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Strategies to Improve the Student Engagement of Vocational College Class Based on Design Thinking

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ABSTRACT

Student engagement is an important factor affecting the educational outcomes of colleges, which can help colleges better understand the quality of students' learning and the mechanism of students' effective learning to help colleges make corresponding improvements. While previous research and literature studies have found that students in vocational colleges class have low student engagement. Design thinking is a comprehensive thinking with mature concepts, methods, and tools, which has been widely used in the field of education. This study introduced the design thinking in the vocational colleges class, proposed the teaching activity mode and strategy based on design thinking, tried to use design thinking to intervene students' class behavior, and conducted the strategy by empirical research. The results show that the teaching mode based on design thinking has a positive effect on improving student engagement in class.

Keywords: Design thinking, Student engagement, Education

INTRODUCTION

Under the background of economic development entering a new stage, China's vocational education is also undergoing in-depth adjustment and transformation to adapt to the development requirements of domestic social and economic situation. In 2015, the State Council issued the grand blueprint of "Made in China 2025", calling for highly skilled talents with superb skills and innovative thinking to enrich every corner of industrial development. The popular conception of "learning society" and "career development" indicates that vocational education, as an important part of lifelong education system, should shoulder the great mission of promoting people's self-development. At present, China attaches more importance to vocational education than any other time period. However, China's vocational education still faces many challenges (Du, 2018). Due to the low status of vocational education in China in past years. Vocational schools are the choice of students with relatively low scores in the college entrance examination, teachers also report that the students in the class have a bad attitude in learning, poor self-control, and are not

interested in learning, vocational colleges class have low student engagement and classroom teaching is difficult to carry out (Zheng, 2016).

TEACHING STRATEGIES BASED ON DESIGN THINKING

Student Engagement

In the 1960s, the word "engagement" was first introduced into the field of education, and then gradually expanded. The famous scholar Astin believes that student involvement refers to "students' internal psychological activities and external behaviors in a series of activities related to learning" (Astin, 1999), which has a strong connection to the theory of student engagement. Types of engagement are often categorized into behavioral engagement, emotional engagement, agentic engagement, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004; Furlong et al., 2003; Jimerson, Campos, & Greif, 2003).

(1) Behavioral engagement

Behavioral engagement entails learner conduct such as following the rules and involvement in learning activities with effort, persistence, and concentration (Birch & Ladd, 1997).

(2) Emotional engagement

Emotional engagement refers to the presence of positive emotions in class or during task involvement, such as "interest, enjoyment and enthusiasm" (Skinner et al., 2009). It also refers to the positive and negative emotions a learner experiences in response to the teacher, peers, and the education environment (Gunuc & Kuzu, 2015; Trowler, 2010).

(3) Cognitive engagement

Cognitive engagement is defined as the level of student investment in thoughtful, strategic, and willing efforts to understand complex ideas or master difficult skills (Fredricks, Blumenfeld, Friedel, & Paris, 2004). Cognitive engagement involves an ability to engage in self-regulated learning and an appreciation for the value of learning. In cognitive engagement, students are motivated to learn, both in and out of the classroom (Gunuc & Kuzu, 2015).

(4) Agentic engagement

Agentic engagement refers to the extent of the student's constructive contribution into the flow of the instruction they receive in class such as letting the instructor knows what they want or interested in, expressing opinions, and asking questions (Reeve, 2013). Reeve and Tseng (2011) initially proposed the concept of agentic engagement. They defined it as "students' constructive contribution into the flow of the instruction they receive" (p. 258).

Desing Thinking

Simon first proposed in 1969 that design is a universal way of thinking. In 1987, Peter Rowe, a professor at Harvard School of Design, published the book Design Thinking, which brought design thinking into the public eye. In 1992, Richard Buchanan pointed out that design thinking can creatively solve wicked problems (Peng, 2019). At present, design thinking has been maturely applied in the fields of engineering, management and education,

and a variety of tools and models have been derived, such as Stanford University's 5-step design thinking and the British double diamond model. Due to its goal-oriented, integrates technology and business, emphasizes cultivating students' thinking methods, it has been proved to be effective in cultivating students' higher-order thinking and promoting the realization of innovative achievements, is an excellent model of education.

Teaching Strategies Based on Design Thinking

The introduction of design thinking into courses to improve student engagement is based on the following reasons. Design thinking can be divided into five stages: empathy, define, idea, prototype, and test. In each stage, a large number of tools will be used, such as grouping, interview, brainstorming, user research, planning blueprint, reporting, etc. These methods can arouse students' enthusiasm, improve students' take more time and energy in class, so as to improve student engagement in class to a certain extent. The rationale structure is shown in Figure 1.

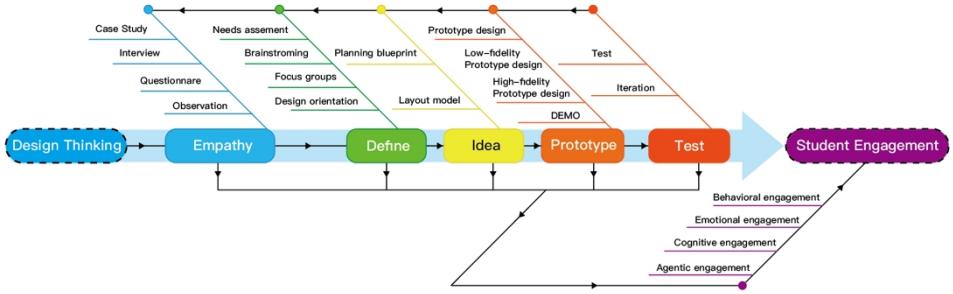

Figure 1: The rationale structure.

TEACHING EXPERIMENT DESIGN

The teaching strategies were used in the Career Planning course which is offered in the first semester of the third grade of higher vocational college, 144 students in 3 classes are from the College of Art and Design took part in the experiment.

The study adopted a mixed methodology, which was the combination of qualitative and quantitative research. To measure the student engagement in class, questionnaire adapt from Reeve (2013) was used in the research. Due to the limitations of class time and students' attention, the questions were changed to 9 items, and contains Behavioral Engagement, Emotional Engagement, Agentic Engagement, and Cognitive Engagement (see Table 1). Self-reflection reports also be used in this research as qualitative research to measure student engagement in class. The questionnaire was administered at the beginning of the course to measure the entry level of each group before the teaching and was administered again at the end of the teaching.

Table 1. Sample questionnaire adapt from Reeve (Reeve. 2013).

Dimension	Items
Behavioral Engagement	1. When I'm in this class, I actively participate in class discussions.
	2. When I'm in this class, I listen carefully.
Emotional Engagement	3. I enjoy working in class task in this class.
	4. This class is fun.
	5. When group members work on task in this class, I am enthusiastically involved.
Agentic Engagement	6. I let my teacher know what I want to know.
	7. During class, I ask questions to help me learn.
Cognitive Engagement	8. I try to explain ideas or concepts in my own words.
	9. I try to apply acquired knowledge in this class to complete a learning task or solve problems.

Table 2. Compare the results before and after teaching (Q1).

1. When I'm in this class, I actively participate in class discussions.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	9.03%	18.42%
Agree-4	22.92%	29.61%
Neither agree nor disagree-3	53.47%	48.68%
Disagree-2	10.42%	1.97%
Strongly disagree-1	4.17%	1.32%

TEACHING EFFECT AND ANALYSIS

WJX (www.wjx.cn) was used to collect the quantitative data of questionnaires and the qualitative data of the reflective statement online.

(1) Behavioral engagement

Behavioral engagement awareness includes 2 questions (Q1-Q2). According to the analysis of the questionnaire results, compared with the beginning of the course, the teaching strategies based on design thinking improve students' actively participate in class discussions by 9.39%, listen carefully in class by 6.74% (strongly agree).

(2) Emotional engagement

Emotional engagement awareness includes 3 questions (Q3-Q5). According to the analysis of the questionnaire results, compared with the beginning of the course, the teaching strategies based on design thinking improve students' enjoyable working in class task by11.97%, fun in class by 10.56%, involvement in group work by 12.57% (strongly agree).

(3) Cognitive engagement

Cognitive engagement awareness includes 2 questions (Q6-Q7). According to the analysis of the questionnaire results, compared with the beginning of the course, the teaching strategies based on design thinking improve students'

Table 3. Compare the results before and after teaching (Q2).

2. When I'm in this class, I listen carefully.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	15.97%	21.71%
Agree-4	31.25%	34.87%
Neither agree nor disagree-3	47.92%	42.11%
Disagree-2	2.78%	0.66%
Strongly disagree-1	2.08%	0.66%

Table 4. Compare the results before and after teaching (Q3).

3. I enjoy working in class task in this class.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	10.42%	22.37%
Agree-4	26.39%	40.13%
Neither agree nor disagree-3	54.86%	34.21%
Disagree-2	6.25%	1.97%
Strongly disagree-1	2.08%	1.32%

Table 5. Compare the results before and after teaching (Q4).

4. This class is fun.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	11.81%	22.37%
Agree-4	29.86%	44.08%
Neither agree nor disagree-3	51.39%	30.92%
Disagree-2	4.86%	1.97%
Strongly disagree-1	2.08%	0.66%

Table 6. Compare the results before and after teaching (Q5).

5. When group members work on task in this class, I am enthusiastically involved.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	13.19%	25.66%
Agree-4	29.17%	44.08%
Neither agree nor disagree-3	50.69%	27.63%
Disagree-2	4.86%	1.32%
Strongly disagree-1	2.08%	1.32%

Table 7. Compare the results before and after teaching (Q6).

6. I let my teacher know what I want to know.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	15.97%	18.42%
Agree-4	31.25%	47.37%
Neither agree nor disagree-3	45.14%	31.58%
Disagree-2	5.56%	1.97%
Strongly disagree-1	2.08%	0.66%

Table 8. Compare the results before and after teaching (Q7).

7. During class, I ask questions to help me learn.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	7.64%	12.5%
Agree-4	17.36%	31.58%
Neither agree nor disagree-3	56.94%	46.05%
Disagree-2	12.5%	7.89%
Strongly disagree-1	5.56%	1.97%

share their want to know to teacher in class by 2.45%, ask questions in class by 4.86% (strongly agree).

(4) Agentic engagement

Agentic engagement awareness includes 2 questions (Q8-Q9). According to the analysis of the questionnaire results, compared with the beginning of the course, the teaching strategies based on design thinking improve students' explain concepts in class by 10.75%, apply acquired knowledge to complete a learning task in class by 10.78% (strongly agree).

In the self-reflection report, most of the students also mentioned that they liked this teaching method very much and talked about their fondness for group activities for many times. They hoped to have more practical tasks and have more interaction with teachers and classmates.

Table 9. Compare the results before and after teaching (Q8).

8. I try to explain ideas or concepts in my own words.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	8.33%	19.08%
Agree-4	27.08%	38.16%
Neither agree nor disagree-3	52.78%	37.5%
Disagree-2	8.33%	3.95%
Strongly disagree-1	3.47%	1.32%

Table 10. Compare the results before and after teaching (Q9).

9. I try to apply acquired knowledge in this class to complete a learning task or solve problems.		
Items	**The ratio at the beginning of the course**	**The ratio at the end of the course**
Strongly agree-5	7.64%	18.42%
Agree-4	20.83%	33.55%
Neither agree nor disagree-3	56.94%	42.11%
Disagree-2	11.11%	4.61%
Strongly disagree-1	3.47%	1.32%

CONCLUSION

According to the research results, strategies based on design thinking has a positive promoting effect on the improvement of students' participation, and this model can provide a new classroom teaching paradigm for vocational education. Admittedly, there are shortcomings in this study, for example, the questionnaire needs to be designed more rigorously to follow the characteristics of students in vocational colleges, and the improvement of constructed of four kinds of engagement need to be further analysed. Furture research will concentrate on the questionnaire optimize, and more subdivisions will be made on the improvement of the dimensions of four kinds of engagement.

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