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# Knowledge Hiding Behavior in Online Learning Communities: A Chain Mediation Based on Self-Efficacy and Organizational Psychological Ownership

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**Abstract.** With its flexible and convenient learning methods, rich learning resources and convenient information transmission channels, the online learning community has injected new impetus into the cause of education. However, the open and generative characteristics of the online learning community also preclude learning activities from implementing collective constraints, resulting in the emergence of knowledge hiding behavior. Based on this, researchers have attempted to explore the factors that affect knowledge hiding behavior and to identify the influencing mechanisms. Using structural equation modeling (SEM) and exploratory factor analysis (EFA), this study analyzed a questionnaire on the knowledge hiding behavior of 420 graduate students in online learning communities and found that professional commitment, transformational leadership and a proactive personality have a negative impact on knowledge hiding behavior through self-efficacy and organizational psychological ownership. Based on the model interpretation, this paper suggests that the following aspects should be explored for their potential to diminish knowledge hiding behavior: Assess the proactive personality level of graduate students; the training unit can stimulate students' self-efficacy in terms of the expected results, rewards, relationships and perceived costs of the individual; the supervisor should establish and improve the knowledge sharing mechanism within the organization; the tutor should strengthen the cultural construction of the scientific research team.

**Keywords:** professional commitment; transformational leadership; proactive personality; knowledge hiding behavior

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## 1. Introduction

Due to the rapid recent development of remote education, online education, and especially artificial intelligence technology, increasing numbers of organizations are utilizing social media, virtual communities, and other online platforms to acquire knowledge, share opinions, and exchange ideas. With their flexible and convenient learning methods, rich learning resources, and efficient information dissemination channels, online learning communities have injected new momentum into the education sector under exceptional circumstances, alleviating the educational challenges caused by the pandemic. As the education sector gradually returns to normalcy, educators are beginning to focus on the quality and efficiency of online learning.

In virtual communities, the lack of formal contracts and external incentives makes it easier for learners to engage in hidden behaviors when contributing knowledge, leading to predictions that the latest and most valuable knowledge is not being effectively obtained (Hung et al., 2015). The essence of online learning is the circulation of information within the network, with the form of learning in the virtual network having a vague boundary, as opposed to a real classroom. At the same time, the main body of online learning exists in the form of text symbols, rendering the “social dependence” between learners low, as they are more willing to hide their true feelings and conceal their genuine attitudes and thoughts (Omotayo & Akintibubo, 2024). As an essential foundation for the cultivation of innovative ability, the knowledge production and reserve of graduate and doctoral students will directly affect the progress of scientific research activities (Ghani et al., 2020). This is especially the case in the era of artificial intelligence, with the flattening of internet communication mode; knowledge hiding behavior in an online learning community will cause a more significant impact in a short period time, coupled with the significant data storage function of an online learning community. Knowledge hiding may cause persistent misunderstanding among learners, leading to incorrect data analysis conclusions (Zhai et al., 2023). Therefore, close contact, interactive sharing and extensive cooperation among graduate students each play an essential role in promoting students’ study, academic growth and innovation ability (Cheng et al., 2021; Ghani et al., 2020). Numerous studies have already shown that knowledge hiding is detrimental to the flow of information between organizations; it can lead to knowledge gaps, create barriers to individual cooperation, and may to some extent stifle the creativity of organizational members. Conversely, knowledge sharing, as an important aspect of knowledge management, can significantly enhance organizational performance and innovation capabilities (He et al., 2021).

At present, knowledge hiding is rarely discussed in research due to the mistaken belief that promoting knowledge sharing is an effective way to combat knowledge hiding (Ghani et al., 2020). However, knowledge hiding is a deliberate attempt to conceal knowledge (Connelly et al., 2011) and is not simply the opposite of knowledge sharing; in fact, they may even coincide (Peng, 2013). Therefore, scholars are coming to realize that knowledge hiding behavior often involves more complex psychological motivations and organizational variations (Connelly & Zweig, 2014). Thus, researchers believe that a large number of diversities in

online learning communities, especially in the field of higher education, will affect the accumulation and transfer of knowledge and may potentially hinder scientific innovation (Ghani et al., 2020). Researchers have attempted to explore in-depth the influencing mechanisms of knowledge hiding behavior in online learning communities. A better understanding of this issue can help scientific research teams to perform knowledge management more effectively, as well as enhancing team research vitality and promoting the coordinated development of teams and members. Additionally, the analysis algorithms of artificial intelligence can be improved, along with the interaction efficiency of Renren Internet. Not only would this knowledge benefit the scientific community, but it would also help learners to establish good social relationships in the community, promote a better learning atmosphere, increase the efficiency of interaction between people, and improve overall learning performance. Indeed, the user experience could be enhanced in a precise and targeted manner, creating a good community with a knowledge sharing atmosphere that can improve the learning efficiency of online learners.

## **2. Theoretical Basis and Research Hypothesis**

Bandura put forward the social learning theory, which holds that individual cognition, environmental factors and behavior are closely related, with behavior being largely the result of the interaction between cognition and environment. Knowledge hiding behavior is also often influenced by the dual variables of complex individual psychological motivation and organization (Connelly & Zweig, 2014). The personal factors of social learning theory emphasize the cognitive factor. Professional commitment refers to an individual's sense of responsibility and identification with the subject he is learning. Learners with a strong sense of professional commitment will be motivated by their introspective motivation to explore, communicate and learn more about their professional field, enhancing their dedication and confidence to promote the development of their professional field. This will encourage them to actively share knowledge with others, thus reducing knowledge hiding behavior. Especially in the online learning environment, such learners are more willing to take the initiative to seek like-minded netizens worldwide, discussing learning and studying together, forming resonance. When interacting with their environment, individuals with proactive personalities are more willing to take positive actions to change their environment. For example, in online learning, such students are more willing to take positive actions to promote knowledge sharing rather than hiding knowledge.

### **2.1 Professional Commitment, Transformational Leadership, Proactive Personality and Self-Efficacy**

Professional commitment refers to the emotional acceptance and recognition generated by learners on the basis of their cognitive understanding of their learning. This is accompanied by positive external behavior and an inner sense of appropriateness (Yu et al., 2021). After students identify with the subject, they will believe in its value, and take their learning more seriously, thus enhancing self-confidence and improving self-efficacy. Students with a strong sense of professional identity have clearer learning goals. They will focus on this learning

goal, work hard to resolve any obstacles, constantly improve their academic performance, and build their academic self-efficacy (Guo & Wang, 2023). Moreover, students with a strong sense of professional identity will create a clear career plan for themselves according to professional development trends and industry requirements, coordinate the relationship between theoretical knowledge and practical ability, and constantly improve their ability, thereby improving self-efficacy (Zhou & Wu, 2023). Thus, the following hypothesis is formulated:

- H1: There is a positive relationship between professional commitment and self-efficacy.

Transformational mentors can provide individual members with a sense of efficacy (Ghani et al., 2020). Transformational leadership can set good examples for students, respect students' feelings, encourage students' learning and work, and clarify the long-term direction of their efforts. Based on mutual trust and motivation, transformational mentors tend to assign challenging learning tasks to their followers, providing students with appropriate knowledge and resources to help them overcome tension and anxiety in the learning process, and improving learners' self-efficacy (Cheng et al., 2021). Therefore, the following hypothesis is formulated:

- H2: There is a positive relationship between transformational leadership and self-efficacy.

In order to achieve both their own goals and those of the organization, individuals with an active personality will actively search for information for their own use, and when people in the organization need help, these individuals will have more confidence in their own knowledge of the subject and their knowledge sharing ability to promote the organization to achieve its goals. Students with a highly proactive personality will participate actively in various activities, stimulate their own internal motivation, enhance their self-confidence, and improve their sense of efficacy. Lent and Brown (2019) believed that self-efficacy plays an intermediary role in the mechanism of the influence of active personality on individual behavior and outcome, and further research has found that highly proactive individuals have higher self-efficacy and are more confident in their ability to complete tasks. Individuals who have a proactive personality will set high goals for themselves, thus improving organizational citizenship behavior. As a result, the following hypothesis is formulated:

- H3: There is a positive relationship between proactive personality and self-efficacy.

## **2.2 Self-Efficacy and Organizational Psychological Ownership**

Self-efficacy refers to an individual's ability to judge, believe or grasp whether he can complete a particular activity at a certain level. High self-efficacy will produce enough effort to strive hard for good results, and successful results will further reinforce the expectation of self-success. Therefore, people with a high sense of self-efficacy have improved organizational citizenship behavior by improving the consistency with which they achieve their goals (Ullah et al., 2021).

Thus, we propose the following hypothesis:

- H4: There is a positive relationship between self-efficacy and organizational psychological ownership.

### **2.3 Organizational Psychological Ownership and Knowledge Hiding Behavior**

Organizational psychological ownership refers to learners who regard the scientific research organization as being a part of themselves; they will exhibit a positive attitude toward the organization, showing more out-of-role behaviors (Chen et al., 2020). Organizational psychological ownership can stimulate the altruistic spirit of employees (Chen et al., 2020), improve their willingness to share knowledge, and reduce the behavior of knowledge hiding (Zhao et al., 2019). Scientific research teams in universities have a natural and urgent demand for knowledge flow and sharing, aiming at scientific research innovation (Cerne et al., 2015). The higher the level of organizational psychological ownership among team members, the more strongly they experience organizational self-esteem and personal self-esteem, thus stimulating behaviors that are beneficial to the organization and other team members, such as knowledge sharing, rather than knowledge hiding, in the face of knowledge requests from others (Ladan et al., 2017). Thus, the following hypothesis is constructed:

- H5: There is a negative relationship between organizational psychological ownership and knowledge hiding behavior.

### **2.4 The Mediating Role of Self-Efficacy**

Self-efficacy refers to an individual's confidence in their ability to accomplish a specific task or achieve particular goals; typically, it is closely associated with their perception of their own abilities. Professional commitment reflects an individual's identification and sense of belonging to their professional field, and these two concepts are closely intertwined because an individual's self-efficacy can affect their level of identification with their professional role and responsibilities (Ullah et al., 2021). Students with a high sense of professional identity will overcome difficulties through their efforts and will continuously improve their sense of self-efficacy. According to the theory of mental ownership, organizational ownership can be realized through effectiveness, self-identification, and the positive evaluation and judgment of goals. Learners with a high sense of self-efficacy will stimulate their sense of responsibility for the organization, striving with an active will to achieve behaviors that are conducive to the organization. Therefore, the following statement is hypothesized:

- H6: Self-efficacy mediates the relationship between professional commitment and organizational psychological ownership.

A transformational mentor is a manifestation of personality charm. The successful experience of a mentor can help learners to form optimistic attitudes and positive behaviors, improving students' self-confidence in the face of difficulties, enhancing their sense of self-efficacy and organizational identity, and encouraging students to exhibit more behaviors that are beneficial to the organization (Ladan et al., 2017). Self-efficacy plays a mediating role between transformational mentors and teachers' organizational commitment (Ibrahim

et al., 2014). The relationship between teachers and students in online learning communities is similar, so we can infer the following hypothesis:

- H7: Self-efficacy mediates the relationship between transformational leadership and organizational psychological ownership.

In general, people with proactive personalities tend to show higher levels of self-efficacy due to their natural tendency to take their initiative and their belief in their own ability to achieve goals through hard work and positive behavior. Individuals with proactive personalities will take the initiative to seek the information they need to use in their work in order to achieve their own goals and those of the organization. When people in the organization need help, these individuals will share their knowledge and try their best to achieve the objective of the organization (Ghani et al., 2020). Thus, we can posit the following hypothesis:

- H8: Self-efficacy mediates the relationship between proactive personality and organizational psychological ownership.

## **2.5 The Mediating Role of Organizational Psychological Ownership**

Self-efficacy refers to an individual's ability to determine whether he can perform a specific activity at a certain level. High self-efficacy will produce sufficient effort to strive for this goal, and successful results will further reinforce the expectation of self-success. Therefore, people with a high sense of self-efficacy are more likely to exhibit improved organizational citizenship behavior by improving their self-consistency goals (Yu et al., 2013). Organizational psychological ownership indicates that learners regard the scientific research organization as a part of themselves, and will have a positive attitude toward the organization, exhibiting more out-of-role behaviors (Nadeem et al., 2021). Such characteristics lead researchers to believe that the scientific research group, or the scientific research organization of the university, also applies to this theory. Therefore, we hypothesize that:

- H9: Organizational psychological ownership mediates the relationship between self-efficacy and knowledge hiding behavior.

## **2.6 The Chain Mediation of Self-Efficacy and Organizational Psychological Ownership**

In the field of education, professional commitment refers to the positive attitude and behavior of students who identify with their subject and are willing to make significant efforts to advance it. Students with a strong sense of professional identity will create a clear career plan for themselves according to professional development trends and industry requirements, coordinating the relationship between theoretical knowledge and practical ability and constantly improving their own ability, thereby enhancing their self-efficacy (Zhai et al., 2023). Graduate students with a high sense of academic superiority, a high sense of accomplishment and a strong sense of responsibility for professional issues, who are more inclined to be loyal to the profession and show a high sense of professional identity, usually have a strong sense of exploration, professionalism and confidence to promote the future development of the field, and are more willing to teach others the principles related to the profession (Ghani et al., 2020).

Zhai et al. (2023) also confirmed that learners with high professional commitment tend to have a higher professional development mission and, in line with their love for their profession, when presented with the knowledge requirements of others, they will not have too much psychological pressure to satisfy their self-esteem and improve their self-efficacy; moreover, they will be willing to take the initiative to share and discuss their knowledge with others, especially in the online learning environment. They tend to be more willing to find partners and groups with the same beliefs, discuss topics together, and find resonance. Therefore, it is not difficult to infer that students with a high sense of professional identity will have a high sense of self-efficacy, and will show great exploration, dedication and self-confidence to promote the future development of their field. Thus, the following hypothesis is formulated:

- H10: There is a negative relationship between professional commitment and knowledge hiding behavior.

When it comes to postgraduate studies, the tutor is the most impactful and significant person, playing a direct and essential role in the academic development of students (Ghani et al., 2020). In particular, transformational mentors can set an excellent example for students, respecting the feelings of students, encouraging students with learning and work, and clarifying students' long-term aims. Transformational leadership is based on trust and mutual encouragement among members of the organization to improve learners' sense of self-efficacy (Zhu & Akhtar, 2014). In an e-learning community, transformational mentors are more inclusive of students' individual needs and development, helping to build good social relationships with students in the online environment and facilitating interaction between teachers and students as well as among students. Communication makes it easier for people to share knowledge based on their interests, reducing competition and the emergence of knowledge hiding behaviors (Zhai et al., 2023). We therefore propose the following hypothesis:

- H11: There is a negative relationship between transformational leadership and knowledge hiding behavior.

Students with higher initiative will also have more decisive judgment and confidence in their own academic ability and learning behaviors. College students with positive personalities are more confident in completing study tasks and have more self-identification. At the same time, college students with high self-evaluation will cope better with all kinds of setbacks and difficulties, with self-confidence in their learning and in student life providing a robust psychological reserve (Kim et al., 2009). To achieve their own goals and those of the organization, individuals with proactive personalities will actively search for information for their own use and, when other staff in the organization need help, these proactive individuals will have more confidence in their own knowledge of subjects and their knowledge-sharing ability to promote the organization to achieve its goals by helping the other person. (Ghani et al., 2020).

We therefore posit the following hypothesis:

- H12: There is a negative relationship between proactive personality and knowledge hiding behavior.

According to the existing research, students with higher professional commitment have a positive attitude towards the development of their profession, are willing to start their long-term career, contribute to promoting the whole field of research, and take the initiative to assume a position as the disseminator of knowledge (Ghani et al., 2020; Zhai et al., 2023). In education, the mentoring style is based on the management and training of students in a specific organizational context. Teachers and students with transformational mentoring styles inspire and encourage each other and promote students' expectations for future development through encouraging words and deeds. In such an organization, students are more willing to consider the goals of the whole team and tend to take the initiative to share knowledge (Zhai et al., 2023). Personal factors are the essential contents of learners' self-cognition in the knowledge exchange process and the key factors that affect learners' knowledge exchange behavior. According to research (Peng, 2013), the stronger the initiative of knowledge owners, the lower the probability of knowledge hiding behavior.

Therefore, the following hypotheses are proposed:

- H13: Self-efficacy and organizational psychological ownership play a chain mediating role between professional commitment and knowledge hiding behavior.
- H14: Self-efficacy and organizational psychological ownership play the role of chain mediation between transformational leadership and knowledge hiding behavior.
- H15: Self-efficacy and organizational psychological ownership play a chain mediating role between proactive personality and knowledge hiding behavior.

### 3. Methodology

#### 3.1 Questionnaire Design and Data Collection

Two instruments were used for data collection in this study. First, face-to face interviews were conducted with students who were enrolled in Chinese universities, in order to determine whether learners exhibit knowledge hiding behavior in the online learning environment as well as the ways in which they hide knowledge. Following the interviews, additional data were collected through a questionnaire.

The questionnaire comprised of six variables, including professional identification, transformational mentors, proactive personality, self-efficacy, organizational psychological ownership, and knowledge hiding behavior. The thematic section of the questionnaire used a 5-point Likert scale measurement, ranging from 1 to 5 indicating "completely disagree" to "completely agree". All of the questions in the main part of the questionnaire were adapted from established scales in domestic and foreign literature, considering the specific characteristics of the questionnaire and the research context. All questions underwent a process of bilingual translation between Chinese and English to ensure that no translation errors or information omissions had occurred. Before distributing the formal questionnaire, the researcher conducted a small-scale pre-test to gather feedback on the comprehension level and word accuracy. As a result,



further revisions of the test questionnaire were performed to align with the reading and comprehension habits of domestic scholars before finalizing the formal questionnaire.

The sample size is calculated by  $n = Z^2 \sigma^2 / d^2$ , according to the confidence level of 95%; the sampling error is not more than 5%;  $Z$  is the  $Z$ -score corresponding to the desired confidence level (95% confidence level corresponds to  $Z=1.96$ );  $\sigma$  is the population standard deviation (given as 0.5);  $d$  is the desired margin of error (5% or 0.05 in decimal form). Hence,  $Z^2 = 1.96^2 = 3.8416$ ,  $\sigma^2 = (0.5)^2 = 0.25$ ,  $d^2 = (0.05)^2 = 0.0025$ ,  $n = 1.96^2 * 0.5^2 / 5\%^2 = 3.8416 * 0.25 / 0.0025 = 384.16$ , indicating that the minimum sample size required for this investigation is 385.

China is comprised of three regions, namely the eastern region, the central region and the western region. Under the condition of Simple Random Sampling, we used the equal number distribution method for data collection; as a result, 160 questionnaires were distributed in each region. The subjects of this study were graduate students who had online learning experience in China. 480 questionnaires were issued and 460 questionnaires were returned within two months. After screening, valid questionnaires were selected, and the effective questionnaire recovery rate was 91.3%. Table 1 shows the socio-demographic profile of participants in the questionnaire.

**Table 1: Demographic profile of the participants (n=420)**

	Categories	Frequency	Percent
Gender	Male	121	28.8%
	Female	299	71.2%
Age(years)	18-30	305	72.6%
	>30	115	27.4%
Subject	Natural Science	89	21.2%
	Humanistic and Social Science	331	78.8%
Degree program	Master's Degree Candidate	344	81.9%
	Doctoral Candidate	76	18.1%

### 3.2 Variable Measurement

The measurement of variables refers to the research of relevant scholars. Among them, the independent variables were identified as professional identity, proactive personality and transformational mentor. The scale of professional identity was attributed seven items, with typical items including: For me, this is the best among all the central areas or research fields. The proactive personality scale was compiled with five items. The scale adopted for transformational mentoring style comprised a total of six items. The dependent variable was knowledge hiding behavior, with six items in total. The mediating variables were self-efficacy and organizational psychology, which included seven items in total.

## 4. Results

### 4.1 Data Analysis and Model Testing

In this study, SPSS was used to conduct exploratory factor analysis on six variables: professional identity, transformational coaching style, proactive personality, self-efficacy, organizational psychological ownership, and knowledge hiding. Factor loading, Cronbach's  $\alpha$  and Average Variance Extracted were selected as reliability analysis indexes through which to obtain the reliability of the scales. The validity analysis index uses the difference between the square root of AVE and the correlation coefficient of each factor to judge its discriminant validity. Finally, AMOS was used for confirmatory factor analysis to analyze the model fitting index. On the fitting index, the ratio of card room to freedom  $\chi^2/df$ , AGFI (Adjusted Goodness of Fit Index), GFI (Goodness of Fit Index), and TLI (Tuck-Lewis) were selected; NFI (normed Fit Index), was used to compare the fitting Index CFI (Comparative Fit Index), and the approximation error square root RMSEA was used to judge the fit of the model.

### 4.2 Reliability and Validity of Constructs

As can be seen in Table 2, the Cronbach's  $\alpha$  and composite reliability of the six dimensions were all greater than 0.8 and AVE was greater than 0.5, indicating that the scale had a good aggregation effect. At the same time, Table 2 indicates that the square root of AVE is better than the correlation coefficient between variables, indicating that each dimension has good discriminative validity.

Table 2: Summary of the standard load factor, AVE value, and CR value

Constructs	Observational variable	Factor loading	S.E.	C.R.	P	CR	AVE
PC	PC1	.839					
	PC2	.806	.063	17.199	***		
	PC3	.857	.059	18.981	***		
	PC4	.803	.064	17.105	***	.929	.654
	PC5	.733	.075	14.935	***		
	PC6	.749	.060	15.405	***		
	PC7	.863	.057	19.198	***		
TL	TL1	.789					
	TL2	.832	.065	16.253	***		
	TL3	.832	.066	16.249	***	.918	.653
	TL4	.860	.064	16.945	***		
	TL5	.801	.065	15.482	***		
	TL6	.728	.071	13.710	***		
PP	PP1	.782					
	PP2	.795	.070	14.777	***		
	PP3	.824	.069	15.425	***	.894	.629
	PP4	.813	.072	15.167	***		
	PP5	.748	.069	13.733	***		
SE	SE1	.616					
	SE2	.639	.112	9.680	***	.914	.608

	SE3	.772	.117	11.166	***		
	SE4	.810	.119	11.553	***		
	SE5	.893	.114	12.328	***		
	SE6	.824	.117	11.691	***		
	SE7	.859	.117	12.024	***		
KHB	KHB1	.804					
	KHB2	.855	.070	17.678	***		
	KHB3	.861	.071	17.872	***	.936	.711
	KHB4	.883	.070	18.530	***		
	KHB5	.864	.067	17.969	***		
	KHB6	.788	.067	15.779	***		
OPO	OPO1	.924					
	OPO2	.929	.037	28.072	***		
	OPO3	.848	.042	22.341	***	.909	.672
	OPO4	.683	.050	14.828	***		
	OPO5	.675	.052	14.543	***		

PC = Professional Commitment, TL = Transformational Leadership, PP = Proactive Personality, SE = Self-efficacy, OPO = Organizational Psychological Ownership, KHB = Knowledge hiding behavior

According to the values shown in Table 3, knowledge hiding behavior and its internal items have good structural validity.

**Table 3: Correlation values**

Variable	1.PC	2.TL	3.PP	4.SE	5.KHB	6.OPO
PC	.809					
TL	.364***	.808				
PP	.473***	.268***	.793			
SE	.555***	.363***	.574***	.780		
KHB	-.430***	-.366***	-.385***	-.482***	.843	
OPO	.517***	.420***	.466***	.520***	-.448***	.820

### 4.3 Structural Equation Model Test

A structural equation model is established based on the theoretical model and hypothesis, and the fit degree is tested using data statistics software. As shown in Figure 1, this study includes independent variables (professional commitment, proactive personality, transformational leadership), mediating variables (self-efficacy, organizational psychological ownership), and the dependent variable (knowledge hiding behavior). The overall fit test of the model was conducted to judge the degree of match between the formal survey data and the model. The test results are shown in the figure below.

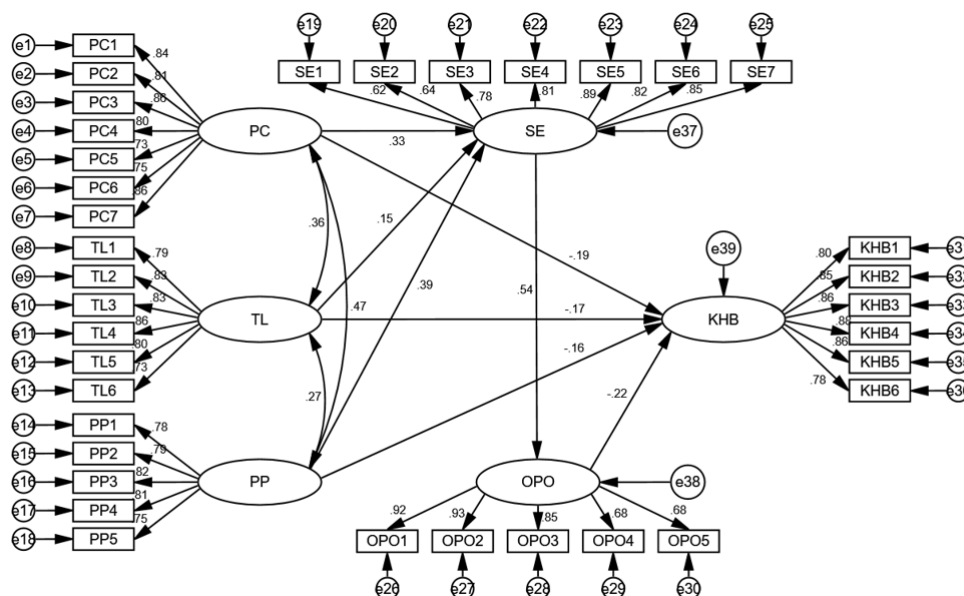


Figure 1: Model fit test

4.4 Model Fit Criteria

Based on the theoretical model and research hypothesis, the researcher established Structural Equation Modeling (SEM) to test the model fit criteria. Based on the research of Doll, when the parameters estimated by the model become numerous, it becomes difficult for the Goodness of Fit Index (GFI) to reach the standard of 0.9, so 0.8 is also appropriate. The detection value is 0.854, which is within the acceptable range. According to MacCallum’s research, Adjusted Goodness of Fit Index (AGFI) the detection value is 0.833, which is acceptable. The whole model fitting index is within the ideal range; thus, our measurement model is satisfactory (Table 4).

Table 4: Model fitting

	x <sup>2</sup> /df	AGFI	GFI	TLI	CFI	RMSEA
Evaluation criteria	1–3	>.8	>.8	>.9	>.9	<.08
Statistical values	1.618	.833	.854	.953	.957	.045
Model fit	Yes	Yes	Yes	Yes	Yes	Yes

The researcher used the maximum likelihood estimation to analyze the path of the structural model. The standard error of the path coefficient is S.E. All are positive numbers with no abnormal phenomena occurring, corresponding critical value. The absolute values of C.R. were all greater than 1.96, indicating that the regression coefficient values had significant differences at the level of 0.05. The

criterion for the path coefficient significance test is as follows: when the critical ratio is greater than 1.96, it is significant at  $p < 0.05$ ; when the critical ratio is greater than 2.58, it is substantial at  $p < 0.001$  level (Table 5).

**Table 5: Path coefficient and hypothesis test**

			Estimate	S.E.	C.R.	P	Result
SE	<---	PC	.330	.038	5.285	***	Support
SE	<---	TL	.154	.032	2.919	.004	Support
SE	<---	PP	.389	.043	6.011	***	Support
OPO	<---	SE	.544	.112	8.194	***	Support
KHB	<---	PC	-.191	.056	-2.912	.004	Support
KHB	<---	TL	-.172	.051	-2.918	.004	Support
KHB	<---	PP	-.164	.061	-2.522	.012	Support
KHB	<---	OPO	-.222	.048	-3.833	***	Support

Note: \*\*\* indicates substantial at the 0.001 level

As can be seen from the fitting index test results in the above table, the model fitting index meets the standard, so path analysis and hypothesis testing between variables can be performed. The standardized path coefficient of PC on SE was 0.330 ( $p < 0.05$ ), indicating that PC had a significant positive effect on SE, so the hypothesis was valid. The standardized path coefficient of TL on SE was 0.154 ( $p < 0.05$ ), indicating that TL had a significant positive effect on SE, so the hypothesis was valid. The standardized path coefficient of PP on SE was 0.389 ( $p < 0.05$ ), indicating that PP had a significant positive effect on SE, so the hypothesis was valid. The standardized path coefficient of SE on OPO was 0.544 ( $p < 0.05$ ), indicating that SE had a significant positive effect on OPO, so the hypothesis was valid. The standardized path coefficient of PC on KHB is -0.191 ( $p < 0.05$ ), indicating that PC has a significant negative effect on KHB, so the hypothesis is valid. The standardized path coefficient of TL on KHB was -0.172 ( $p < 0.05$ ), indicating that TL had a significant negative effect on KHB, so the hypothesis was valid. The standardized path coefficient of PP on KHB was -0.164 ( $p < 0.05$ ), indicating that PP had a significant negative effect on KHB, so the hypothesis was valid. The standardized path coefficient of OPO on KHB was -0.222 ( $p < 0.05$ ), indicating that OPO had a significant negative effect on KHB, so the hypothesis was valid.

#### 4.5 Mediation Effect Tests

This research employed the bootstrap sampling method (bootstrap sample = 2000), and bias-corrected method to check the mediation effect to generate the asymmetric confidence intervals (CIS) for indirect associations (MacKinnon et al., 2004). Table 6 displays the result.

**Table 6: Mediation results by bootstrapping method**

Parameter	Estimate	Lower	Upper	P
PC-SE-OPO	.180	.092	.277	.001
TL-SE-OPO	.084	.020	.154	.008
PP-SE-OPO	.212	.125	.314	.000
SE-OPO-KHB	-.121	-.239	-.016	.023
PC-SE-OPO-KHB	-.040	-.093	-.008	.013
TL-SE-OPO-KHB	-.019	-.049	-.003	.014
PP-SE-OPO-KHB	-.047	-.107	-.006	.020
PC-KHB	-.191	-.369	-.017	.029
PC-KHB	-.231	-.398	-.060	.010
TL-KHB	-.172	-.336	-.019	.030
TL-KHB	-.190	-.351	-.039	.018
PP-KHB	-.164	-.300	-.029	.017
PP-KHB	-.211	-.359	-.057	.007

Note: PC = Professional Commitment, PP = Proactive Personality, TL = Transformational Leadership, SE = Self-efficacy, OPO = Organizational psychological ownership, KHB = Knowledge hiding behavior

The standardized indirect influence coefficient of PC-SE-OPO is 0.180, the confidence interval of indirect effect does not contain 0, and p is less than 0.05, indicating that SE plays an intermediary role between PC and OPO, so the hypothesis is valid. The standardized indirect influence coefficient of TL-SE-OPO is 0.084, the confidence interval of indirect effect does not contain 0, and p is less than 0.05, indicating that SE plays an intermediary role between TL and OPO, so the hypothesis is valid. The standardized indirect influence coefficient of PP-SE-OPO is 0.212, the confidence interval of indirect effect does not contain 0, and p is less than 0.05, indicating that SE plays an intermediary role between PP and OPO, so the hypothesis is valid. The standardized indirect influence coefficient of SE-OPO-KHB is -0.121, the confidence interval of indirect effect does not contain 0, and p is less than 0.05, indicating that OPO plays an intermediary role between SE and KHB, so the hypothesis is valid.

The standardized indirect influence coefficient of PC-SE-OPO-KHB is -0.040, the confidence interval of indirect effect does not contain 0, and p is less than 0.05, indicating that SE and OPO play a chain intermediary role between PC and KHB, so the hypothesis is valid. The confidence interval of PC-KHB (direct effect) does not contain 0, and p is less than 0.05, indicating that SE and OPO play a partial mediating role between PC and KHB. The standardized indirect influence coefficient of TL-SE-OPO-KHB is -0.019, the confidence interval of indirect effect

does not contain 0, and  $p$  is less than 0.05, indicating that SE and OPO play a chain intermediary role between PC and KHB, so the hypothesis is valid. The confidence interval of PC-KHB (direct effect) does not contain 0, and the  $p$ -value is less than 0.05, indicating that SE and OPO play a partial mediating role between TL and KHB.

The standardized indirect influence coefficient of PP-SE-OPO-KHB is -0.047, the confidence interval of indirect effect does not contain 0, and  $p$  is less than 0.05, indicating that SE and OPO play a chain intermediary role between PC and KHB, so the hypothesis is valid. The confidence interval of PC-KHB (direct effect) does not contain 0, and  $p$  is less than 0.05, indicating that SE and OPO play a partial mediating role between PP and KHB.

Based on self-efficacy and organizational psychological ownership, this study explores the influence mechanisms of professional commitment, transformational leadership and proactive personality on knowledge hiding, builds corresponding models, and puts forward relevant research hypotheses. Through the analysis of data from a sample of 420 students with master's and doctoral degrees, this study has demonstrated that the following statements are validated. There is a positive relationship between professional commitment and self-efficacy. There is a positive relationship between transformational leadership and self-efficacy. There is a positive relationship between proactive personality and self-efficacy. There is a positive relationship between self-efficacy and organizational psychological ownership. There is a positive relationship between professional commitment and knowledge hiding behavior. There is a positive relationship between transformational leadership and knowledge hiding behavior. There is a positive relationship between proactive personality and knowledge hiding behavior. There is a positive relationship between organizational psychological ownership and knowledge hiding behavior. Self-efficacy mediates the relationship between professional commitment and organizational psychological ownership. Self-efficacy mediates the relationship between transformational leadership and organizational psychological ownership. Self-efficacy mediates the relationship between proactive personality and organizational psychological ownership. Organizational psychological ownership mediates the relationship between self-efficacy and knowledge hiding behavior. Self-efficacy and organizational psychological ownership play a chain mediating role between professional commitment and knowledge hiding behavior. Self-efficacy and organizational psychological ownership play a chain mediating role between transformational leadership and knowledge hiding behavior. Self-efficacy and organizational psychological ownership play a chain mediating role between proactive personality and knowledge hiding behavior.

## 5. Conclusion

This paper employed empirical research to test the conceptual model. The analysis revealed that transformational leadership, professional commitment and proactive personality, through self-efficacy, have a significant impact on knowledge hiding. With the development of artificial intelligence technology, more and more university research teams have established a stable online

organizational structure, including mentors and students through online learning and discussion, which is the same as the offline organizational form. Members of online learning groups also have relationships such as competition, cooperation and resource exchange.

Learners with a high sense of self-efficacy are able to accurately position their own growth goals, believe that they can effectively master learning and life and, when they encounter various setbacks and difficulties, they can make appropriate adjustments, forming good self-recognition and judgement in order to promote the healthy development of themselves and their research team.

Transformational mentors will take into account the team's research projects and students' development needs, enhance students' sense of belonging to the organization and enthusiasm for learning, create opportunities and strengthen cooperation among learners in an organizational atmosphere of fairness, innovation and a strong sense of belonging, paying attention to students' personalized development. Furthermore, such mentors will respect students' own development direction, thereby enhancing students' self-efficacy and reducing knowledge hiding.

Learners with a high sense of professional identity have deep feelings for the entire professional field, will take the initiative to combine personal development with their specialized subject, and will combine personal interests with collective interests. Therefore, such learners will not regard an inquirer as a potential collaborator, which will mobilize learners' enthusiasm in developing their professional field. As an independent personality trait, proactive personality has a significant impact on self-efficacy. To achieve their goals, such people will allocate time reasonably, make continuous efforts, and even change their circle of influence in order to promote individual self-efficacy and reduce knowledge hiding.

## **6. Implications**

Knowledge hiding behavior has been rarely researched in the higher education context. Therefore, the results of this research will provide useful insights into the knowledge hiding behavior of master's and doctors' degree students. In theoretical terms, this study focused on the factors of influence as well as the influencing mechanism of knowledge hiding behavior among graduate students. Additionally, this study elucidates various practical approaches that can be applied to reduce students' knowledge hiding behavior.

### **6.1 Theoretical Implications**

Research into knowledge hiding behavior is very important, both in terms of traditional face-to-face education and modern online learning. Few studies to date have examined knowledge hiding behavior in the field of higher education. First, this study offers theoretical contributions to the literature on higher education management and knowledge management; second, this research enriched and validated the theory of learning and social cognitive behavior. The results reveal that both organizational and personal factors influence learners' behavior, which



is consistent with the social cognitive theory that personal factors, environmental factors and behavior interact. Third, this is the first research to explore the influence of personality factors on knowledge hiding in online learning. The results showed that individuals with a strong proactive personality will reduce knowledge hiding behavior.

## **6.2 Practical Implications**

In practical terms, this study offers an in-depth understanding of knowledge hiding behavior in practice in the online learning context. The implications for higher education institutions and research organizations are that practitioners should formulate specific policies to improve learners' organizational identification; for example, higher institution managers can improve their leadership skills to create a sharing online learning environment. In a sharing culture, students prefer to share knowledge rather than hide it. Furthermore, in the process of talent selection, higher institution managers must pay attention to the personality traits of the candidates, as a stable personality trait, once formed, is difficult to change quickly. In contrast to traditional face-to-face learning environments, online learning environments require learners to have proactive personality traits. Finally, supervisors should seriously consider professional commitment as a vital factor among their pedagogical criteria. Supervisors should help their students to familiarize themselves with their research domains and guide their students to realize their roles and future development direction, enabling students to evaluate their majors professionally, and encouraging students to help each other and shed more light on their professional development.

## **7. Recommendations**

### **7.1 Limitation**

Due to time, energy and cost constraints, the research data were collected only from universities in mainland China. Therefore, the results may not be applied globally because of the differences in cultural backgrounds across various countries and regions. This difference may affect students' psychology and learning styles. If data samples can be collected from different cultural backgrounds and the randomness of the samples improved, more interesting results may be acquired and the research conclusions will be more generalizable.

### **7.2 Future Directions**

Information technology has changed the means of knowledge transmission, with the mechanisms of influence and influencing factors of knowledge hiding behavior in online learning communities also becoming more complex. In future research, attention should be paid to the influence of knowledge hiding behavior in online learning communities on teaching and instructional design, technology application and educational management. In addition, it would be interesting to compare online and offline knowledge hiding behaviors, or to compare knowledge hiding behaviors in different knowledge domains, which would bring more value to the research field.

## **8. Discussion**

### **8.1 Comparison with Previous Studies**

Most prior studies have conducted in-depth research on the influencing variables of knowledge hiding behavior from the aspects of subject factors, object factors, environmental factors, and so on. Scholars such as UsmanGhani et al. (2020) have focused on three dimensions of knowledge hiding behavior in online learning communities; namely, procrastination, pretending to be stupid, and free riding. Based on the relevant researches in the field of psychology and information systems, a conceptual model was proposed to explore knowledge hiding behavior in virtual communities; ultimately, it verified that the lack of incentives for knowledge sharing in online learning communities leads to knowledge hiding behavior. Furthermore, Zhai et al. (2021, 2023) analyzed network communication characteristics and reported that flat learning methods and rich media content are correlated with the complexity of learners' psychology and behavior, thus promoting knowledge hiding behavior. Additionally, some scholars have used the grounded theory method to examine why individual researchers hide knowledge from the perspective of researchers. Most of the research subjects in the existing studies are college students. According to research (Labafi, 2017; Pan et al., 2016), the educational level will affect knowledge hiding behavior, with knowledge hiding behavior being much higher than knowledge sharing behavior in organizations of higher education. On the other hand, the current study takes graduate students as the research object, and focuses on the impact of knowledge owners' personality traits on knowledge. Ghani et al. (2020) built a theoretical framework on the influencing factors of knowledge hiding in online learning communities, designing a formation mechanism model of knowledge hiding in online learning communities, and analyzing the influencing mechanism and action mechanism of online learners' knowledge hiding behavior. Based on the existing research, this study discusses the influencing factors of knowledge hiding behavior from the perspective of personality and ownership theory.

### **8.2 Management Suggestion**

Based on the research results, this study proposes suggestions from the perspectives of college enrollment management, talent training and scientific research management (Fauzi, 2023). First, it is necessary for enrollment managers to assess the proactive personality level of master's and doctoral students. Once formed, stable personality traits are difficult to change quickly. As a particular type of work, scientific research requires master's and doctoral students to have long-term determination and endurance in the face of hard work, especially in the back-to-back environment of the online learning community. The ability to proactively identify problems, identify opportunities and propose creative solutions is also required. Therefore, in terms of recruitment and assessment, it is necessary to take into account the quantitative scientific research ability and the soft strength of candidates' active personality levels, in order to select those with high-level innovative talents who are suitable for scientific research and academic work. At the same time, university administrators should pay attention to the guiding role of tutors, encouraging mentors to optimize their guidance styles, thereby reducing students' knowledge hiding behavior and increasing the knowledge harvest of students; this, in turn, will improve the quality of graduate training.

Regarding talent training, the training unit can stimulate doctoral students' self-efficacy from the expected results, rewards, relationships and perceived costs of the individual. First of all, the supervisor needs to pay attention to the personality development of students, create an online learning environment for doctoral students based on fairness, innovation and a strong sense of belonging, attach importance to the ethical education of students, and enhance their organizational identity. Furthermore, supervisors should encourage students to share tacit knowledge that is difficult to standardize and systemize, while emphasizing learners' professional commitment. In teaching and scientific research, apart from paying attention to the content and framework of knowledge itself, students should also be taught about the development history, current development status, challenges faced and future development prospects of the subject, in order to open up the relationship between professional knowledge, national development and social progress, enhancing students' professional identities and thereby reducing knowledge hiding behavior. Finally, the master's and doctoral students themselves should strive to accurately grasp their personal growth goals, cultivate a positive attitude, take the initiative to adjust themselves, focus on honest self-awareness and self-evaluation, and form a sound personality characteristic.

In terms of scientific research management, first of all, the supervisor should establish and improve the knowledge sharing mechanism within the organization, such as developing a scientific and reasonable assessment system, improving the punitive mechanism for knowledge hiding, emphasizing the reward mechanism for knowledge sharing, and considering the research experience and ability of project leaders when selecting them, linking the performance assessment with the scientific research output. Secondly, the tutor should strengthen the cultural construction of the scientific research team, dynamically evaluating and revising the development goals of students, respecting the individual differences of students, establishing a sustainable, equal, inclusive and diverse academic sharing platform, and creating a fair and just environment to encourage healthy competition (Ghani et al., 2020) by creating an active knowledge exchange and knowledge sharing environment. Finally, it is necessary to keep up with the pace of the development of national education informatization, update and implement the policy of improving students' information literacy and information technology, and build a cooperative modern technology interaction channel and platform for postgraduates, with knowledge sharing at its core and problem solving as its orientation.

## 9. References

- Cerne, M., Babic, K., Connelly, C. E., & Skerlavaj, M. (2015). Team-level knowledge hiding, social leader-member exchange, and prosocial motivation. *Academy of Management Proceedings*, 25(1).  
<https://doi.org/10.5465/ambpp.2015.16302abstract>
- Chen, Y., Li, C., & Li, Y. (2020). A study on the path to overcome the hostility of knowledge sharing hostility under the "mentoring system" talent training model. *Modernization of Management*, 1(40), 4. <https://doi.org/10.19634/j.cnki.11-1403/c.2020.01.015>

- Cheng, F. F., Wu, C. S., & Su, P. C. (2021). The impact of collaborative learning and personality on satisfaction in innovative teaching context. *Frontiers in Psychology, 12*. <https://doi.org/10.3389/fpsyg.2021.713497>
- Connelly, C. E., & Zweig, D. (2014). How perpetrators and targets construe knowledge hiding in organizations. *European Journal of Work and Organizational Psychology, 24*(3), 479–489. <https://doi.org/10.1080/1359432X.2014.931325>
- Connelly, C. E., Zweig, D., Webster, J., & Trougakos, J. P. (2011). Knowledge hiding in organizations. *Journal of Organizational Behavior, 33*(1), 64–88. <https://doi.org/10.1002/job.737>
- Fauzi, M. A. (2023). Knowledge hiding behavior in higher education institutions: A scientometric analysis and systematic literature review approach. *Journal of Knowledge Management, 27*(2), 302–327. <https://doi.org/10.1108/jkm-07-2021-0527>
- Ghani, U., Zhai, X., Spector, J. M., Chen, N. S., Lin, L., Ding, D., & Usman, M. (2020). Knowledge hiding in higher education: Role of interactional justice and professional commitment. *Higher Education, 79*(2), 325–344. <https://doi.org/10.1007/s10734-019-00412-5>
- Guo, X., & Wang, N. (2023). Study on the relationship between professional commitment, self-efficacy and learning burnout of vocational students. *International Journal of Education and Humanities, 7*(2), 210–213. <https://doi.org/10.54097/ijeh.v7i2.5624>
- He, P., Jiang, C., Xu, Z., & Shen, C. (2021). Knowledge hiding: Current research status and future research directions. *Frontiers in Psychology, 12*, Article 748237. <https://doi.org/10.3389/fpsyg.2021.748237>
- Hung, S. Y., Lai, H. M., & Chou, Y. C. (2015). Knowledge-sharing intention in professional virtual communities: A comparison between posters and lurkers. *Journal of the Association for Information Science and Technology, 66*(12), 2494–2510. <https://doi.org/10.1002/asi.23339>
- Ibrahim, M. S., Ghavifekr, S., Ling, S., Siraj, S., & Azeez, M. I. K. (2014). Can transformational leadership influence on teachers' commitment towards organization, teaching profession, and students learning? A quantitative analysis. *Asia Pacific Education Review, 15*, 177–190. <https://doi.org/10.1007/s12564-013-9308-3>
- Kim, T.-Y., Hon, A. H., & Crant, J. M. (2009). Proactive personality, employee creativity, and newcomer outcomes: A longitudinal study. *Journal of Business and Psychology, 24*, 93–103. <https://doi.org/10.1007/s10869-009-9094-4>
- Labafi, S. (2017). *Ocultamiento del conocimiento como obstáculo para la innovación en las organizaciones: Un estudio cualitativo de la industria del software* [Knowledge hiding as an obstacle of innovation in organizations: A qualitative study of the software industry]. *AD-Minister (30)*, 131-148. <https://doi.org/10.17230/ad-minister.30.7>
- Ladan, S., Nordin, N. B., & Belal, H. M. (2017). Influence of transformational leadership on knowledge hiding: Mediating role of organizational psychological ownership: A proposed framework. *Studia Universitatis Babeş-Bolyai Negotia, 62*(4), 97–117. <https://doi.org/10.24193/subbnegotia.2017.4.06>
- Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. *Journal of Vocational Behavior, 115*, Article 103316. <https://doi.org/10.1016/j.jvb.2019.06.004>
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99–128. [https://doi.org/10.1207/s15327906mbr3901\\_4](https://doi.org/10.1207/s15327906mbr3901_4)
- Nadeem, M. A., Liu, Z., Ghani, U., Younis, A., & Xu, Y. (2021). Impact of shared goals on knowledge hiding behavior: The moderating role of trust. *Management Decision, 59*(6), 1312–1332. <https://doi.org/10.1108/md-09-2019-1197>
- Omotayo, F. O., & Akintibubo, A. O. (2024). Knowledge hiding in the academia:

- Individual and social factors predicting knowledge hiding behaviour of undergraduates of a Nigerian university. *Journal of Librarianship and Information Science*, 56(1), 145–163. <https://doi.org/10.1177/096100062211335>
- Pan, W., Zhou, Y., & Zhang, Q. (2016). Does darker hide more knowledge? The relationship between Machiavellianism and knowledge hiding. *International Journal of Security and its Applications*, 10(11), 281–292. <https://doi.org/10.14257/ijasia.2016.10.11.23>
- Peng, H. (2013). Why and when do people hide knowledge? *Journal of Knowledge Management*, 17(3), 398–415. <https://doi.org/10.1108/jkm-12-2012-0380>
- Ullah, I., Wisetsri, W., Wu, H., Shah, S. M. A., Abbas, A., & Manzoor, S. (2021). Leadership styles and organizational citizenship behavior for the environment: The mediating role of self-efficacy and psychological ownership. *Frontiers in Psychology*, 12, Article 683101. <https://doi.org/10.3389/fpsyg.2021.683101>
- Yu, C., Yu, T.-F., & Yu, C.-C. (2013). Knowledge sharing, organizational climate, and innovative behavior: A cross-level analysis of effects. *Social Behavior and Personality: An International Journal*, 41(1), 143–156. <https://doi.org/10.2224/sbp.2013.41.1.143>
- Yu, F., Chen, Q., & Hou, B. (2021). Understanding the impacts of Chinese undergraduate tourism students' professional identity on learning engagement. *Sustainability*, 13(23), Article 13379. <https://doi.org/10.3390/su132313379>
- Zhai, X., Wang, M., Chen, N.-S., Ghani, U., & Cacciolatti, L. (2021). The secret thoughts of social network sites users: A scale for the measurement of online knowledge-hiding in a knowledge exchange (KE) context. *Interactive Learning Environments*, 31(5), 2899–2913. <https://doi.org/10.1080/10494820.2021.1913608>
- Zhai, X., Wang, M., & Ghani, U. (2023). The SOR (stimulus-organism-response) paradigm in online learning: An empirical study of students' knowledge hiding perceptions. In M. Wang, J. Ryoo, & K. Winkelmann (Eds.), *Cross reality (XR) and immersive learning environments (ILEs) in education* (pp. 48–63). Routledge. <https://doi.org/10.4324/9781003457121-5>
- Zhao, H., Liu, W., Li, J., & Yu, X. (2019). Leader-member exchange, organizational identification, and knowledge hiding: The moderating role of relative leader-member exchange. *Journal of Organizational Behavior*, 40(7), 834–848. <https://doi.org/10.1002/job.2359>
- Zhou, S., & Wu, W. (2023). A study on the relationship between higher vocational students' perceived teacher support and learning engagement: The chain mediation of academic self-efficacy and professional commitment. *Nurture*, 17(4), 595–606. <https://doi.org/10.55951/nurture.v17i4.435>
- Zhu, Y., & Akhtar, S. (2014). How transformational leadership influences follower helping behavior: The role of trust and prosocial motivation. *Journal of Organizational Behavior*, 35(3), 373–392. <https://doi.org/10.1002/job.1884>

### Appendix 1 (Variable measurement scales)

Variable	Number	Question item	Origin
Professional commitment (PC)	PC1	I feel very loyal to my major area or research work.	Usman Ghani, Xuesong Zhai, et al. (2019)
	PC2	For me, this is the best among all the major areas or research fields.	
	PC3	I am proud to tell others that I am part of this major area or research field.	
	PC4	I am sure this major area or research field has a bright future.	
	PC5	I never planned to change majors.	
	PC6	I spend a lot of time increasing my expertise.	
	PC7	Overall, I like my profession very much.	
Knowledge hiding behavior in online learning community (KHB)	KHB1	When I use SNS for learning and my friend/peer sends a message asking for information, I pretend I am too busy.	Xuesong Zhai, Nian-sheng Chen, Usman Ghani, Luca Caccidatti (2019)
	KHB2	When I use SNS for learning and my friend/peer sends a message wanting some information, I pretend I know nothing about the topic and don't know what s/he is talking about.	
	KHB3	When I use SNS for learning and my friend/peer sends a message asking for information, I share emojis, stickers and images to avoid the conversation.	
	KHB4	When I use SNS for learning and my friend/peer sends a message asking for information, I share emojis, stickers and images to hide some information or ignore what I am being asked.	
	KHB5	When I use SNS for learning and my friend/peer sends a message asking for information, I agree to help but I also manipulate the information (mislead or give him/her information different from what s/he wanted).	
	KHB6	When I use SNS for learning and my friend/peer sends a message asking for information, I agree to help but instead I gave him/her incomplete information.	
Transformational Leadership (TL)	TL1	When I use SNS for learning and encounter any difficulties, my tutors are willing to give me extra help.	John M. Schaubroeck(2016)
	TL2	When I use SNS for learning, my tutor will consider my interests when making decisions.	
	TL3	When I use SNS for learning and need help when I encounter a problem, my tutor will quickly help me.	
	TL4	When I use SNS for learning, my tutor cares about my opinion in the discussion.	
	TL5		

Organizational psychological ownership (OPO)	TL6	When I use SNS for learning, my tutor can show me the goal to strive for and the direction of learning.	Constant (1994), Jarven, Staple (2001)
	TL7	When I use SNS for learning, my tutor often communicates with students to understand our studies, lives, and family situations.	
	OPO1	The tutor has excellent professional knowledge and ability, and has a strong sense of innovation.	
	OPO2	When I use SNS for learning I have a high sense of personal belonging to our team.	
	OPO3	When I use SNS for learning I feel that I belong to my academic organization.	
	OPO4	When I use SNS for learning I feel that the knowledge gained by individual learning is shared by the learning team.	
	OPO5	When I use SNS for learning most people in the organization feel like they own the organization.	
Proactive personality (PP)	OPO6	I feel that the knowledge used in learning belongs to the whole team.	Bateman & Grant (1993)
	PP1	When I am studying in an online community, I have a hard time seeing this organization as mine (upside down).	
	PP2		
	PP3	I'm good at turning problems into opportunities.	
	PP4	I am a powerful force for change.	
	PP5	I like challenging work.	
Self-efficacy (SE)	PP6	I enjoy the pleasure of facing and overcoming difficulties.	Bandura (1971)
	SE1	I'm always looking for new ways to make my life better.	
	SE2	I will try my best to help people who need it.	
	SE3	I can solve a problem if I try my best, in most cases.	
	SE4	If I do my best, I am able to solve the problems posed by most learners in the online learning community.	
SE5	I always deal with difficulties calmly, because I believe in my ability to deal with problems. In the online learning community, I can always find several solutions to a problem raised by others. I am confident that I will be able to provide valuable knowledge to other learners in the online learning community		