

# Research on the Relationship Between the Elements of Students' Learning State in the New Learning Space

Xiaozhen Shi

Ningbo University of Finance & Economics, Ningbo, 315175, China

sherry\_613@126.com

**Key words:** Canonical Correlation, Learning State, Subjective Initiative, Effective Results.

**Abstract.** With the application of new learning space, the study of college students' learning state has attracted more attention. By analyzing the research of teaching in the new learning space, it is found that the empirical research on students' learning state combination with the characteristics of students in the new period is insufficient. In this paper, C university has been promoting teaching in the new learning space for a long time. Therefore, by investigating the learning status of C university's students and using SPSS 25.0 for data analysis, it was found that students' learning state had a higher improvement in subjective initiative and effective results showing a positive trend, and there was a significant correlation between subjective initiative and effective results.

## 1. Introduction

Influenced by the development of learning theory and technology, it has become a research hotspot to reconstruct traditional classroom and laboratory. Researchers propose many terms to refer to this new thing: future classroom, active learning space, active learning classroom, etc. Although the basic concepts are not the same, most of them emphasize the characteristics of information technology support, collaborative learning, interaction and learner centered. In order to distinguish from traditional learning space, this article calls it "new learning space".

In addition, some scholars have studied the change of students' learning effectiveness in the new learning space. From the perspective of influence results, the conclusion has three dimensions, including learning participation, social interaction and learning results. For example, students feel more hardworking and interested in learning <sup>[1]</sup>. Or, students' discussion and question answering have increased in classroom <sup>[2]</sup>. Moreover, the knowledge of students is kept longer <sup>[3]</sup> and their academic performance is better <sup>[4]</sup>.

At present, through literature review, it is found that there are few researches on the application of learning space, and there are still some deficiencies in relevant researches: Firstly, empirical research on the impact of new learning space on students' behavior state is relatively deficient; Secondly, there is no relevant analysis on students' learning in motivation stimulation, learning participation, interaction, learning results and other learning state, lacking the support of theory and model. Therefore, the key to study the application of new learning space is to find out the characteristics of college students in the new era, and explore the potential learning needs from the motivation, behavior, results and other dimensions of students' learning state.

## 2. Research framework

### 2.1 Defining concepts

The term "learning state" comes from the study of children with learning disabilities, and it discusses the composition of students' learning disabilities. According to different objects and levels, researchers have the following definitions: (1) Learning state refers to the characteristics of students' physical and mental activities in intensity, stability and durability when they are engaged in learning activities. (2) Learning state is the functional state of body and mind when people are learning. It mainly includes the state of sober mind and concentration of attention, emotional state and physical function <sup>[5]</sup>. (3) Learning state refers to the sum of students' attention state, emotional state and

motivation state in learning process and results [6].

Students' learning state can be distinguished by subjectivity and objectivity. Therefore, the main dimension of this paper is the subjective initiative and effective results. The subjective initiative is the outward expression of learning state. It is the basic learning performance that learners pay attention to the specific teaching environment and teaching tasks. The effective results are based on the learners' learning results and observed by their actual ability. Then, this paper describes the specific performance of the learning state with eight elements: motivation, learning participation, interactive communication, learning resources, academic record, thinking ability, collaboration ability and problem-solving ability.

## 2.2 Data sources

In this study, the students who study in the new learning space in C university are taken as the research objects. The subjects of study are engineering, management, literature and art. In addition, the questionnaire uses the Likert five level scale, taking the influence of new learning space on students' learning status as the research topic, a total of 371 sample data are collected.

## 3. The data analysis

In this study, there are 208 boys and 163 girls in the 371 samples. The proportion of major is 49.5% in engineering, 34% in culture, 5.4% in art and 11.1% in management. Freshmen, sophomores, juniors and seniors account for 22%, 34%, 28% and 18% of the total number of samples respectively, which are representative in this kind of student group.

According to the reliability and validity test by using SPSS 25.0, Cronbach's Alpha coefficient of the total scale is 0.802, so the scale has high internal consistency. In addition, the KMO value is 0.907, and the Bartlett spherical test P value is less than 0.001, which indicates that the sample data accords with the basic condition of data analysis.

### 3.1 Students perform well in all elements of the learning state

Table 1. The mean distribution of learning state elements

| Dimension             | Elements                  | Mean | Mode |
|-----------------------|---------------------------|------|------|
| subjective initiative | motivation                | 4.13 | 4    |
|                       | learning participation    | 4.24 | 4    |
|                       | interactive communication | 3.98 | 3    |
|                       | learning resource         | 3.71 | 4    |
| effective results     | thinking ability          | 3.75 | 4    |
|                       | collaboration ability     | 4.32 | 4    |
|                       | Problem-solving ability   | 3.69 | 3    |
|                       | academic record           | 2.68 | 3    |

As shown in Table 1, students have a strong sense of subjective initiative in learning state, and the average value of their compliance is about 4, which is in the range of "relatively consistent". Specifically, students feel that their willingness to learn autonomously is stronger, and they are glad to participate in different types of teaching activities actively in the classroom. When they encounter problems and doubts, they will also take the initiative to communicate with teachers and students. At the same time, they believe that the new learning space provides a more convenient access to get the knowledge and resources.

In addition, the average value of students' effective results is also kept at 3-4 points, which is in the "relatively consistent" range. Specifically, most students think that they can be more good at finding problems and thinking deeply through learning in the new learning space and exercising in different teaching activities. If they encounter projects in teaching activities, they can also have more interaction with their peers. And the ability to solve complex problems through efforts with peers is improved. Finally, students in the middle of learning achievement level have a significant improvement in learning achievement.

### 3.2 Significant correlation between the elements of learning state

Table 2 shows the correlation coefficients obtained from the typical correlation analysis using SPSS 25.0. The first correlation coefficient of the typical correlation variables is 0.872,  $p < 0.001$ , and the correlation is significant. That is to say, the stimulation of students' learning motivation and the enhancement of deep-thinking ability are mutually supportive and related. And the second correlation coefficient of typical correlation variables is 0.318,  $p < 0.001$ , and the correlation is significant. That is to say, the more students participate in teaching activities, the higher their team cooperation ability is.

Table 2 Typical correlation analysis coefficient

| Canonical Correlations |             |            |                 |        |         |            |       |
|------------------------|-------------|------------|-----------------|--------|---------|------------|-------|
|                        | Correlation | Eigenvalue | Wilks Statistic | F      | Num D.F | Denom D.F. | Sig.  |
| 1                      | 0.872       | 3.174      | 0.206           | 46.918 | 16.000  | 1109.621   | 0.000 |
| 2                      | 0.318       | 0.112      | 0.861           | 6.248  | 9.000   | 886.031    | 0.000 |
| 3                      | 0.206       | 0.044      | 0.958           | 4.004  | 4.000   | 730.000    | 0.003 |
| 4                      | 0.004       | 0.000      | 1.000           | 0.005  | 1.000   | 366.000    | 0.943 |

It can be seen that students' participation and interaction in teaching activities can mostly express the subjective initiative of learning state. At the same time, the improvement of deep-thinking ability, cooperation ability and problem-solving ability are the direct reflection of the effective results of learning state. Therefore, according to the standardized correlation coefficient of each element, the correlation expression of each element in the learning state under the new learning space can be constructed as follows:

$$U = -0.271* \text{motivation} - 0.37* \text{learning participation} - 0.369* \text{interactive communication} - 0.129* \text{learning resources} \quad (1)$$

$$V = -0.413* \text{thinking ability} + 0.369* \text{collaboration ability} - 0.339* \text{problem-solving ability} + 0.024* \text{academic record} \quad (2)$$

Note: U and V represent the quantitative expression of subjective initiative and effective results..

## 4. Conclusions and Suggestions

### 4.1 The application of new learning space is a teaching reform adapted to the characteristics of students

In the new era, college students are more informational and more receptive to the new learning space teaching. Not only students' learning content is derived from a single textbook to online and offline combination, teaching activities range from cramming to project practice, theme reporting, and so on. In addition, homework is not limited to theoretical learning, but also combined with industry background and practice. Of course, the improvement of physical environment promotes the improvement of teachers' teaching mode, and also urges the change of students' learning style. Compared with the traditional classroom, students' learning state also present a positive impact.

### 4.2 The study of learning state should be combined with school differences and the times

Some studies show that differences in universities also make the students' differences in learning status. At different stages of the integration of new learning space and technical support, we need to pay different attention to students' learning state. In the early stage of application, we should focus on promoting the application of teaching in the new learning space, and pay attention to the ability improvement of some students. After this stage, we can analyze the application data of teachers and students, get the feedback to improve the design. Finally, through big data analysis, we can find out the changes of students' learning state in different stages, and help teachers optimize their teaching design.

With the continuous development of information technology, the theory of learning space is gradually improved. Therefore, the key to improve the comprehensive ability of students is how to

effectively combine the school-based situation, teaching situation and learning situation. This research is a series of achievements of new learning space teaching application. With the deepening of practice, future research should be based on the application effect of the current new learning space, and the goal is to train application-oriented talents who can form a systematic and innovative learning style in the new era.

### Acknowledgement

This research was financially supported by Research Project of Ningbo Education Science Planning in 2019 (Grant NO. 2019YGH042)

### References:

- [1] Dori Y J, Belcher J, How Does technology-enabled Active Learning Affect Undergraduate Students Understanding of electrothermal Concepts, *Journal of the Learning Sciences*, vol.14, pp. 243-279, 2005.
- [2] Baepler P, Walker J D, Active Learning Classrooms and Educational Alliances: Changing Relationships to Improve Learning, *New Directions for Higher Education*, vol.137, pp. 27-40, 2014.
- [3] Xu Yafeng, Zhao Bo. Study on influencing factors of teachers' use of learning space, *Open education research*, vol.20, pp.10-110, 2014.
- [4] Ye Xindong, Chen Weidong, Zhang Jiping, Design and realization of future classroom environment, *China audiovisual education*, vol.01, pp. 82-87, 2014.
- [5] Xu Yulan, Investigation and countermeasures on learning status of vocational high school students, *Secondary vocational education*, vol.08, pp.6-7+13, 2005.
- [6] Mu Feiyan, Investigation and analysis on learning status of students with learning difficulties in western China, *Gansu agriculture*, vol.12, pp.307, 2006.