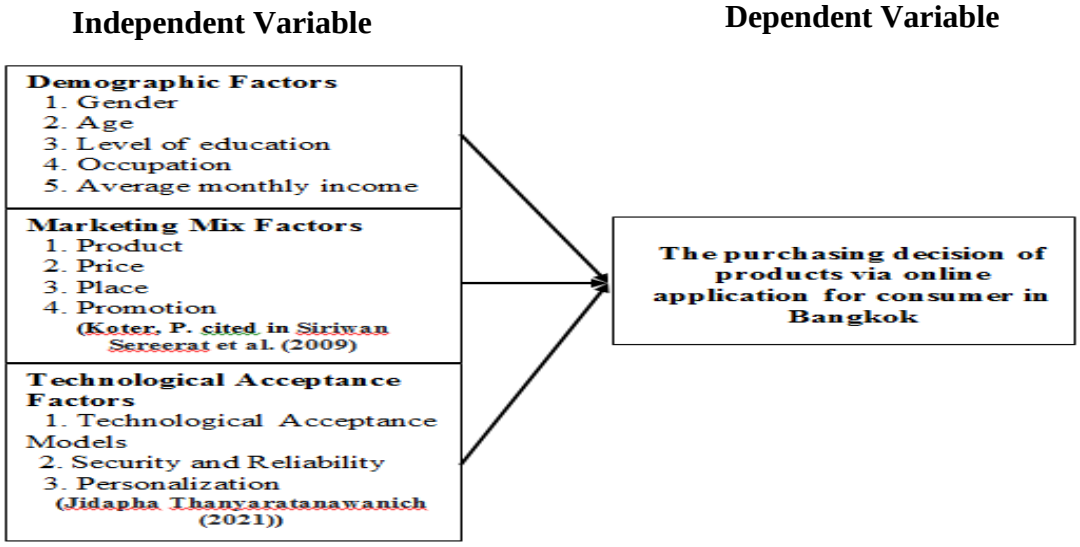

Figure 1: Research Framework

Hypotheses

1. Different demographic factors of consumers in Bangkok will make different purchase decisions via online applications.

2. Marketing mix factors (4P's) are important factors influencing the purchasing decisions via online applications of customers in Bangkok.

3. Technological Acceptance factors are important factors influencing the purchasing decisions via online applications of customers in Bangkok.

Methodology

- Population and Sample Group

The population and the sample group were those who have shopped through online applications and live in Bangkok. The sample size using Taro Yamanae's formula reference (1973) with unknown exact population.at a 95% confidence level with a margin of error of +/- 5%, with some reserves. Therefore, the sample size was 400 individuals. The sampling method was a convenience sampling, whereby only those who had shopped through online applications in Bangkok.

Collecting Data Method

Research Tool

The research tool was a questionnaire. Before proceeding with the actual data collection, the research tool was tested for reliability by finding the Cronbach's alpha coefficient) and the confidence level of the questionnaire was 0.922

In the questionnaire, the first question asked the respondents to confirm that they were the persons who had purchased the products via online application and who lived in Bangkok. If yes, they can continue to do all the questions in questionnaire. If not, please stop to answer anymore. Therefore, we can get the target sample group.

The score level in the questionnaire is a rating scale, with 5 scores according to the Likert Scale method as follows: -

Rating Score	**Meaning Level Opinion/Purchase Decision**	
	Level	**Level**
5	Most agree / Definitely buy	
4	Totally agree / Should buy	
3	Moderately Agree/Not Sure	
2	A little agree / Unlikely to buy	
1	Least agree / Absolutely do not buy	

Criteria of Mean score range and their meaning (Boonchom Srisaaard, 2017)

Mean Range Criterion	**Opinion Level / Purchase Decision Level**
4.21-5.00	Most agree / definitely buy
3.41-4.20	Totally agree / should buy
2.61-3.40	Moderately Agree/Not Sure
1.81-2.60	A little agree / Unlikely to buy
1.00-1.80	Least agree / Absolutely do not buy

$$\text{Range} = \frac{\text{Max} - \text{Min}}{\text{No. of level}} = \frac{5 - 1}{5}$$
$$= 0.8$$

- **Statistics for Data Analysis**

1. Descriptive statistics were used Frequency, Percentage, Mean, and Standard Deviation (S.D.)

2. Inferential statistics ware t-test, One-way ANOVA, LSD. and Multiple Regression Analysis for testing research hypothesis.

Research Result

1. The purchasing decision behavior of products via online application of consumers in Bangkok.

The analysis of data on decision-making behavior of online shopping of the sample group showed the results as follows:

1.1 The sample group was used to online shopping application, used Lazada the most, accounting for 31%, followed by Ensogo 22%, Weloveshopping 14%, Zalora 11%, Kaidee (OLX) and iTruemart are at 7%, Shopee 6%, and other 2% respectively.

Average purchase frequency of online app (number of times/month) of online shoppers who bought 1-2 times per month accounted for 42%, followed by less than 1 time per month or 42%, buying 3-4 times per month or 10%, buying 5-6 purchases per month representing 4%, and buying more than 6 times per month, accounting for 2%, respectively.

On average amount of purchases made via the online application per time, most of them have an average purchase cost per time d300-500 Baht, representing 26%, followed by 501-700 Baht, accounting for 19%, 901-1,100 Baht, representing 14%, more than 1,500 Baht, accounting for 12%, 701- 900 Baht or 10%, 1,101-1,300 Baht, or 8%, less than 300 Baht or 6%, and 1,301-1,500 Baht or 3%, respectively.

The most popular products and services that the sample group purchased via online applications is clothing/apparel accounted for 24%, followed by goods or electronics for 23%, shoes/bags for 20%, watches/accessories for 15%, others at 10%, books and airfares for 8% respectively.

The online shopping app that they use the most is Lazada 36%, Ensogo 22%, Weloveshopping 14%, Zalora 12%, Shopee 9%, Kaidee (OLX), iTruemart, and others. 7% respectively.

Consumers' decision to shop online in Bangkok after consideration was as

follows: Definitely buy 52%, probably buy 24%, not sure 18%, 5% unlikely, and 1% definitely not, respectively.

2. Important factors affecting consumers' decision to shop through online applications in Bangkok

2.1 Demographic factors affecting purchasing decisions via online application of consumers in Bangkok

Demographic factors were gender, age, education level, occupation and income under the assumption that different demographic factors will differentiate consumers' purchasing decisions via online apps in Bangkok. From the hypothesis testing, it was found that gender, age, educational level and different income had the same decision to buy products through online applications, while different occupations made decisions to buy products online differently at statistically significant at the .05 level as shown in Table 1. The results of the differential test, there was a significant difference ($P < 0.05$) between students, students and employees of private companies as in Table 2. The students have higher purchasing decisions on average than private company employees. This may be due to the obligations and responsibilities of private company employees are more than students, resulting in having to think before making a purchase decision.

Table 1: The testing results of the demographic factors affecting purchase decision of products via online application of consumers in Bangkok

Demographic Factors	**t / F Value**	**P-value**
1. Gender	t = 5.680	.793
2. Age	F = 13.521	.661
3. Education level	F = 9.447	.076
4. Occupation	F = 10.075*	.037
5. Average income per month	F = 14.229	.448

*****Statistically significant at level.05

Table 2: Comparison of differences between groups of purchasing decisions of products via online application classified by occupation

Occupation		**Mean Difference (I-J)**	**Std. Error**	**P-value.**
Student	Government officer/State enterprise employee	.2891	.1305	.059
	Private company employee	.3672*	.1133	.027
	Business owner/Butler/ Housewife/Freelance	.2994	.1573	.068
Government officer/State enterprise employee	Student	-.2891	.1305	.059
	Private company employee	.0805	.0995	.437
	Business owner/Butler/ Housewife/Freelance	.0063	.1209	.886
Private company employee	Student	-.3672*	.1133	.027
	Government officer/State enterprise employee	-.0805	.0995	.437
	Business owner/Butler/ Housewife/Freelance	-.0751	.1099	.547
Business owner/Butler/ Housewife/Freelance	Student	-.2994	.1573	.068
	Government officer/State enterprise employee	-.0063	.1209	.886
	Private company employee	.0751	.1099	.547

*****Statistically significant at level .05

2.2 Marketing Mix factors influencing the purchasing decision of products via online application of consumers in Bangkok

Consumers in Bangkok paid attention to the factors of the marketing mix that affected the decision to buy products via online applications. Overall, it is at a high level. Place has the highest average ($\overline{X}$ = 3.85, S.D. = 0.74) followed by Promotion ($\overline{X}$ = 3.82, S.D. = 0.7 3), Product ($\overline{X}$ = 3.62, the S.D. = 0. 6 4), Price ($\overline{X}$ = 3.59, S.D. = 0.81) when classified by each aspect.

1. Product: There are more products to choose from than buying through other channels.

2. Price: There are morediscounts than buying through other channels

3. Place: it is more convenient than buying through other channels.

4.Promotion: it gives more discount than buying through other channels.

Table 3: Analysis the marketing mix factors affecting purchasing decision of products via online application of consumers in Bangkok

Marketing Mix Factors	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**P - value**
	B	**Std. Error**	**Beta**		
1. Product	-.191	.074	-.181.	-1.673	.234
2. Price	-.183	.071	-.174	-1.767	.189
3. Place	.202	.065	.195	4.512*	.023
4. Promotion	-101	.066	-.097	-1.541	.068
Total	-.161	,067	-.036	0.036	.081

*****Statistically significant at level .05

From Table 3 , it was found that the marketing mix factors affected the purchasing decision of the online application of consumers in Bangkok. Statistically significant at the .05 level was Place. From the results of the analysis of each variable, the beta coefficient of the regression equation (Beta Coefficient) was obtained, which is a value that represents the relationship between the variables, independent and dependent variables. If any independent variable has a high Beta Coefficient, then that independent variable has a strong effect on the dependent variable. The results of the analysis could be sorted in descending order as follows: factors of Place, Promotion, Price and Product.

2.3 Factors in technology acceptance affecting consumer purchasing decision via online application of consumers in Bangkok

Consumers in Bangkok opinions focusing on technology acceptance: The factors of technology acceptance affecting the decision to buy products via online applications overall were at a high level ($\overline{X}$ = 3.65, S.D.=1.05), when considering each aspect, it was found that the factor of technology acceptance (Technology Acceptance Model: TAM) had the highest mean ($\overline{X}$ = (3.78, S.D. = 1.04) followed by Personalization factor ($\overline{X}$ =3.54, S.D.=1.01), Security and reliability factor had an average of ($\overline{X}$ = 3.36, S.D. = 0.99) at a moderate level.

1. Technology Acceptance Model (TAM): helps consumers to be more convenient.

2. Security factor: can verify identity and can keep the information of buyers.

3. Personalization factors: have channels to contact customers individually, conveniently and quickly, such as online chats, e-mails, or message systems (Inbox).

Table 4: Analysis the Technological Acceptance Factors affecting to purchasing decision of products of consumers in Bangkok

Technological Acceptance Factors	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**P - value**
	B	**Std. Error**	**Beta**		
1. Technology Acceptance Model: TAM	.206	.034	.257	2.642*	,015
2. Security and Reliability	.211	.058	.212	3.214*	.023
3. Personalization	-.102	.074	-.144	-1.789	.132
Total	**.092**	**.062**	**.022**	**0.408***	**.037**

***Statistically significant at level .05

From Table 4, it was found that technology acceptance factors affecting shopping online applications decisions. statistically significant at the .05 level were Technology Acceptance Model (TAM), Security and Reliability Factors. From the results of the analysis of each variable, the coefficient of the regression equation (Beta Coefficient) is obtained, which is a value that represents the relationship between the independent variable and the dependent variable. If any independent variable has a high Beta Coefficient, it means that the independent variable has a large impact on the dependent variable. The results of the analysis can be arranged in descending order as follows: Technology Acceptance Model (TAM) factor, Security and Reliability factors and Personalization factor respectively.

Conclusion and discussion

From the research on the important factors affecting consumers' purchasing decisions via online application in Bangkok. The results can be summarized and discussed as follows.

1. Consumer decision-making behavior through online applications in Bangkok

The average use of the app is 1-2 times per month. The most frequently use online application is the Lazada. The average amount of purchases made through online applications is 300–500 Baht. The most popular items to buy online are clothes/apparel. and the level of purchasing decisions online of consumers in Bangkok is at the level of definitely buy.

2. The important factors affecting purchasing decision of products via online application of customers in Bangkok

2.1Demographic factors affecting purchase decision of products via online application of consumers in Bangkok

By testing the hypothesis about the differences in demographic factors by using Independent-Samples t-test and One-Way ANOVA (F-test) with statistical significance at level .05.They are gender, age, education level, occupation, average monthly income. The results showed that demographic factors, i.e. gender, age, education level was no different, while consumers with different occupations made

purchase decision differently. For students, the average purchase decision was higher than those who worked in private companies. This may be due to the obligations and responsibilities of private company employees. There is a need for them to think before making a purchase. The results are consistent with the research by Jidapha. Thanyaratanawanich (2021) on Factors affecting the purchase of products via online applications for consumers in Nonthaburi Province.

2.2 Marketing mix factors affecting purchasing decisions via online applications of Consumers in Bangkok

Marketing mix factors affecting consumers' purchasing decisions via online applications in Bangkok statistically significant level at .05 is Place, and as a result of the analysis of each variable, the beta coefficient is obtained, which is a value that represents the relationship between the independent variable and the dependent variable. If any independent variable has a high Beta Coefficient, then that independent variable has a strong effect on the dependent variable. The results of the analysis can be sorted in descending order as follows: Factors of Place, Promotion, Price and Factor of Product. The results of this research are consistent with the research of Waranya Phopraithong (2013), which has conducted research on Factors affecting the decision to buy clothes online from an online store The results of the research found that Factors affecting the decision to buy clothes online from an online store are the factors of distribution channels and the work of the website affecting the decision to buy from an online store.

2.3 Technological acceptance factors influencing the purchasing decision of products via online application for consumer in Bangkok

Factors in technology adoption affecting online shopping decisions Applications statistically significant at the .05 level were Technology Acceptance Model (TAM), Security and Reliability Factors. (Reliability) from the results of the analysis of each variable will get the coefficient of the regression equation (Beta Coefficient), which is a value that represents the relationship between independent and dependent variables If any independent variable has a high Beta Coefficient, it means that the independent variable has a large impact on the dependent variable. The results of the analysis can be arranged in descending order as follows: Technology Acceptance Model: TAM), the security factor (Security) and the reliability aspect. (Reliability) and personal service factors The results of this research are consistent with the research of Kawarin Laddinan (2014), who conducted a study on The research results revealed that technology acceptance and online consumer behavior affecting e-book purchase decision, technology acceptance and online consumer behavior affecting e-book purchase decision of the Consumers in Bangkok Consumer Electronics in Bangkok" found that the adoption of intent-to-use technology had the greatest impact on consumers' decision to purchase e-books in Bangkok. A study of factors affecting the decision to buy clothes online from an online store Technology acceptance and online consumer behavior affecting e-book purchase decision Technology acceptance and online consumer behavior affecting

e-book purchase decision among consumers in Bangkok It was found that the adoption of intent-to-use technology had the greatest impact on consumers' decision to purchase e-books in Bangkok. A study of factors affecting the decision to buy clothes online from an online store Technology acceptance and online consumer behavior affecting e-book purchase decision Technology acceptance and online consumer behavior affecting e-book purchase decision among consumers in Bangkok It was found that the adoption of intent-to-use technology had the greatest impact on consumers' decision to purchase e-books in Bangkok. A study of factors affecting the decision to buy clothes online from an online store.

In addition, the results of this research are consistent with the research results of Pornchanok Plaboon (2 0 1 5) conducting a study on the acceptance of innovation and technology. use of technology and consumer behavior affecting people's willingness to use financial transactions via PromptPay system of the Thai government found that consumer behavior Emotional motivation affects people's willingness to use financial transactions via PromptPay. This is because the government has proposed an incentive to encourage people to turn to financial transactions via the PromptPay system, namely to reduce the fee for money transfers. Thus, it can stimulate people's interest in applying for membership. Financial transactions via the Thai government's PromptPay system.

Recommendations

1. Recommendations from this research

From this research, the researcher would like to suggest things that would be useful to those involved as follows.

1. If entrepreneurs want to increase sales volume through online applications, they should focus on also the target group is student group more because students / students are a group of professionals who decide to buy products through online applications more than other careers.

2. From the research results Marketing mix factors affecting purchasing decisions via online application. The most important thing is Place factor. Therefore, in order to attract more consumers to shop online through applications. Operators should focus on and should improve the ordering channel via online applications to be more convenient for ordering and can check the order status better than ordering through channels. other way

3. According to the results of the study Factors in technology acceptance affecting to purchasing decisions of products for consumer applications in Bangkok found that technology - Acceptance Model (TAM) factors, security and reliability factors., so entrepreneurs should pay attention to technology acceptance by making purchases through the application, consumers will be more comfortable. Security purchases made through the application with identity can be checked. and reliability. The purchase of goods through the application keeps the information of the purchaser of goods and services very reliably.

4. The result of this research can be use to plan for online marketing strategies.

2. Recommendation for further research

1. Should conduct further research studies Psychological and innovation

adoption factors and Technology that affects consumers' decision to shop through online applications.

2. Should conduct a research study on Important factors affecting food delivery behavior of consumers through the application channel.

3. Should conduct a research study on the behavior of using the Internet of consumers in Bangkok to do financial transactions.

References

Boonchom Srisaard (2017). *Base Research*. Bangkok: Suwiriyasarn Publishing.

Borwornsak Sanokham (2019). Factors influencing the decision to buy products through social networks of Undergraduate students in Bangkok**.** *Ratchapark Journal Humanities and Social Sciences,13(31).*

Boonmet Wiwattananukul (2564). *Getting to know B2C e-Commerce business***.** Bank of Thailand, retrieved from www.bot.or.th/Thai/Statistics/Articles/Doc_Lib_statisticsHorizon/StatHorizon_B2 C_ eCommerce.pdf

Jidapha Thanyaratanawanich (2021). Factors affecting the purchase of goods through online applications of consumers in Nonthabur province**.** *Journal of Humanities and Social Sciences.* Rajapruek University,7(2).

Kawarin Laiddenan. (2014). *Acceptance of technology and online consumer behavior that affects decide to buy electronic books for consumers in Bangkok***.** Thesis, Master's Degree Bangkok University.

Pornchanok Plaboon. (2015). *Acceptance of innovation and technology. use of technology and consumer behavior Resulting in people's intention to use financial transactions via PromptPay system of the Thai government***.** Master of Business Administration, Thesis, Bangkok University.

Philip Kotler (2003). *Marketing Maagement (Global ed).* New Jersey: Asimmon &Schuster

Premkamol Hongyon. (2019). *Factors influencing the decision to buy products via online applications. (Lazada) of digital consumers in Bangkok***.** Master of Business Administration Siam University

Samart Sitthimanee (2019). *Factors affecting the decision to buy products via online channels: A case study Nan Province and Bangkok***.** Thesis, Master of Arts Program (Organizational Administration) Faculty of Liberal Arts Krirk University

Siriwan Sereerat et al. (2009). *Modern Marketing Management***,** Update 2009. Bangkok: Publishers. Diamond to Business World.

TCIJ: Thai Civil Rights and Investigative Journalism (2021). www.tcijthai.com/news/2021/19/scoop/11763 Retrieved on 16 August 2021

Waranya Phopraithong. (2013). *Factors affecting the decision to buy clothes from online stores.* Master of Business Administration Program, Faculty of Commerce and Accountancy, Thammasat -University.

Taro Yamanae (1973). *Statistics: An Introductory Analysis.* 3rd ed. New York: Harper and Row Publication.

Effectiveness of a Blended Learning Model for Teaching Chinese Listening Skills to Mathayom Suksa Four Thai Students

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ABSTRACT

This mixed methods study aimed to investigate the effectiveness of a Blended Learning (BL) Model in improving Chinese listening skills and to evaluate satisfaction towards the blended teaching model of Mathayom Suksa Four Thai students. The experiment was conducted at Ratwittaya School in Term 1, from June to July, Academic Year 2021. The sample consisted of 31 students of Mathayom Suksa Four by purposive sampling. Achievement Tests, Satisfaction Questionnaires and Semi-structured Interviews were utilized as the research tools. The IOC result of the satisfaction questionnaire was 0.99 and that of the semi-structured interview was 0.84. The results of the pre-posttest indicated that the students performed better after the intervention. The mean score of the pre-test was 32.39 and the post-test was 36.16. The significant value of 0.0001($p < 0.005$) confirmed the effectiveness of BL Model. The results of the questionnaires showed that student satisfaction was found in all aspects with teaching quality, learning skills and learning experiences getting higher percentages than learning resources, learning environment and assessment and feedback. The semi-structured interviews revealed that the students were satisfied with blended learning with reasons such as friendly class atmosphere and freedom of discussion in groups. Besides improving the students' listening skills, blended learning also developed the students' 21st century skills such as self-directed learning skills and problem-solving skills. The results of this study showed that Blended Learning was an effective teaching approach for Chinese listening skill enhancement.

Keywords: Blended Learning Model, Chinese Listening Skills, Thai High School Students

Introduction

More and more Thai people start to get interested in learning Chinese (Xi, 2016). With the One Belt One Road Policy, Thailand has shown greater interest in Chinese as a second foreign language for students after English (Fan, 2020) for communication in the service businesses. Consequently, a large number of

students aim to secure jobs in various companies (Zhang, 2017). Thus, Chinese has become an important language for them (Da, 2020).

Wilt (1950) explains that in a person's lifetime, listening accounts for 45% of the total communication. Similarly, Yavuz and Celik (2017) claim that listening is a pre-requisite for other language skills, reflecting the belief that language is primarily oral with listening and speaking as the most important skills (Asassfeh, 2015).

However, many problems in teaching the Chinese language. especially in primary and secondary schools of Thailand have hindered the success (Sea-Jia, 2015). The problems are 1) Outdated Chinese textbooks making it hard for students to set up a complete Chinese learning system (Zhou, 2019; Li, Huang & Ma, 2020). 2) The lack of multimedia classrooms resulting in infrequent use multimedia courseware (Wang & Geng, 2019); 3) The use of traditional methods. especially Grammar translation method (Wang & Geng, 2019). 4) Inappropriate curriculum and insufficient Chinese class hours (Zhou, 2019). The Government of Thailand stipulates that the teaching hours of Chinese are 5-10 class hours per week, and each class is 40 to 50 minutes long. Learning Chinese is disrupted from time to time due to extracurricular activities in learning Chinese (Su, 2016).

For Chinese listening teaching, how to improve students' listening skills and listening comprehension ability are often a major point of concern (Cai, 2019). Synonyms and inference ability has become a research focus (Yavuz & Celik, 2017). It is necessary to improve Chinese teaching materials, update and innovate the Chinese listening teaching methods (Wu, 2015). Looking for a new teaching method and learning model to solve these problems has become a challenge for teachers of Chinese as a Foreign language (Ma, 2020). According to Murati and Ceka (2017), technology should be an important part of their educational experience.

E-learning, MOOC (Massive open online courses) and flipped classroom are replacing traditional teaching models in recent years (Chu & Ma, 2017), However, according to the report of the World Economic Forum (2020), people believe that the teaching effect of pure online teaching or online learning is poor. Comments on online teaching while students study from home due to the spread of the Covid 19 point out that negative comments outnumber positive ones (Maulida, 2021). Therefore, a new learning model—blended learning appears to be a good choice (Feng, Sun & Cao, 2019). Husain (2020) states that education will be moving towards a blended model. Zhu (2019) also claims that blended learning that combines the traditional classroom and online learning may become the school of the future and the main teaching approach.

Therefore, blended learning can lend itself as an alternative teaching and learning approach if schools continue to exist. In recent years, more and more scholars have noticed the benefits of blended learning and have started to investigate the blended learning models in different areas, such as reading, writing and speaking (Kusmaryati & Amertaningrum, 2017; Al Rouji, 2020; Chen, 2020). However, there are few researches about teaching Chinese as a foreign language listening class based on the blended learning model (Qian, 2019).

This is why this study was an attempt to investigate the effectiveness of a listening class based on blended learning to enhance student learning achievement and to move away from old techniques that are commonly believed to be ineffective. This study was worth conducting as the findings from it will shed some light on whether a blended learning Chinese listening class could benefit students.

Research Questions

1) Can a Blended learning model improve students' Chinese Listening skills?

2) Are students satisfied with the blended teaching model?

Research Objectives

1) To find out the effectiveness of the blended learning model in students' Chinese listening skills.

2) To investigate the satisfaction of Mathayom 4 Thai students toward the blended learning model adopted for teaching Chinese as a Foreign Language.

Research Hypotheses

1) The students' Chinese listening skill after the intervention by blended learning was better than before.

2) The participating students were satisfied with their listening classes.

Literature Review

1. Blended learning

Blended learning is an innovative approach of learning that incorporates the benefits of both traditional classroom teaching and ICT enabled learning. It includes offline learning and online learning (Lalima & Dangwal, 2017). Blended learning has many benefits (Zaka, 2013). Hadisaputra, Ihsan, Gunawan and Ramdani (2020) claim that blended learning encourages student-centered learning, independent learning skills and critical thinking capacities. Autonomous learning skills have also been enhanced (Ahn, 2017). Blended learning through online learning provides students with more opportunities to learn outside of school hours and use resources anytime, anywhere as well as flexible time to learn (Tucker &Wycoff & Green, 2017). What's more, blended learning can help students set their own learning space easily and conveniently ((Luthan, Misra & Lutan, 2021). As a result, students can improve their personal skills (Tyley, 2020).

In class, teachers and students have more time to interact and so does online communication (Lalima & Dangwal, 2107). When students have problems with learning, they can interact with teachers directly (Dziuban, et al, 2018). Arney (2015) states that blended learning can help teachers find more methods to adapt to this generation of students. Teachers can send instructional materials to students immediately and students can automatically learn. It does not only enrich teachers' teaching resources but also gives classes a new life (Cleveland-Innes & Wilton, 2018).

2. Students' Satisfaction

Students' satisfaction refers to the evaluation of students' attitude towards learning experience, teaching services and facilities (Weerasinghe & Fernando, 2017). It helps highlight the advantages and disadvantages of the program, including the staff, environment, curriculum and even policies (Abbas, 2018). However, satisfaction is affected by numerous different factors. The factors that influence student satisfaction are listed below (See Figure 1).

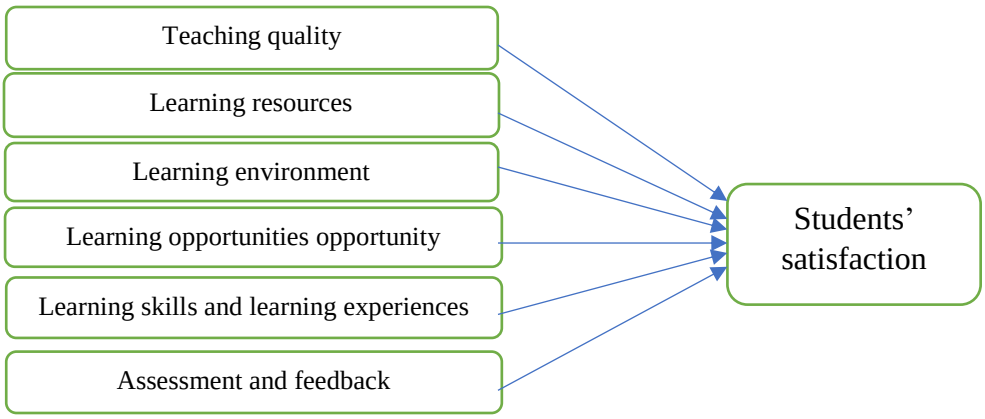

Figure 1 Factors indicating students' satisfaction

3. Chinese listening skills

Listening is a highly complex process in daily communication or in a language (Rost, 2002; Sahin, 2020). Listening is a crucial skill. It helps language learners to receive information with language input and interacts with other language skills (Vandergrift & Goh, 2012). Khuziakhmetova and Porcheskub (2016) state that listening is the basic skill for the development of speaking, reading and writing. Kim and Pilcher (2016) also mention that the quality of listening ability can affect the quality of both speaking and writing. No listening skill, means no language learning, even no communication (Ahmadi, 2016). Strengthening listening training and facilitated students' listening comprehension ability should be paid more attention to (Cai, 2019). In order to achieve better listening comprehension, different listening sub-skills must be practiced and developed (Wang, 2017). Dai and LYU (2017) state that with the emphasis on listening teaching of Chinese as a foreign language, many scholars are committed to using new theories to guide teaching and create new approaches.

Research Methodology

This study adopted a one group pre-posttest experimental design. There was only one class of Thai Mathayom Suksa Four with a total of 34 students. Based on Krejcie and Morgan (1970) formulae, 31 students could be used as the sample of the study.

Figure 2 below shows the conceptual framework of the study.

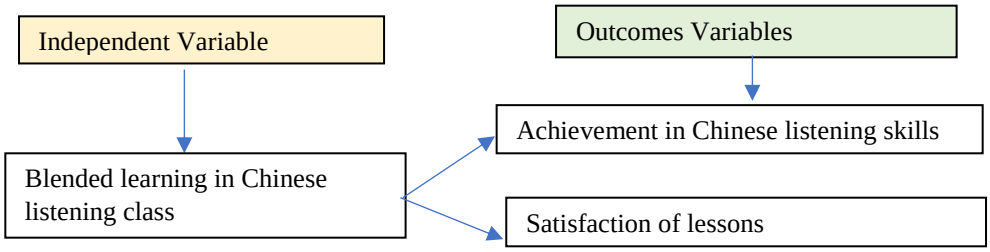

Figure 2 Conceptual framework

The instruments consisted of achievement tests, Satisfaction Questionnaires and Semi-structured interviews. One intervention instrument was the lesson plans. All instruments were submitted to three experts to verify the content validity by using Item Objective Congruence Index (IOC). The IOC score result for the questionnaire was 0.99, while the IOC score result for the semi-structured interview was 0.84, and that of the lesson plans was 1. Thus, the instruments used in the study showed high validity. The Cronbach's Alpha of the Questionnaire was 0.922, so the questionnaire was highly reliable.

The Pre-Post Test conducted before and after the intervention aimed to evaluate the effective of the model according to the first research objective. The test papers adopted are HSK Level 4 paper which is solely supervised by the Ministry of Education of China and contain 45 listening items. The quality report of the new Chinese Proficiency Test (2012) showed that most HSK tests have a reliability of 0.90.

The Satisfaction Questionnaire and the semi-structured interview were aimed to examine the satisfaction of the students. The former contained six dimensions including the teaching quality and teaching opportunities, the learning resources, the learning environment, the learning experience, assessment and feedback and overall satisfaction. The 5-point Likert Scale was used. At the end of the course, a survey questionnaire was sent to each student in the sample group. The semi-structured interviews were organized to collect qualitative data from 5 volunteering interviewees after the questionnaire step.

The lesson plans were designed following the blended learning model steps (See Table 1)**.** The blended learning model in this study consisted of 3 steps: 1) Online self-learning; 2) Offline discussion learning; 3) Evaluation. Before the class, the students did their self-study on the online learning materials provided by the teacher and the self-learning tasks. The students were asked to record the problems that they had encountered. In the classroom, they discussed the problems that they had in small groups and then a group representative was selected to present the results of the group's discussion and learning. Finally, the teacher commented on their work and added knowledge highlights. The duration of the study was one month, with 12 blended listening sessions of 45 minutes each.

Based on the blended learning model. The main steps of the teaching lesson plans are shown below.

Table 1 Blended Listening Teaching Process

Subject	**Chinese listening**	**Participants**	**31**
Level	**Mathayom Suksa Four**	**Teaching materials**	**PowerPoint, video, audio,**
Time	**45 minutes/per lesson**	**Total sessions**	**12**
Teaching Process	**Step 1: Online self-learning** 1) The students click the link to Quizlet posted by the teacher, learn vocabulary, and complete the exercise on the Quizlet. 2) They previewed the topic of the class, watch the video and answer the questions. 3) Students write down the questions which cannot be solved by themselves. **Step 2: Face to face learning** 1) Group discussion. 2) Students' presentation. 3) The teacher's supplements. 4) The groups watch the video or listen to the audio, strengthen the listening skills. 5) Conversation in small groups. **Step 3: Evaluate**		

Data analysis of the pre-post test scores was completed with the use of a computer program (SPSS), T-test dependent, Mean, and Standard Deviation. The data analysis of the questionnaire was done with a computer program (SPSS); the descriptive statistics of frequency and percentage of all items in the questionnaire were calculated in order to find the result of the students' answer question by question. The data analysis of the semi-structured interviews was done with a computer program (Hyper Research), which took the following steps:1) Select the resources 2) Create theme code book 3) Select the interview content and apply the corresponding code 4) Click on the report generator to display the analysis results. The program was used to analyze the interview qualitative data so as to maintain the objectivity of the data analysis technique.

Findings

1. The results of the pre-post test scores from 31 students were presented in Figure 3, Figure 4 and Table 2 as follows:

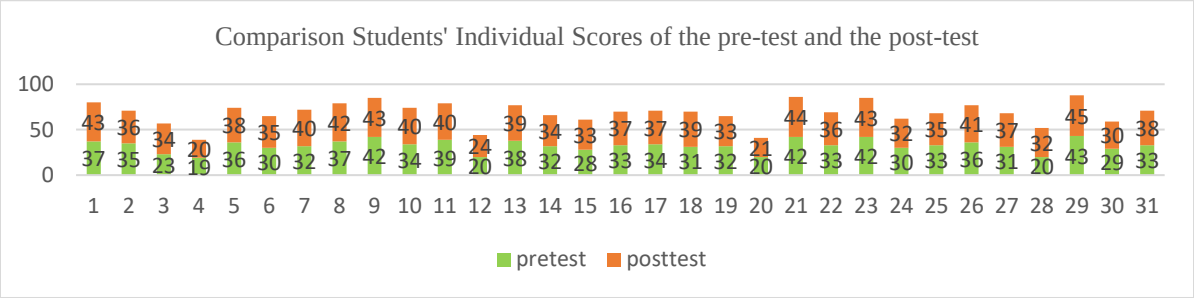

Figure 3 Comparison of the Scores of the Pre-test and the Post-test

Figure 3 shows the individual scores of each student on the pre-test and post-test. The graph clearly describes the difference in scores for 31 students on the pre-test and post-test. This proves that blended learning approach can be very helpful for students.

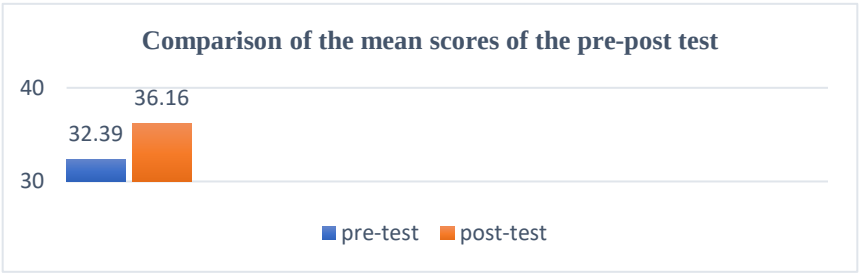

Figure 4 Comparison of the Pre-test and Post-test Means

Figure 4 shows that the mean score of the post-test (36.16) was higher than that of the pre-test (32.39). It suggests that the scores of the post-test increased compared to the scores of the pre-test after using the Blended Learning approach.

Table 2 Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	-3.77		.53623	-4.86933	-2.67906	-7.038	30	.0001
pretest	32.39	6.64						
posttest	36.16	6.19						

*SD=Standard Deviation

Table 2 shows the data analysis results of the pre-test and the post-test. The significance of the study was 0.0001(p=0.0001), which is clearly lower than 0.05(p<0.05). It indicated that there is a significant difference in the experiment. The mean score ($\bar{x}$) of the pre-test was 32.39 (SD=6.64) while the mean score ($\bar{x}$) of the post-test was 36.16 (SD= 6.19). The mean score of the post-test was 3.77 points higher than in the pre-test. It proved that students had improvement in listening skills based on the implementation of blended learning. The SD (6.64) in the Pre-test was wider than SD (6.19) in the Post-test. It indicated that the students' scores of the post-test were closer to the mean than in the pre-test, which means that the group performed better than in the post-test. Therefore, it can be concluded that the blended learning helped to improve students' Chinese listening skills.

2. The results of the questionnaire were presented as Table 3**.**

Table 3 Analysis of the Questionnaire Responses

	Percentage (n=31)					
Item	Strongly disagree	Disagree	Neutral	Agree (A)	Strongly agree (SA)	**Total A/SA**
Teaching quality and Teaching opportunities						
1. My instructor is knowledgeable in the subject content.	0%	0%	25.8%	32.3%	41.9%	74.2%
2. My instructor provided opportunities to ask questions.	0%	0%	16.1%	61.3%	22.6%	83.9%
3. My instructor treated me with respect.	0%	0%	22.6%	48.4%	29%	77.4%
4. My instructor made the subject as interesting as possible.	0%	0%	12.9%	71%	16.1%	87.1%

5. My instructor delivered the subject content effectively.	0%	0%	9.7%	58.1%	32.3%	90.4%
6. My instructor efficiently made the class run smoothly.	0%	0%	25.8%	51.6%	22.6%	74.2%
Average	0%	0%	18.82 %	53.78 %	27.42%	81.2%
Learning resources						
7. The learning resources are easy to access.	0%	0%	41.9%	35.5%	22.6%	58.1%
8. The learning resources are up to date.	0%	0%	19.4%	41.9%	38.7%	80.6%
9. The quality of the listening materials is practical.	0%	0%	32.3%	41.9%	25.8%	67.7%
10. The listening learning materials are enjoyable.	0%	0%	29%	48.4%	22.6%	71%
Average	0%	0%	30.65 %	41.93 %	27.43%	69.36 %
Learning environment						
11.The design of discussion, evaluation, cooperation and other activities in the teaching process are going well.	0%	0%	32.3%	61.3%	6.4%	67.7%
12.The learning atmosphere is good.	0%	3.2%	35.5%	41.9%	19.4%	61.3%
13.The interaction between the teacher and classmates is good.	0%	0%	19.4%	48.4%	32.3%	80.7%
14.This course has provided me with opportunities to explore ideas or concepts in depth.	0%	0%	25.8%	48.4%	25.8%	74.2%
15.I have the right opportunities to provide feedback on my course.	0%	0%	32.3%	58.1%	9.7%	67.8%
Average	0%	0.64%	29.0 6 %	51.62 %	18.72%	70.34 %
Listening skills and Learning experiences						
16.This course has made me more confident in listening to Chinese.	0%	0%	19.4%	45.2%	35.5%	80.7%
17.This course helps me develop my ability to work as a team member.	0%	0%	32.3%	51.6%	16.1%	67.7%
18.This course helps me develop the ability to plan my own work.	0%	0%	25.8%	54.8%	19.4%	74.2%
19.This course improved my skill in understanding the main idea of a conversation.	0%	0%	19.4%	54.8%	25.8%	80.6%

20.This course improved my skill in doing summaries.	0%	0%	19.4%	54.8%	25.8%	80.6%
21.This course improved my vocabularies that matches each situation.	0%	0%	16.1%	54.8%	29%	83.8%
22. I have received helpful comments on my work.	0%	3.2%	29%	41.9%	25.8%	67.7%
Average	0%	0.46%	23.06 %	51.13 %	25.34%	76.47 %
Assessment and Feedback						
23.Instructor often praised and encouraged good learning behaviors in class.	0%	0%	35.5%	41.9%	22.6%	64.5%
24.Assessment was fair to all students.	0%	0%	32.3%	38.7%	29%	67.7%
Average	0%	0%	33.9%	40.3%	25.8%	66.1%
Overall satisfaction						
25. Generally speaking, I am satisfied with this course.	0%	0%	19.4%	51.6%	29%	80.6%

*n= number of participants

Table 3 shows that most of the responses from students concentrated on 3 (Neutral), 4 (Agree) and 5 (Strongly agree). The overall satisfaction Item 25, where the "Strongly agree" received 29 % and "Agree" received 51.6%, shows that 80.6% of the students were satisfied with blended learning.

On average, 81.21% of the participants agreed and strongly agreed with the teaching quality (Items 1-6). Based on this result, it clearly indicates that students were satisfied with the lessons at the high level. However, among the six items of teaching quality (Items 1-6), Item 5 "My instructor delivered the subject content effectively" got the highest degree of "Strongly agree" and "Agree" (90.3%), while Item 1 "My instructor is knowledgeable in the subject content" and Item 6 "My instructor efficiently made the class run smoothly" got the lowest degree of "Strongly agree" and "Agree" (74.2%).

In terms of the learning resources (Items 7-10), 69.36% of the participants agreed and strongly agreed. It means that the students were generally satisfied with the learning resources. However, among the four items, Item 8 "The learning resources are up to date" got the highest degree of "Strongly agree" and "Agree" (80.6%), while Item 7 "The learning resources are easy to access" got 58.1%.

As for the learning environment (Items11-15), 70.32% of the participants agreed and strongly agreed with the items. This result suggests that the blended learning environment meets students' requirements and students had satisfaction with blended learning environment. However, among the five items, Item 12 "The learning atmosphere is good" got the lowest

degree of "Strongly agree" and "Agree" (61.3%). while Item 13"The interaction between the teacher and classmates is good" with 80.6%.

The results of the listening skills and learning experiences, Items 16-22, on average, showed that 68.64% of the participants agreed and strongly agreed with the items. It obviously indicates that most of the students were satisfied with the skills acquired. However, among the seven items, Item 17 "This course helps me develop my ability to work as a team member" and Item 22 "I have received helpful comments on my work" got the lowest degree of "Strongly agree" and "Agree" with (67.7%), while Item 21"This course has made me more confident in listening to Chinese" got (83.9%).

In addition, on average, among the six dimensions: the teaching quality, the learning resources, the learning environment, listening skills and learning experiences, assessment and feedback and overall satisfaction. the highest level of satisfaction was found at the teaching quality (81.21%), which means that the teaching quality met most of the students' requirement. However, the lowest level of satisfaction was found at assessment and feedback (66.1%), which suggests that teachers should improve the way of assessments of blended learning.

3**.** The results from the Semi-structured Interview data analysis presented the reasons for students' satisfaction with blended learning. It was categorized into four relevant themes to show why the students in the study like blended learning. They are skills development, learning style of students and suggestions from students, which is shown in Figure 5 below.

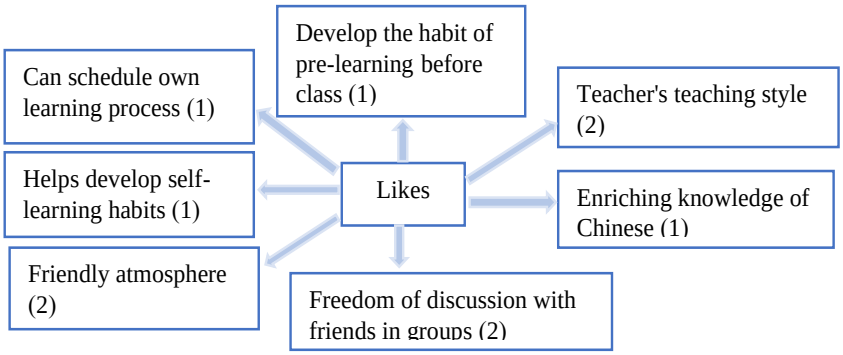

Figure 5 Reasons Why Students Liked Blended Leaning

Figure 5 shows that most interviewees enjoyed learning with the blended learning approach, but they had different reasons for their preferences related to teacher's teaching style and friendly learning atmosphere. They can freely discuss with friends in the classroom. One respondent stated that blended learning could help students better than just following the teacher in class and help them better understand and acquire knowledge. One respondent stated that blended learning helped them develop self-learning habits. The interviewees' actual words are listed below.

- The study atmosphere is active and not as quiet as before. And we can discuss freely in class and be able to say what we want to say.

(Interviewee 1)

- I can schedule my learning process, listen to what I want to listen to and read the learning materials I want to read. (Interviewee 3)

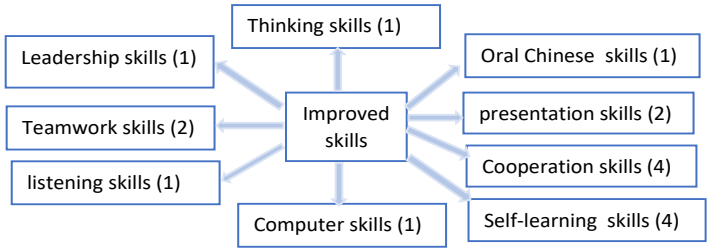

Figure 6 Skills Development

Figure 6 shows students improve not only their listening skills, but other skills as well in blended learning listening class such as thinking skills, leadership skills, teamwork skills, presentation skills self-learning skills and oral Chinese skills. As some interviewees described**:**

● I think my self-learning is better than before, and I can easy to understand the meaning of conversation when I listen. (Interviewee 1)

● Especially teamwork skills, and my oral Chinese skills, I can fluently express in Chinese. My listening skills also. (Interviewee 2)

● It helps me improved my vocabulary. And it has improved my ability to take notes quickly, so that I know how to pick up the key points of the material. (Interviewee 3)

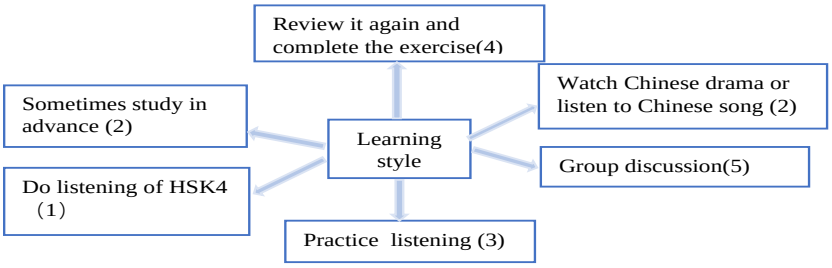

Figure 7 Learning Styles of Students

Figure 7 shows that the students had different learning styles during the blended learning listening class. Such as do HSK 4 listening Test, review and learning in advance and watch Chinese drama and listening to Chinese song. Some interviewees said**:**

● I usually study in advance by myself……And then practice listening. In the class room, I would like to discuss with my friends. (Interviewee 1)

● If I completed the exercise**.** I would watch Chinese TV series or listen to Chinese song, this

is a good way to practice listening**.** (Interviewee 2)

● The lessons we learned are too easy for me. I like to go searching online for teaching materials that are appropriate for me, and then learn by myself, do listening of HSK4 Test. (Interviewee 5)

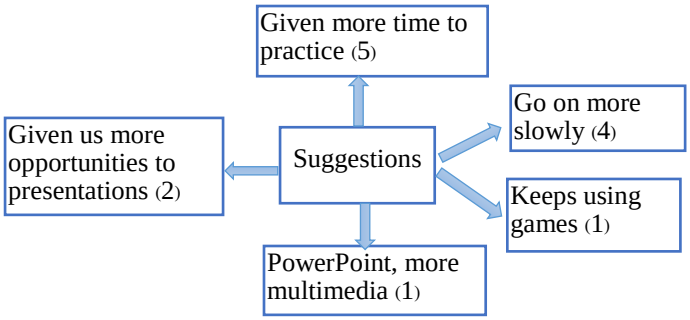

Figure 8 Interviewees' Suggestions

Figure 8 shows students' suggestions for learning in blended listening classes which offer some challenges in the implementation process. Thus, the students voiced that the teachers could give them more time to practice and prepare for the presentation, go on more slowly during teaching and utilize more multimedia. Below were some interviewees' suggestions:

● I hoped that the teacher would go on more slowly. And given more time to practice and given us more opportunities to presentation." (Interviewee 1)

● I hoped that the teacher would go on more slowly. Give us more time to practice And I hope the teacher keep using games to teach in the classroom in the future to keep the class interesting." (Interviewee 5)

Discussion

According to the results of the study, the use of blended learning is considered useful, effective and appropriate way to improve the performance of Mathayom Suksa Four Thai students in Chinese listening.

1. Blended learning improved students' listening skills.

From the results of the pre-posttest, the post-test scores of students were significantly higher than those in the pre-test. It proves that blended learning is very helpful in students' Chinese listening. This finding was similar to Banditvila (2016), Lalima1 and Lata Dangwal (2017) and Liu (2017) who stated that the use of blended learning approach can help students to promote their listening skills. It is also in line with Caruso, Colombi and Tebbit (2017), Yang (2018) and Chen (2020) agreed that blended learning is a combination of online and offline teaching and learning which provides students with many opportunities to develop their listening skills in their learning and help students to improve learning outcomes. Ahn (2017) conducted a study on the application of blended learning models in a Korean Language Course, and found that blended learning model help to

effectively develop students' skills in all aspects of Korean language especially in listening skills.

Blended learning encourages student-centered learning. In the blended listening class, students need to do their self-study before the class and enables students to improve their listening skills by helping and supporting group members (Zaka, 2013; Staker & Horn, 2014; Du, 2017). As well as blended learning offered a flexible leaning time, flexible learning places and flexible learning paths. Students can learn independently out of the class. When students learn online independently, they can avoid blindness and inefficiency in independent listening learning, creating effective unity between independent learning and classroom teaching before and after class, and allowing students to target practice according to their weak points (Yang, 2018; Ahn, 2017; Hadisaputra, Ihsan, Gunawan & Ramdani, 2020). In blended learning model, students have more time to practice their listening for successful outcomes. When the students have more time for outcomes, it was easier to achieve success. This finding supported by Lalima and Lata Dangwal (2017); Tucker, Wycoff and Green (2017), Yang and Wang2019) and Chen (2020).

2. Students were satisfied with learning listening with the blended learning model

Most students mentioned that they enjoy learning in friendly learning atmosphere of blended learning and enjoyed independent learning because they could go for targeted exercises for their weaknesses. When the course was easy, enjoyable, active, well organized and offered an equal opportunity for the students; they were happy with blended learning. This finding was supported by Wang and Yin (2016) and Abbas (2018).

Additionally, Blended Learning helps students to improve their other skills such as presentation skill, computer skill, cooperative skill, independently learning skill, critical thinking skill and leadership skill. When students acquire learning skills, they are satisfied with the learning approach. This finding was supported by Banditvilai, (2016), Dziuban, Graham, Moskal, Norberg and Sicilia (2018) and Li and Carroll (2017).

What's more, when students get a great academic performance they may have higher satisfaction (Siming, Gao & Xu, 2016).

In summary, blended learning encourages student-centered approach with the teacher as the facilitator. Blended learning creates a relaxed and friendly learning atmosphere where students can discuss freely with their friends and provide a cooperative learning environment. Blended learning also offers a flexible learning model. In this model, students can arrange their own schedule of study, can search for their favorite study materials to learning and have more time to practice listening. Thus, blended learning is beneficial for Chinese listening teaching and learning.

Conclusion and Recommendations

According to the analysis of the pre-posttest, it was found that students' listening skills improved under the study with blended learning with 32.39 in the pre-test and 36.16 in the post-test. The results of the questionnaires

also showed that the blended learning have enhanced learners' Chinese listening skills in many aspects. 76.47% of the participants believed they got improvement in listening skills, such as mastery of the key points, summarizing skills, understanding the main idea and enlarging vocabularies.

Other findings from the semi-structured interview data showed that blended learning helps students to improve their skills in various areas such as computer skills, cooperative skills, self-learning skills, critical thinking, problem-solving skills and leadership skills. Since blended listening classes are new and challenging for some students, the students said that they need more time to practice at the beginning. This idea is in line with Alvarez (2020), who is convinced that students often faced challenges in blended learning and when students did not know blended learning before, they would need more time to work on blended learning.

It is recommended that in the process of listening teaching, teachers should help learners construct their knowledge and encourage them become autonomous learners. Students should be allowed to choose the activities and lessons to ensure that blended learning is carried out successfully. Future researchers should include studies of how students in different countries and at different grade levels are affected by blended learning models. Future research should be conducted on blended learning for a longer period of time. Also, emphasis of future research should be on the application of blended learning approaches to more subject areas.

References

Ahn, M. (2017). *Student Perception of Language Achievement and Learner Autonomy in a Blended Korean Language Course: The Case Study of Defense Language Institute Foreign Language Center* (Master's thesis). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 10683956.)

Arney, L. (2015). *Go Blended!: A Handbook for Blending Technology in Schools*. San Francisco: Jossey-Bass.

Al Rouji, O. (2020). The Effectiveness of Blended Learning in Enhancing Saudi Studnents' Competence in Paragraph Writing. *English Language Teaching*,*13*(9),72. doi:10.5539/elt.v13n9p72

Ahmadi, S.M. (2016). The Importance of Listening Comprehension in Language learning. *International Journal of Research in English Education, 1*(1), 7–10. Retrieved from http://ijreeonline.com/browse.php?a_code=A-10-1-2&

Abbas, Z. (2018). Blended Learning and Student Satisfaction: An Investigation into an EAP Writing Course. *Advances in Language and Literary Studies*, *9*(1),102. doi:10.7575/aiac.alls.v.9n.1p.102

Alvarez Jr, A. V. (2020). Learning from the Problems and Challenges in Blended Learning: Basis for Faculty Development and Program Enhancement. *Asian Journal of Distance Education, 15*(2), 112–132.

Asassfeh, S.M. (2015). Prospective EFL Teachers: What Language Learning Beliefs Do They Hold? *Asia-Pacific Education Researcher, 24*(1), 13–26. doi:10.1007/s40299-013-0154-1

Banditvilai, C. (2016). Enhancing Students' language skills through blended learning. *The Electronic Journal of E-Learning, 14*(3), 220–229.

Chen, Y.Y. (2020). *The Application of Online and Offline Blended Learning Mode to English Listening Teaching in Junior Schools*. Masters' thesis. Shang Hai Normal University.

Cleveland-Innes, M., & Wilton, D. (2018). *Guide to Blended Learning*. Commonwealth of Learning (p. 8). Retrieved from http://oer4nosp.col.org/id/eprint/35/

Caruso, M., Colombi, A. G., & Tebbit, S. (2017). Teaching how to listen. Blended learning for the development and assessment of listening skills in a second language. *Journal of University Teaching and Learning Practice, 14*(1). doi:10.53761/1.14.1.7

Cai, W.B. (2019). A Study on the Application of MOOC in College English Listening Teaching from the perspective of Blended Learning. *Comparative Study of Cultural Innovation,6* (35),134-135.

Chu, C.L., & Ma, C.C. (2017). Innovative development and future direction of higher education in the era of "Internet+". *Chongqing Higher Education Research, 5*(4), 121-127.

Da, H. J. (2020). Research on the Development of Confucius Institute in Thailand. *Journal of Chinese Language and Culture, Huachiew Chalermprakiet University, 7*(1),19-32. Retrieved from https://so02.tci-thaijo.org/index.php/clcjn/article/view/244939

Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended Learning: The New Normal and Emerging Technologies. *International Journal of Educational Technology in Higher Education, 15*(1), 1-16. doi:10.1186/s41239-017-0087-5

Dai, Y, & LYU, J. (2019). Figurative pedagogy and advanced Chinese listening instruction for foreigners. *Continuing Education Research, 000*(004), 104-107.

Du, X.X. (2017). *Research and Practice of blended Learning Mode for English majors—Take an introduction to Linguistics course as an example*. Nanjing: Southeast University Press.

Fan, C. X. (2020). Study on Chinese teaching in countries along the "One Belt and One Road" – a case study of Thailand. *Journal of Xingyi Normal University for Nationalities, 2*(04), 108-112.

Feng, X.Y., Sun Y.W., & Cao, J.T. (2019). Blended learning in the era of "Internet+": learning theory and pedagogical foundations. *Chinese Distance Education, 1*(02), 7-16-92. doi:10.13541/j.cnki.chinade20190127.002

Hadisaputra, S., Ihsan, M. A., Gunawan, & Ramdani, A. (2020). The development of Chemistry learning devices based blended learning model to promote students' critical thinking skills. *Journal of Physics: Conference Series, 1521* (4). doi:10.1088/1742-6596/1521/4/042083

Husain, A. S. (2020, July 25th). *Education: The Future of digital education*. Retrieved from https://www.dawn.com/news/1636577

Kim, Y.S. G., & Pilcher, H. (2016). What is listening comprehension and what does it take to improve listening comprehension? In R. Schiff & M. Joshi (Eds.), *Handbook of interventions in learning disabilities* (pp. 159-174). New York: Springer

Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement, 30*(3), 607–610. doi:10.1177/001316447003000308

Kusmaryati, S. E., & Amertaningrum, I. P. (2017). *Exploring Students Interests In Learning English* (A Descriptive Study in Elementary Schools in Kudus) (pp. 184–191). Universitas Muria Kudus. doi:10.24176/03.3201.22

Khuziakhmetov, A. N., & Porchesku, G. V. (2016). Teaching listening comprehension: Bottom-up approach. *International Journal of Environmental and Science Education, 11*(8), 1989–2001. doi:10.12973/ijese.2016.572a

Lalima, Dr., & Lata Dangwal, K. (2017). Blended Learning: An Innovative Approach. Universal *Journal of Educational Research, 5*(1), 129–136. doi:10.13189/ujer.2017.050116

Li, D.Q., Huang, Y.Q., & Ma, Y.Y. (2020). Research on the current situation and Demand of Chinese teaching in Thailand. *Journal of Qiqihar Normal College, 3*(05),92-94. doi :10.16322/ J.CNki. 23-1534 / Z.2020.05.031.

Liu, X. (2017). A preliminary study on teaching cultural factors in listening to Chinese as a foreign language for beginners. *Heilongjiang Education: Theory and Practice, 2*(7), 38-39.

Luthan, E., Misra, F., & Luthan, L. (2021). Application of Blended Learning Model to Increase Motivation and Student Learning Outcomes in Accounting Theory Subjects at Fekon Unand. *In Proceedings of the 3rd International Conference on Educational Development and Quality Assurance (ICED-QA 2020)* (Vol. 506). Atlantis Press. Retrieved from doi:10.2991/assehr.k.210202.029

Maulida, L.N. (2021). Implementation of the basic concepts of learning took place in the era of covid-19 pandemic. *Progress of Pendidikan, 2*(3), 134–138. doi:10.29303/prospek.v2i3.157

Murati, R., & Ceka, A. (2017). The Use of Technology in Educational Teaching. *Journal of Education and Practice, 8* (6). doi:10.4324/9780203759820

Ma, H. N. (2020). The Application of Modern Educational Technology in Teaching Chinese as a Foreign Language under the New Situation. *Education Research, 3*(8),2630-4686. doi:10.32629/er.v3i8.3035

Qian, Y.Q. (2019). Study on the Application of Mixed Learning in Chinese listening as a Foreign Language. *Journal of Jiangxi Vocational and Technical College of Electricity, 32*(02), 3.

Rost, M. (2002). *Teaching and Researching Listening*. London: Longman.

Siming, L., Gao, J., & Xu, D. (2015). Factors leading to students 'satisfaction in the higher learning institutions. *Journal of Education and Practice, 6*(31).25-29.

Sea-Jia, H. (2015). *The Teaching of Chinese and the Text Usages in Thailand*. Guangzhou: Sun Yat-Sen University Press.

Su, X. M. (2016). Exploring the problems and countermeasures of teaching Chinese culture in five high schools in Surat Thani, Thailand. *Teaching Research, 39*(03), 117-120.

Sahin, H. (2020). Investigation of listening types of Turkish pre-service teachers in terms of the various variables: A case of Kafkas University. *Journal of Language and Linguistic Studies, 16*(1), 306-315. doi: 10.17263/jlls.712835

Staker, H., & Horn, M. B. (2014). *Blended: Using Disruptive Innovation to Improve Schools*. San Francisco: Jossey-Bass.

Tucker, C.R., Wycoff, T., & Green, J.T. (2017). *Blended Learning in Action: A Practical Guide Toward Sustainable Change.* CA: Corwin Press.

Tyley. (2020). Blended learning. *Fire Risk Management*. doi:10.4324/9780429259500-8

Vandergrift, L., & Goh, C. C. M. (2012). *Teaching and Learning Second Language Listening: Metacognition in Action*. New York: Routledge.

Weerasinghe, I. S., Lalitha, R., & Fernando, S. (2017). Students' satisfaction in higher education literature review. *American Journal of Educational Research*, *5*(5), 533–539. Retrieved from http://pubs.sciepub.com/education/5/5/9

Wang, X.J., & Geng, Y. (2019). Existing problems and Countermeasures of Chinese teaching in Thailand. *Literature education, 2*(01), 147-149. doi: 10.16692 /j.carol carroll nkiwxjyx

Wang, Y.H., & Yin, H.R. (2016). An empirical study of university students' satisfaction with MOOCs.An empirical study of students' satisfaction with MOOCs: A survey based on data from Ocean University of China. *Shandong Higher Education, 4*(10), 35-43.

World Economic Forum. (2020, January). Schools of the future: Defining new models of education for the fourth industrial revolution. *World Economic Forum Reports 2020*, p1–33. Retrieved from www.weforum.org

Wang, X. (2017). Exploring the teaching of listening to Chinese as a foreign language. *Examination Weekly, 77*(2).

Wu, J. (2015). A little reflection on the innovation of Chinese listening pedagogy. *Journal of Linguistics,20*(58), 117-119. doi:CNKI:SUN:YWXK.0.2015-20-058.

Wilt, M. E. (1950). A Study of Teacher Awareness of Listening as a Factor in Elementary Education, *The Journal of Educational Research, 43*(8), 626-636. doi: 10.1080/00220671.1950.10881817

Xi, Y. (2016). *Teaching design of "Interesting Harmonics" in Thai Chinese integrated class*. Master's thesis. Anyang Normal University.

Yang, Z.J., & Wang, Q. (2019). Exploration of Teaching Chinese as a Foreign Language Base on Blended Learning ——Take HSK as an example. *Journal of Guangxi Open University, 30* (02),15-19.

Yavuz, F., & Celik, O. (2017). The importance of listening in communication. *Global Journal of Psychology Research: New Trends and Issues, 7*(1), 8–11. doi:10.18844/gjpr.v7i1.2431

Yang, S, Y. (2018). *A study on the application of Mooc in college English listening teaching from the perspective of blended learning*. Master's thesis, Jilin University.

Zhu, X.M. (2019). *Integration of Internet Learning and Classroom Learning*. Retrieved from https://edu.gmw.cn/2019-11/29/content_33360792.htm

Zhou, C.J. (2019). *Research on the problems of Chinese language teaching and its countermeasures in Thai secondary schools*. Master's thesis. Guangxi Normal University.

Zaka, P. (2013). A case study of blended teaching and learning in a New Zealand secondary school, using an ecological framework. *Journal of Open, Flexible, and Distance Learning, 17*(1), 24-40. Retrieved from https://www.learntechlib.org/p/147990/

Zhang, W. Y. (2017). *A study on the current situation of Chinese language teaching in Kulubachan Secondary School Thailand.* Master's thesis. Yunnan University.

Sample Size Estimation using Yamane and Cochran and Krejcie and Morgan and Green Formulas and Cohen Statistical Power Analysis by G*Power and Comparisons

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ABSTRACT

Sample Size Determination of Quantitative Research; population size as research fields for the researchers to collect data for analyzing Descriptive Statistics and Inferential Statistics. Therefore sample size refers to a representative of the population. Research Purposes are: to study sample size determination of academic officer for references to determine the sample size of the research appropriate for population size, and to calculate sample size by G*Power. Derivation of the sample size of this research is Documentary Research by calculating from various formulas of the academic officer such as Taro Yamane, Krejcie & Morgan, Cochran, Green, S. B., and Cohen J. which including calculation formulas, table, comparison and computer program of G*Power - depending on variable types, variable measurement scales, Type **I** error (Alpha, α=0.05), Type **II** error (Beta, β), Power of Test: $1-\beta$ =0.80 and Effect Size=0.30.

KEYWORDS: Sample size**,** Population, Significance, Size of a test, Effect size, Power of test.

Introduction

In Quantitative Research; it is tough for researchers to access a large population size; therefore, the researchers need to reduce the population size into correct, adequate and appropriate sample size for collecting data from research fields by processing reference number analyzed from sample called Statistics back to Parameters called population. Population has classified into 3 types as follows 1) Classified by group into 2 groups such as 1.1 General population 1.2 Hypothetical population 2) Classified by scope of population into 2 types such as 2.1 Finite population is every unit of study can specify scope or completely count all the numbers 2.2 Infinite Population is every unit of study but this cannot specify scope or completely count all the numbers and 3) Classified by population characteristics into 2 types (Sedlack & Stanley, 1992) such as 3.1 Homogeneity is population in every unit has similar structural features 3.2 Heterogeneity is population in each unit has different structural features.

Sample is a representative as part of the population that the researchers are interested in. A good sample is the sample with complete important characteristics that are similar to the population, and is also a good representative of the population.

Good sample characteristics

A Good and reliable sample as a representative of the population in every research shall have characteristics as follows

1. Sample must have the same characteristics as population. The more of similarity, numbers of research will not be required. On the other hand, the fewer of similarity, many more numbers of research will not be required.

2. Sample should derive by probability sampling in accordance with preliminary agreement or conditions in statistic that is used for data analysis, especially Inferential Statistics that is used for referencing research results to population; there will be most preliminary agreement or conditions that sample should derive by probability sampling.

Theory

Sample Size Determination; the researchers should consider various factors as follows;

1) Expense, time, labor and data collection tools.

2) Population size.

3) Similarity; the more of similar population, the usage of samples size will be small. If the population is very different, there will be plenty of variances, therefore, the usage of sample size will be large.

4) Accuracy

5) Sampling error

6) Reliability

Sample size determination:

1. Sample size determination by using criteria

- Hundreds of populations; use 15-30% of sample size
- Thousands of populations; use 10-15% of sample size
- Tens Thousands of populations; use 5-10% of sample size
- Hundreds Thousands of population; use 1-5% of sample size

2. Sample size determination by calculation formulas.

3. Sample size determination by using tables.

4. Sample size determination by calculating computer programs.

Purposes

1. To study sample size determination of academic officer for references.

2. To determine sample size of the research appropriate for population size.

3. To calculate sample size by G*Power.

Benefit of Research

1. Researchers can determine the correct sample size.

2. Guidelines of sample size selection or determination of different methods.

3. Facilities for researchers by using computer tools.

Research Process

A researchers conduct a research by Documentary Research.

1. Population and sample determination; researchers conduct a research by documentary research in order to search for the truth of the phenomenon of sample size determination that appropriates for the real representatives of population size in Quantitative Research (Chanuan, 2020).

2. Creation of data collection tools which types of source document; researchers collect data from both national and international researches as published international journal.

2.1 Primary Document: Data that is the most closely matches the study.

2.2 Secondary Document: Data that has some inaccuracies from primary document.

3. Data Collection: All research data, researchers set criteria of data collection including 1) Authenticity 2) Credibility 3) Representativeness and 4) Meaning.

4. Data Analysis: Researchers analyze data from primary document and secondary document by both Content Analysis and Statistical Analysis depending on variable types, variable measurement scales, Type I error (Alpha, α), Type II error (Beta, β), Power of Test: 1- β and Effect Size by G*Power Ver.3.1.9.7.

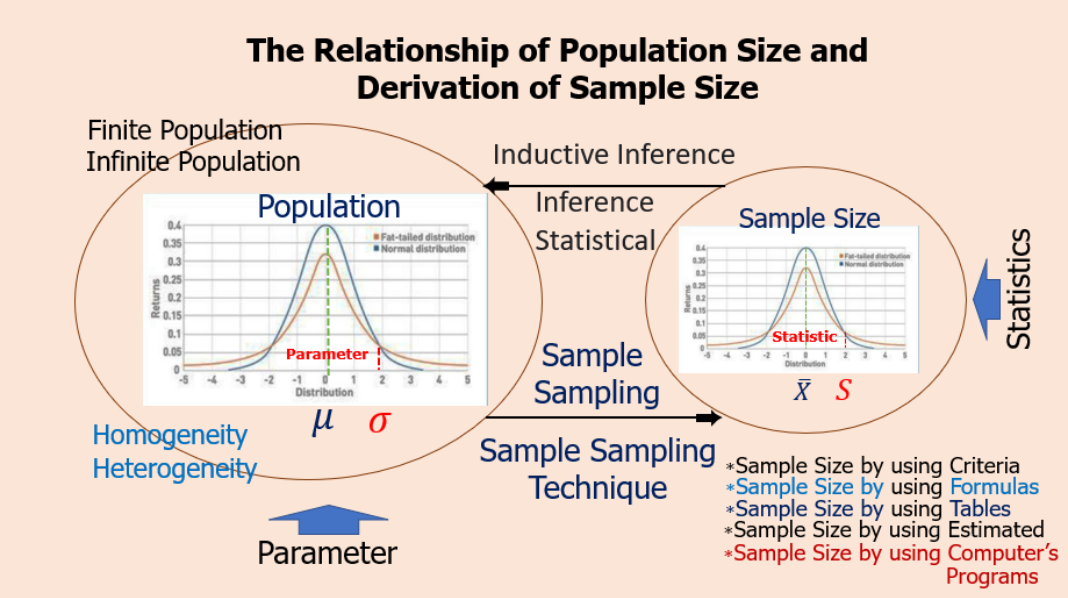

Figure 1 The relationship of population size and derivation of sample size (Chanuan, 2020).

Research Methods and Research Results

Sample Size Determination by calculation formula of Yamane compares with Cochran Table. All 5 cases Cohen compares with sample size by calculating computer programs and Green.

1.Taro Yamane Formula (Yamane, 1973)

$$n = \frac{\mathrm{N}}{1 + \mathrm{N}e^2}$$

$$n = \frac{37{,}581}{1 + 37{,}581\mathrm{x}0.05^2} = 395.78$$

$$\approx 396$$

Where n = sample size

N = population size = 37,581

e = error (0.05) reliability level 95%

or; e = level of precision always set the value of 0.05

Yamane (1973) adjusted calculation formula to be more accurate; by increasing of π = population variance from Dichotomous Variable equal to 0.50 and z = z score at significance level α (where z = 2 at α = 0.05 and z = 3 at α = 0.01) as the following formula

$$n = \frac{(z)^2(\pi)(1-\pi)(N)}{(z)^2(\pi)(1-\pi) + (N)(\mathrm{e})^2}$$

$$n = \frac{(2)^2(0.50)(1-0.50)(37{,}581)}{(2)^2(0.50)(1-0.50) + (37{,}581)(0.05)^2}$$

$$= 395.79 \approx 396$$

From calculation formula of given 37,581 population; sample size equals to 396 compares with Taro Yamane Table at

reliability level 95% ($e = \pm 5\%$) and various errors; sample size equal to 394–397 which have a similar value.

2. Krejcie & Morgan Formula (Krejcie & Morgan, 1970) If the population size is known

$$n = \frac{\chi^2 Np(1-p)}{e^2(N-1) + \chi^2 p(1-p)}$$

$$n = \frac{3.841 \times 37{,}581 \times 0.5(1-0.5)}{0.05^2(37{,}581-1) + 3.841 \times 0.5(1-0.5)}$$

$$n = \frac{36{,}087.16}{93.95 + 0.96} = 380.225 \approx 380$$

n = sample size

N = population size $= 37{,}581$

e = acceptable error of sample size

χ^2= Chi-square $d_f = 1$ and reliability level 95% ($X^2 = 3.841$)

p = the population proportions (Assumed to be 0.5)

Compare calculation formula with Krejcie & Morgan Table; sample size is 380 which equals to the population proportion and assumed to be 0.5; acceptable error 5% and reliability level 95% but the advantage by using table can calculate small and 10 or more sample size and population.

3. Cochran Formula (Cochran, 1977)

3.1 If the population size is unknown but a lot, the population proportion is known

$$n = \frac{p(1-p)z^2}{e^2}$$

$$n = \frac{(0.1)(1-0.1)(2.58)^2}{(0.05)^2} = 240$$

n = sample size

p = the population proportion ($p = 0.1$)

e = acceptable sampling error ($e = 0.05$)

z = z value at reliability level or significance level.

- Reliability level 95% or significance level 0.05; z = 1.96
- Reliability level 99% or significance level 0.01; z = 2.58

3.2 If the population size is unknown, the population proportion is unknown.

$$n = \frac{z^2}{4e^2}$$

$$n = \frac{(1.96)^2}{4(0.05)^2} = 384.16$$

n = sample size

p = the population proportions

e = acceptable sampling error ($e = 0.05$)

z = z value at reliability level or significance level.

- Reliability level 95% or significance level 0.05; z = 1.96
- Reliability level 99% or significance level 0.01; z = 2.58

3.3 If the population size is unknown and estimated population mean

$$n = \frac{\sigma^2 z^2}{e^2}$$

$$n = \frac{15^2 x\ 1.96^2}{5^2} = 35\ unit$$

n = sample size (unit)

σ= standard deviation of the sample ($\sigma = 15$)

e = acceptable sampling error $\approx (\pm 5\%)$

[If σ is unknown, defined e as % of σ such as 8% of σ ($e = 0.08\sigma$) or 10% of σ ($e = 0.10\sigma$)]

z = z value at reliability level or significance level.

- Reliability level 95% or significance level 0.05; z = 1.96
- Reliability level 99% or significance level 0.01; z = 2.58

3.4 If the population size is known and estimated the population proportion.

$$n = \frac{p(1-p)}{\frac{e^2}{z^2} + \frac{p(1-p)}{N}}$$

$$n = \frac{0.5(1-0.5)}{\frac{0.05^2}{1.96^2} + \frac{0.5(1-0.5)}{2{,}000}} = 322$$

n = sample size
N = population size
e = acceptable sampling error
p = the population proportions
z = z value at reliability level or significance level.

- Reliability level 95% or significance level 0.05; z = 1.96
- Reliability level 99% or significance level 0.01; z = 2.58

3.5 If the population size is known and estimated population mean

$$n = \frac{NZ^2\sigma^2}{(N-1)e^2 + Z\sigma^2}$$

$$n = \frac{400x(1.96)^2x\,(15)^2}{(400-1)(5)^2 + 1.96x(15)^2} = 33\ unit$$

n = sample size (unit)
N = population size (unit)
σ= standard deviation of the sample
e = acceptable sampling error

[If σ is unknown, defined e as % of σ such as 8% of σ $(e = 0.08\sigma)$ or 10% of σ $(e = 0.10\sigma)$]

z = z value at reliability level or significance level.

- Reliability level 95% or significance level 0.05; z = 1.96
- Reliability level 99% or significance level 0.01; z = 2.58

4, Samuel B. Green Formula (Green, 1991)

Regression Analysis is calculation of sample size from Green Formula which is the representative of population; it suitable for research by Sample Survey in data collection in order to test hypothesis by Regression Analysis. The dominant characteristic of Green Formula which does not take into account in population size; number of independent variables are only known. Green had developed equation (Harris, 1975) as n ≥ 50 + m and (Howell, 2002) noted that Green Formula is appropriate for Regression Analysis more than other formulas but not suitable for few predictors. For 5 predictors, the power of a hypothesis test is 0.80

$$n \geq 50 + 8(m)$$

where n is sample size
m is predictor or independent variables If m = 13, sample size estimated

$$n \geq 50 + 8(13) = 154$$

5. Jacob Cohen Formula

5.1 Calculation of sample size by group as follow:

$$n = \frac{N_{0.05}}{400f^2} + 1$$

$$n = \frac{1{,}096}{400(0.70)^2} + 1 = 7$$

Where $N_{0.05}$ = derived from table (Cohen, 1977: p.384); effect size from $f = \frac{\sigma_m}{\sigma} = 0.70$ One-way Analysis of Variance test) and Power of test as defined at significance level (α) = 0.05 or 0.01 such as significance level 0.05 and Power of test 80% and u = 3 (Group 1) = 1096 unit; therefore, calculation of sample size is 7 unit per group.

5.2 Calculation of sample size for Parametric Statistics by Regression Analysis (Chua, 2006) as follow;

Calculation of sample size of Cohen; independent variables k can be maximum of 10 (u = 10), Power of Test = 0.80, Effect Size : $f^2 = 0.15$ where Type I error (Alpha, α) = 0.05

$$N = \frac{\lambda}{f^2}$$

where f^2 : (Effect Size) from equation (Cohen, J. 1992: pg.115)

$$f^2 = \frac{R^2}{1 - R^2}$$

substitute f^2 to the main equation, so Calculation Formula of sample size of Cohen,

$$N = \frac{\lambda\,(1 - R^2)}{R^2}$$

For a trail value of v = 120, λ = 17.4 (from table 9.4.2, Cohen, 1988). Substitute λ to sample size equation ($N = \frac{\lambda}{f^2}$), therefore N = 17.4/0.15 = 116, and (v = N-u-1) = 116-10-1 = 105

However, v value at v = 60 and v = 120; N is the best value so

$$\lambda = \lambda_L - \frac{\frac{1}{V_L} - \frac{1}{V}}{\frac{1}{V_L} - \frac{1}{V_U}}\,(\lambda_L - \lambda_U)$$

$\lambda_L =$ where v = 60
$\lambda_U =$ where v = 60
$V_L =$ v low
$V_U =$ v high
where v = 60, λ = 18.7, and v = 120, λ = 17.4. substitute λ to equation

$$\lambda = \left[18.7 - \frac{\frac{1}{60} - \frac{1}{105}}{\frac{1}{60} - \frac{1}{120}}(18.7 - 17.4)\right] = 17.58$$

therefore

$$N = \frac{\lambda}{f^2} = \frac{17.8}{0.15} = 117$$

Results from calculation many times; it found that λ value at v = 60 and v = 120 will little decrease N, therefore the appropriate value from calculation of sample size is N = 116.

5.3 Calculation of sample size by G*Power Program

It can calculate sample size or power test of many analytical statistics such as exact statistics, t - tests, F - tests, Chi - square, Z tests, ANOVA, Correlation and Regression.

Calculation of sample size by G*Power Program in case of One-way ANOVA; data input into computer program, analytical statistics and other values including types of variables, variables scale, Type I error (Alpha, α), Type II error (Beta, β), Power of Test: 1- β and Effect Size as follow (Cohen, 1988)

Estimated Sample Size for One-way ANOVA (Faul et al., 2009) as shown in the figure 2, 3.

F- test for Group Effect
H_0: delta = 0 versus H_A: delta! = 0
Study Parameters:
Alpha = 0.0500
Power = 0.8000
delta = 0.7014
N_g = 4
m1 = 68.0000
m2 = 72.0000
m3 = 77.0000
m4 = 80.0000
Var_m = 21.1875
Var_e = 43.0650
Estimated sample sizes:
N = 28
N per Group = 7

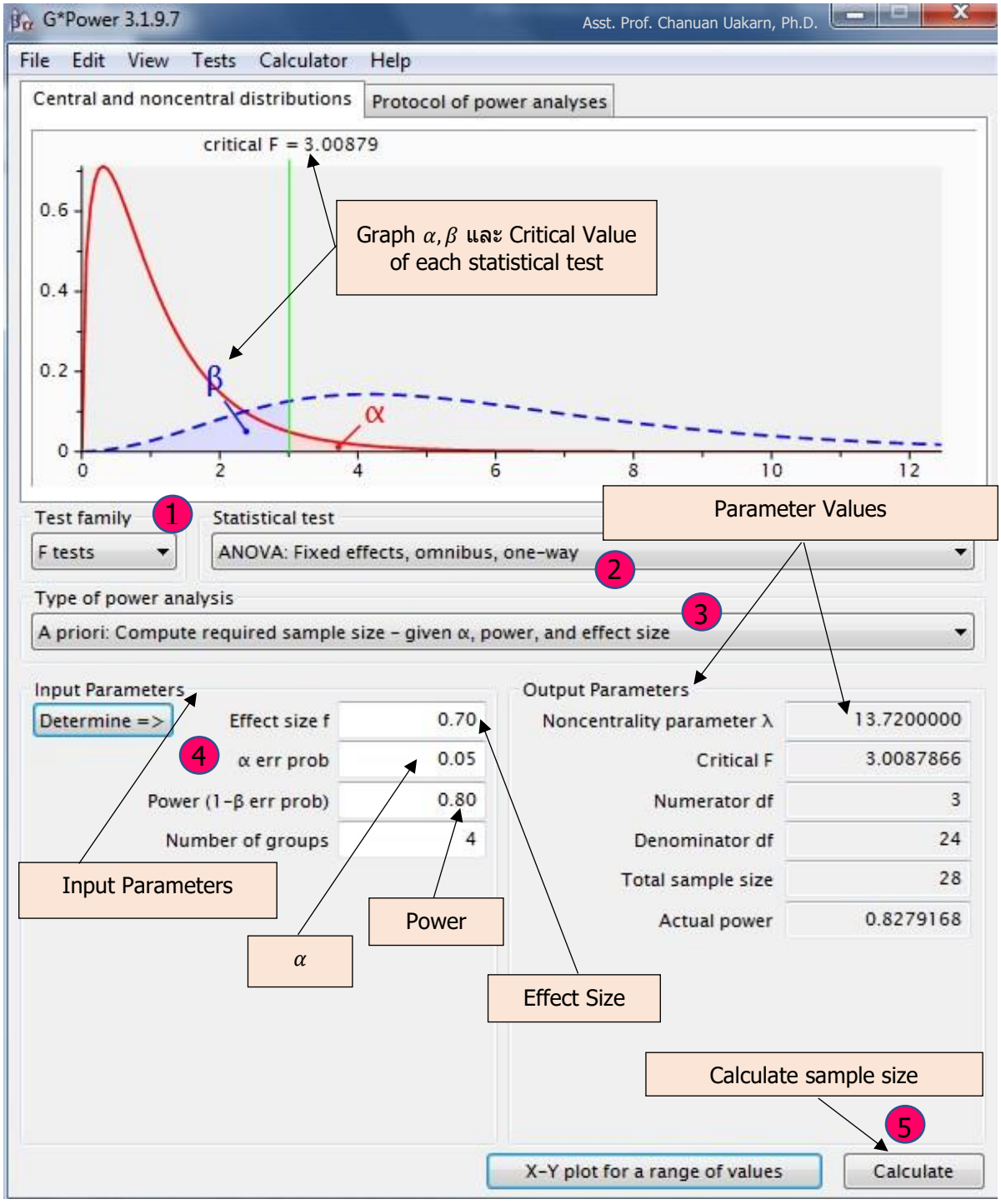

Figure 2 Shows input parameters of various statistical test by G*Power Program in case of One-way ANOVA.

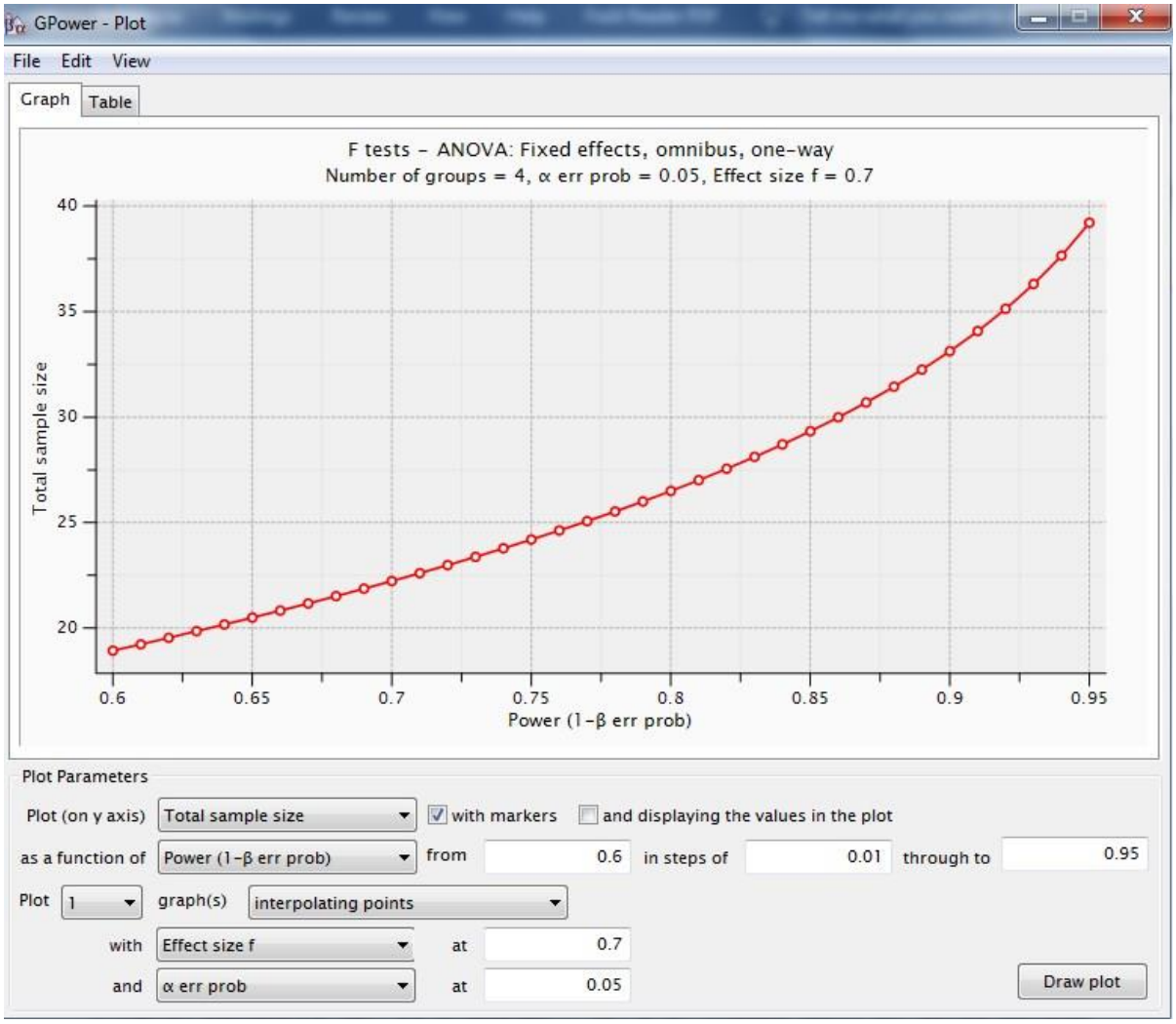

Figure 3 The relationship of total sample size and power of test: Power $(1-\beta)$.

Table 1 Input procedure as statistical values required for calculation of sample size by G*Power (3.1.9.7). (Faul et al., 2009) as shown in the figure 4, 5 and 6.

Statistical Values α = 0.05, power (1-β) = 0.80 Effect size = 0.30 and μ^2=0.088						
Procedure			Data Input	Calculation of Sample Size		
Type 1	Type 2	Type 3		Type 1	Type 2	Type 3
1	1	1	Test family	F-Test	F-Test	F-Test
2	2	2	Statistics test	ANOVA: Fixed effect, omnibus, one-way	ANOVA: Fixed effect, omnibus, one-way	ANOVA: Fixed effect, Special, main effects and interactions
3	3	3	Type of power analysis	A priori compute required sample size-given α,	A priori compute required sample size-given α,	A priori compute required sample size-given α,

				power, and effect size	power, and effect size	power, and effect size
–	4	4	Input Parameter	–	Determine=≫	Determine=≫
–	5	–	Select Procedure	–	Effect size from means	–
4	6	5	Number of groups	3	3	3
–	7	–	SD σ within each group	–	18.25	–
–	8	–	Mean	–	45.7, 43.5, 32.6	–
–	9	–	Equal n	–	50	–
–	10	6	Size	–	50	Direct
–	11	7	Total sample size	–	150	Partial μ^2=0.088
–	12	8	Calculate	–	Effect size f=0.3138471	Effect size f=0.31063
5	13	9	Calculate and transfer to main window	Effect size f=0.30 (Cohen)	Effect size f=0.3138471	Effect size f=0.31063
6	14	10	Calculate	Total sample size 111	Total sample size 102	Total sample size 178
			Critical F	3.08039	3.08824	1.88578

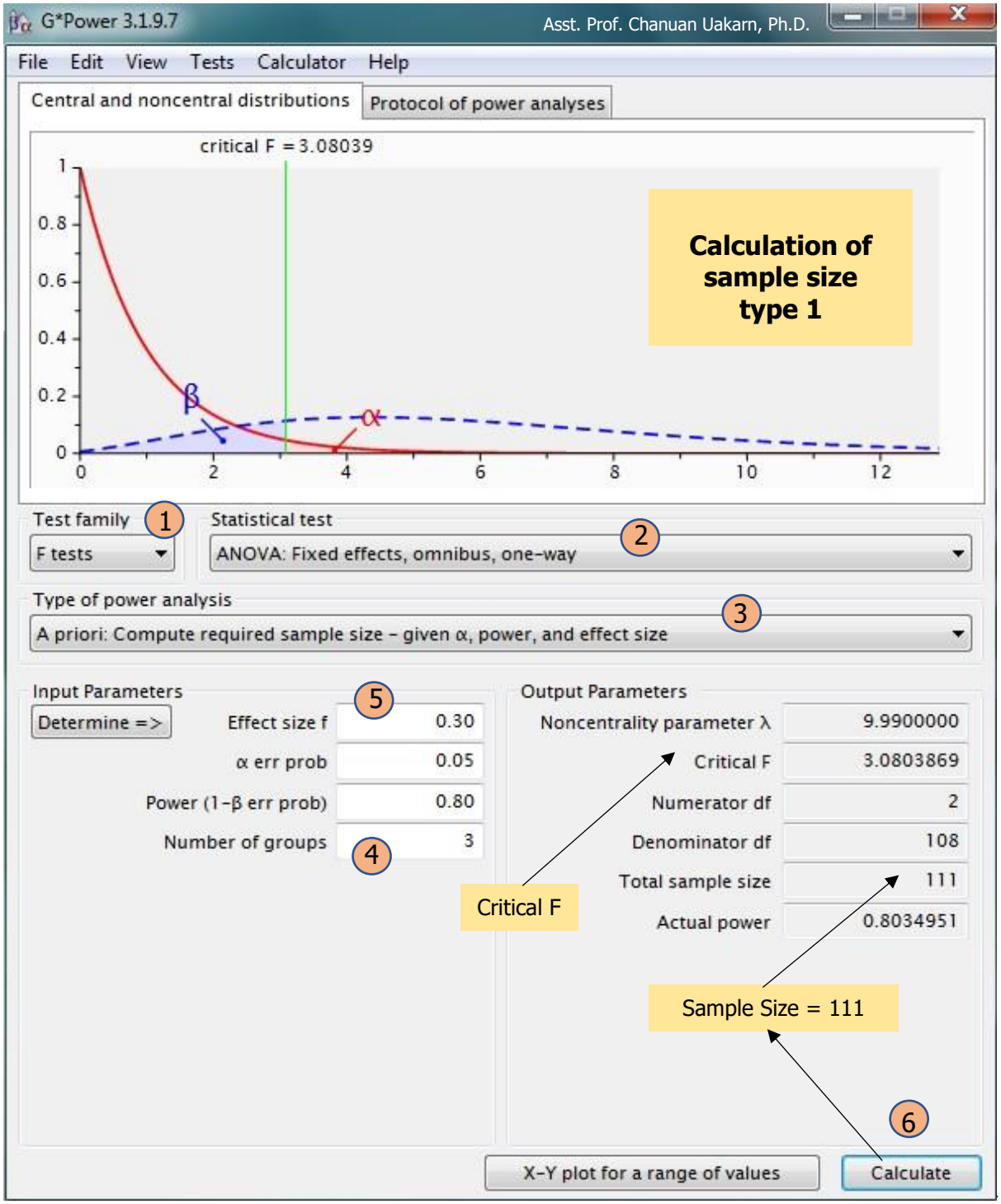

Figure 4 Shows calculation of sample size type 1.

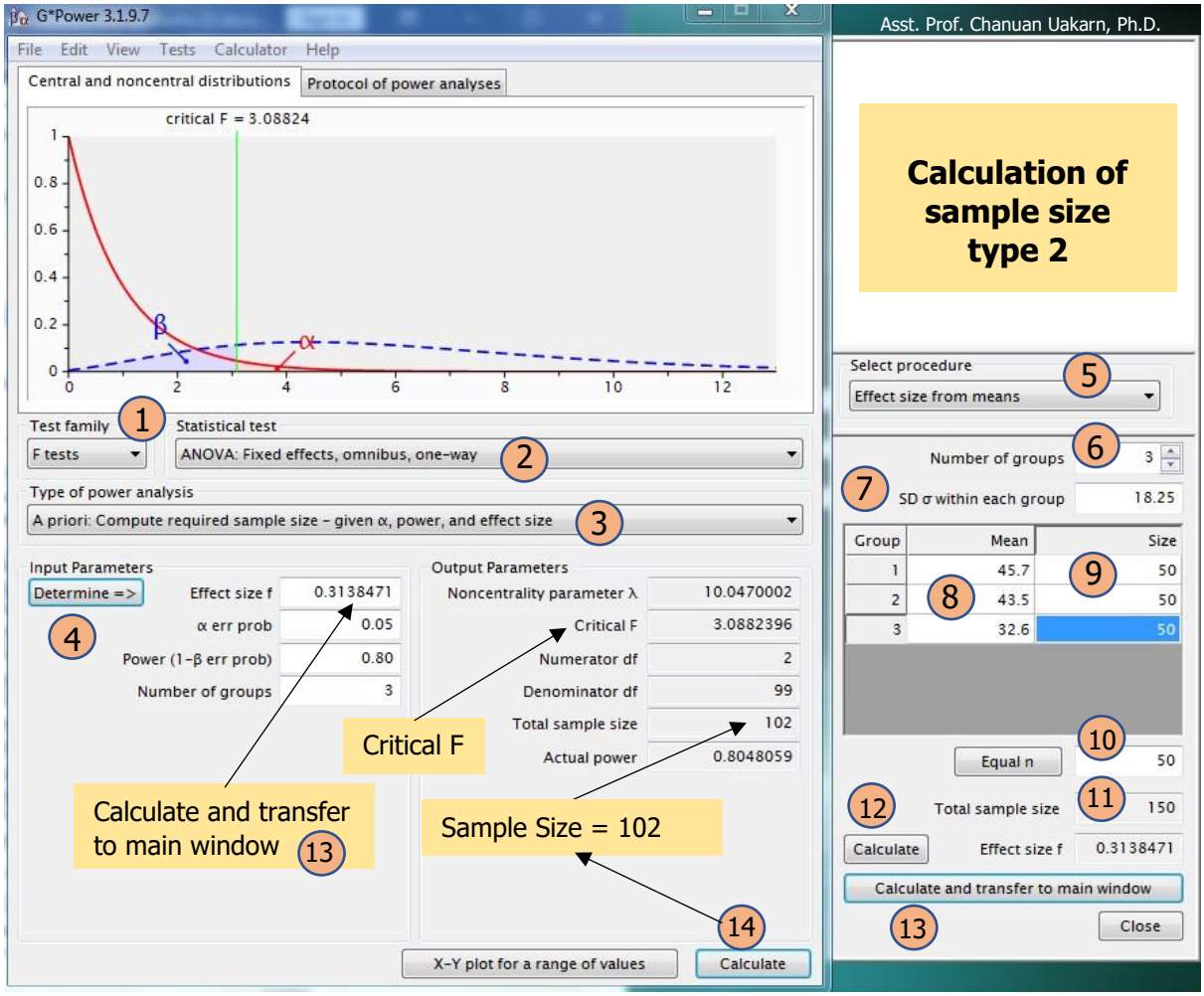

Figure 5 Shows calculation of sample size type 2.

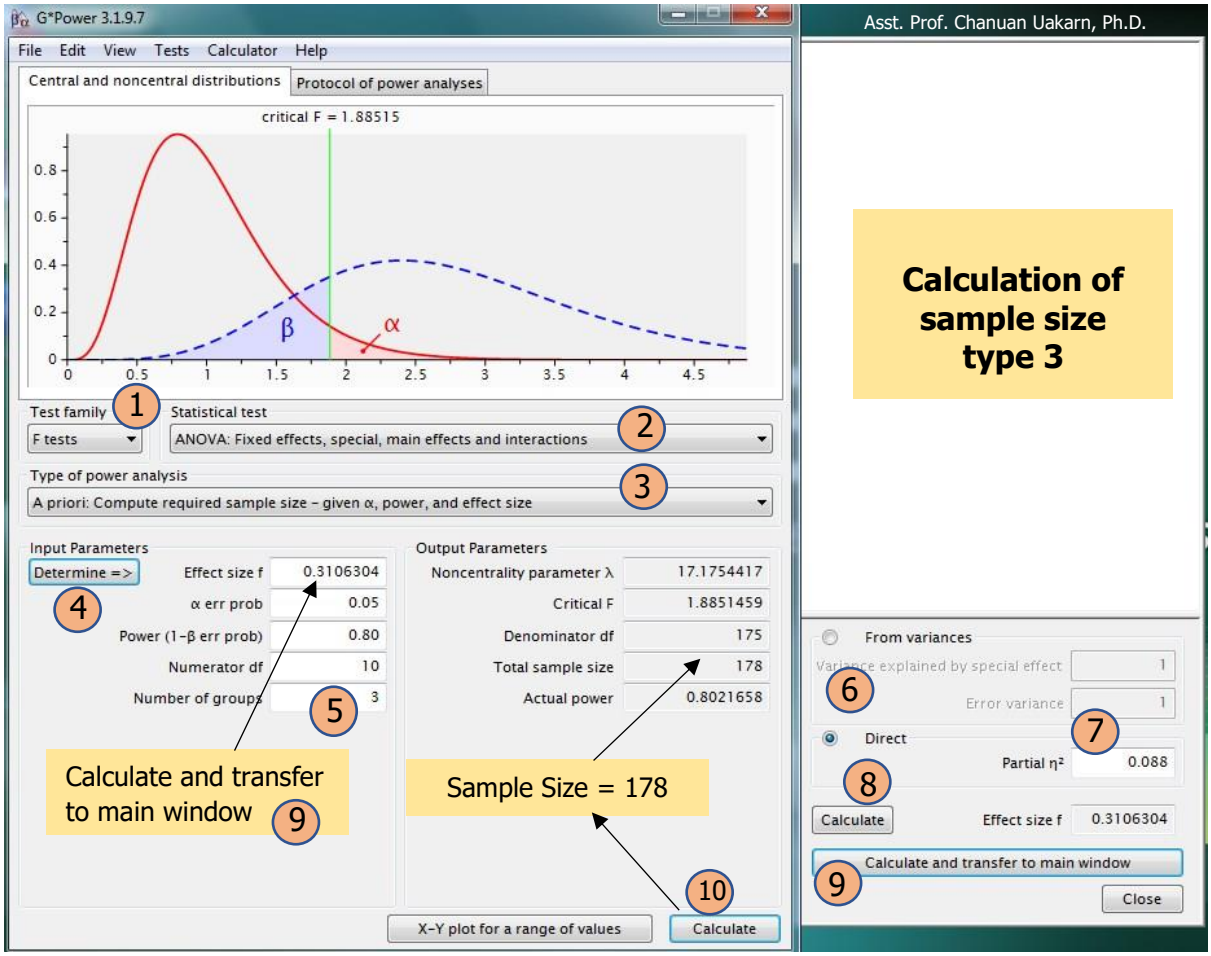

Figure 6 Shows calculation of sample size type 3.

Discussion and recommendation

According to Calculation of Sample Size by formulas and tables of academic officer together with input various statistical values, these are in order to receive the real value of representatives of population and correct sample size. Results from similar experiments such as Taro Yamane and Krejcie & Morgan However, the sample size is still high. In terms of Green and Cohen, the sample size is smaller, or not relatively not close to Cochran these are depending on size or number of inputs, statistical values, acceptable error, power of test, effect size, population size, variable size. The most important is the selection of statistical methods for analyzing Inferential Statistics with parameters such as t-Test, F-Test, z-Test, ANOVA, Regression Analysis or Inferential Statistics without parameters for instance correlation and Chi-Square.

Conclusion and recommendation

Sample Size Determination of Yamane and Krejcie & Morgan are suitable for Survey Research and Finite Population; but not suitable for Experiment Research. In case the population size is unknown but the number is high, population proportion is known or the population size is unknown, population proportion is unknown or the population size is unknown and estimated population mean or the population size is known and estimated the population proportion Cochran Formula is suitable for all these. Green Formula is easy and suitable for Regression Analysis; number of independent variables are only known. Cohen Formula is another choice; the calculation depends on (α), Power of Test, Effect Size, Type I or II error and correspond with calculation by G*Power.

Reference

Chua Lee Chuan. (2006)**.** Sample Size Estimation Using Krejcie and Morgan and Cohen Statistical Power Analysis: A Comparison. *Jurnal Penyelidikan IPBL,* Jilid 7.

Cochran, W. G. (1977). *Sampling techniques.* 3rd Ed. New York: John Wiley & Sons.

Cohen, J. (1977). *Statistical Power Analysis for Behavioral Sciences***.** 1st Ed. New York: Academic Press. StataCorp. 2003. STATA Reference Manual Release 10. Texas: Stata Press.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences***,** 2nd Ed. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Cohen, J. (1992). Quantitative Methods in Psychology: Power Premier. *Psychological Bulletin;* July1992; Vol.112, No.1; pp.155-159

Chanuan Uakarn. (2020). *Advanced Quantitative Research Methods in Public Policy*. Kasem Bundit University: Public Policy and management, Lecture document 2-2020.

Faul, F., Erdfelder, E., Lang, A.-G., and Buchner, A. (2007). *G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods,* 39, 175-191.

Faul, F., Erdfelder, E., Buchner, A., and Lang, A.-G. (2009). *Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behavior Research Methods,* 41, 1149-1160.

Krejcie, R.V., and Morgan, D.W. (1970) *Determining Sample Size for Research Activities. Educational and Psychological Measurement.* 30, 607 – 610.

Samuel B. Green, (1991). *How Many Subjects Does It Take To Do A Regression Analysis?* Jul 1;26(3), 499-510.

Sedlack R. G., and Stanley J. (1992). *Social Research: Theory and Methods.* 1st Ed., Indiana University: Allyn and Bacon.

Yamane, Taro. (1973), *Statistics: An Introductory Analysis.* London: John Weather Hill, Inc.

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