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An Empirical Study on the Influence Factors of Simulation Software Practice Effect of Economic and Management Students—Based on the Teacher's Ability of TPACK

Lihan GU

School of Economics and Management, Taishan University, Taian, China

Abstract: ***With the development of technology, simulation software practice has gradually become a new implementation method of technology-integrated teaching. Based on the theory of TPACK and the model of Logit model, this paper conducted an empirical study on the influence factors of simulation software practice effect of economic and management students. It was found that the teachers' Pedagogical Knowledge (PK), Content Knowledge (CK) and Pedagogical Content Knowledge (PCK) had positive effects on practice performance of economic and management students. In addition, the pre-service cultivation of teachers and the students' practice cognition are also the important influence factors. Contrary to expectation, the individual characteristics of students and the technological knowledge of teachers have no obvious effects on practice performance. In the process of practice of economic and management students, we should pay more attention to the teachers' PK (choosing practice teaching method according to student analysis), CK (rich theoretical and practical knowledge) and PCK (choosing diversified experimental teaching method).***

Keywords: higher education, simulation software, influence factors, TPACK, Economics and Management Students.

1. INTRODUCTION

The continuous development of science and technology such as artificial intelligence and big data has triggered changes in the global labor market, making the concept of information technology and curriculum integration continue to penetrate into the field of education. Educational informatization has become the inevitable development trend of education in the future. Therefore, knowledge about how to integrate education and information technology has become the endogenous driving force of educational reform in the 21st century (Ren Gaimei et al., 2014). The Outline of The National Medium and Long Term Education Reform and Development Program (2010-2020) >issued by The State Council in 2010 points out that information technology has a revolutionary impact on the development of education and must be attached great importance; Education departments should advance the deployment of educational information network, promote the modernization of educational content, teaching means and methods.

Simulation experimental teaching center is an important project of the Ministry of Education in the construction of experimental teaching center in colleges and universities following the construction of national experimental teaching demonstration center. It is the product of the deep integration of subject specialty and information technology. At present, the development of simulation experiment teaching in economics and management has not achieved the expected effect, and most of the practice courses of economics and management are in vain. Different from science and engineering majors, software practice teaching in the field of economic management started late, and the practice effect is not ideal. On the one hand, there are few types of software itself, and the simulation degree of software is uneven. On the other hand, students have not paid enough attention to this kind of experiment. Therefore, the guiding role of teachers in this link is particularly prominent. In order to improve the effect of practice, teachers of economics and management majors must have strong teaching ability of integrated technology to achieve seamless connection between teaching and student practice.

However, many studies show that teachers face great challenges and difficulties in both theoretical and practical aspects of technology integrated teaching (Deng et al.,2014; Tsai & Chai, 2012). Experts and scholars at home and abroad have carried out in-depth research on this issue. In order to establish an appropriate thinking framework in the research and better grasp the concept of information technology integrated teaching, the academic community put forward the concept of " Technological Pedagogical Content Knowledge " (TPACK for short) (Koehler& Mishra, 2005). In recent ten years, many researches have been carried out based on this theoretical framework

(Aleksandra & Irina, 2020). TPACK mode constructs the framework of knowledge system for the cultivation of "new teachers", that is, the curriculum system should include technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK). PCK is the combination of pedagogical knowledge (PK) and content knowledge (CK); TCK is a reasonable representation of the two-way interaction between content knowledge (CK) and technological knowledge (TK); TPK is a technical means and technical application strategy to complete teaching tasks produced by the interaction of pedagogical knowledge (PK) and technological knowledge (TK). TPACK model emphasizes that teachers at any teaching stage consciously combine technology, teaching method and content knowledge to pass on, rather than simply learning various knowledge in isolation.

At present, most of the research in the theoretical circle belongs to theoretical research (He & Wu, 2008), mainly focusing on the framework construction of TPACK and the relationship between various factors. Other researchers discussed the problem of teacher education under the framework of TPACK, such as teacher professional literacy (Li, 2013), teacher's role (He, 2012), teacher training (Chen, 2009; Valtonen et al., 2020), the implication of TPACK in concrete course (Zhang, 2013; Bretscher, 2023; Zhang et al., 2022; Liu et al., 2022), the blended teaching competences model (Wang et al., 2022), moderating effect of TPACK on digital teaching (Feng et al., 2023).

He Ke kang (2008) proposed the principles and methods of classifying teaching models based on the integration of information technology and curriculum. Jiao Jianli and Zhong Hongrui (2010) systematically studied the teacher knowledge framework of "technology teaching method content knowledge" from the aspects of the proposal of TPACK framework. Wu Huanqing et al. (2012) believe that the implementation of technology integration curriculum is a very promising strategy in the development of teachers' TPACK. Some scholars also discussed teacher education under the TPACK framework. Li Haifeng (2013) conducted a one semester experimental study on the knowledge literacy of subject teaching method of teacher integration technology, the experiment shows that teachers should have seven kinds of teachers' professional abilities and qualities related to TPACK, and five effective training strategies are proved through the experiment. He Xiaoli (2012) effectively integrated technical knowledge, curriculum content knowledge and teaching method knowledge into the classroom, and believed that the role of teachers has its particularity. Chen Jing (2009) believed that to improve teachers' educational technology ability, it is necessary to integrate technology with subject knowledge and teaching method knowledge, and studied how teachers optimize teaching by using technology in specific situations and enrich and improve teachers' knowledge of integrated technology subject teaching method (TPCK). Zhang Litao (2013) studied the specific implementation process of TPACK in the curriculum, expounded the implementation of TPACK integration mode in college teaching, and analyzed the implementation effect. Wei Zhihui, Hu Xiaotian & Liu Yumei et al. (2021) studied that the development focus of college foreign language teachers in the post Mu class era is different at different stages of TPACK application. This study also provides an empirical research basis for colleges and universities to systematically promote the education and teaching reform supported by the technology.

At present, the researches of scholars have greatly enriched the research on teachers' integration technology behavior, but few literatures can use quantitative analysis to prove the impact of teachers' TPACK ability on curriculum effect, and there is even less research on the role of teachers' TPACK ability on practice effect. As a supplement to theoretical teaching, practice can deepen theory, sublimate cognition and improve operation, and is a bridge from theory to practice. Due to the particularity of economics and management practice relying on software, it is more necessary to understand the effect of teachers' ability to integrate technology teaching on practice. Based on this, this paper intends to discuss the influences, key influencing factors and mechanism of teachers' TPACK ability on the practice effect of economics and management students, aiming to improve the practice effect of economics and management simulation software, and provide effective suggestions and improvement direction for teachers of economics and management department to improve TPACK ability and carry out practice courses in a scientific and flexible way.

2. RESEARCH HYPOTHESIS AND MODEL CONSTRUCTION

2.1 Research hypothesis

Xu Peng et al. (2017) believe that TPACK is a new teacher knowledge framework in the information technology era. Teacher development TPACK is very important for effective use of technology for teaching and promoting teacher professional development. Through the deep integration of information technology and curriculum, teachers can guide students to use information technology more effectively and reasonably in teaching activities,

deepen the understanding of subject knowledge, improve the teaching effect, and then promote students' learning. This paper designs an index system from five aspects: Teachers' TPACK ability, students' individual characteristics and class environment, teachers' training and experimental cognition, with a total of 15 variables as the influencing factors of whether students are satisfied with the effect of software practice[1] . The description and setting of specific explanatory variables are shown in Table 1.

2.1.1 Teachers' TPACK ability

According to the definition of TPACK, the teaching ability of teachers is reflected in seven aspects. In view of the high correlation and overlap among the seven factors, TPACK, as a knowledge complex integrated with the above aspects, and TPK, TCK and PCK factors, can be repeatedly explained in the topic design. This phenomenon of "combination" of factors makes it difficult to achieve accurate identification and measurement of the seven factors in the current study(Chai et al., 2011; Jang & Tsai, 2013). In this paper, six questions are designed based on previous literature, involving PK, TK, CK, TPK, TCK and PCK[2] .

(1) Teachers' Pedagogical Knowledge (PK) aspect. In the practice of students, the traditional teaching-learning separation mode is no longer applicable. The practice process reflects more interaction between students and teachers, and the teaching method is an effective carrier of interaction. Generally speaking, teachers should flexibly design practice teaching methods according to students' foundation and interests, such as task-oriented practice teaching, problem-oriented soft practice teaching and research-oriented practice teaching, and constantly improve teaching methods according to students' feedback, so as to achieve good teaching effects. Therefore, hypothesis 1 is put forward. Teachers can flexibly choose software practice Pedagogical Knowledge (PK) according to their learning situation, which plays a positive role in the practice effect.

(2) Teachers' Technological Knowledge(TK) aspect. Under the background of information age, the technology tools of auxiliary teaching are in the dynamic process of continuous development, change and expansion. It is a complex problem to integrate teaching technology in teaching, and there are few unified and convenient rules suitable for various teaching conditions, teaching situations and individual students. This requires teachers to change their self-positioning from simple technology consumers to effective technology users, and finally to put forward creative technology use requirements according to the development of actual teaching needs and promote technology upgrading. Teachers' development from passive use of machinery to effective active use to creative design plays a prominent role in the development of integrated technology teaching. Therefore, hypothesis 2 is proposed that teachers can accurately select and skillfully use simulation practice software and other information equipment (TK) according to the teaching practice, which has a positive effect on the practice effect.

(3) Teachers' Content Knowledge (CK) aspect. No matter what the background, the basic job of teachers is to help students learn content. Although teachers formulate teaching strategies to help students learn, these strategies need to be based on and driven by teachers' understanding of the subject content they are teaching. Therefore, hypothesis 3 is put forward, teachers can have rich theoretical and practical knowledge reserves, and guide the simulation software (CK) to play a positive role in the effect of practice.

(4) Teachers' Integrating Technological Knowledge and Pedagogical Knowledge (TPK) aspect. In addition to the special internship software, students also need to use a variety of software designed not for educational purposes but for business environment (communication, entertainment, office, etc.) such as PowerPoint and excel. On the one hand, the core content of practice course is to deepen students' understanding of subject knowledge with the help of special practice software. The premise to achieve this goal is that teachers can effectively integrate the information equipment and practice teaching methods; On the other hand, teachers need to reject the fixed functionality of software, but develop software skills to surpass the most common uses of technology, reconfigure them for specific teaching purposes, and fully integrate teaching methods with information technology to promote

[1] The questionnaire adopted the form of liszt five scale to set the question options. In order to make the difference between the results more obvious, we divided the first three items and the last two items into two different levels in the later data sorting process.

[2] In view of the high correlation and overlap among the seven factors, TPACK, as a knowledge complex integrated with the above aspects, and TPK, TCK and PCK factors, have some parts that can be explained repeatedly in the topic design. This combination of factors makes it difficult to accurately identify and measure seven factors in current studies (Chai et al., 2011; Jang & Tsai, 2013) [14-15]. In order to avoid the deviation of the definition of each factor and the "distortion" of the interpretation of the result as much as possible, the remaining six factors are regarded as the comprehensive embodiment of TPACK factor, and the questions are not set separately for TPACK factors.

students' learning and understanding. So, TPK requires teachers to be forward-looking, creative and open. Therefore, Hypothesis 4 is put forward. Teachers can effectively integrate information equipment and practice teaching methods (TPK) and play a positive role in the effect of practice.

(5) Teachers' Integrating technological knowledge and content knowledge (TCK) aspect. In software practice courses, on the one hand, teachers need to have a certain way and thinking of thinking and using technology, and they need to have a deep understanding of the complex relationship between technology, teaching and content and flexible teaching decision-making ability. Technology has become the core vocabulary of teachers' learning content. On the other hand, technology is increasingly seen as a driver of learning. Only by learning to use technology can we effectively teach with technology. Therefore, Hypothesis 5 is put forward. Teachers can guide the process of simulation software and deepen students' theoretical knowledge (TCK), which plays a positive role in the effect of practice.

(6) Teachers' Integrating pedagogical knowledge and content knowledge (PCK) aspect. Software practice under the guidance of teachers in teachers' understanding of the subject content depth and overall development of students and the differences of cognition, completely monitor teaching teaching self-efficacy, choose the appropriate teaching method to present subject matter knowledge, establish the original knowledge of learners level, subject content knowledge and the connection between the discipline teaching goal, is to realize the first premise of effective teaching. Teachers' correct after-school reflection, methodological reasoning ability and rich forms of knowledge representation can help students establish a complete knowledge system, deeply understand the subject content and apply what they have learned. Therefore, hypothesis 6 is put forward that teachers can rely on their own knowledge reserves to choose diversified practice teaching methods (PCK), which plays a positive role in the practice effect.

2.1.2 Control variables

The control variables include students' individual characteristics, class environment, teacher training and experimental cognition.

(1) Students' individual characteristics include students' gender, performance ranking, information technology ability and theoretical knowledge reserve. At present, there is no relevant empirical research to prove that gender will have a positive or negative impact on the acceptance of technology, so we can not determine the direction of gender's impact on the effect of software practice; The results ranking is based on the comprehensive results of last semester, which reflects the students' learning foundation and learning ability to a certain extent. Students who can achieve higher results have better learning foundation and ability, and can better realize the acceptance and adaptation to new technologies. Therefore, they will have a higher evaluation on the ease of use of technical software; Information technology ability is based on whether students pass the computer level II test. For students who already have the computer level II, it will be more convenient to operate the software on the computer, which can also improve students' acceptance of software experiments and help students quickly adapt and enter the best learning state. Therefore, these two factors are expected to have a positive impact on the effect of software practice.

(2) The learning atmosphere of students' environment and the attendance rate of internship courses are regarded as the inspection indicators of class environment. A good class environment can have a subtle incentive effect on individuals, so it will have a positive impact on the effect of software internship.

(3) Previous research results show that there are significant differences between pre-service teachers (normal university students) and in-service teachers in their understanding and practice of TPACK. Therefore, whether teachers have received training is also studied as an important indicator in this paper. Trained teachers have a higher level of TPACK, which can improve the effect of students' software practice and have a positive impact.

(4) Experimental cognition refers to students' attitude towards internship courses. Whether students are interested in software belongs to behavioral cognition. Whether students recognize experiment is an important link to improve theory and practice belongs to thinking cognition. Cognitive improvement of the degree of attention to the internship course can have a positive impact on the internship effect.

Table 1: Explanation of model variables and expected influence direction

Variable types		Variable	Variable assignment	Mean	standard deviation	Expected impact direction
Teacher's ability	TPACK	H1 Whether teachers can choose the practice teaching method according to the learning situation (Pedagogy Knowledge PK)	No=0, Yes=1	0.643	0.480	Positive
		H2 Whether teachers can accurately select and skillfully use internship software and other information equipment (Technology Knowledge TK)	No=0, Yes=1	0.778	0.417	Positive
		H3 Whether teachers have a wealth of theoretical and practical knowledge to guide the internship (Content Knowledge CK)	No=0, Yes=1	0.681	0.468	Positive
		H4 Whether teachers can effectively integrate information equipment and practice teaching methods (Technology Pedagogy Knowledge TPK)	No=0, Yes=1	0.662	0.474	Positive
		H5 Whether teachers can deepen the students' theoretical knowledge through guiding the software practice operation process (Technology Content Knowledge TCK)	No=0, Yes=1	0.604	0.490	Positive
		H6 Whether teachers can rely on their own knowledge reserves to choose diversified practice teaching methods (Pedagogical Content Knowledge PCK)	No=0, Yes=1	0.720	0.450	Positive
Control variables	Student characteristics	H7 Gender	female=0, male=1	0.285	0.453	Definite
		H8 Score ranking (last term)	Last70%=0, Top 30%=1	0.473	0.501	Positive
		H9 Information technology capability[3]	No=0, Yes=1	0.372	0.485	Positive
		H10 Theoretical knowledge reserve	Have studied less than three subjects=0, Have studied three subjects or above =1	0.271	0.445	Positive
	Class environment	H11 Whether the learning atmosphere in the class is high	No=0, Yes=1	0.705	0.457	Positive
		H12 Attendance rate of students participating in software practice	Less 90% =0, Above 90% =1	0.614	0.489	Positive
	Teacher training	H13 Whether teachers have undergone pre-service training	No=0, Yes=1	0.285	0.453	Positive
	Experimental cognition	H14 Whether students are interested in software practice	No=0, Yes=1	0.594	0.492	Positive
		H15 Whether students recognize the experiment is an important part of the theoretical and practical improvement	No=0, Yes=1	0.749	0.435	Positive

[3]Whether the student has passed the computer Level 2 test

2.2 Model Construction

In this paper, students' satisfaction evaluation of software practice effect is divided into five grades from low to high: "very dissatisfied", "dissatisfied", "less satisfied", "satisfied" and "very satisfied" according to the Liszt scale scoring mode. In order to simplify the calculation, in the establishment of the model, the students' satisfaction with the effect of software practice is only divided into "dissatisfied" and "satisfied"(The first three grades are classified as "dissatisfied" and the last two grades are classified as "satisfied"). In this way, the degree of students' satisfaction with the effect of software practice becomes an individual choice behavior which is jointly decided by many factors. Logit binary choice model is suitable to determine its influencing factors. The model is as follows:

$$p=F(y=1|X_i)=\frac{1}{1+e^{-y}} \quad (1)$$

In formula (1),y is the dependent variable, representing students' satisfaction with the effect of software practice. Its value range is {0,1}, y=1 indicates satisfaction, y= 0 indicates dissatisfaction. P represents the probability that students are satisfied with the effect of software practice; x_i(i = 1, 2, 3... n) is an independent variable, indicating the factors that may affect students' satisfaction with the effect of software practice. The linear relationship between Y and x_i (i= 1,2,3..., n) is as follows:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n \quad (2)$$

βi (i =1,2,3...., n) is the regression coefficient of the explanatory variable. βi is greater than 0, indicating that the ith factor has a positive influence on the software practice effect; βi is less than 0, it means that the ith factor has a negative influence on the software practice effect.

After combining Equations (1) and (2), the Logit model is obtained as follows:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon \quad (3)$$

In formula (3), β_0 is a constant term and ε is a random error.

Statistical analysis software Stata15.0 was used to fit Equation (3), and the fitting results of the influencing factor model of the effect of students' participation in software practice were obtained.

3. DATA SOURCES AND BASIC INFORMATION OF SAMPLES

3.1 Data sources

This paper divides the research scope into major universities in Shandong Province, and selects students majoring in economic management as the research sample. In the investigation of TPACK, this paper investigates the development of simulation experiment. From the perspective of students, the investigation enables students to acquire and apply knowledge by carrying out practical experiments using simulation software. The application software selected by the teachers of the software department and in line with the professional subject content and students' learning situation is used by students. The use of the software and the integration of theoretical knowledge involved in the operation process are carried out under the guidance of teachers. Therefore, the software practice itself is a practice of teachers integrating information technology under the framework of TPACK, and also reflects the construction degree of teachers' TPACK concept. Whether teachers can build a good TPACK framework directly affects the effect of software practice and students' satisfaction.

This paper selects Shandong University of Science and Technology, Taishan University and Shandong Agricultural University in Tai'an city of Shandong Province as samples. Data were obtained from one-to-one interviews conducted by students majoring in economics and management between November and December in 2022. The questionnaire was mainly targeted at sophomores, juniors and seniors from the three colleges of economics and management. The questionnaire was mainly aimed at sophomores, juniors and seniors majoring in economics and management in three universities. The selected universities have not carried out software simulation practice for freshmen, so freshmen are not the objects of this study. Through stratified sampling method, 480 questionnaires were put in. After screening, the questionnaires with inconsistent information were removed as invalid data. Finally, 414 valid questionnaires were obtained with effective recovery rate of 86.25%.

3.2 Statistical analysis

The 414 respondents majored in accounting, International Business, International Trade, e-commerce, finance, human resources and public finance, with the majority of female students accounting for 69%; Sophomores accounted for 36 percent, juniors 39 percent and seniors 25 percent; The internship software includes Simtrade, ERP, POCIB, EFM, e-commerce simulation and insurance business training; 35% of the 414 respondents were dissatisfied with the effect of software practice. The large proportion of students dissatisfied with the practice results shows that there are still many problems in software practice and there is a lot of room for improvement.

Table 2: Basic information of samples

The distribution of specialty	accounting	16%	The distribution of grade	Sophomore	36%
	international business	23%		Junior	39%
	international trade	23%		Senior	25%
	E-commerce	14%	Practice software	Simtrade	36%
	finance	11%		ERP	8%
	human resources	5%		POCIB	23%
	public finance	8%		EFM	7%
The distribution of universities[4]	Shandong University of Science and Technology	39%		E-commerce simulation	14%
	Taishan University	30%			
	Shandong Agricultural University	31%		Insurance business training	12%
The gender of distribution	male	31%	Practice effect	satisfied	65%
	female	69%		dissatisfied	35%

4. RESULTS AND ANALYSIS

4.1 Estimation results

Analysis on the influencing factors of students' participation in simulation software practice.In this paper, the econometric analysis software Stata15.0 is used to conduct logit statistical analysis on 414 sample data to determine the prediction effect of the model. First, all 15 variables in Table 1 are taken into account, and the estimated results are shown in Model 1 in Table 3.

Table 3: The estimated results of the model

Variables	Model 1			Model 2		
	Regression coefficient	Z statistic	Statistical probability	Regression coefficient	Z statistic	Statistical probability
H1	2.5813***	3.47	0.001	2.5967***	4.34	0.000
H2	0.6142	0.77	0.441	--	--	--
H3	1.3826*	1.79	0.073	1.4943*	1.64	0.102
H4	0.2814	0.45	0.654	--	--	--
H5	0.8628	1.08	0.282	--	--	--
H6	1.9285*	1.75	0.080	1.7642**	2.49	0.013
H7	0.5638	0.67	0.500	--	--	--
H8	0.0132	0.02	0.982	--	--	--
H9	-0.5003	-0.90	0.369	--	--	--
H10	-0.2374	-0.48	0.631	--	--	--
H11	-0.3163	-0.39	0.693	--	--	--
H12	-0.4133	-0.34	0.733	--	--	--
H13	1.9369**	2.29	0.022	1.6078*	2.3	0.021

H14	2.0646***	3.62	0.000	2.2746***	4.00	0.000
H15	1.1839*	1.79	0.074	0.9460*	1.57	0.116
Pseudo R^2		0.7008			0.6841	
Prediction accuracy(%)		94.20			93.72	
Significance level		0.0001			0.0000	

Note: ***, ** and * are statistically significant at the level of 1%, 5% and 10% respectively.

4.2 Result analysis

4.2.1 Significant indicators

In the TPACK behavior index of teachers, the regression coefficients of PK, CK and PCK are 2.5967, 1.4943 and 1.7642 respectively, and their statistical probabilities are 0.000, 0.102 and 0.013 respectively, indicating that PK, CK and PCK of teachers have a significant positive impact on the effect of students' software practice. And the influence degree is relatively large, in line with the theoretical expectation. Among the three indicators, teachers' PK has the highest impact, followed by PCK and CK. Since it is very important to choose the right software for software practice, the higher the intelligence and simulation degree of the software used by students, the more interactive and immersive the students will feel, and then promote the fun of learning, the better the effect of software practice will be. This is because it is very important to choose the right software to carry out software practice courses. Only with the high degree of intelligence and simulation of the software used by students can they experience the feeling of interactivity and immersive experience, thus increasing the interest of learning and finally making the effect of software practice better. Teachers' TPACK ability can help students build theoretical knowledge system and deepen their understanding of theoretical knowledge, which is conducive to students' flexible application in practice, so it will also make software practice achieve better results.

The regression coefficient of teacher training is 1.6078, and its statistical probability is 0.021, indicating that whether teachers have been trained has a significant positive impact on the effect of students' software practice, which is in line with the theoretical expectation. The formation of teachers' TPACK ability is a systematic project and a fusion of various knowledge. It takes a long training process for social individuals to grow from new teachers or non teachers to mature expert teachers (Bai Xingang, 2017). Teacher training can help teachers understand the TPACK concept, skillfully or even creatively integrate all kinds of knowledge, and design a series of TPACK courses in line with the actual teaching situation. Teachers who have received pre-service training are often able to have higher quality TPACK and flexibly apply technology, knowledge and teaching method, thus significantly improving the effect of software practice.

The regression coefficients of "whether students are interested in software" and "whether students recognize experiment as an important link to improve theory and practice" are 2.2746 and 0.9460 respectively, and the statistical probabilities are 0.000 and 0.116 respectively, indicating that students' intention to use software and their recognition of experiment have a significant positive relationship with the effect of software practice, which is consistent with the expectation.

The regression coefficients of "whether students are interested in software" and "whether students recognize experiment as an important link to improve theory and practice" are 2.2746 and 0.9460, respectively. The statistical probabilities were 0.000 and 0.116, respectively. This shows that students' intention to use the software and their recognition of the experiment have a significant positive relationship with the effect of the software practice, which is consistent with the expectation. The influence degree of students' interest in software is much greater than their recognition of the experiment. This is because students' interest in experiments can lead students to take the initiative to absorb knowledge and produce learning behavior more directly. However, students' attention to experiment on the ideological level comes from the emphasis on the importance of experiment in the external environment, which can not produce strong learning motivation, and it is easy to interrupt learning in the process of inducing learning behavior. This also reflects the importance of subjective initiative in learning activities.

4.2.2 Insignificant index

All TPACK contents including technology (TK, TPK, TCK) and variables involving individual characteristics of students in the teacher TPACK behavior index did not have a significant impact on the effect of software practice, which was inconsistent with our expectations. There are two possible reasons for this phenomenon. First, the research is carried out in the background of colleges and universities. Technology users (college students) have strong learning ability compared with primary and secondary school students, so they can accept and adapt to an information technology without relying too much on teachers' guidance. Second, in order to popularize the application and promote the transfer of subject knowledge, the practice software of economics and management majors does not set too many technical thresholds in operation, which is relatively simple and suitable. Therefore, the individual differences in the degree of technology acceptance among students are not enough to affect the effect of software practice.

The variables "whether the learning atmosphere in the class is high" and "the attendance rate of students participating in software practice" did not pass the significance test. The regression coefficients were -0.3163 and -0.4133, and the statistical probabilities were 0.693 and 0.733, respectively. The possible explanation for the insignificance of the former is that, on the one hand, the learning mode of university is different from that of primary and secondary education, and the time for learning in a class as a unit is limited, which greatly weakens the influence of the collective on the individual learning effect. On the other hand, in the university environment, college students' learning consciousness has taken shape. The class learning atmosphere will affect the individual and ultimately affect the students' learning effect. However, with the gradual maturity of students' independent consciousness, the impact of this transmission will be weakened to a great extent, and the practice effect of college students will no longer rely too much on the class learning atmosphere. The possible explanation for the latter is that economic management majors in colleges and universities started software practice late and have not formed a reasonable course plan. Some unnecessary contents are set in the course development process, which makes the course progress slow and redundant. Students can still achieve good internship effects even without full participation.

5. CONCLUSIONS AND RECOMMENDATIONS

With the continuous development of education, the enrollment of colleges and universities is expanding year by year, and the recipients of higher education have gradually become a group that can not be ignored, and they are also the key training objects in the education reform. Based on 414 questionnaires and logit binary model, this paper analyzes the factors influencing the effect of software practice among students majoring in economic management in three universities in Tai 'an, Shandong province. Research shows that: Whether teachers can choose experimental teaching methods (PK) ,whether teachers have rich theoretical and practical knowledge reserves to guide experiments (CK), whether teachers can choose diversified experimental teaching methods based on their own knowledge reserves(PCK),whether teachers have received pre-service training, whether students are interested in software, and whether students recognize experiment as an important part of theoretical and practical improvement have a significant impact on the effect of students' software practice.

Based on the above research conclusions, this paper puts forward the following suggestions to improve the effectiveness of software practice for students majoring in economics and management in colleges and universities:

First, the standards of teachers' information technology application ability training courses directly affect the implementation and effect of teachers' information technology application ability training courses, and play an important role in teachers' information technology application ability and transfer to the teaching situation effectively. College and university teachers can be trained on the teaching concept of TPACK when they are employed, so as to improve their teaching quality and level and focus on cultivating their ability to use pedagogical knowledge and content knowledge. By establishing a complete training standard of teacher information technology curriculum, a set of teacher training mode which is compatible with the subject content of colleges and universities is constructed;

Second, in practice class, the teacher should focus on strengthening its pedagogical knowledge (PK), Content knowledge (CK) and Pedagogical content knowledge (PCK), enrich their theoretical and practical knowledge reserves, and consciously choose diversified teaching methods based on their knowledge reserves and students' learning situation.

Third, in the course design, teachers should choose practice software that takes into account both simulation and knowledge, realize the organic integration of software operation projects and subject theoretical knowledge, attract students to actively and deeply understand subject knowledge, help students improve their application ability and innovative thinking, and promote students' connotative development.

Fourth, there are still problems in the curriculum of experimental learning of economics and management majors. When arranging the progress of software practice, we should pay attention to the compactness of course content, eliminate the too simple steps for college students, speed up the practice process, and focus on the improvement of practice efficiency.

Fifth, the school should give teachers to carry out internship courses integrating TPACK ability, create corresponding conditions and give them some space.

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AUTHOR PROFILE

Lihan Gu, professor, School of Economics and Management, TaiShan University, Taian, China. Graduated from Shandong University in 2012 with a PhD in Management. In terms of theoretical research in marketing. In the past 5 years, more than 10 academic papers have been publicly published, of which 2 were included in CSSCI and 1 was included in ISTP; Preside over 3 provincial-level scientific research projects and 6 departmental level scientific research projects; Participated in 2 national level projects and 5 provincial level projects; Editor in Chief: 1 professional textbook; Publish one academic monograph. Email: gulihan@163.com.