

Research on the Training Mechanism of Innovative Applied Talents in Statistics Teaching in Newly-Established Undergraduate Colleges—A Case Study on Yibin University

Yiling Fan^{1,a*}, Hui Wen², Daiqiong Wen³, Tao Zhou⁴

¹Faculty of Agriculture, Forestry, and Food Engineering, Yibin University, Yibin, Sichuan, China

²Ministry of Comprehensive Reform and Development Planning, Yibin University, Yibin, Sichuan, China

³Faculty of Intelligence Manufacturing, Yibin University, Yibin, Sichuan, China

⁴School of Law and Public Administration, Yibin University, Yibin, Sichuan, China

^a178872969@qq.com

*Corresponding author

Abstract: The era of big data and the development strategy of digital China have brought new requirements for cultivating the innovative talents in newly-established undergraduate colleges. According to the indicators of the innovative training project of Yibin University from 2012 to 2022, it is found that the statistics teaching has a greater positive impact on cultivating the college students' innovation ability. It further analyzes the mechanism of statistics teaching on cultivating the innovative talents, and draws a conclusion on the internal consistency and tower-shaped mechanism of statistics teaching, information literacy and innovation ability, as well as proposing the further improvement on the reform of statistics teaching for non statistics majors.

Keywords: Newly-established undergraduate colleges; Statistics teaching; Information literacy; Innovation ability

1. Introduction

Currently, in the era of big data and the background of "digital China", the college student's information literacy has become the prerequisite for their innovative spirit and creative ability, which adds new content to the talent cultivation in the new undergraduate colleges. The process of innovation is also a process of information perception, information cognition, information combination, information integration and information evaluation, and an information innovation process of information input, processing, output and feedback^[1]. Statistics is a subject of collecting, analyzing, interpreting and presenting the data. Therefore, statistics teaching is not only conducive to the cultivation of undergraduate student's information literacy, but also plays an important part in cultivating the innovative applied talents in the newly-established undergraduate colleges.

Yibin University has always attached great importance to enhancing the college student's innovative spirit and creative ability, promoting their employment, and actively practicing the important guiding instructions of Chairman.

Therefore, taking Yibin University as an example, studying the mechanism of statistics teaching for cultivating the innovative applied talents has positive significance for cultivating the innovative applied talents in newly-established undergraduate colleges.

2. Current Situation of Statistics Teaching and Innovative Talent Cultivation

2.1 Current Situation of Innovative Talent Cultivation at Yibin University

The national and provincial indicators of innovation training projects of 2012-2022 innovation program in Yibin University are selected in the paper for analyzing the current situation of innovative talent cultivation in Yibin University in the past 11 years.

By sorting out and analysis, it was found that the approved national and provincial innovation training projects in Yibin University have been on the rise year by year. In 2016, the number of approved innovative projects was almost double that of 2015, and exceeded 100 in 2019. From the approval indicators of innovation training projects of large innovation projects with provincial level or above, Yibin University has gained remarkable achievements in cultivating the innovative talents in the past 11 years.

From 2012 to 2022, the total number of approved projects in the Science and Engineering Department of Yibin University has always been higher than that of the Humanities and Social Sciences Department. However, since 2015, the number of approved projects in the Humanities and Social Sciences Department has been increasing, and in 2021 and 2022, it gradually equated with the Science and Engineering Department. From the perspective of statistics teaching, it is found that the scope, depth and application of statistics teaching in Science and Engineering Department are significantly higher than those in Humanities and Social Sciences Department. However, with the era of big data approaching, China attaches great importance to big data, digital economy and talent's ability of survey and analysis. Humanities and Social Sciences Department quickly enhances the application of survey and statistical methods in their selected topic projects.

2.2 Relation between Statistics Teaching and Innovative Talent Cultivation

Since there are some differences in statistics teaching offered by the Humanities and Social Sciences Department of Yibin University, to analyze the correlation between statistics teaching and innovative talent cultivation by choosing the innovation cultivation project indicators of the Humanities and Social Sciences Department is more targeted and representative. By analyzing the proportion of the projects involving statistical methods in the total number of approved projects in the Humanities and Social Sciences Department of Yibin University from 2012 to 2022, it can be found that the average proportion of total projects is 47.72%, 53.3% for national projects, and 40.22% for provincial projects. And more than 80% of the approved projects of the first-level management disciplines: business management and public service administration, adopt the survey and statistical methods, with an average of 85.15%, followed by education with 71.2%, Chinese language and literature with 43.4% and law with 33.4%. The last two disciplines are foreign language and arts and sports, respectively. So it can be seen that high-level project evaluation standards are more favored for cultivating the students in statistical thinking and innovative work. The differences in statistical teaching among the main disciplines of the Humanities and Social Sciences Department have a significant impact on the approval of innovative cultivation projects

In summary, by analyzing the project indicators for innovation and entrepreneurship cultivation for the college students at Yibin University from 2012 to 2022, it is found that the University has indeed significantly improved its effectiveness in cultivating innovative talents. What's more, the statistics teaching helps to develop the students' statistical thinking and enables them to improve their ability in collecting, processing, and expressing the data, which has a significant positive impact on improving the students' innovation ability, especially in the Humanities and Social Sciences Department.

3. Analysis on the Mechanism of Statistics Teaching in Cultivating Innovative Talents

Under the background of the big data era and the development strategy of digital China, new requirements are brought to the cultivation of innovative talents, that is, the cultivation of information literacy, which is a must in the modern information society; Statistics teaching has the advantages in cultivating the students' information literacy.

3.1 Information Literacy is Conducive to Cultivating Innovation Ability

3.1.1 Information Literacy Helps to Cultivate the College Student's Innovation Consciousness

The cultivation of innovation consciousness shall aim to help the college students set up innovation goal and develop their innovation potential and passion. The cultivation of information literacy enables the college students to form a conscious response to various information and enhance their sensitivity to the information required. In the information age, cultivating a strong sense of information among the college students, enhancing their sensitivity to information and the ability to recognize information, is essential to condense the new ideas, knowledge, and discoveries.

3.1.2 Information Literacy Helps College Students Develop Innovative Thinking

Since all human innovation starts from the innovation of thinking, the key to innovation is innovative thinking^[2]. The cultivation of innovative thinking is to cultivate the college student's ability to get rid of the formed thinking constraints, and to be good at putting forward new ideas or methods. Therefore, the training of information literacy is conducive to the college students' learning and practice in accordance with the dialectical thinking of information processing and analysis to enhance their own innovative thinking ability.

3.1.3 Information Literacy Helps to Improve the College Student's Ability of Scientific Research

The process of scientific research is usually divided into five stages: selecting research topics, designing research, collecting the data, sorting out and analyzing the data, and obtaining results^[3]. As far as college students are concerned, their abilities in independent learning, information processing, and analytical judgment are the reflection of their abilities of scientific research. Therefore, the cultivation of good information literacy is conducive to developing the college student's independent learning ability. What's more, it can help them make use of the modern information technology to analyze the information according to the purpose, keep on learning new knowledge, improve their knowledge structure, and lay foundation for innovation.

3.2 Statistics Teaching is Conducive to Cultivating Information Literacy

3.2.1 Statistics Teaching is Conducive to Cultivating Information Consciousness

The information consciousness is reflected in three aspects: First, a keen perception of information; Second, a persistent observation of information; And third, a contemplation and interpretation of the value of information. Statistics teaching activates the students' sensitivity to numbers and inspires them to have a critical thinking "What has been done is done" to the digital information. Therefore, by developing the students' statistical thinking, it can consciously cultivate the students' understanding, discovery, development, utilization of information, and finally their information consciousness is formed imperceptibly.

3.2.2 Statistics Teaching is Conducive to the Cultivation of Information Thinking

The core of information thinking lays in the information values. The main characteristic of the information age is expressed in numbers, and the feature of statistics teaching is to adopt numbers as the language. In the process of teaching statistics, the function and value of information are derived to cultivate the students' thinking about the correlation between data and information, understand the role of digital resources and statistical technology in innovation, learn about the functions of information society and the value of goods, and develop the thinking of statistical information.

3.2.3 Statistics Teaching is Beneficial for Cultivating Information Ability

Information ability refers to a person's ability of collecting, sorting out, processing, analyzing, and expressing the information. The key content of statistics teaching can be summarized as: observation, measurement, division, combination, description, expression, comparison, connection, evaluation, measurement, limitation and strategy^[4]. The statistical teaching enables the students to acquire the abilities of information acquisition, processing, utilization, and application. This training process is also consistent with the scientific research process, which will improve the students' information ability as well as promoting their abilities of scientific research and innovation.

4. Suggestions on the Cultivating Mechanism for Innovative Statistical Talents in Newly-established Undergraduate Colleges

4.1 Create an innovative atmosphere for school culture

Innovative school culture should reflect the characteristics of relaxation, democracy, freedom, openness and progress, which helps to create an atmosphere of free discussion. It shall include: encouraging critical thinking and divergent thinking; Creating a relaxed atmosphere and an environment that embraces failure; Attaching importance to the promoting role of humanities and arts disciplines and activities in scientific and technological innovation; Allowing the good innovation atmosphere to have an effect on cultivating the student's innovation consciousness imperceptibly. And the key to creating an innovative atmosphere for school culture lies in establishing and implementing the incentive mechanism

of innovation. The effective implementation of incentive mechanism of innovations will have a great influence and promotional effect, as well as promoting the construction of innovative school culture.

4.2 Build an innovation platform for the statistics teachers and establish a sound incentive mechanism for the teacher innovation

The innovation platform for statistics teachers can provide the material guarantee and conditional support for their innovative activities. For example, setting up the study project of statistical teaching, research projects, research topics and teaching teams, or conducting the statistical teaching competitions for young teachers. The school shall strive to build different platforms for the teacher's innovation, in order to meet their innovative desires, arouse their innovative spirit and cultivate their innovative abilities. The incentive mechanism of innovation for the statistics teachers refers to a series of institutional measures that can inspire, guide and evaluate the independent cultivation of teacher's self-innovation ability. The incentive mechanism for the teacher's innovation is a new educational value system, where the schools shall further improve their current teacher evaluation system and add evaluation criteria that reflect the teaching innovation.

4.3 Build a innovation platform for the student and establish a sound incentive mechanism for the student's innovation

The innovation platform for the student can provide the material guarantee and conditional support for the their innovation activities. For example, establishing a science and technology association or technology steering group to encourage the students to participate in scientific and technological practice as well as different innovation competitions; Establishing a student innovation center independently managed by the students, and conduct extracurricular scientific and cultural activities; Setting a special fund for the scientific and technological innovation to support and reward the college students for involving in the scientific and technological innovation activities. The incentive mechanism for the student's innovation refers to a series of institutional measures that can inspire, guide and evaluate the independent cultivation of student's self-innovation ability. The incentive mechanism for the student's innovation is a new educational value, which requires the schools to further improve their current student's evaluation system and add evaluation criteria that reflect the student's innovation, for example, the innovation credits, the student's innovation awards and innovation funds. When evaluating the student's innovation, in addition to the traditional methods, we shall explore some new evaluation methods, such as research reports, research results display, research results report, classmate evaluation, community evaluation and evaluation on critical thinking. What's more, the student's performance shall be evaluated in the process of cultivating and training the innovative abilities.

4.4 Innovate the statistics teaching content and teaching methods

Innovation in the statistics teaching content includes removing the inactive concepts and outdated knowledge, make up the new teaching content, and timely reflect the modern achievements in science, technology and culture in the curriculum and teaching content.^[5] Innovation in the teaching methods refers to encouraging the "inspiring, interactive and probing" teaching practices in the classroom; Encouraging the problem-based, case-based, discussion-based, and situational teaching; Encouraging the establishment of specialized seminar courses to promote the combination of teacher guidance and student self-learning;^[6] Encouraging the mentors to offer comprehensive guidance and inspiration in the student's learning, life, thoughts, emotions, behavior, work and employment. Therefore, great importance shall be attached to the evaluation of the teacher's performance in the cultivation and training of the student's innovation.

5. Conclusion

In summary, statistics teaching can promote the college students to develop their statistical thinking, get the hang of applying data expression and conscious behavior of showing their thinking with data, improve their sensitivity to information, and express their new ideas, concepts, and products with data^[7]. Therefore, there is an internal consistency among statistics teaching, information literacy and innovation ability, which forms the mechanism for statistics teaching to cultivate the innovation ability. Although statistics is not specialized in the newly-established undergraduate colleges, statistics teaching courses do promote the cultivation of the college student's innovation ability. Therefore, further improvement

and reform of statistics teaching in newly-established colleges is beneficial to the cultivation of innovation talents.

Acknowledgements

Fund Project supported by: General Project of the Research Center for Reform and Development of Newly-established Colleges "Research on Innovative Applied Talent Teaching in Newly-established Undergraduate Colleges: Based on the Perspective of Statistical Teaching" (Project No.: XJYX2019B11) and General Project "Comparative Study of Development Positioning and Goal Planning of Newly-established Undergraduate Colleges - A Case Study on Newly-established Undergraduate College in Sichuan Province" (Project No.: XJYX2021B21).

References

- [1] Li Mingzhen, Qu Changsheng. *Information Literacy Education and Cultivation of Innovation Ability of College Students [J]. Journal of Modern Information, 2007 (03): 197-199*
- [2] Xing Yanli. *Education Reform of Information Literacy and Cultivation of College Students' Innovation Ability [J]. Library Work and Study, 2009 (03): 93-96*
- [3] Yang Yuqing, He Jing. *Statistics Teaching and Cultivating Scientific Research Ability of College Students [J]. Tribune of Social Science In Xinjiang, 2015 (05): 108-110.*
- [4] Li Jinchang. *Discussion on Several Issues of Statistical Thought [J]. Statistical Research, 2006 (03): 31-37+81*
- [5] Guo Jinchuang. *How to Establish an Innovative Talent Training System in Teaching Oriented Colleges [J]. China Higher Education, 2007, (2): 47*
- [6] Yi Hong. *Strengthening Education Reform and Improving the Quality of Undergraduate Talent Training [J]. China Higher Education, 2007, (2): 44*
- [7] Fan Yilin. *The Path and Practice of "Ideological and Political Education" of Applied College English under the Mixed Teaching Mode [J]. Yibin University Journal, 2006 (04): 125-128*