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Impact of Web-Based Teaching on the Learning Performance of Education and Training in the Service Industry during COVID-19

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Abstract

In response to the impact of the COVID-19 pandemic in 2020, companies around the world have suspended on-site jobs and adopted remote operations. Education and training in some companies are also being carried out through web-based teaching. In addition to bringing new challenges to traditional education and training, web-based teaching platforms also provide a wealth of information sources and application channels for corporate education and training. This study targeted service staff in the service industry as subjects, and incorporated three types of teaching methods into the research design, namely video tutorial, computer-aided teaching and web-based teaching. ANOVA and stepwise regression are then used to analyze the learning motivation, learning attitude and learning performance in an integrated comparison. The results showed that in the service industry, using web-based teaching to conduct employee training for service staff had a substantial impact on improving their learning performance.

Keywords: video tutorial, computer-aided teaching, web-based teaching, learning motivation, learning attitude, learning performance

INTRODUCTION

Since it began in November 2019, the COVID-19 epidemic has spread to more than 120 countries and regions around the world within a few months, and infected more than 300,000 people. The epidemic has yet to be completely under control, and countries have adopted protective measures such as evacuation, shutting down flights and closing borders. The spread of the epidemic has not only affected economic and trade momentum in Southeast Asia. It has also restricted Thai exports and foreign tourists from visiting Thailand. As a result, the growth of service output has been greatly limited. The tourism industry in Thailand accounts for 11% of its gross domestic product (GDP). In 2019, 39.8 million international tourists visited Thailand. However, the Tourism Division, Culture, Sports and Tourism Department of Thailand has estimated that only 14 million foreign tourists will visit Thailand this year (2020), which is the lowest number in 14 years.

To cope with the impact of the COVID-19 epidemic and avoid interruption in their operations, service industry companies in Thailand have gradually implemented isolation plans or adopted remote work to reduce the risk of human contact. In response to the epidemic, the Thai government has also launched numerous subsidy programs. It hopes to help manufacturing and related technical service industries that have been impacted by the epidemic encourage their employees to take advantage of their excess time during their work suspension to engage in learning. The global isolation measures against COVID-19 has unexpectedly

accelerated the popularization of related technology applications, particularly working online from home, web-based teaching, telemedicine and economy (Basilaia & Kvavadze, 2020; Biswas et al., 2020; Cahapay, 2020; Cortes, 2020; Darma et al., 2020; Demuyakor, 2020; Kamsurya, 2020; Mulenga & Marbán, 2020; Murphy et al., 2020; Radwan et al., 2020; Tria, 2020) Among these applications, web-based teaching has become a powerful tool for large-scale service corporations in Thailand for employee education and training during the COVID-19 epidemic.

Characterized by its absence of time and space barriers coupled with its rapid development, computer network technology has allowed computed-aided learning and training systems to replace some of the traditional corporate education and training (Rand, 1996). Web-based teaching is an innovative remote teaching method delivered through the Internet, Intranet or World Wide Web (Hall, 1997). With the advantages of information technology and the prevalence of the Internet, education and training conducted through the Internet not only meets the need for real-time, fast, large-scale and flexible delivery. It also reduces training costs (Driscoll, 2002; Horton, 2000).

Assuming that the different teaching methods are moderating variables in learning motivation and learning attitude, this research conducted a comparative study to examine the impact of different teaching methods on learning performance. Using service personnel training in the top four service industries in Bangkok (banks, telecommunications, restaurants and department stores) as the research object and the three teaching methods as moderating variables, namely video tutorial, computer-aided training and web-based teaching, the research examined the impact of the three teaching methods on learning motivation, learning attitude and learning performance.

LITERATURE REVIEW AND RESEARCH HYPOTHESIS

Video Tutorial and Computer-aided Teaching

Video tutorials use videos to bring trainees into a completely unfamiliar and intuitive world where the trainees seem to be spectators but are in fact participants. Video tutorials usually enable trainees to remember the training content for much longer (Steffes & Duverger, 2012). Computer-aided teaching is the implementation of training activities by means of Internet tools and Internet environment. It is delivered to the corporate computer network and presented in a browser mode (Dyer, 1997; Nichols, 1997). Computer-aided teaching particularly emphasizes adaptive learning, where the main advantages include providing customized learning and allowing learners to select different answers for different situations. However, the main disadvantage is that it is more expensive than general teaching media and is easily influenced by human factors. The study believes that in the education and training process, different teaching methods will have different significant impact on learning performance, and hence proposed research Hypothesis 1 (H1).

Web-based Teaching

Web-based teaching is a method of using computers to teach courses through the Internet (Rosenberg et al., 2001). Web-based instructions (WBI) can provide students with an autonomous and flexible learning environment. In addition to the learning functions provided by traditional computer-aided teaching, web-based learning also offers the advantages of content interaction and group interaction, simultaneous and asynchronous interaction, and individual and group interactions (Liaw et al., 2007). At the same time, it allows for interactive actions such as asking questions, seeking guidance and responding to inquiries (Lamaster & Tannehill, 1997).

In the past, web-based teaching for employee training in international chain corporations was based on time, distance and travel expense considerations (Das et al., 1999). Today, under the impact of the COVID-19 epidemic, web-based teaching methods have become powerful tools for companies for educating and training their employees who are staying at home for isolation.
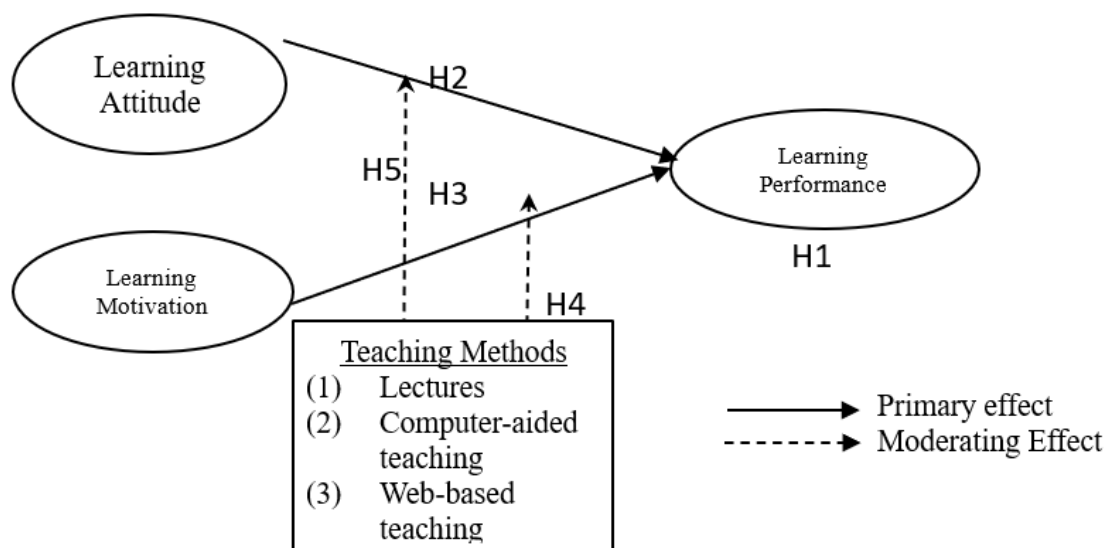
Figure 1. Research Framework

Learning Motivation, Attitude and Performance

Learning motivation is a form of mental demand in individuals to pursue success (Stipek et al., 1995). For service providers in the service industry, their motivation to receive education and training is closely related to their working environment (Miller, 1967). At the same time, when trainees feel that the learning content is consistent with their interests and needs, their learning satisfaction is greater (Lam & Wong, 1974). In digital learning, four important indicators, namely attitude, experience, cognition and learning style can enhance trainee learning (Simonson et al., 2000). Among these, attitude is the most important indicator. Since attitude has an orientational impact on the perception of activities, it will impact learning performance. Therefore, the learning performance of learners is related to their learning motivation, where the higher the learning motivation of the learners, the better their learning performance (Berdie, 1965; McCombs, 2000). Hence this study hypothesized that learning motivation and learning performance have a positive and significant correlation (H2); likewise, the study also hypothesized that learning attitude and learning performance have a positive and significant correlation (H3). Since three different teaching methods, namely video tutorial, computer-aided teaching and web-based teaching are used in the research design, the research further hypothesized that the different teaching methods have a moderating effect on the impact of learning motivation on learning performance (H4). The research also hypothesized that the different teaching methods have a moderating effect on the impact of learning attitude on learning performance (H5).

RESEARCH METHOD

Research Framework

This research mainly discussed the implementation of web-based teaching in major service industries in Bangkok during the COVID-19 epidemic and the impact of web-based teaching on learning performance in service personnel education and training. For a clearer understanding of the relationship between web-based teaching and learning performance, different teaching methods are added as moderating variables. To portray the relationship between the research variables and the research hypotheses, the hypotheses are integrated into the research framework and illustrated in **Figure 1** to better demonstrate their relationship. Based on the abovementioned research hypotheses, the conceptual framework for this research is constructed.

Table 1. Reliability analysis of questionnaire variables

Variable Measurement	Measurement Items	Cronbach's α
Learning Motivation Dimension	Total of 8 items	0.864
Learning Attitude Dimension	Total of 5 items	0.876
Learning Performance Dimension	Total of 6 items	0.853

n＝137

Research Design and Procedure

The research variables in the research framework are divided into three parts: independent variable, dependent variable and moderating variable. The independent variables are learning motivation and learning attitude, the dependent variable is learning performance and the moderating variables are the different teaching methods. All variables are measured on a 7-point Likert Scale.

The questionnaire in this study is divided into four main dimensions: learning motivation, learning attitude, learning performance and demographic variables. The learning motivation variable has a total of 8 items, and is modified from the learning motivation scale constructed by Pintrich, Smith, Garcia and McKeachie (1993). The learning attitude variable has a total of 5 items, and is adapted from the scale compiled by Liaw et al. (2007). The learning performance variable has a total of 6 items, and is adopted from the learning performance scale constructed by Bloom, Engelahar, Frust, Hill and Krathwohl (1956). After completing the implementation of the video tutorial, computer-aided teaching and web-based teaching, the trainees were allowed to conduct practice exercises remotely. They were evaluated using the learning performace scale to determine the outcome of their training.

The formal research is mainly based on a quasi-experimental design where the human resource departments of the top four service industries in Bangkok conducted education and training courses during the COVID-19 epidemic. The service personnel trainees were the research subjects, and the human resource directors served as course instructors. Existing training materials of the companies' human resource departments were used, and the same topics and same subjects were used as the teaching units for this research. Three teaching methods, video tutorial, computer-aided teaching and web-based teaching, were used for teaching. Among these, video tutorial and computer-aided teaching provided the service personnel with online learning at any time. The total time for each lesson was 1 hour. On the other hand, the web-based teaching was scheduled for every Tuesday and Thursday. The content teaching time was 45 minutes, and the guided practice time was 15 minutes.

In each company, the trainees were divided into three groups of 12 people per group. A different training theme was introduced each week, and the three different teaching methods were implemented in turn. The teaching experiment took two months to complete to ensure that the trainees adapted to the different teaching methods. The assessment questionnaires were then distributed to the trainees to complete.

The assessment questionnaires were distributed to the research objects. A total of 36 employees from each company participated in the training, and a total of 144 assessment questionnaires were distributed, of which a total of 7 returned questionnaires were invalid (accounting for about 4.8% of the total number issued; notwithstanding the error, the experiment result was unaffected). The invalidity of the questionnaires was mainly due to inaccurate answers such as failure to answer all the questionnaire items or providing only single-word answers, failure to participate in the practice exercises for all three types of teaching method, or being on leave of absence on the day of the experiment. The final number of valid questionnaires was 137 questionnaires (accounting for 95.2% of the total number issued). In the reliability analysis, the Cronbach's α for each variable was greater than 0.8, indicating that the pre-test questionnaire in this study has good reliability, as shown in **Table 1**.

Table 2. Analysis of the differences in learning performance for different teaching methods

Dependent Variable	F value	P value	(a) Teaching Method	(b) Teaching Method	Mean Deviation (a-b)	Significance
Learning Performance	4.081	0.0267	Web-based teaching	Computer-aided teaching	.2418	.017*
				Video tutorial	.3967	.004*
			Computer-aided teaching	Web-based teaching	-.2431	.017*
				Video tutorial	.1432	.048*
			Video tutorial	Web-based teaching	-.3972	.005*
				Computer-aided teaching	-.1452	.048*

n＝137；*p＜.05，**p＜.01

Table 3. The mean, standard deviation and correlation coefficient of various variables[a]

	Mean	Standard Deviation	Learning Motivation	Learning Attitude	Learning Performance
Learning Motivation	3.95	.58			
Learning Attitude	3.92	.52	.73(**)		
Learning Performance	3.88	.59	.69(**)	.63(**)	

Note: a. n＝137；*p＜.05，**p＜.01

Table 4. Regression analysis of learning motivation, learning attitude and learning performance[a]

		Learning Performance		
	Predictive Variables	β	R2	ΔR2
Step 1	Demographic Variables		.004	
Step 2	Learning Motivation	.545**	.486**	.483**
	Learning Attitude	.783**	.538**	.537**

Note: a. n＝137，*p＜.05，**p＜.01

Research Hypothesis Testing

Testing differences in learning performance for different teaching methods

This research hypothesized that there are significant differences in learning performance for different teaching methods (H1). To test research hypothesis H1, the study used ANOVA and the Scheffe method to perform post-hoc verification. The significant level for testing the impact of different teaching methods on learning performance was set at $\alpha=0.05$. The results showed a F value of 4.081 and a p value of 0.0267, indicating significant different learning performance for different teaching methods, as shown in **Table 2**. Multiple comparisons showed that web-based teaching had the strongest impact on learning performance, followed by computer-aided teaching, thereby supporting Hypothesis 1.

Testing the relationship between learning motivation, learning attitude and learning performance

To test hypotheses H2 and H3, the study used correlation coefficients and stepwise regression analysis to obtain the mean, standard deviation and correlation coefficient of the variables. The results showed that the significance level of all correlation coefficients of the variables reached $p<.01$. Learning motivation and learning attitude showed a moderate to high correlation (r=.73); learning attitude and learning performance showed a moderate correlation (r=.69); and learning motivation and learning performance showed a moderate correlation (r=.63), as shown in **Table 3**.

The study then used demographics as control variables in Step 1, followed by learning motivation and learning attitude in Step 2 to predict learning performance. As demonstrated by the results of regression analysis in **Table 4**, learning motivation was controlled by demographic variables; learning motivation was predictive of learning performance (ΔR^2 = .483, p<.01) and showed a significant positive correlation (B=.545, p<.01). Learning attitude was controlled by demographic variables; learning attitude was predictive of learning effectiveness (ΔR^2=.537, p<.01) and showed a significant positive correlation (β=.783, p<.01).

The analysis results supported hypotheses H2 and H3, indicating that when the trainees were positive in their learning motivation and learning attitude, their skills learning and intrinsic abilities were positively enhanced

Table 5. Analysis of the moderating effect of different teaching methods on relationship between learning motivation and learning performance[a]

		Web-based Teaching			Computer-aided Teaching			Video Tutorial		
	Analysis of Moderating Effect	β	R2	ΔR2	β	R2	ΔR2	β	R2	ΔR2
Step 1	Demographic Variables		.093			.002			.108	
Step 2	Learning Motivation	.459**	.602	.519**	.463*	.641	.630**	.387*	.538	.430**
	Learning Attitude	.734**	.567	.498**	.798**	.591	.574**	.654**	.602	.494**

Note: a. n=137. Demographic variables include category and gender. *P＜.05, **p＜.01

during the learning process. More importantly, the positive learning attitude had a stronger impact than learning motivation on learning performance.

Testing the moderating effect of different teaching methods on the relationship between learning motivation and learning performance

In terms of the moderating effect of different teaching methods on the relationship between learning motivation and learning performance, the study proposed Hypothesis 4 and Hypothesis 5. Demographics were introduced in Step 1 as control variables, followed by learning motivation and learning attitude in Step 2 to predict learning performance. The data were then categorized according to the different teaching methods, and the analysis results are as shown in **Table 5**.

As can be seen from the analysis data in **Table 5**, regardless of the three different teaching methods, learning motivation, learning attitude and learning performance showed a positive correlational structure. However, in terms of learning motivation and learning performance, the regression coefficients show that when teaching was delivered through web-based teaching and computer-aided training methods, the impact of trainee learning motivation on learning performance was significantly higher than when the course was delivered through video tutorial. In terms of learning attitude, the use of digital teaching in the training also resulted in a significantly higher impact on learning performance of the trainees than the use of ordinary video tutorials. Therefore, adopting different teaching methods in education and training can have a certain impact on the learning performance of the trainees. As indicated by the findings, the different teaching methods had a moderating effect on the impact of learning motivation on learning performance, thereby supporting hypotheses H4 and H5.

CONCLUSIONS AND SUGGESTIONS

The research results showed that the use of digital teaching is more effective than the use of video tutorial alone. This is because in the service industry, the service process involves many steps and cumbersome details. For trainees with little experience, it is difficult to digest within a short period of time the standard operating procedures taught in the video tutorial and internalize the information to become a part of their service skills. When training is delivered through computer-assisted teaching, the trainees can train themselves by following the guidelines provided in the computer teaching content. However, the trainees cannot communicate and interact with an inanimate computer interface. On the other hand, web-based teaching can provide the function of face-to-face interaction. It allows trainees to interact with their instructors at any time without time or space limitation, and allows them to review correct and standard operating procedures.

Therefore, using the convenience of Internet technology to create a diversified education and training environment for learning anytime and anywhere is a noteworthy development strategy for service industry vendors to improve their business performance. This strategy is suitable for investment by large international corporations, and the return on this investment can be seen in substantive benefits such as the greatly reduced cost of work or training related expenses, the ability to upgrade work related knowledge or skills at any time to retain excellent and valuable employees, and improvement in the quality of the company's services and productivity (Driscoll, 2002).

This research recommends that service providers assess the completeness of their company's internal information infrastructure, ensure that all their employees can adapt to new learning methods and face the corporate challenge of keeping pace with technology. In the future when AI, VR and 5G technology have matured, existing web-based teaching models will be revolutionized with virtual lecturers (Johnson & Valente, 2009). With the development of AI and a supportive 5G environment, a new generation of web-based teaching will allow students to communicate with their virtual trainers on the Internet anytime and anywhere. Furthermore, virtual reality technology can even provide virtualized workplaces for students to perform repeated practice operations. Finally, the development of web-based teaching content for enterprises is essentially similar to the development of traditional teaching courses. It can also follow a systematic cycle of analysis, design, development, implementation and assessment. Then according to the job attributes of the trainees and their task uniqueness and characteristics, items in the teaching content can be adjusted at different stages to achieve maximum effectiveness in the education and training.

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