

Investigation and Analysis of students' Technological Innovation Ability in Vocational Colleges

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Abstract: With the rapid development of social economy and science and technology, scientific and technological innovation as one of the basic skill requirements of college students, especially for higher vocational college students, having certain scientific and technological innovation ability will be able to meet the development needs of enterprises. In order to better understand the current situation of students' scientific and technological innovation ability in higher vocational colleges, this paper conducts a questionnaire survey on specific samples of students in higher vocational colleges. The collected data include students and graduates, which can effectively obtain the analysis results of data. The results of the questionnaire survey in this paper will provide some basic data support for the cultivation of students' scientific and technological innovation ability in higher vocational colleges, and provide some help for the related education and teaching research and teaching reform.

Keywords: Technological innovation ability, Vocational colleges, Questionnaire investigation, Current situation analysis.

1. Introduction

With the strong support of the state for the development of vocational colleges, society and enterprises have higher and higher requirements for students' scientific and technological innovation ability. How to effectively cultivate students' scientific and technological innovation ability in vocational colleges is worth our in-depth thinking and research [1-2]. There are many factors that affect students' scientific and technological innovation ability in higher vocational colleges, including some subjective and objective factors [3,4].

Literature [5] puts forward practical methods for cultivating scientific and technological innovation ability characterized by "six ones" for students in higher vocational colleges; Literature [6] uses computer teaching to improve the cultivation of students' scientific and technological innovation ability in higher vocational colleges, and has achieved certain results, but it is only applicable to some majors; Literature [7] analyzes the combination of scientific and technological innovation and the cultivation of Higher Vocational Students' scientific and technological innovation ability, and discusses and analyzes how higher vocational colleges in China should actively cultivate higher vocational students' scientific and technological innovation and their own innovative thinking ability, but the analysis is insufficient. Therefore, this paper designs a questionnaire for the cultivation of students' scientific and technological innovation ability in higher vocational colleges, analyzes the logical relationship of the survey data, and gives the relevant problem-solving measures.

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2. Questionnaire Design of Scientific and Technological Innovation Ability

This data survey mainly focuses on the students of Yunnan Vocational College of land and resources, and the sampling indicators are mainly: students and graduates. Through the comprehensive analysis of on campus learning and post graduation needs, we can ensure the rationality of the questionnaire. The survey data of scientific and technological innovation ability mainly includes five observation dimensions: awareness, interest, initiative, perplexity and relevance. Through the investigation and analysis of the five observation dimensions, the problems existing in the scientific and technological innovation ability of students in higher vocational colleges can be effectively concluded to a certain extent, including cognitive problems, key factors affecting students' scientific and technological innovation ability, subjective factors, etc. an open-ended question is also set, Let students take the initiative to give short answer questions that can improve their scientific and technological innovation ability. The whole questionnaire mainly includes 11 questions: 8 single choice questions, 2 multiple choice questions and 1 short answer question. The main ideas of questionnaire design are as follows:

3. Survey Statistics and Analysis

This questionnaire adopts the method of online questionnaire survey. A total of 395 questionnaires have been collected, 392 of which are valid, and the survey data are valid. The following is the data statistics for the investigation and analysis of the five observation dimensions. The relevant statistical results are as follows.

Table 1. Main ideas of questionnaire design

Observation dimension	No.	Problem factors
Essential information	1	Student classification
Awareness	2	Understanding of scientific and technological innovation
Degree of interest	2	Attention to scientific and technological innovation and objective factors
Degree of initiative	2	The main factors influencing the ability of scientific and technological innovation
Perplexity	2	Environmental factors of cultivating scientific and technological innovation ability
Correlation	2	Content related factors of ability training and subject course learning

3.1. Basic Information

The basic information collected in this questionnaire includes students' gender, grade and graduation. Among the 390 vocational college students surveyed, 34.69% were male and 65.31 were female; The details of grades and graduation are as follows: the proportion of freshmen is 50.51%, the proportion of sophomores is 33.67%, the proportion of junior students is 7.65%, and the proportion of students who have graduated is 8.16%. The relevant data in this paper are obtained under the data of these two basic information, and the relevant results are closely related to the basic information.

3.2. Recognition

Two data were collected for cognition, and the problems were as follows:

(1) Have you paid attention to scientific and technological innovation competitions?

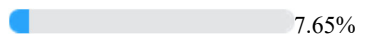
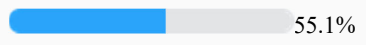
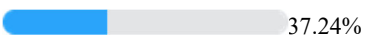
Option	Subtotal	Proportion
Very concerned	30	 7.65%
Follow	216	 55.1%
Not concerned	146	 37.24%

Figure 1. Survey data results

If you had the chance, would you consider participating in the science and technology innovation competition?

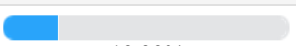
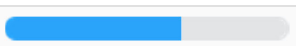
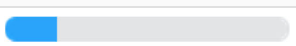
Option	Subtotal	Proportion
Take an active part in	78	 19.39%
Will attend	244	 62.24%
Don't want to participate	72	 18.37%

Figure 2. Survey data results

It can be seen from the above data that in the study and work life of the schedule, 55.1% of the students pay attention

to the science and technology innovation competition, 7.65% of the students pay close attention to the competition, but 37.24% of the students do not pay attention to the competition directly. This result is far beyond our expectations. It can be seen that the basic awareness excludes more than one third of the students; Assuming the opportunity to participate in scientific and technological innovation competitions or robot competitions, 62.24% of the students in higher vocational colleges will participate in the competitions, 19.39% of the students actively participate, but 18.37% of the students do not want to participate. It can be seen that nearly one fifth of the students do not want to participate in the competitions if they have the opportunity to participate in them in time.

3.3. Interest

For the dimension of students' interest, it mainly investigates the students' gains from participating in scientific and technological innovation competitions. The main contents include: improving the ability to apply professional knowledge, improving team coordination, achieving good creativity and little gain. In order to consider the diversity and richness of the survey, other options are set. The relevant survey results are shown in the figure below.

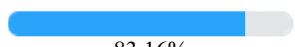
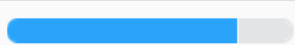
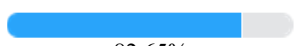
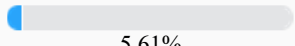
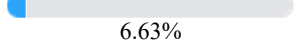
Option	Subtotal	Proportion
Improve the ability of professional knowledge	326	 83.16%
Improve team coordination	318	 81.12%
Achieve good creativity	324	 82.65%
Nothing	22	 5.61%
other	26	 6.63%

Figure 3. Survey data results

It can be seen from the above data that, in terms of students' interest, there are multiple choices. More than 80% of the first three choices have been made, but only 5.61% of the students have chosen to be unproductive, and 6.63% of the students have chosen other students. This is where I am confused. Since more than 80% of the students think that participating in scientific and technological innovation competitions can improve their professional knowledge, teamwork and creativity, why don't they want to participate in scientific and technological innovation competitions? This may be related to objective factors such as weak basic knowledge and insufficient self-confidence.

3.4. Initiative

In terms of initiative, we mainly investigated the main factors affecting your participation in scientific and technological innovation competitions or activities, including learning factors, confidence factors, time factors and other factors. For the purpose of data concentration and effectiveness, we adopted single choice. The relevant data investigated are as follows.

Option	Subtotal	Proportion
Participating in the competition will affect learning	26	6.63%
Lack of ability and confidence to participate	264	67.35%
I don't know why	26	6.63%
Too busy to study	48	12.24%
other	28	7.14%

Figure 4. Survey data results

It can be seen from the above data table that the biggest factor affecting the students of higher vocational colleges to participate in scientific and technological innovation competitions is the option: insufficient ability and no confidence to participate, which accounts for 67.35%; Because the learning time conflicts with the competition time, accounting for 12.24%, which is also the second dimension impression factor; The other three factors accounted for 6.63%, 6.65% and 7.14% respectively. Therefore, we can see that students' interest and initiative are closely related, and we can not analyze the cultivation of students' scientific and technological innovation ability alone.

3.5. Distress

In terms of the degree of perplexity, we investigated and counted the scientific and technological innovation ability that can be increased by participating in the project. The relevant data are as follows.

Option	Subtotal	Proportion
Participate in scientific and technological innovation competitions	294	75%
Learning science and technology innovation courses	296	75.5%
Autonomous Learning and hands-on operation	294	75%
Build interest groups and carry out innovation activities	270	68.8%
other	12	3.06%

Figure 5. Survey data results

As can be seen from the data table, the top three options have the highest proportion of Li, which is about 75%. They all believe that the improvement of scientific and technological innovation ability can be achieved by participating in scientific and technological innovation competitions, learning scientific and technological innovation

courses, autonomous learning and hands-on operation; 68.88% of them think that it can also be achieved by building interest groups.

3.6. Relevance

In terms of relevance, the investigation on the relationship between scientific and technological innovation and classroom teaching is mainly considered. The relevant survey data are as follows. 84.69% of the students thought that it was the practice and extension of classroom learning, but 10.2% of the students thought that there was no time for scientific and technological innovation competitions because classroom learning took up too much time; 5.2% of the students thought that scientific and technological innovation competitions would affect classroom learning. It can be seen that classroom teaching, practical teaching and scientific and technological innovation competition are the main training lines with high relevance.

Option	Subtotal	Proportion
It is the practice and extension of classroom learning	332	84.69%
Scientific innovation will affect classroom learning	20	5.1%
Learning takes too much time, and there is no time for scientific innovation	40	10.2%
other	0	0%

Figure 6. Survey data results

4. Problem Handling and Measures

In view of the above survey data and problems, there are three main problems in the cultivation of scientific and technological innovation ability in Higher Vocational Colleges:

One is the publicity channels and atmosphere for the cultivation of scientific and technological innovation ability. I don't know how to participate in the competition;

Second, students' interest is generally low and their self-confidence is not enough;

Third, it is not clear why we should participate in scientific and technological innovation competitions, and we cannot clarify the relationship between subject learning and competitions.

In view of the above problems, combined with the characteristics of higher vocational colleges, as well as the actual situation and learning ability of students, this paper puts forward three aspects of solutions and measures to solve the problems of Higher Vocational Colleges in students' scientific and technological innovation ability, which will provide some basic data support for the cultivation of students' scientific and technological innovation ability in higher vocational colleges, and provide some help for relevant education and teaching research and teaching reform. Relevant ideas and measures are as follows.

(1) Open up the ways and ideas of publicity in higher vocational colleges, and construct the integrated training mode of "classroom + competition";

(2) Construct the idea of "guidance + interest" progressive training;

(3) The three-dimensional integrated training mode of "theoretical teaching + practical teaching + scientific and technological innovation competition".

5. Conclusion

Through the above investigation and analysis, we can master the current situation of students' scientific and technological innovation ability in Higher Vocational Colleges to a certain extent, make a simple analysis and summary, and summarize the problems existing in the cultivation of students' scientific and technological innovation ability in higher vocational colleges. This paper gives simple problem handling and measures. The relevant data and results will provide some basic data support for the cultivation of students' scientific and technological innovation ability in higher vocational colleges, and provide help for relevant education and teaching research and teaching reform.

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Vocational College. (No. 2021KJTD02)

References

- [1] Zhao Lin, Xiao Caixia Research on the cultivation of College Students' innovative ability in Higher Vocational Colleges [j] China Vocational and technical education, 2017 (20): 4
- [2] Li Jie Research on the cultivation of students' scientific and technological innovation ability in Higher Vocational Colleges [j] Tomorrow fashion, 2016 (14)
- [3] Zhuliuxian, sun Yong, hanjunfeng, et al Exploration on the ways to cultivate the innovative ability of mechanical students in Higher Vocational Colleges [j] Technological innovation and productivity, 2019 (7): 3
- [4] Dingchuanan Research on the improvement of scientific and technological innovation ability of Higher Vocational Colleges from the perspective of modern industrial system [j] Education and career, 2019 (18): 5
- [5] Miao Ying, Li Yingji, Wang Jun Training practice of students' scientific and technological innovation ability in Higher Vocational Colleges characterized by "six ones" [j] Mold industry, 2021
- [6] Zhanglijun Analysis on cultivating students' innovative ability in computer teaching in Higher Vocational Colleges [j] Intelligence, 2020 (08): 151-151
- [7] Lihuanan On scientific and technological innovation and the cultivation of students' innovative ability in Higher Vocational Colleges [j] It manager world, 2019