Research on the Application of College Students' Online Learning Cognitive Engagement Evaluation

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Abstract: College Students' online learning is gradually becoming more and more normalized. There is a correlation between learning engagement and learning quality. Cognitive engagement is important components of online learning engagement. Through literature research, expert consultation and analytic hierarchy process, this paper constructs the "online cognitive engagement evaluation index system of college students", which includes two first-class indicators, four second-class indicators, and determines the weight of each level of indicators. Through the design and development of the evaluation index system, based on the structural equation model of the observed variables on the corresponding latent variables of the factor load, the experimental class of college students online cognitive engagement was evaluated and analyzed, which provides reference for the development of online learning engagement evaluation of college students.

Keywords: Online learning, cognitive engagement, evaluation index system

1. Introduction

Learning engagement is an important factor to guarantee learning quality and influence learning performance, it is particularly important in the "online" situation. Learners' behavioral engagement is supported by their own internal psychological activities to achieve certain goals. Learners' cognitive engagement, such as strategy selection, monitoring and regulation, is an important factor affecting the quality of learning. This study starts with the connotation of online cognitive engagement, constructs the evaluation index system of College Students' online cognitive engagement, designs and develops evaluation tools, selects experimental objects for application, and provides reference for the research and practice of online learning cognitive engagement.

2. Cognitive Engagement in Online Learning

Cognitive engagement referred to the high degree of "participation" of learners' cognitive strategies and psychological resources (Heflin H, Shewmaker J & Nguyen J,2017), which was an element of online learning engagement. Most scholars believed that it mainly refers to learners' realization of their learning goals, selection of suitable methods and strategies in the process, and monitoring and regulation of their whole learning process (Lee,E. ,Pate,J.A.,& Cozart, D,2015). According to the composition of learning strategy coverage, Michael and others summarized learning strategies as cognitive strategies, metacognitive strategies and resource management strategies. Therefore, from the perspective of learning strategies, combined with the cognitive and metacognitive ideas proposed by Michael and others, the related research of scholars in cognitive engagement, and the cognitive characteristics of dialectical logical thinking and independent thinking of college students, this study defines "cognitive engagement in online learning" as: the learning strategies adopted by learners in order to achieve learning objectives in online learning environment Methods, skills and cognitive strategies to monitor and regulate the whole learning activities.

3. Determination and Evaluation of Evaluation Tools

The reliability coefficients of all dimensions were greater than 0.8, which indicated that the questionnaire had good reliability. The final "questionnaire of College Students' cognitive engagement in online learning" was shown in Table 1.

Table 1. *Questionnaire of College Students' Cognitive Engagement in Online Learning*

Evaluation dimension	Exogenous latent variable	Latent variable of internal cause	Topic content
cognitive engagement	cognitive strategy	rehearsal strategy	D2: After class, I will browse the platform resources to help complete the practical homework.
			D3: After class, I will review what I have learned on the platform in time to consolidate what I have learned.
			D4: I can relate the knowledge acquired on the platform to other disciplines.
		elaborative strategy	D5: When reviewing the contents I have learned online, I will often divide them into primary and secondary ones according to my own level and grasp the main points.
			D7: I will often summarize what I have learned into an outline to help me remember.
		organization strategy	D1: Before class, I will use the resources in the platform to preview what I want to learn.
			D6: I can summarize all kinds of resources in the platform into systematic knowledge.
	metacognitive strategy	planning strategy	D9: Usually, I will have a plan to review and practice the course content I have learned online.
			D10: Before the online test, I will make an effective review plan according to my actual situation.
			D12: I can carefully analyze the reasons for the mistakes in the online homework or test.
		monitoring strategy	D8: I will set my own online learning goals according to the guidance tasks.
			D13: I will review regularly according to the resources on the platform to help understand the relationship between knowledge points.
			D14: When I encounter difficulties in online learning, I will adjust my online learning plan and method in time.
		adjustment strategy	D11: When I study online, I often ask myself some questions to make sure I really understand what I have learned.
			D15: I will often evaluate and summarize the advantages and disadvantages of my online learning process.
			D16: I will often compare with other students to check their "online" learning methods and efficiency problems.

4. Structural Equation Model Analysis

Therefore, a second-order confirmatory factor analysis was conducted for the dimensions of "cognitive

strategy" and "metacognitive strategy" with three first-order factors. Through calculation, the modified standardized parameter estimation model was shown in Figure 1.
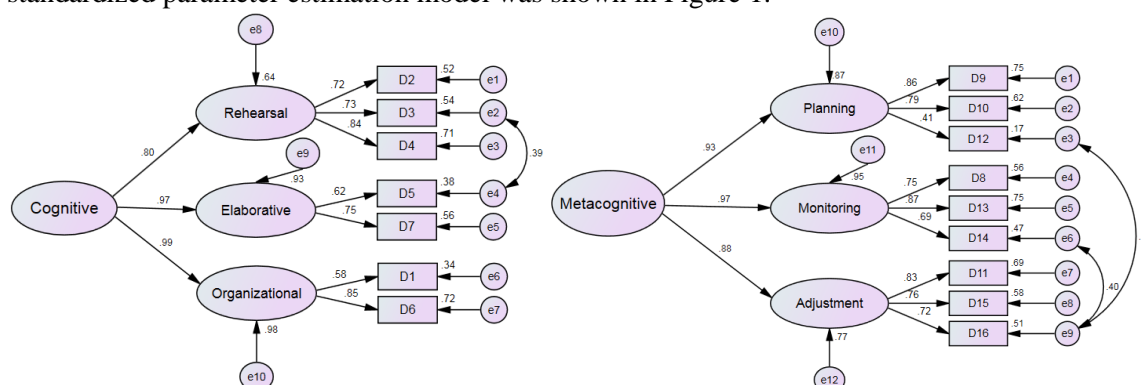

Figure 1. The Model Diagram of Standardized Parameter Estimation of Second-order Confirmatory Factor Analysis of "Cognitive Strategy" and "Metacognitive Strategy".

5. Discussion

In the dimension of "cognitive strategy", the cognitive engagement of college students was evaluated according to the factor load of each observation variable on its internal latent variable. In terms of "elaborative strategy", the vast majority of students in the two classes can often summarize what they have learned, which can effectively help to memorize knowledge points. In the aspect of "rehearsal strategy", the students of the two classes pay more attention to linking the learned knowledge with other subjects, which can better reflect the retelling strategy, so as to promote the online learners' "cognitive input". By browsing the platform resources to help complete the homework, and by reviewing the contents learned on the platform to consolidate the learned knowledge. However, there was a lack of summary and Reflection on the problems and deficiencies in the process of online learning.

6. Conclusion

Based on the established evaluation index system, the application research was carried out to explore the cognitive engagement of college students in online learning. The research found that: College students should be good at organizing all kinds of resources in the online platform into systematic knowledge, and pay attention to the organization strategy in the process of online learning; they should pay more attention to the connection and construction between knowledge and subject knowledge; they should summarize and reflect more on the problems and shortcomings in the process of online learning; only in this way can college students effectively promote the engagement of them in online cognition.

Acknowledgements

References

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