

Ways to Improve and Cultivate Scientific Literacy of Minority College Students

Changfen Gong¹, Dan Zhang², Rongrong Peng²

¹School of Wealth Management, Nanchang Institute of Technology, Nanchang 330108, China

²School of General Education, Nanchang Institute of Technology, Nanchang 330108, China

Keywords: minority student; scientific literacy; cultivating way; improvement method

Abstract: Cultivating students' scientific literacy is the core goal of science education in our country, and it is also the starting point and destination of higher education today. This paper takes the minority college students of Nanchang Institute of Technology as the research object, combines their national characteristics, refers to the contents of the public scientific literacy survey in China, uses questionnaires, teacher-student discussions and other forms, obtains the current situation of the minority college students' scientific literacy, and analyses the causes of their low scientific literacy. It is pointed out that we should start from the three levels of school, teacher and student to establish effective ways of cultivation, so as to improve the overall level of scientific literacy of minority college students.

1. Introduction

The concept of scientific literacy was continuously developed, since it was put forward by American scholar P.D.Hurd in 1958 [1][2]. The three-dimensional model proposed by Professor J. Miller[3], Director of the Center for International Development of Scientific Literacy in the United States, has been widely accepted by the academic community. Miller believes that scientific literacy is the most basic public understanding of modern science, the measurement of public scientific literacy should include three dimensions. First, the understanding of scientific principles and methods. Second, the understanding of scientific terms and concepts. Third, the awareness and understanding of the social impact of science and technology. With the advent of the era of knowledge-based economy and the impact of scientific and technological progress, the requirements for the comprehensive quality of college students in China will increase day by day. Scientific literacy is the intrinsic condition for college students to survive, develop and improve in the future and the necessary basis for realizing their value of life. therefore, scientific literacy education has become an indispensable part of quality education for college students today[4].

2. Investigation on the Current Situation of Scientific Literacy of Minority College Students

2.1 A Survey of Public Scientific Literacy in China

In 2015, the Chinese Association of Science and Technology (CAST) completed the ninth nationwide sampling survey of public scientific literacy [5], the survey report shows that the proportion of citizens with scientific literacy in China has reached 6.20%. Although the gap between China and western developed countries has been narrowed, it still shows the fact that the national literacy is low. At the same time, the report also shows that there are significant diversity in the basic scientific literacy level of the public at different educational degrees. The public in minority areas have some problems, such as unreasonable knowledge structure, insufficient understanding of the essence, process and method of science and so on. It is imperative to improve the scientific literacy of minority college students.

2.2 Objects and Basic Contents of the Survey

The subjects of this survey are minority preparatory students of Nanchang Institute who are minority college students from freshmen to juniors. Through the educational administration

department, we can have a comprehensive understanding of the information of the total number of minority college students, the proportion of men and women, the distribution of grades, and the professional information. The survey mainly refers to the contents of public scientific literacy in China, and some modifications have been made according to the ethnic characteristics of college students. Through questionnaires, teacher-student talks and other forms, the following information is mainly grasped.

(1) General characteristics and common development trend of basic scientific literacy of Minority College students in Nanchang Institute of Technology.

(2) Commonness and difference of scientific literacy among students of different grades, genders and nationalities.

(3) The relevant factors affecting minority college students' scientific literacy, such as parents' participation, learning interest, learning strategies, learning anxiety, attitudes towards school culture, teacher-student relationship and so on.

(4) There are some obstacles in the implementation of scientific literacy education in universities, such as the curriculum setting of scientific education, the selection of teaching content, teaching resources, teachers' morale and so on.

3. Analysis of the Reasons Affecting the Scientific Literacy of Minority College Students

3.1 Limited by objective conditions

From the questionnaire, it is found that many of the minority students were born in poor areas, such as agriculture, animal husbandry and mountainous areas. its economy, culture, especially education, has been in a backward state for a long time. Students have no economic conditions to buy extra-curricular books, and high-tech products are ever more extravagant. This is an unavoidable practical problem and the result of many scholars' investigations [6]. As we all know, the mastery of cultural basis is closely related to the level of scientific literacy, and cultural basis is gradually formed at different ages, it is difficult to compensate for the lack of knowledge, when they are at a certain age due to the limitation of objective conditions.

3.2 Minority students' ideology is still relatively closed

Through questionnaires, it is found that minority college students have formed a relatively stable lifestyle in their growth process, their outlook, values and world outlook are relatively simple, and the speed of accepting new things is slow, which is far behind the speed of updating social science knowledge nowadays. This phenomenon is particularly prominent among the impoverished minority college students from Guizhou and Xinjiang [7][8].

3.3 The serious shortage of science experiment teaching in minority areas

In northern Gansu, Golmud, Xinjiang, Inner Mongolia, Guangxi and other areas, because of these reasons such as the lack of equipment, drugs, old facilities and teachers' indifference, so that science experiments are seriously inadequate or not offer, and it hasn't been solved yet. In this case, it is difficult for teachers to start teaching, which leads students not to do the most basic experiments when they enter university, let alone comprehensive and design experiments, the experimental teaching is neglected, which lead to the deficiency of students' scientific thought and ability training [9][10].

3.4 Over-narrow specialty settings and unreasonable curriculum setting

The main function of traditional higher education is to transfer knowledge, the teachers have to adopt "spoon feeding", when they teach relevant professional knowledge. In addition, some courses are outdated and can not keep pace with the times, which leads minority college students to neglect the rich and colorful world, so that depress their scientific mind, and neglect the scientific spiritual literacy for college students. At the same time, the liberal arts teachers are influenced by traditional education in college, their scientific knowledge is narrow and lack of creative thinking, which also

limits the improvement of students' scientific literacy.

4. Ways to cultivate scientific literacy of minority college students

The cultivation of scientific literacy is a systematic project. It is impossible to improve only from a single aspect, so it should start from the three levels such as schools, teachers and students, the effective ways of cultivation is established, and which should act together and innovate actively [11][12].

4.1 School level

School education is an important base for improving scientific literacy, so we should start from the school level. First, let Minority College students understand the meaning of "science" and understand scientific literacy in many ways. Second, create a good scientific atmosphere and strengthen scientific and technological education knowledge. Third, build a platform for scientific and technological practice. Fourth, improve the evaluation mechanism and enhance the motive force of scientific innovation of ethnic minorities. Fifth, realize the infiltration of art and science[13][14], and reform the teaching system, curriculum system, teaching content, subject function, campus culture and so on.

4.2 Teacher level

Teachers should change their concepts, improve their knowledge structure, master modern teaching methods, and get rid of narrow professional education ideas and simple teaching consciousness. Strengthening the interdisciplinary scientific literacy is in favor of training talents, promoting teachers' scientific literacy is one of the key to improve the scientific literacy training of minority college students.

4.3 Student level

We should pay attention to the important of self-study in cultivating the self-education of minority college student. First, self-study can cultivate minority college students' self-control, willpower and concept of time efficiency. Second, self-study is conducive to form the creative thinking of minority college students. Thirdly, self-study can broaden the scope of knowledge acquisition of minority college students and improve their knowledge structure.

5. Conclusion

Minority students are a special group in colleges. Due to many factors, their scientific literacy is lower than that of Han students. However, with the rapid development of science technology and economy in today's society, they shoulder the burden of building their hometown, which is the important support for promoting the economic development of minority areas in China. Therefore, promoting the scientific literacy of minority college students should be put in an irreplaceable position, and consciously train them. At the same time, the minority college students should enhance the awareness of self-development, broaden their vision, continue to study and research, and improve their scientific literacy from the multiple levels.

Acknowledgement

In this paper, the research was sponsored by the School-level Topics of Nanchang Institute of Technology (Grant No. NGRW-18-03) and the Education Science Planning of Jiangxi Province (Grant No. 18YB297)

References

- [1] Hurd, P. D. Science literacy: Its meaning for american schools[J]. Educational Leadership, 1958, 16(1):13-16.

- [2] Hurd, P. D. Science education for a new age: the reform movement [J]. NASSP Bulletin, 1958, 69(482):83-92.
- [3] Miller J D. Scientific Literacy: A conceptual and empirical review [J]. Daedalus, 1983, 112(2): 19-48.
- [4] Xuefu Xu. Understand students scientific literacy from different perspectives [J]. Journal of Subject Education, 2010, (6):40-43.
- [5] China Association for Science and Technology. China public scientific literacy report 2015[M]. Popular Science Press, 2015, 9.
- [6] Shengzhi Wu, Guoliang Huang. Research on the scientific literacy of Guangxi college students [J]. Journal of Guangxi University for Nationalities (Natural Science Edition), 2007, 13(4):87-90.
- [7] Guofu Lv. Research on the scientific quality and the cultivating ways of the poverty minority ethnic female undergraduates in Guizhou province [J]. Guizhou Ethnic Studies, 2007, 27(117):179-183.
- [8] Xuejing Li. On raising the quality minority university students in Xinjiang [J].Journal of Xinjiang Normal University (Social Sciences), 2007, 28(3):114-116.
- [9] Tiequn Zhu, Zhihong Zheng. The scientific spiritual imperfection of college students and the countermeasures [J].Journal of North China Institute of Water Conserancy and Hydroelectric Power (Social Science), 2000,16(3):38-41.
- [10] Qiaoling Hunag. A study on cultivating scientific quality of liberal arts nudergraduates[J]. Journal of Lishui University, 2010, 32(3):43-47.
- [11] Lifei Lai. A study of students scientific literacy and capability in faculties of arts [J].Journal of Ningbo University (Educational Science Edition), 2010, 32(2):56-60.
- [12] Xiaoqin Lai. Studyon scientifie literaey of the high school students in Guangxi minority regions [D]. Southwest University, 2007.
- [13] Lee O, Hart J, Cuevas P, et al. Professional development in inquiry based science for elementary teachers of diverse student groups [J]. Journal of Research in Science Teching, 2004, 41(1):1021-1043.
- [14] Lederman N G. Students' and teachers' conceptions of the nature of science: a view of research [J]. Journal of Research in Science Teacher, 1992,29(4),331-359.