

Moderating Effect of Self-Efficacy for the Relationship between Participation Intention and Practice Effect

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Abstract

Educational practice has always been an important part of teacher education. It not only embodies the organic combination of theory and practice, but also serves as an important means to achieve the existing training goals of schools and meet the needs of society. This research has grasped the core connection between "subjective initiative" and "objective effect" in educational practice. From the perspective of students, it focuses on exploring the relationship between students' participation intention, self-efficacy, and practical effect. The moderator of self-efficacy indicates that self-efficacy will affect the actual impact of participation intention on practice effect. To evaluate the measurement and structural models, structural equation modeling (SEM) was performed using the Partial Least Squares (PLS). The findings are displayed: (1) Participation intention positively predicts the practice effect; (2) Self-efficacy moderates the relationship between participation intention and practice effect. From the perspective of students participating in educational practice, this research explores the relationship between students' participation intention, self-efficacy, and practice effect, and mainly explores the moderating role of self-efficacy for the relationship between participation intention and practice effect. Additionally, this research enriches the current understanding of the factors affecting the practice effect, and suggests possible directions for future research.

Keywords: Participation Intention, Practice Effect, Self-Efficacy

Introduction

The quantity and quality of teachers in various countries are mainly achieved through teacher education, and educational practice is a crucial component. In recent years, countries have increasingly focused on the research of educational practice, carefully designing its goals

and contents, and innovating its models and system management to improve the quality and effectiveness of educational practice. Although the research on educational practice is diverse, most focus on aspects such as practice models, practice reforms, organization and management, and the construction of practice bases (Liu, 2010; Zhu et al., 2012; Zhao et al., 2012; Pan, 2013; Gu & Cui, 2014; Li & Xu, 2019). Only a few studies are conducted from the perspective of students, and they propose that we should pay attention to the emotional communication of students during the educational practice process, promote the transformation of students from "let me practice" to "I want to practice", thereby improving the practical effect.

However, the students' issues, such as their attitude, self-efficacy, and willingness to participate, can all affect the practice effect. This hinders the development of students' teaching skills, which are essential qualities for a qualified teacher, and influences their career development and lifelong growth. Educational practice is very important for students because they are the main participants and beneficiaries, and their experiences in educational practice are more genuine, which can truly highlight the existing problems in the practice.

Although existing studies have explored the structural design and management systems of educational practice, they have paid relatively little attention to students' subjective factors. In particular, the role of self-efficacy in shaping the relationship between students' participation intention and their actual practice effect has not been adequately examined. Self-efficacy, as an important psychological resource, not only reflects students' confidence in their ability to accomplish teaching tasks but also plays a potential moderating role in transforming willingness into effective practice performance. Based on these gaps, this study aims to: (1) examine the direct influence of participation intention on practice effect, (2) analyze the moderating role of self-efficacy in the relationship between participation intention and practice effect, and (3) propose feasible strategies to improve the quality of educational practice from the students' perspective.

This research makes threefold contributions. First, it provides a theoretical contribution by enriching the literature on educational practice from the perspective of student subjectivity, and by clarifying the moderating mechanism of self-efficacy between participation intention and practice effect. Second, it offers practical insights by emphasizing that educational administrators and teacher educators should not only optimize external conditions and institutional arrangements, but also pay attention to cultivating students' psychological resources to enhance practice effectiveness. Third, it contributes methodologically by employing Partial Least Squares Structural Equation Modeling (PLS-SEM) to empirically test the proposed relationships, thereby offering a robust quantitative paradigm for future research in teacher education.

Literature review

Educational practice

Educational practice is an important part of educational activities, and it is a crucial step for students to convert theoretical knowledge into practical abilities and enhance their comprehensive qualities. Yang (1997) pointed out that the development of educational practice has gradually evolved from the initial apprenticeship system to a more organized professional experience, integrating modern technologies and research, and often extending

from the curriculum all the way to post-graduation employment. Liu (2002) believes that educational practice is a process in which pre-service teachers, with the help of their teachers, understand the actual situation of education, apply educational theories to teaching, develop teaching skills, and continuously enhance their understanding of teaching professionalism. Baek & Ham (2009) argued that educational practice offers students the opportunity to engage in real classroom teaching and manage students, which plays a crucial role in cultivating the teaching abilities of future teachers and is an indispensable part of pre-service education. In this research, educational practice is defined as a practical activity where four-year normal university students enter practice schools in alignment with their training goals and under the guidance of both university and practice school teachers, gain an initial understanding of the realities in primary and secondary schools, and seek to enrich their professional knowledge and develop their professional skills, aiming to enhance their overall professional quality as prospective teachers.

Practice Effect

Practice effect is not only an important index to measure the effect of educational practice but also provides practical experience and theoretical support for the development of an educational career, which is embodied in the growth and development of students, the impact on students, the contribution to the school, the feedback of the instructor and the value of educational management. The factors that affect the practice effect are more complex, such as the direct influence of students' professional foundation, learning attitude, practical ability, and self-adjustment ability. The teacher's professional level, guidance ability, and feedback quality will affect the growth of students. Whether the practice school provides adequate teaching resources, a supportive environment, and practical opportunities. The rationality of the practice plan, the clarity of the goal, and the perfection of the evaluation system. The support of education management departments for activities includes system guarantee and resource regulation (Cao et al., 2020; Wang et al., 2020; Ye, 2022; Xie et al., 2022; Zhao et al., 2023). In current research, the practice effect is defined as the ability of students to engage effectively in education and teaching work through personal active learning and external environmental support, as measured by Meng (2022).

Participation Intention

The idea that behavior depends heavily on intention is by no means new. Behavioral intention is the tendency of an individual to take a specific behavior, which has a certain degree of predictive effect on the individual's behavior. Behavioral intention based on the TPB has been widely used to research teacher education, e.g. teachers' decision-making using educational technology (Cheon et al., 2012), teachers' interpersonal behavior in the classroom (Pelletier & Sharp, 2009), predicting science teachers' intentions (Zint, 2002), and the influence of teacher behavior on students' learning outcomes (Hein, 2012).

Educational practice is a practical teaching activity that requires students to have solid theoretical knowledge, practical experience, and strong communication and cooperation skills. Xu (2014) analyzed students' intentions to practice, noting that behavioral intention can enhance practice participation, learning efficiency, communication and cooperation abilities, and teaching skills. Feng & Zhang (2023) found that behavioral intention significantly impacts college students' learning behavior, with strong behavioral intention serving as a subjective reason for more effective learning behavior. The stronger the intention to engage in a

particular behavior, the higher the likelihood of that behavior occurring. In this research, participation intention refers to the behavioral tendency and attitude of students toward participating in educational practice activities. It is primarily reflected in two aspects: planful competence and decision competence, which were measured using adaptations from Code (2020).

Self-Efficacy

Since self-efficacy was proposed by Bandura (1977), it has been more deeply discussed in academic circles, and many educators have realized the important role of self-efficacy in learning and mental health. Early research by Zimmerman et al. (1990) found that gifted students have a higher efficacy than ordinary students, math efficacy is positively correlated with the use of autonomous learning strategies, and seeking peer help is positively correlated with language self-efficacy. Later, Zimmerman (2000) also found that high self-efficacy can make students show more obvious advantages when facing difficult and challenging tasks and pointed out that self-efficacy is positively correlated with students' learning motivation, self-regulation ability, and academic performance. Wang et al. (1999) showed that self-efficacy can help students overcome learning difficulties, and improving self-efficacy is an effective way to improve learning results. Later, the scope of research objects on self-efficacy was expanded to include students at different ages, such as elementary school, high school, and university. For example, Liang (2004) investigated the relationship between academic self-efficacy and the mental health of university students and found that the stronger academic self-efficacy, the higher learning motivation, and the better mental health level of students. Hwang et al. (2016) evaluated the relationship between self-efficacy and academic achievement and found that self-efficacy was positively correlated with students' academic achievement. In recent years, researchers have also found self-efficacy in conjunction with academic performance and learning psychology. For example, Tong & Liao (2019) found through the growth tracking survey of university students that their self-efficacy can positively predict students' academic performance and learning optimism.

To sum up, research on self-efficacy shows that students' learning performance is closely related to their self-efficacy, which affects people's persistence in activities, attitude towards difficulties, and mood towards work. Therefore, it is necessary to conduct in-depth research on the specific self-efficacy of students, to enhance their self-efficacy in participating in educational practice, and then enhance their learning enthusiasm and improve the practice effect. And the self-efficacy measurement scale was adapted, modified, and translated into English from Zhang & Schwarzer's (1995) General Self-Efficacy Scale (GSES).

Based on the research discussed above, this study will explore the influence of participation intention on the practice effect in educational practice, as well as the moderating role of self-efficacy between participation intention and practice effect. The structural model shown in Figure 1 has been developed to provide a clearer picture of the relationships between variables (Hair et al., 2017; Lay & Khoo, 2014). The following modeling hypotheses are proposed:

H₁: The participation intention has a positive and significant effect on practice effect in educational practice.

H_{1a}: The planful competence has a positive and significant effect on practice effect in educational practice.

H_{1b}: The decision competence has a positive and significant effect on practice effect in educational practice.

H₂: The self-efficacy moderates the relationship between participation intention and practice effect in educational practice.

H_{2a}: The self-efficacy moderates the relationship between planful competence and practice effect in educational practice.

H_{2b}: The self-efficacy moderates the relationship between decision competence and practice effect in educational practice.

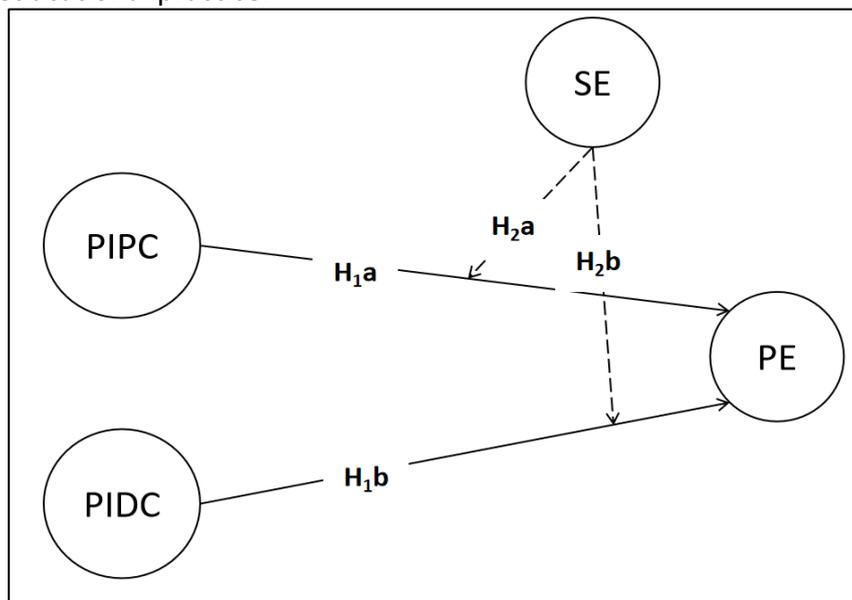


Figure 1 Proposed structural model

Note: PIPC=Planful competence, PIDC=Decision competence, SE= self-efficacy, PE = Practice effect.

Methodology

Participants

This research investigated physical education students who had attended educational practice at three universities in Shaanxi Province, China. A pilot study was conducted with 60 students to test the reliability and validity of the instruments. Subsequently, 200 students who had completed the educational practice were selected through purposeful and random sampling, as shown in Table 1.

Table 1
Demographic information of participants (n = 200)

Gender	Male	151
	Female	49
University	Shaanxi Normal University	65
	Xianyang Normal University	80
	Xi'an Peihua University	55

Measures

Based on previous research, the variables in this study were measured using an 11-point semantic differential scale (from 0 = strongly disagree to 10 = strongly agree). The survey was conducted among intellectually capable and sensitive university students who were able to

self-rate using the 11-point semantic differential scale (Gulo, 1966; Oulo, 2017). The instrument consisted of three sub-scales, with a total of 22 items: 6 items measuring participation intention, 8 items measuring self-efficacy, and 8 items measuring practice effect, as shown in Table 2.

Table 2

The scale of participation intention, self-efficacy, and practice effect

NO.	Items	Reference
Participation intention		
Dimension 1 : Planful competence		
1.	I take a lot of care before choosing.	
2.	I try to be clear about my objectives before choosing.	
3.	I like to consider all of the alternatives.	Code (2020)
Dimension 2 : Decision competence		
4.	I feel confident about my ability to make decisions.	
5.	I think that I am a good decision maker.	
6.	The decisions I make turn out well.	
Self-efficacy		
1.	I can always manage to solve difficult problems if I try hard enough.	
2.	I am confident that I could deal efficiently with unexpected events.	
3.	Thanks to my resourcefulness, I know how to handle unforeseen situations.	Zhang & Schwarzer (1995)
4.	I can solve most problems if I invest the necessary effort.	
5.	I can remain calm when facing difficulties because I can rely on my coping abilities.	
6.	When I am confronted with a problem, I can usually find several solutions.	
7.	If I am in a bind, I can usually think of something to do.	
8.	No matter what comes my way, I am usually able to handle it.	
Practice effect		
1.	I can effectively predict, prevent and control classroom risks.	
2.	I have the ability to guide the school sports club activities.	
3.	I can master and use various teaching methods and skills to form my own teaching style.	
4.	I can coordinate the order of students' entry and exit in group activities such as recess practice and sports meeting.	
5.	I have the knowledge and ability to deal with emergencies in classroom teaching quickly.	Meng (2022)
6.	I have the ability to assist PE teachers in planning and organizing group activities such as recess exercises, big recess activities and sports meetings.	
7.	I can master the timing and skill of whistling.	
8.	I can manage classroom teaching effectively and maintain orderly physical education classroom order.	

Results and Discussion

Measurement Model

Following the recommendations of Hair et al. (2017), the first step is to test the convergent validity and reliability. Convergent validity is obtained when the model meets the following criterias: the loadings for all variables should ideally equal or exceed 0.700 (Hair et

al., 2014), and composite reliability exceeded the 0.700 threshold. Subsequently, the average variance extracted (AVE) should exceed 0.500 (Fornell & Larcker, 1981). Ultimately, after deleting items with loadings below 0.700, the constructed model met all the requirements, as shown in Table 3 and Figure 2.

Table 3
Evaluation of measurement model

Scale	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
Planful Competence	0.838	0.843	0.902	0.755
Decision Competence	0.824	0.876	0.893	0.736
Self-efficacy	0.930	0.936	0.943	0.673
Practice effect	0.930	0.932	0.943	0.672

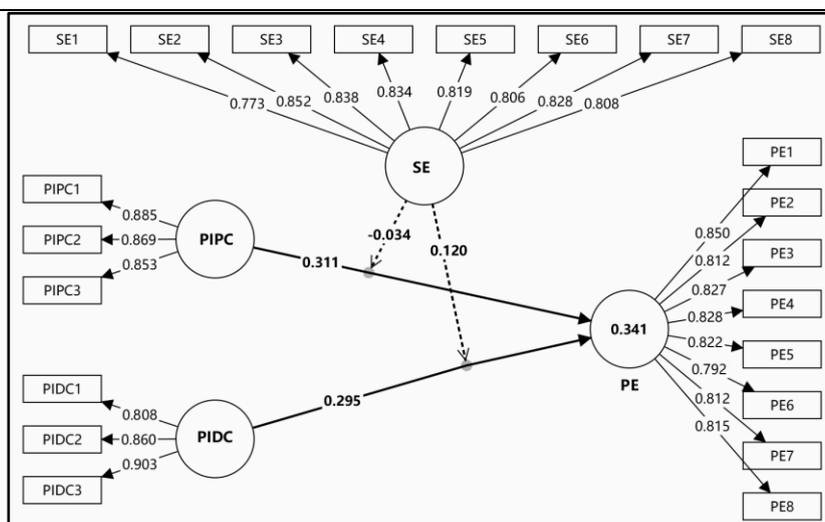


Figure 2 PLS-path analysis of path coefficients and R² values (n = 200)

Discriminant Validity

The research used the Heterotrait-Monotrait Ratio (HTMT) criterion proposed by Henseler et al. (2015) to assess discriminant validity, which is considered established when the value is below the 0.90 threshold suggested by Kline (2011). In the research, the HTMT values ranged from 0.056 to 0.520, indicating that discriminant validity was satisfied.

Structural Model

The structural model was evaluated for covariance, and all predictors met the initial criteria. Specifically, the variance inflation factor (VIF) ranged from 1.000 to 2.784, which is greater than 1 and well below 5, indicating very satisfactory reliability (Hair et al., 2017). This suggests that there are no multicollinearity issues. Additionally, as suggested by Hair et al. (2017), a bootstrap procedure with a resampling rate of 5000 was used to obtain the Beta coefficients, p-values, t-values, and bootstrap confidence intervals. The one-tailed t-test thresholds used in this analysis were 1.645 (significance level < 0.05), 2.327 (significance level < 0.01), and 3.092 (significance level < 0.001) (Hair et al., 2017). The standardized path coefficients estimated by the path model for the direct effects of the two sub-dimensions of PI (PIPC and PIDC) on PE, based on the bootstrap process, are as follows: PIPC → PE = 0.311,

and PIDC \rightarrow PE = 0.295. These results indicate positive relationships between the variables, as shown in Table 4.

Table 4
Assessment of structural model (n = 200)

Relationship	Standard path coefficients	Sample mean (M)	Standard deviation	T statistics	P values
PIPC \rightarrow PE	0.311	0.312	0.066	4.719	0.000
PIDC \rightarrow PE	0.295	0.298	0.065	4.546	0.000
SE \rightarrow PE	0.162	0.167	0.068	2.383	0.017
SE x PIPC \rightarrow PE	-0.034	-0.035	0.058	0.590	0.556
SE x PIDC \rightarrow PE	0.120	0.117	0.058	2.076	0.038

R² Value and Q² Value

The coefficient of determination (R^2) is determined by the square correlation between the actual value and the predicted value of a specific endogenous structure or dependent variable to measure the predictive accuracy of the model, according to Hair et al. (2017). R^2 can vary from 0 to 1, with higher values denoting higher predictive accuracy. A strong R^2 value is considered to be 0.75, moderate 0.50, and weak 0.25. In current research, the obtained R^2 of practice effect is 0.341 (as shown in Figure 3). This shows that the data have good prediction accuracy. As Stone (1974) points out, Q^2 is a criterion for predicting correlation, and Henseler and Fassott (2009) also highlight its utility in evaluating the predictive power of research models. Q^2 evaluated the predictive validity of the model using a blindfold procedure by partial least squares (PLS). Q^2 value greater than zero indicates that the exogenous structure has a predicted correlation with the endogenous structure, where 0.02 is weak, 0.15 is moderate, and 0.35 is strong (Hair et al., 2011). The Q^2 of practice effect is 0.223, which indicates that the model has excellent predictive relevance.

Moderating Effect Assessment

When discussing moderating effects in the context of PLS path modeling, the research refers to a moderated relationship within the structural model. This means that the focus is on how moderating variables influence the direct relationships between latent variables (Henseler et al., 2010). Consequently, the current research specifically examines the effect of moderating variables on these direct paths. There are two types of moderating relationships: continuous and categorical. A continuous moderating effect occurs when the moderating variable is measured metrically, while a categorical moderating effect arises when the moderating variable is categorical, such as gender (Hair et al., 2017). The current research focused on investigating the moderating effect of a continuous variable.

The construct that took the role of a moderator variable in current research is self-efficacy (SE). The alternative hypotheses from H_{2a} to H_{2b} focused on testing the moderating effects for sub-dimensions of PI, namely planful competence (PIPC) and decision competence (PIDC), on practice effect (PE). Table 5 illustrates the path model estimation for the moderating effect of SE from two sub-dimensions of PI (i.e., PIPC and PIDC) on PE. The path coefficient for SE \times PIPC \rightarrow PE reported as -.034, which is less than zero but close to zero, indicates a weak negative relationship. SE \times PIDC \rightarrow PE reported as .120, shows positive values above zero, and

this indicates self-efficacy has a positive moderating effect in the relationship between decision competence and practice effect in educational practice.

Table 5

The moderator Role of Self-Efficacy

Ha	Relationship	Path Coefficient (Std. β)	S. D	p Values	Decision
H2	SE \rightarrow PE	.162	.068	.017*	Has effect
H2a	SE \times PIPC \rightarrow PE	-.034	.058	.556	No moderating effect
H2b	SE \times PIDC \rightarrow PE	.120	.058	.038*	Has moderating effect

Note: *. This has met the significance level ($p < .05$); Bootstrapping (n=5000);

From Table 5, the moderating effect of PIPC on PE via SE is insignificant ($\beta = -.034$, p value = .556). The 95% confidence interval of the indirect effect [-0.143, 0.084] includes zero. It can be concluded that the moderating effect of planful competence on practice effect via self-efficacy is insignificant. Thus, the alternative hypotheses (H_{2a}) failed to support. On the contrary, Table 5 shows the moderating effect of PIDC on PE via SE is significant ($\beta = .120$, p value = .038*). And the 95% confidence interval of the indirect effect [0.001, 0.229] does not include zero. It can be concluded that self-efficacy has a significantly positive moderating effect on the relationship between decision competence and practice effect. Thus, the alternative hypothesis (H_{2b}) proposed in the current research is supported.

Conclusion

According to the empirical evidence, both sub-dimensions (i.e., planful competence and decision competence) show positive and significant effects on practice effect in educational practice. The positive relationship indicates that when students possess high planful competence and decision competence, they have a greater practice effect on educational practice. Among the two path relationships shown by the sub-dimensions of participation intention have shown positive and significant effects on practice effect in educational practice. Results have shown that participation intention, planful competence and decision competence are key components, which have a direct impact on an individual's success in performing a certain behavior. These abilities influence how individuals respond to challenges, develop strategies, and make effective decisions in real-world situations. In current research, planful competence and decision competence are particularly important to the practice effect in educational practice.

According to the result, self-efficacy has no significant moderating effect on one sub-dimension of participation intention, which is the planful competence and practice effect in educational practice. Conversely, self-efficacy has a significant moderating effect on the other sub-dimension of participation intention, which is the decision competence and practice effect in educational practice. This result indicates that the greater the student's self-efficacy, the greater the positive impact of decision competence on the practice effect. High self-efficacy can increase interns' confidence in their decision competence and make them more willing to adopt and implement their own decisions. In this way, they may be more active in

the educational practice, and ultimately improve the practice effect. The moderating effect of self-efficacy shows that self-efficacy will affect the actual effect of participation intention on practice effect in educational practice. In the case of high self-efficacy, the relationship between participation intention and practice effect may be more significant, while in the case of low self-efficacy, the relationship may be weaker. By improving self-efficacy, students can better realize their participation intention and improve the practice effect in educational practice.

Finally, the researcher would like to point out that students, as the subject of educational practice, should be paid enough attention. Under the dual background of teacher education and educational reform, only students with strong participation intention and high self-efficacy can contribute to educational practice and obtain better practice effect.

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