



# Connotation and Interpretation of Professional Literacy of Pre-science Teachers in Xinjiang

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## ABSTRACT

The construction of a perfect evaluation index system of professional literacy of pre-science teachers is the basis of measuring the level of professional literacy of pre-science teachers in Xinjiang. It is of great practical significance to identify the advantages and disadvantages of education of pre-science teachers in Xinjiang. Based on "Professional Standards" and "Certification Standards", this paper constructs an evaluation index system of Xinjiang pre-science teachers' professional literacy, including 3 first-level indicators and 18 second-level indicators.

## 1. Introduction

The educational development of ethnic minorities is closely related to the educational development of the whole country. Under the realistic dilemma of "unable to get, use and retain high-quality science teachers", it is extremely urgent to improve the educational level of Xinjiang pre-science teachers. Taking Xinjiang pre-science teachers as the research object, this paper explores the professional literacy of pre-science teachers and points out the direction for them to be qualified as science teachers in ethnic areas. Comprehensively deepen reform in June 2020, the central committee meeting by the "deepening the reform of new times education evaluation overall plan", the meeting pointed out that to "establishing scientific and meet the requirements of The Times educa-

tion evaluation system and mechanism", how to measure professional literacy of science teachers in Xinjiang, and diagnose problems in the process of pre-science teachers develop, will be a top priority. Therefore, the construction of a scientific and effective evaluation index system for professional literacy of Xinjiang pre-science teachers can provide tools for talent cultivation in colleges and universities, and provide a basis for improving the ability of pre-science teachers.

## 2. Interview Induction and Summary

By analyzing the current situation of science education in Tibetan areas of Gannan, Gansu Province, Ma Qilong proposed that ethnic minority areas should adjust measures to local conditions and include courses with ethnic

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**Table 1.** Basic information of interview experts

	Group	Number	Proportion		Group	Number	Proportion
Age	30 years old and below	0	0%	Teaching Age	10 years and below	5	15.15%
	31-40 years old	11	33.33%		11-15 years	21	63.64%
	40 years old and above	22	66.67%		16 years and above	7	21.21%
Competent	Teaching Assistant	3	9.09%	Education	College	0	0%
	Lecturer	7	21.21%		Undergraduate	11	33.33%
	Associate Professor	10	30.30%		Postgraduate	17	51.52%
	Professor	3	9.09%		Doctor of Philosophy	5	15.15%

characteristics in personnel training programs<sup>[1]</sup>. Li Shicun believed that the quality of teaching staff would affect the quality of science education in primary and secondary schools in Tibetan areas. We should start from improving the quality of science teachers in “Tibetan classes” and urge them to participate in all kinds of learning in order to improve teaching ability and quality, so as to solve the cultivation problem of high-quality science teachers in primary and secondary schools from the root<sup>[2]</sup>. CAI Wenbo and Xu Xin conducted a survey on 1117 minority science college students and found that mathematics learning ability of science college students has a strong predictive power to academic achievement, and good learning ability can improve academic achievement<sup>[3]</sup>. Peng Guangming et al. believe that the literacy of mathematics normal university students includes mathematical professional knowledge and normal skills. The local Normal College for Nationalities has explored a new way to improve the quality of normal students in minority areas by the cultivation mode of “one body, two wings, three drives, four platforms and five modules”<sup>[4]</sup>. In conclusion, the science to study of students in ethnic minority areas are mainly concentrated in science teaching, science, science teachers and students cultivate way students grades, science teachers professional accomplishment, etc., most of them are present situation research causes and countermeasures of analysis and put forward the opinion suggestion, not on its connotation and evaluation index system for research.

Since the connotation of professional literacy has not yet been determined, the commonness and difference of the connotation of professional literacy of normal university students in minority areas are clarified by combing relevant literature. Meanwhile, the connotation of professional literacy of normal university students in minority areas is determined according to the particularity of mul-

ti-culture in minority areas. Pre-science teachers regional particularity of Xinjiang, combined with the Xinjiang ethnic culture is diverse, so before the construction of teachers professional accomplishment evaluation index system is necessary to understand the science teachers and pre-science teachers’ personal understanding, the focus is on access to Xinjiang pre-science teachers professional unique. About teachers professional literacy for this, the self-made interview outline, from Shihezi university, Xinjiang normal university, Hotan normal school, primary and secondary schools in Hotan area of 33 experts interview, including 19 colleges and universities teachers, 14 primary and secondary school teachers, due to the three times will be coronavirus outbreak, therefore all interviews are telephone interview.

The telephone interview records are sorted into text mode, and then the key concepts or problems are marked in the way of coding, and then “local concepts” are found. The five “local concepts” mentioned most frequently are extracted from the interview, and their distribution is shown in Table 2.

**Table 2.** “Indigenous Concepts” Distribution Table

Indigenous concept	Number of mentions	Proportion
Political Environment	40	9.73%
Cultural awareness	38	9.26%
Basic knowledge	32	9.06%
Multicultural Education	26	8.36%
Language skill level	24	8.26%

Combined with the “indigenous concept” mentioned by experts, it can be learned from the interview that the professional literacy of pre-science teachers in ethnic minority areas has the following characteristics:

(1) Do a good job in ethnic and cultural identity education: firmly establish the “three inseparable” idea, that

is, the Han nationality is inseparable from the minority nationality, the minority nationality is inseparable from the Han nationality, and ethnic minorities are inseparable from each other; We should strengthen the concept of “five identities”, namely, identification with the motherland, the Chinese nation, the Chinese culture, the Communist Party of China and the path of socialism with Chinese characteristics. There have been 13 ethnic groups living in Xinjiang since ancient times, but statistics by the end of 2019 show that the number of ethnic groups living in Xinjiang has now reached 55. Multiple ethnic groups live together and have inherited many traditional customs and customs from generation to generation. The People of Xinjiang are like pomegranate seeds closely embracing each other for prosperity and common development. The “five identities” are the concrete embodiment of the Five Views of Marxism, the fundamental purpose of national unity education, and the ideological basis for safeguarding national unity and promoting people of all ethnic groups to get along with each other in harmony. As the main force of future teachers in Xinjiang, we must establish a firm sense of community of the Chinese nation and do a good job in “three inseparable” and “five identity”, which is a big problem in cultivating the next generation to become qualified successors of socialism.

*Expert 1: Students and teachers of all ethnic groups in Xinjiang must safeguard national unity and ethnic unity. This is the prerequisite. Only with a strict grasp of political thinking can other work be carried out easily.*

*Expert 8: Do well national unity can learn from each other, promote each other.*

*Expert 15: Stability and unity is the premise, with this, normal university students can better develop other abilities, after all, division and turmoil is a disaster; stability and unity is a blessing.*

*Expert 30: The teacher's political thought is the most important, what they think in the heart, very easy to influence the student, some of the influence is imperceptible, therefore, the teacher must follow the party, stand good team.*

*Expert 33: With the current words, after normal university students is “for the party education, education for the country”.*

(2) Has perfect minority region culture: ethnic areas facing the complex situation of science teachers and student nationalities, should not only have solid basic knowledge of science, have extensive scientific and cultural knowledge, also need to know the local minority culture history and all kinds of education and economic policies, this is a normal part of the knowledge structure of the inside. For example, tatar, Uzbek, Xibe are generations of

emphasis on education, while Uyghur, Hui are generations of mercantile nations. The Mongolian people are resolute, tenacious and unyielding, while the Kirgiz pay attention to the pioneering spirit. The traditional festivals of different ethnic groups are also different. For example, the Uyghur, Kazak and other ethnic groups celebrate the Eid al-Adha, Narizi and Norizi festivals, while the Zhuang, Miao and Han peoples focus on the Spring Festival.

*Expert 4: Each nation has its own characteristics, and many nations have left indelible marks in history through long-term development. These cultural and historical knowledge should be mastered by normal university students.*

*Expert 9: Teachers in minority areas should know about local customs so that they can combine their lectures with real life.*

*Expert 20: A lot of primary and secondary school teachers don't understand education policies, including at the beginning of the class, and various subsidies policy for poor, in high class students master the knowledge, then spread to their students, as a result, there are more and more people know this is the party and the state in order to develop the frontier, guides them to know the Party's Gratitude .*

(3) Possess a solid basic knowledge of science: During the interview, many experts emphasized that the mastery of science knowledge is the key to whether science normal students can truly become a qualified science teacher, and whether the basic knowledge of science is solid determines whether future teachers can develop smoothly. There is a positive correlation between the science achievement of students in minority areas and the basic knowledge of science teachers<sup>[5]</sup>. The basic knowledge of science teachers solves the problem of what teachers teach students. The status quo, development trend and social role, to grasp the difficult points, not only to know the truth, but also to know the reason, learn to draw parallels and draw inferences. That is to say, science teachers must master solid basic knowledge in order to build a strong position and teach the class well.

*Expert 2: The reason why teachers can become teachers is that they must have solid basic knowledge. As the saying goes, if you give students a glass of water; you must have a bucket of water yourself.*

*Expert 13: At present, the most important manifestation of some teachers' own lack of ability is their lack of solid knowledge of science subjects, and frequent mistakes in the teaching process, including the pronunciation, writing, and basic methods in the operation process of scientific terminology.*

*Expert 21: Teachers will only follow the textbook when*

they teach. Science teaching is completely based on textbooks. This is absolutely impossible. The coherence of knowledge is very important. In a complete knowledge system, although each knowledge point is isolated, in fact, they are interconnected.

(4) Possess the ability of multicultural education: Xinjiang has implemented the combination of ethnic and Han schools for many years. Students of different ethnic groups have differences in culture and concept, as well as differences in personality characteristics and knowledge of students of different ethnic groups. Teachers should establish multicultural thinking as soon as possible to face diversified education challenge. Due to the lack of educational resources in ethnic areas, the professional development of teachers has its particularity, that is, it must be combined with the local economy and culture in order to achieve the purpose of mutual adaptation and common development<sup>[6]</sup>. Therefore, science normal students in ethnic areas should have good cultural recognition ability, cross-cultural communication ability to live in harmony with various ethnic groups, and in the teaching process, make full use of cultural differences to teach students mutual respect and spread the concept of cultural equality.

*Expert 5: Xinjiang is a place where many ethnic groups gather. Various ethnic groups are scattered in all parts of the northern and southern Xinjiang. It is better to be able to combine the local ethnic culture for teaching.*

*Expert 26: What belongs to the nation is what belongs to the world. The rare and valuable intangible cultural heritage of ethnic minorities is also the excellent traditional culture of the Chinese nation. These can be interspersed in teaching, so that more people and children can understand and cherish it, and it is even more necessary to protect and cherish it.*

*Expert 31: The way of thinking of primary and secondary school students in ethnic areas is obviously inconsistent, and they are more or less influenced by the original ecological family. In the remote southern Xinjiang area, the parents of the students must have lived here for generations, pure ethnic culture. Ideas are deeply ingrained in their minds, and students living in such families inevitably have intersections. Therefore, teaching must be close to the actual life of students.*

(5) Possess the language ability to teach science knowledge: Xinjiang science normal students come from various ethnic groups across the country, but mainly in the northwest region, and the vast majority of candidates applying for normal majors come from rural areas. Some minority normal students have received education in the national language since childhood, and the use of the national lingua franca is not satisfactory. For this part of

science normal students, it is not only required to be able to speak the national lingua franca, but also to be able to accurately express the language in the science subjects. In professional terms, the former may be done by many ethnic students, while the latter requires a full understanding of science subjects and their own experience. This is exactly what ethnic minority students lack. The same is true for Han nationality normal students. It is precisely because most of them are from rural areas that they did not speak standard Mandarin since childhood. They used the local dialect in their previous life and even in their classrooms. After entering university, they really tried to use standard Mandarin to communicate and study for the first time. So in the whole learning process, you will face the phenomenon of heavy accent and inaccurate pronunciation. Science normal students of all ethnic groups should practice the basic skills of “three characters and one sentence” for normal students during the period of receiving normal education, so as to lay the foundation for future career planning.

*Expert 11: Some teachers can't even speak Mandarin, let alone teaching. Language barrier is a problem that our teachers in Xinjiang have to solve.*

*Expert 19: Normal students must lay a solid language foundation in the training process. They must not only be able to speak, but also be able to teach, that is, to be able to accurately express scientific terms, and to do a good job in the connection between basic education and higher education knowledge.*

*Expert 25: At present, many areas in southern Xinjiang require teachers to be able to teach classes in the national language, otherwise they will be considered for changing posts. Due to the transition period, many teachers can only speak the national language, which does not really meet the basic requirements of science teaching.*

The above are some of the more prominent features presented in the interview, and they are also characteristic of ethnic regions. When it comes to the professional literacy of normal students, the universal ability of teachers will also be involved, such as teacher morality, the mastery of pedagogy and psychology knowledge, the ability to lecture, the ability to organize activities, etc.

### 3. The Initial Construction of the Indicator System

The above text analysis through the interviews has basically found the unique characteristics of the professional literacy of science normal students in ethnic areas. Combined with the research on the professional literacy of normal students at home and abroad, the professional literacy

of normal students in ethnic areas, the science normal students in ethnic areas, and the evaluation of professional literacy, According to the operational definition and characteristics of the professional literacy of science normal students in ethnic areas, an evaluation index system for the professional literacy of science normal students in ethnic areas is initially constructed, including 3 first-level indicators and 18 second-level indicators, as follows:

#### 4. Conclusions

This research constructs the professional literacy evaluation index system of Xinjiang science normal students, including 3 first-level indicators: professional spirit, professional knowledge and professional ability, willingness to stay in Xinjiang; professional knowledge includes science subject knowledge, education and theory

**Table 3.** Preliminary construction of the evaluation index system

Primary indicator	Secondary indicator	Indicator explanation
professional spirit	patriotism	The understanding of the consciousness of the Chinese nation's community and the five identities.
	national unity	Firmly establish the thought of "three inseparables" and the awareness of preventing religion from infiltrating into the ideological field.
	educational beliefs	Possess an attitude of scientific exploration, are enthusiastic about the profession of science teachers, and agree with the work of teachers.
	professional ethics	Be able to implement the party's educational policy, have the awareness of teaching according to the law, and have the professional ethics of teachers.
	personal cultivation	Respect students' personality and individual differences, pay attention to students' health, and be responsible, patient and loving.
	Willingness to stay in Xinjiang	Willingness to stay in frontier jobs in the future.
professional knowledge	scientific knowledge	Be able to master the professional knowledge system, basic ideas and experimental methods learned.
	educational and psychological knowledge	The understanding and mastery of pedagogy, the basic theory of psychology, and multicultural education knowledge.
	subject teaching knowledge	Be able to choose appropriate teaching strategies based on the subjects taught.
	multicultural knowledge	Can master the traditional culture and historical knowledge of various ethnic groups in Xinjiang, and respect each other's customs and habits.
	minority policy	Follow the latest developments in the region and learn about the policies of ethnic minorities in Xinjiang.
professional competence	scientific language ability	Be able to use the national common language to convey the information of science textbooks, explain the truth, and inspire thinking.
	scientific thinking and applying ability	Be able to have certain scientific inquiry skills such as computing power, logical reasoning power, spatial imagination and model construction ability, and be able to analyze problems with experiments and solve problems with data.
	Innovative and reflective ability	Be able to take the initiative to combine ethnic and regional characteristics, constantly reflect on, and improve educational work.
	multicultural ability of scientific teaching	Be able to use the laws of national culture to carry out science teaching design, teaching implementation, and teaching evaluation.
	ability of informational technology	Able to use various modern information technology means to assist science teaching.
	communicational ability	Good at communicating with teachers and students of all ethnic groups, able to adapt to the environment of different ethnic cultures and learn from each other.
	ability of organizational management	Understand the characteristics of students' physical and mental development, plan and organize collective activities, and initially have the ability to manage classes.

of psychology, subject teaching knowledge, multicultural knowledge, minority policy; professional ability includes science language ability, science thinking and application ability, innovative reflection ability, diversity Cultural science teaching ability, information technology ability, communication learning ability and organizational management ability.

The research on the professional literacy of science teachers in ethnic areas is multidisciplinary and complicated. The purpose of this research is to focus on highlighting key indicators when constructing indicators, and not to consider everything carefully. Focus on the core idea “dilute form and focus on substance”<sup>[7]</sup>, adhere to the orientation of morality and people, and resolutely Implement “educate people for the party, educate talents for the country”, and then provide a reference for improving the evaluation of teacher education in colleges and universities in ethnic areas.

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### References

- [1] Ma, Q.L., Dong, S.Zh., Wang, W., 2018. Reasons for the lag of science education in ethnic areas, existing problems and the way out for future reforms: Taking Tibetan areas in Gansu Province as an example. *Ethnic Education Research*. 29(01), 37-43.
- [2] Li, Sh.C., Chen, L.J., Wang, D.Zh., 2017. Suggestions on improving the education and teaching quality of Tibetan science normal students. *Quality Education in the West*. 3(03), 13-14.
- [3] Cai, W.B., Xu, X., 2019. Research on the relationship between mathematics learning ability, professional commitment and academic achievement of minority science college students. *Ethnic Education Research*. 30(04), 19-29.
- [4] Peng, G.M., Xiong, X.P., Wang, M.N., 2017. Research on the Cultivation Model of the Core Competence of Mathematics Teachers in Local Teachers Colleges for Nationalities: Taking Xingyi Teachers College for Nationalities as an Example. *Journal of Mathematics Education*. 26(5), 99-102 .
- [5] He, W., Sun, X.T., 2019. Analysis of the key factors affecting the mathematics academic performance of students in ethnic areas. *Ethnic Education Research*. 30(02), 50-56.
- [6] Ha, J.X., 2005. The problem of balanced development of education in ethnic areas. *Journal of Northwest Normal University (Social Science Edition)*. (06), 94.
- [7] Song, N.Q., Chen, Ch.M., 1996. Re-talk about “dilute the form and focus on the essence”. *Journal of Mathematics Education*. (02), 15-18.