

How the Online Learning Affects for Principals' Management

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Abstract: - In the past decade, the Internet and World Wide Web (WWW) have been considered important in the schools as part of the learning environment. The value of online learning has become widely recognized with development of information technology so as to accept gradually by instruction in the schools. Through the network, everyone can learn anytime and anywhere. This kind of learning convenience completely changes the traditional teaching model. But it is seldom understood about the principals' behavioral intentions to use WWW. The purpose of this study was to develop a Technology Acceptance Model (TAM) for the principals in elementary schools and junior high schools. The Technology Acceptance Model proposes that ease of use and usefulness predict applications usage and behavior. This study was framed by six subscales: perceived ease of use, perceived useful planning, perceived useful learning, perceived useful contents, attitudes toward using online learning, and behavioral intentions to manage via online learning. This study would also explore the relationship between online learning and the principals' leadership. At the same time, the study introduced perceived useful planning, perceived useful learning, and perceived useful contents as new factors that reflected the principals' intrinsic belief in online learning acceptance.

Key-Words: Technology Acceptance Model, TAM, Principals' management in the schools.

1 Introduction

With the rapid development of information technology and network infrastructure construction, the online learning system has been changed from traditional face-to-face classroom to speedy information technology. On the past decades, few of researchers have constructed specifically for the principals' attitudes toward online learning. Via Technology Acceptance Model (TAM), we want to explore the relationship between online learning and the principals' management in the schools..

In 1989, Davis proposed the Technology Acceptance Model (TAM) to address how other factors affected perceived usefulness, perceived ease of use, attitudes toward use, behavioral intentions to use and actual system use [1]. In other words, TAM was made use of expressing the potential user's behavioral intentions to use a technological motivation. Factors contributing to the acceptance of a new information technology (IT) varied with the network, users' belief, and online context. Thus,

research on the acceptance of the online learning would enhance researchers' understanding of the principals' beliefs or motivation to use the WWW and to show how these factors affected the principals' acceptance the use of the online courses.

The purpose of this study was to extend the TAM in the online learning context. We proposed three new variables-- perceived useful planning, perceived useful learning, and perceived useful contents to enhance understanding of the principals' attitudes in online learning. This research also assessed the effect of the difference between the principals' administration factors on their online learning acceptance behavior-- administrative management.

2 Literature Review

2.1 Technology acceptance model (TAM)

In 1989, Davis has shown that TAM could explain

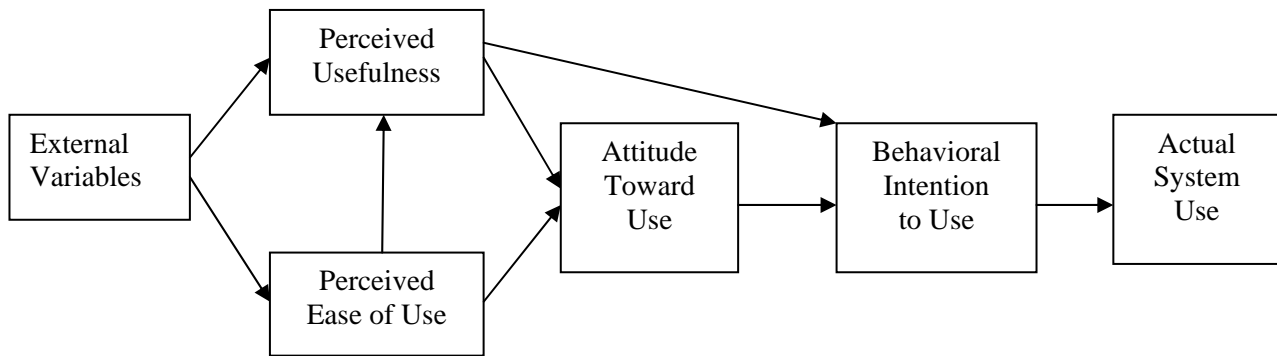


Fig. 1. Technology Acceptance Model [1]

the usage of IT [2]. He indicated that perceived usefulness and perceived ease of use represented the beliefs that lead to IT acceptance. According to TAM, perceived usefulness was the degree of which a person believed that using a particular information system would enhance his or her job performance. Perceived ease of use was the degree of which a person believed that using a particular system would be free of effort. Two other constructs in TAM were attitudes toward use and behavioral intentions to use. Attitudes toward use were determined by the user's beliefs and attitudes toward using the system. Behavioral intentions to use were determined by these attitudes toward use the system[2].

TAM's dependent variable was actual system use. Behavioral intentions to use lead to actual system use. It had been a self-reported measure employing the application in IT. Fig. 1 showed the original TAM model. Some authors had studied the effect of ease of use or usefulness directly on behavioral intentions to use [3]. Some had considered adding new additional relationships factors to attitudes towards use [4]. Hence, to maintain instrument briefly and permit the study of perceived ease of use and perceived usefulness to attitudes towards use, the current research similarly studied the direct effect of ease of use and usefulness on behavioral intentions to use.

However, in the context of online learning and the school's factors, they were the principals in the schools, were considered additional variables. Online learning was proposed as a motive for learning online experience here. Additionally, the school's factors were defined that the principals led teachers to participate online learning activities. Therefore, to increase external validity of TAM, it was necessary to further explore the nature and specific influences of administration at schools and online learning context factors that may alter the principals' acceptance. Fig. 2 showed the model in the current study.

2.2 Perceived ease of use and perceived usefulness in online learning

In the recent survey, the results identified some key ease of use problems. In the qualitative approach[5], for example, cited slow data access as the issue from the Internet, cited difficulty searching for specific information, time delayed due to images, and did incomplete category searches. In another study, they found that the web pages were the slow speed of downloading, users were unable to perform such tasks as finding a page, they found, and so on[6]. So Levi and Conrad[7] offered eight perceived usable principles: speaking the users' language, consistent concepts, minimization of the user's memory load, efficiency and flexibility of use, minimalist and aesthetic design, chunking short documents with one topic, progressive levels of specific detail and navigational feedback.

As to perceived usefulness, less research had considered possible features of perceived usefulness in online learning. Usefulness measures related to the work environment in a web. Griffin identified seven task-related uses of information including information about competitors, customers, suppliers, government regulators, labor, company owners, and company relationships[8]. Information related to functional support within an organization might similarly provide usefulness aspects to a Web. Such functions typically include true data, timely messages, complete information, and relevant web sites.

3 Research model and hypotheses

3.1 Research model

Fig. 2 illustrated the extended TAM examined here. It asserted that the intentions to manage via online learning were a function of: their perceived

usefulness by course contents, learning activities and planning course of online learning, perceived ease of using online learning and attitudes toward using online learning. Intentions were the extent to which the principals would like to manage via online learning in future. Moreover, perceived usefulness was defined as the extent to which the principals believed that online learning would fulfill the purpose. Additionally, perceived ease-of-use was the extent to which the principals believed that online learning was effortless.

The basic assumption was that perceived usefulness in online learning would have a positive effect on the principals' attitudes toward using online learning and their behavioral intentions to manage via online learning.

3.2 Hypotheses

This research model adopted the TAM usefulness – attitude – intention – behavior relationship, so the following TAM hypothesized relationships were proposed in the context of online learning:

- Hypothesis 1.** Perceived ease of use is positively related to attitudes toward using online learning.
- Hypothesis 2.** Perceived useful planning is positively related to attitudes toward using online learning.
- Hypothesis 3.** Perceived useful learning is positively related to attitudes toward using online learning.
- Hypothesis 4.** Perceived useful contents is positively related to attitudes toward using online learning.

Fig. 2. the research model in online learning

- Hypothesis 5.** Perceived ease of use is positively related to behavioral intentions to manage via online learning.
- Hypothesis 6.** Perceived useful planning is positively related to behavioral intentions to manage via online learning.
- Hypothesis 7.** Perceived useful learning is positively related to behavioral intentions to manage via online learning.
- Hypothesis 8.** Perceived useful contents is positively related to behavioral intentions to manage via online learning.
- Hypothesis 9.** Attitudes toward using online learning are positively related to behavioral intentions to manage via online learning.

4 Research method

4.1 Data collection

Empirical data were collected by conducting a survey of the principals' conference in Pingtung, Taiwan. Subjects were the principals in elementary schools and junior high schools. The questionnaires survey yielded 91 usable responses. 76.9% of the respondents were male, and 23.1% were female; 81.3% of the respondents were principals in elementary schools and 18.7% were principals in junior high schools. The other returned sample characteristics are illustrated in Table 1.

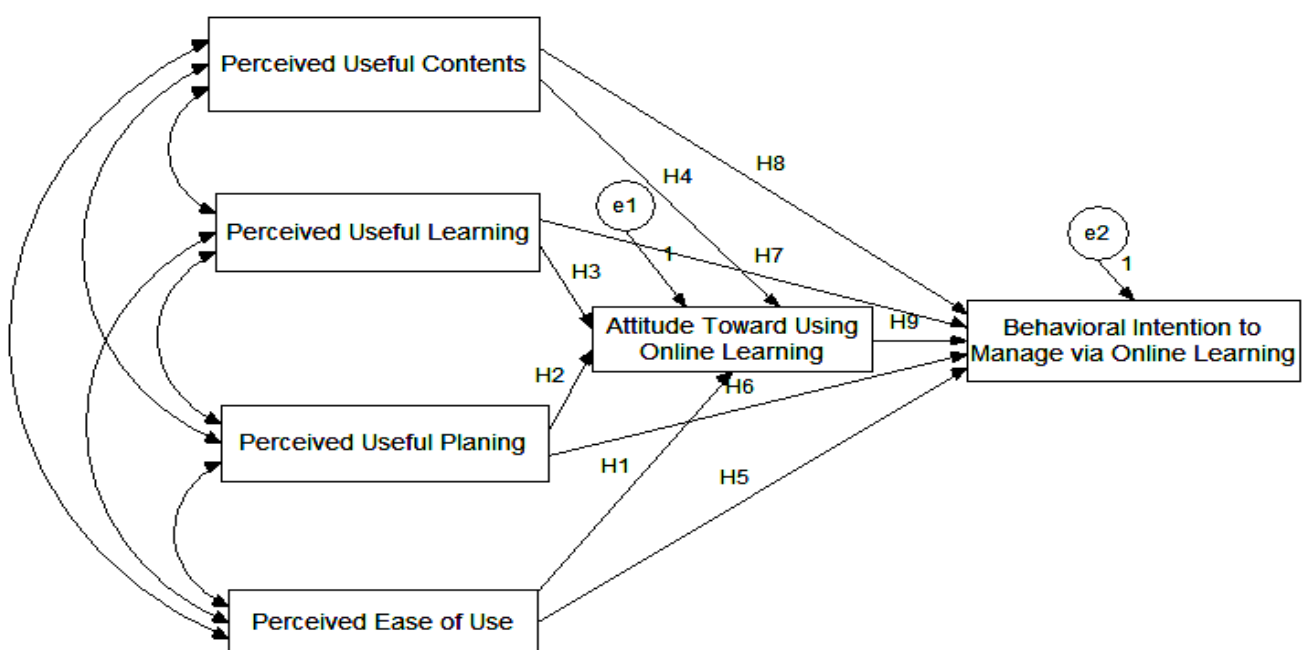


Table 1 profile of the respondents

Items	Frequency	Percentage
Sex		
Male	70	76.9
Female	21	23.1
Total	91	100
Background		
Education	85	93.4
Non- Education	6	6.6
Total	91	100
Years of teaching experience		
< Year 15	8	8.8
Year 16 ~ Year 20	28	30.8
Year 21 ~ Year 25	19	20.9
Year 26 ~ Year 30	34	37.4
>Year 30	91	100
Total		
Principals in		
Elementary Schools	17	18.7
Junior High schools	74	81.3
Total	91	100
Scale of the school		
6 classes	22	24.2
7 classes ~ 12 classes	20	22.0
13 classes ~ 24 classes	22	24.2
25 classes ~ 50 classes	24	26.4
50 classes above	3	3.3
Total	91	100

4.2 Data analysis

The questionnaires were adopted from the thesis on master of education. The internal consistency (Cronbach's α) was 0.9469. The validity and reliability of the scales were deemed adequate. The scale items for perceived ease of use, perceived useful contents, perceived useful learning, perceived useful planning, attitudes toward using online learning, and behavioral intentions to manage via online learning were developed from the study of Yang [9]. The scales were slightly modified to suit the context of online learning. Each item was measured on a five-point Likert scale, ranging from "disagree strongly" (1) to "agree strongly" (5).

5 Results

The intent of our study was to extend TAM by adding perceived useful planning, perceived useful learning, and perceived useful contents concepts in online learning. We hoped to explain principals' acceptance of the online learning. The hypothesized

relationships were tested using path analysis to present in Fig. 3.

5.1. Hypothesis testing

Hypotheses 1 and 5 examined the links between perceived ease of use and attitudes toward using Web-based learning and behavioral intentions to manage via online learning:

- Perceived ease of use was significantly related with attitudes toward using online learning ($\beta = 0.315$, t -value= 3.598, $p < .01$).
- Perceived ease of use was not significantly related with behavioral intentions to manage via online learning ($\beta = -0.084$, t -value= -0.918, $p = .358$). Therefore, the hypothesis 1 was only not rejected.

Hypotheses 2 and 6 examined the links between perceived useful planning attitudes toward using online learning and behavioral intentions to manage via Web-based learning:

- Perceived useful planning was significantly related with attitudes toward using online learning ($\beta = 0.40$, t -value= 3.505, $p < .01$).
- Perceived useful planning was not significantly related with behavioral intentions to manage via online learning ($\beta = 0.09$, t -value= 0.078, $p = .938$). Therefore, the hypothesis 2 was only not rejected.

Hypotheses 3 and 7 examined the links between perceived useful learning and attitudes toward using online learning and behavioral intentions to manage via online learning:

- Perceived useful learning was not significantly related with perceived useful contents ($\beta = 0.096$, t -value= 0.835, $p = .404$).
- Perceived useful learning was significantly related with behavioral intentions to manage via online learning ($\beta = 0.321$, t -value= 2.859, $p < .01$). Therefore, the hypothesis 7 was only not rejected.

Hypotheses 4 and 8 examined the links between perceived useful contents and attitudes toward using online learning and behavioral intentions to manage via online learning:

- Perceived useful learning was not significantly related with attitudes toward using online learning ($\beta = 0.080$, t -value= 0.756, $p = .450$).
- Perceived useful learning was not significantly related with behavioral intentions to manage via online learning ($\beta = 0.162$, t -value= 1.576, $p = .115$). Therefore, hypotheses 4 and 8 were rejected.

Hypotheses 9 examined the links between attitudes toward using online learning and behavioral intentions to manage via online learning: attitude toward using online learning was significantly related with behavioral intentions to manage via online learning ($\beta = 0.456$, t -value= 4.440, $p < .01$). Therefore, hypothesis 9 was not rejected.

The results of testing the structural model are presented in Table 2 and a graphical presentation of the results is shown in Fig. 3.

Table 2 the results of Hypothesis testing

Hypotheses	Relationship	Accept or reject
H1	Perceived ease of use → attitudes	Accept
H2	Perceived useful planning → attitudes	Accept
H3	Perceived useful learning → attitudes	Reject
H4	Perceived useful contents → attitudes	Reject
H5	Perceived ease of use → behavioral intentions	Reject
H6	Perceived useful planning → behavioral intentions	Reject
H7	Perceived useful learning → behavioral intentions	Accept
H8	Perceived useful contents → behavioral intentions	Reject
H9	Attitudes → behavioral intentions	Accept

5.2. Statistics analysis

Based on the background of the principals in this study, we found some interesting results. It could be found from t -value about sex in attitudes toward using online learning showing on Table 3. It showed that the male principals' the mean of t -test was 27.186, and the female principals' the mean of t -test was 25.429, which $t = 2.606$ reached the standard of significance ($p < .01$). This test supported the conclusion that the male principals and female principals were different in attitudes toward using online learning. Given the direction of the difference, we also noted that the male principals had significantly positive attitudes toward using online learning.

Table 3 t -test analysis in the sexes of the principals in attitudes toward using online learning

Sex	N	Mean	SD	t
Male principals	70	27.186	2.994	2.606**
Female principals	21	25.429	2.619	

Note: ** $p < .01$

From Table 4, it showed that the male principals' the mean of t -test was 27.014, and the female principals' the mean of t -test was 26.191, which $t = 1.017$ did not reached the standard of significance ($p > .05$). The differences between the sample means of male principals and female principals were mere random chance and there were no difference in behavioral intentions to manage via online learning between the sexes.

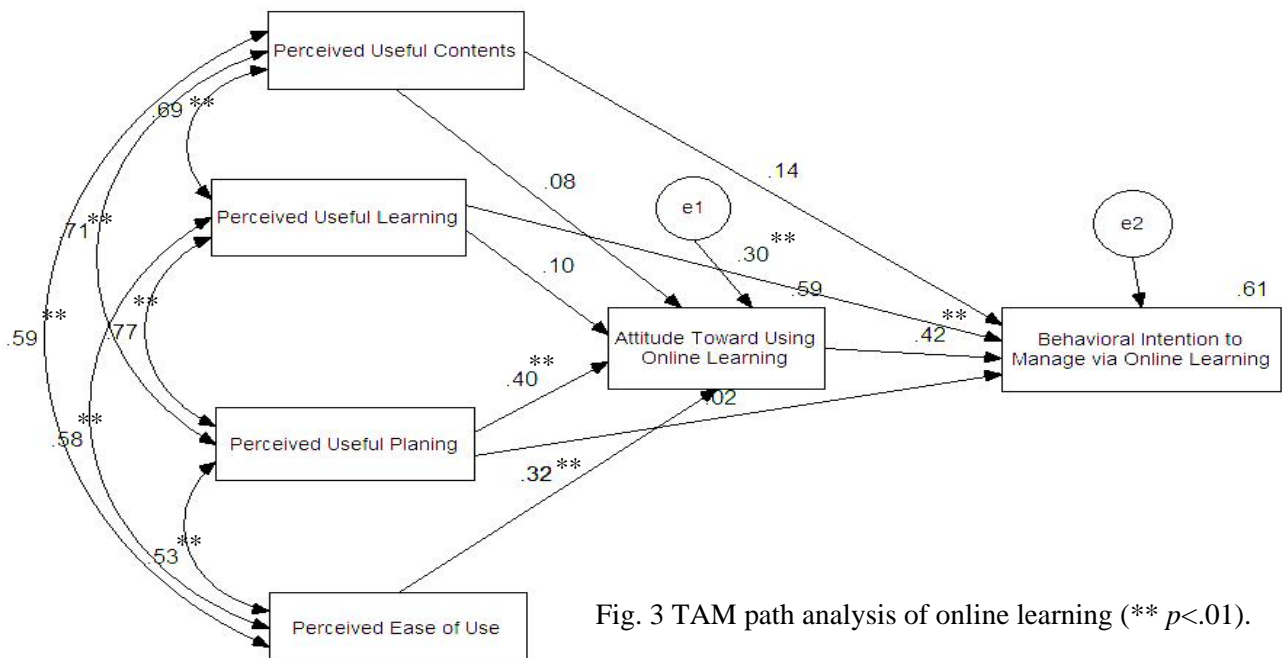


Fig. 3 TAM path analysis of online learning (** $p < .01$).

Table 4 *t*-test analysis in the sexes of the principals in behavioral intentions to manage via online learning

Sex	N	Mean	SD	<i>t</i>
Male principals	70	27.014	2.716	1.017
Female principals	21	26.191	3.400	n.s.

Note: n.s. $p > .05$

For both tests (seeing Table 5 and Table 6), we found the differences between the sample means of education principals and non- education principals were no difference in attitudes toward using online learning and in behavioral intentions to manage via online learning between the education background.

Table 5 *t*-test analysis in the background of the principals in attitudes toward using online learning

Background	N	Mean	SD	<i>t</i>
Education principals	85	26.812	2.942	-.198
Non-education principals	6	27.000	2.191	n.s.

Note: n.s. $p > .05$

Table 6 *t*-test analysis in the background of the principals in behavioral intentions to manage via online learning

Background	N	Mean	SD	<i>t</i>
Male principals	85	25.965	3.318	-1.004
Female principals	6	27.000	2.366	n.s.

Note: n.s. $p > .05$

In years of teaching experience of the principals (seeing Table 7), we can see that the “under year 15” group had the lowest average score and the “from year 16 to year 20” group had the highest average score in attitudes toward using online learning. The ANOVA test would tell us if these differences were large enough to justify the conclusion by chance. In the Table 8, it showed the *F* ratio of 1.474, $p = .217$. We would conclude that the observed differences among years of teaching experience of the principals were no difference in attitudes toward using online learning. The principals’ attitudes toward using online learning did not differ significantly among their years of teaching experience.

Table 7 the means and standard deviation for years of teaching experience of the principals in attitudes toward using online learning

Years of teaching experience	N	Mean	SD
< Year 16	2	25.000	1.414
Year 16 ~ Year 20	8	28.500	2.268
Year 21 ~ Year 25	28	26.214	2.630
Year 26 ~ Year 30	19	27.526	3.044
>Year 30	34	26.529	3.314

Table 8 analysis of variance for years of teaching experience of the principals in attitudes toward using online learning

Variance origin	SS	df	<i>MS</i>	<i>F</i>	<i>Sig.</i>
Between groups	51.684	4	12.921	1.474	.217
In groups	753.922	86	8.767		n.s.
Sum	805.604	90			

Note: n.s. $p > .05$

In Table 9, we can see the means of years of teaching experience of the principals in behavioral intentions to manage via online learning. In the Table 10, it showed the *F* ratio of 2.203, $p = .75$. We would conclude that the observed differences among years of teaching experience of the principals were no difference in behavioral intentions to manage via online learning. The principals’ behavioral intentions to manage via online learning did not differ significantly among their years of teaching experience.

Table 9 the means and standard deviation for years of teaching experience of the principals in behavioral intentions to manage via online learning

Years of teaching experience	N	Mean	SD
< Year 15	2	26.500	3.536
Year 16 ~ Year 20	8	27.000	2.828
Year 21 ~ Year 25	28	26.857	2.578
Year 26 ~ Year 30	19	26.421	3.485
>Year 30	34	27.000	2.913

Table 10 analysis of variance for years of teaching experience of the principals in behavioral intentions to manage via online learning

Variance origin	SS	df	MS	F	Sig.
Between groups	69.811	4	17.453	2.203	.075
In groups	681.376	86	7.923	n.s.	
Sum	751.187	90			

Note: n.s. $p > .05$

For both tests (seeing Table 11 and Table 12), we found the differences between the sample means of principals in junior high schools and principals in elementary schools were no difference in attitudes toward using online learning and in behavioral intentions to manage via online learning between the education background.

Table 11 *t*-test analysis in principals of the different schools in attitudes toward using online learning

Schools	N	Mean	SD	<i>t</i>
Principals in junior high schools	17	27.235	2.796	.0732
Principals in elementary schools	74	26.676	3.044	n.s.

Note: n.s. $p > .05$

Table 12 *t*-test analysis in principals of the different schools in behavioral intentions to manage via online learning

Schools	N	Mean	SD	<i>t</i>
Principals in junior high schools	17	27.471	3.318	1.023
Principals in elementary schools	74	26.676	3.021	n.s.

Note: n.s. $p > .05$

For scale of the school (seeing Table 13), we can see that the “from 7 classes to 12 classes” group had the lowest average score and the “above 50 classes” group had the highest average score in attitudes

toward using online learning. The ANOVA test would tell us if these differences were large enough to justify the conclusion by chance. In the Table 14, it showed the F ratio of 3.287, $p = .015$ ($p < .05$). The differences in attitudes toward using online learning between principals’ scale of the school were statistically significant. Further, we conduct a post hoc analysis to determine which differences were significant. The differences for principals’ attitudes toward using online learning were reported in Table 15. We found that the “7 classes ~ 12 classes” group had significantly less than the “13 classes ~ 24 classes”. We would conclude that the observed differences among principals’ scale of the school were significant difference in attitudes toward using online learning, specially between 7 classes ~ 12 classes and 13 classes ~ 24 classes.

Table 13 the means and standard deviation for scale of the school in attitudes toward using online learning

Scale	N	Mean	SD
6 classes	22	26.864	2.965
7 classes ~ 12 classes	20	25.250	2.881
13 classes ~ 24 classes	22	28.091	2.467
25 classes ~ 50 classes	24	26.458	3.134
50 classes above	3	29.333	1.154

Table 14 analysis of variance of scale of the school in attitudes toward using online learning

Variance origin	SS	df	MS	F	Sig.
Between groups	106.820	4	26.705	3.287*	.015
In groups	698.784	86	8.125		
Sum	805.604	90			

Note: * $p < .05$

In Table 16, we can see that the scale of the school “from 7 classes to 12 classes” group had the lowest average score and the “above 50 classes” group had

Table 15 a post hoc test for differences in scale of the school in attitudes toward using online learning

Scale	Mean of principals’ attitudes toward using online learning					
	Mean	6 classes	7 classes ~ 12 classes	13 classes ~ 24 classes	25 classes ~ 50 classes	50 classes above
6 classes	26.864		1.614	-1.227	0.405	-2.470
7 classes ~ 12 classes	25.250			-2.841*	-1.208	-4.083
13 classes ~ 24 classes	28.091				1.633	-1.242
25 classes ~ 50 classes	26.458					-2.875
50 classes above	29.333					

the highest average score in behavioral intentions to manage via online learning. The ANOVA test would tell us if these differences were large enough to justify the conclusion by chance. In the Table 17, it showed the F ratio of 2.203, $p = .075$ ($p > .05$). We would conclude that the observed differences among principals' scale of the school were no difference in behavioral intentions to manage via online learning. The principals' behavioral intentions to manage via online learning did not differ significantly among their scale of the school.

Table 16 the means and standard deviation for scale of the school in behavioral intentions to manage via online learning

Scale	N	Mean	SD
6 classes	22	26.864	2.997
7 classes ~ 12 classes	20	25.900	2.198
13 classes ~ 24 classes	22	27.909	2.759
25 classes ~ 50 classes	24	26.250	3.234
50 classes above	3	29.333	0.577

Table 17 analysis of variance of scale of the school in behavioral intentions to manage via online learning

Variance origin	SS	df	MS	F	Sig.
Between groups	69.811	4	17.453	2.203	.075
In groups	681.376	86	7.923		n.s.
Sum	751.187	90			

Note: n.s. $p > .05$

5.3 Path analysis

A path analysis of the TAM showed in Fig. 3. The percentage of the variance explained (R^2) of attitudes toward using online learning was 59% and behavioral intentions to manage via online learning was 61%. Based on our hypothesis 7 and 9, perceived useful learning and attitudes toward using online learning had significant direct effects on behavioral intentions to manage via online learning. However, the perceived ease of use, perceived useful planning, and perceived useful contents also had indirect effects, mainly through perceived useful learning and attitudes toward using online learning, on behavioral intentions to manage via online learning, as shown in Table 18.

Perceived ease-of-use was significantly related with **attitudes** toward using online learning. They

involved both direct and indirect paths:

- Direct path: perceived ease-of-use \rightarrow attitude = 0.32
- Indirect path: perceived ease-of-use \rightarrow perceived useful planning \rightarrow attitude = $0.53 \times 0.40 = 0.21$
- Total: Direct+ Indirect= $0.32 + 0.21 = 0.53$

Perceived useful planning was significantly related with **attitudes** toward using online learning. They involve both direct and indirect paths:

- Direct path: perceived useful planning \rightarrow attitude = 0.40
- Indirect path: perceived useful planning \rightarrow perceived ease-of-use \rightarrow attitude = $0.53 \times 0.32 = 0.17$
- Total: Direct+ Indirect= $0.40 + 0.17 = 0.57$

Perceived useful learning was not significantly related with **attitudes** toward using online learning, but they still had indirect paths:

- Indirect paths:
perceived useful learning \rightarrow perceived useful planning \rightarrow attitude = $0.77 \times 0.40 = 0.31$
perceived useful learning \rightarrow perceived ease-of-use \rightarrow attitude = $0.58 \times 0.32 = 0.19$
- Total: Indirect= $0.31 + 0.19 = 0.50$

Perceived useful contents was not significantly related with **attitudes** toward using online learning, but they still had indirect paths:

- Indirect path:
perceived useful contents \rightarrow perceived useful planning \rightarrow attitude = $0.71 \times 0.40 = 0.28$
perceived useful contents \rightarrow perceived ease-of-use \rightarrow attitude = $0.59 \times 0.32 = 0.19$
- Total: Indirect= $0.28 + 0.19 = 0.47$

Perceived ease-of-use was not significantly related with behavioral **intentions** to manage via online learning, but they still had indirect paths:

- Indirect path:
perceived ease-of-use \rightarrow attitude \rightarrow intention = $0.32 \times 0.42 = 0.13$
perceived ease-of-use \rightarrow perceived useful planning \rightarrow attitude \rightarrow intention = $0.53 \times 0.40 \times 0.42 = 0.09$
perceived ease-of-use \rightarrow perceived useful learning \rightarrow intention = $0.58 \times 0.30 = 0.17$
- Total: Indirect= $0.13 + 0.09 + 0.17 = 0.39$

Perceived useful planning was not significantly related with behavioral **intentions** to manage via online learning, but they still had indirect paths:

- Indirect path:
perceived useful planning \rightarrow attitude \rightarrow intention = $0.40 \times 0.42 = 0.17$

perceived useful planning → perceived ease-of-use → attitude → intention = $0.53 \times 0.32 \times 0.42 = 0.07$

perceived useful planning → perceived useful learning → intention = $0.77 \times 0.30 = 0.23$

- Total: Indirect = $0.17 + 0.07 + 0.23 = 0.47$

Perceived useful learning was significantly related with behavioral **intentions** to manage via online learning. They involve both direct and indirect paths:

- Direct path: perceived useful learning → intention = 0.30

- Indirect path:
perceived useful learning → perceived useful planning → attitude → intention = $0.77 \times 0.40 \times 0.42 = 0.13$

perceived useful learning → perceived ease-of-use → attitude → intention = $0.58 \times 0.32 \times 0.42 = 0.08$

- Total: Indirect = $0.30 + 0.13 + 0.08 = 0.51$

Perceived useful contents was not significantly related with behavioral **intentions** to manage via online learning, but they still had indirect paths:

- Indirect path:
perceived useful contents → perceived useful learning → intention = $0.69 \times 0.30 = 0.21$
perceived useful contents → perceived useful planning → attitude → intention = $0.71 \times 0.40 \times 0.42 = 0.12$
perceived useful contents → perceived ease-of-use → attitude → intention = $0.59 \times 0.32 \times 0.42 = 0.08$

- Total: Indirect = $0.21 + 0.12 + 0.08 = 0.41$

Attitudes toward using online learning were significantly related with behavioral **intentions** to manage via online learning. They just had direct path:

- Direct path: attitude → intention = 0.42

Table 18 Effects on attitudes toward using online learning and behavioral intentions to manage via online learning

Independent variables	Dependent variables	Direct effects	Indirect effects	Total effects
Perceived ease-of-use	attitude	0.32	0.21	0.53**
perceived useful planning	attitude	0.40	0.17	0.57**
perceived useful learning	attitude	n.s.	0.50	0.50**
perceived useful	attitude	n.s.	0.47	0.47**

contents				
$R^2=0.59$				
Perceived ease-of-use	intention	n.s.	0.39	0.39**
perceived useful planning	intention	n.s.	0.47	0.47**
perceived useful learning	intention	0.30	0.21	0.51**
perceived useful	intention	n.s.	0.41	0.41**
$R^2=0.61$				
attitude	intention	0.42**	n.s.	0.42**

Note: n.s. means no significant; ** P < 0:01.

6 Conclusions

In this study, we wanted to investigate what factors actually affected the principals' attitudes and behavioral intentions in online learning. Based on statistics analysis, we found that the principals' sex could affect their attitudes toward using online learning. The male principals preferred using IT and online learning at their schools. At the same time, we also found that scale of the school could affect principals' attitudes toward using online learning. The principals at the middle scale school might try their best to improve their learning way in order to develop their own feature. In future, their schools could become larger schools and characteristic schools in their communities.

The results provided evidence of the utility of TAM in online learning. We also found that TAM, which was originally designed to study the initial behavioral intentions, could also be used to understand principals' online learning. Finally, TAM showed potential to provide a more complete explanation about principals' management behavior via online learning. This TAM accounted for more variance in perceived ease of use, perceived useful contents, perceived useful learning, perceived useful planning, attitudes toward using online learning, and behavioral intentions to manage via online learning.

This study revealed that the acceptance of online learning could be predicted by extended TAM ($R^2=0.61$). Perceived useful learning and attitudes toward using online learning significantly and directly affected behavioral intentions to manage via online learning. Notably, differing from the findings of previous TAM studies[10], the results of this study indicated that perceived useful planning did not motivate principals to manage via online learning,

but it directly affected attitudes toward using online learning. However, according to the analytical results perceived useful learning directly affected principals' behavioral intentions to manage via online learning. Hence, we inferred that other factors related to the acceptance of online learning should be considered. Perceived useful planning and perceived useful learning were likely to be important influences on the acceptance of online learning.

References:

- [1] F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, "User acceptance of computer technology: a comparison of two theoretical models," *Management Science*, vol. 35, pp. 982–1003, 1989.
- [2] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, pp. 319–339, 1989.
- [3] C.-L. Hsu and H.-P. Lu, "Why do people play on-line games? An extended TAM with social influences and flow experience," *Information & Management*, vol. 41, pp. 853–868, 2004.
- [4] A. L. Lederer, D. J. Maupin, M. P. Sena, and Y. Zhuang, "The technology acceptance model and the World Wide Web," *Decision Support Systems*, vol. 29, pp. 269–282, 2000.
- [5] N. Lightner, I. Bose, and G. Salvendy, "What is wrong with the World Wide Web? A diagnosis of some problems and prescription of some remedies," *Ergonomics*, vol. 39(8), pp. 995–1004, 1996.
- [6] J. E. Pitkow and C. M. Kehoe, "Emerging trends in the WWW user population," *Communications of the ACM*, vol. 39(6), pp. 106–108, 1996.
- [7] M. D. Levi and F. G. Conrad, "A heuristic evaluation of a World Wide Web Prototype," *Interactions*, vol. 3(4), pp. 50–61, 1996.
- [8] R. W. Griffin, *Management*, 3rd ed. Boston: Houghton Mifflin, 1990.
- [9] H. Yang, "Elementary School Teachers' Attitudes Regarding On-line Training In Ping-tung County," in *Graduate Institute of Educational Technology*. vol. Master Pingtung: National Pingtung University of Education, 2007.
- [10] D. Gefen, E. Karahanna, and D. W. Straub, "Inexperience and experience with online stores: the importance of TAM and trust," *IEEE Transactions on Engineering Management*, vol. 50, pp. 307–321, 2003.