

The Empirical Research of Middle School Biology Teachers' Professional Development: Is the Professional Planning Useful?—Take Guangxi as an Example

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Abstract—Based on the hypothesis that a teacher who has made professional planning usually develops better, through the questionnaire investigation and interview method, research on the current high school biology teachers' professional planning related problems, a survey of Guangxi Guilin, Liuzhou and Qinzhou district among 164 high school biology teachers and 15 top-tier high school biology teachers. To the results for the statistics and analysis of comprehensive science, we put forward the corresponding countermeasures and suggestions to the response problem from the survey.

Index Terms—high school biology teachers, professional consciousness, professional planning, professional development

I. INTRODUCTION

Over the last decade, the debate on school quality (U.S. Congress, 2001) has focused increased attention on teachers' professional development [1]. In China, the topic about teachers' professional development is getting more and more attention of people from all walks of life. The high school biology teachers' professional development is a complicated process, including teachers' external environment and other factors, whether professional planning as a teacher's own factors in middle school biology teachers' professional development and growth plays a role in the process, to effectively promote their professional development level. In order to clearly understand the status of the current Guangxi middle school biology teachers' professional planning, we aim at the core of the current high school biology teachers' professional development in Guangxi elements such as professional awareness, professional ideal, knowledge, skills, professional planning and other related issues, we make a survey on 164 high school biology teachers and 15 top-tier high school biology teachers in Guangxi Guilin, Liuzhou and Qinzhou district. The study and analysis of this article is based on the results of this survey. First, states the connotation and characteristics of

professional planning, then, introduces the research method of this study, and presents the main results of the survey, finally, the analysis of these results and findings are discussed.

II. THE CONCEPT DEFINITION OF TEACHERS' PROFESSIONAL PLANNING

The teachers' professional planning, refers to all aspects of the teachers themselves to teacher's professional development and ideas and planning stages. [2] Specifically including: teachers' idea of career goals and expectations achievements for the selection of work units and position, the design of all kinds of professional goals, the design of growth stage, and the measures taken, etc.

High school biology teachers' professional planning, is to adapt to the demands for the new curriculum reform, and to promote the professional development needs. It is the need of the development of biological science continuously. High school biology teachers can be based on the analysis and study the needs of the development of itself, setting goals, regulating environment, designing strategy, making short-term or long-term planning, and often making self-reflection and process monitoring, which can eventually achieve the intended target and plan, and effectively promote the development of its specialization.

III. THE METHOD AND DESIGN OF THE SURVEY

A. Research Hypothesis

Hypothesis 1: currently, most of middle school teachers in Guangxi may not have the professional planning;

Hypothesis 2: high school biology teachers in Guangxi who develop better may have a better professional planning, such as super teacher may have made their own professional development planning;

Hypothesis 3: whether the teacher's professional consciousness is influence to their own professional development for teachers to be a professional planning.

B. The Research Content

Though the interview of Nanning, Liuzhou, Qinzhou, Guilin city special-class teacher of middle school biology, to investigate whether they have done professional planning, and to study the effect of professional planning for their professional development; At the same time to Liuzhou, Qinzhou, Guilin, Nanning 165 high school biology teachers as investigation object, research status and influence factors of high school biology teachers' professional planning, this paper also intends to prepare high school biology teachers' professional growth and development of the questionnaire, the same with the method of questionnaire, survey of Guangxi middle school biology teachers' professional planning status and factors affecting their professional development.

C. The Research Methods

Questionnaire: In May 2014 and July formal questionnaire investigation, randomly selected from the Guilin, Qinzhou, Liuzhou, Nanning 165 high school biology teachers as research object, among them 164 effective questionnaires were taken back, effective recovery rate was 99%.

The questionnaire is divided into two parts:

The first part is the personal basic information (in the appendix)

The second part of a total of 24 questions designed and using 5 point scoring method, investigate the subject which can be divided into three major directions are: professional consciousness (title (I) : 1, 2, 3, 5, and (II) : 2, 8, 13), professional ideal (title (II) : 1, 3, 5, 6, 9, 12, (III) : 1), professional planning (title (II) : 4, 7, 11, (II) : 2, 3, 5, 6) in three aspects. It is obvious that because of the different survey purpose, on the choice of survey content has very strong pertinence. Based on the questionnaire survey analysis and investigation of the advantages and disadvantages in the consideration, we finally determined to make a true, comprehensive and accurate survey about middle school teachers' professional awareness, professional ideals, professional planning, the relationship between these three aspects and its influence on the development of the high school biology teachers' professional. We import the data into Excel and SPSS software and Matlab software to carry out the clustering analysis, correlation matrix, the mean, variance, correlation coefficient and a series of related analysis methods on the results of the survey for the processing of a comprehensive induction, analysis of the professional consciousness, professional ideals, professional planning and the correlation between the three corresponding factors, and the influence of planning for high school biology teachers' professional development.

IV. THE PRELIMINARY RESEARCH RESULTES

A. High School Biology Teachers have Good Professional Consciousness and Motivate them to do Short-Term or Long-Term Planning

Through the analysis of the recycling of 164 valid questionnaires, we can conclude that the professional

consciousness and professional ideal correlation coefficient is 0.4566, professional consciousness and professional planning and the correlation coefficient is 0.2304, the professional consciousness of professional ideal is bigger; Professional ideal and professional planning and the correlation coefficient is 0.4247, the teachers' professional ideal affect their professional planning, which can draw out that the professional consciousness and professional ideal will indirectly influence a teacher for their professional development planning. (See Table I)

TABLE I. CORRELATION MATRIX OF PROFESSIONAL AWARENESS, PROFESSIONAL IDEALS, PROFESSIONAL PLANNING

	Professional awareness	Professional ideals	Professional Planning
Professional awareness	1	0.4566	0.2304
Professional ideals	0.4566	1	0.4247
Professional planning	0.2304	0.4247	1

B. High School Biology Teachers' Professional Consciousness, Professional Ideals, Professional Planning s

Table II shows that in our survey of 164 high school biology teachers, professional ideal degree is higher, the average and standard deviation of 25.0671 25.0671; and their second degree of professional planning, its average and standard deviation of 21.8963 21.8963. It is visible that teachers need to improve the professional development of their own profession.

TABLE II. PROFESSIONAL AWARENESS, PROFESSIONAL IDEALS, PROFESSIONAL PLANNING AND THE AVERAGE AND STANDARD DEVIATION

	Professional awareness	Professional ideals	Professional Planning
The average	17.1707	25.0671	21.8963
The standard deviation	4.8024	3.6151	4.4122
The median	16	25	22

TABLE III. THE CORRELATION OF TEACHER'S THE LAST DEGREE AND THEIR PROFESSIONAL CONSCIOUSNESS

Number	Professional awareness	The correlation coefficient	Significant inspection
1	subject knowledge	-0.107	0.175
2	Source of knowledge	-0.105	0.183
3	Practical knowledge	-0.097	0.220
4	teaching material	0.061	0.438
5	students experimental	-0.171	0.029
6	students' psychological	0.096	0.231

C. Degree and the Related Situation of Teacher's Professional Consciousness is Not Obvious

Because this study involves the "degree" belongs to the constant ratio data, can be different frequency levels can be regarded as a "sequencing data", so we used correlation analysis to verify "degree" relationship with the professional consciousness. The study found that the last degree overall negative correlation with the teacher's

professional consciousness, but not dramatically. (See Table III)

D. Have an Impact on Teachers' Professional Ideal Major

The Table IV shows that teachers' major overall negative correlation with its professional ideal, in its handling of classroom questions and love of education career extent is significant.

TABLE IV. RELATION WITH PROFESSIONAL IDEAL MAJOR

Number	Professional ideals	The correlation coefficient	Significant inspection
1	Educational policies	0.04	0.610
2	Classroom problem	-0.008	0.918
3	Love education career	-0.001	0.986
4	Attitude to students	0.094	0.234
5	Making CAI	-0.014	0.856
6	Teaching method	0.087	0.279
7	Continue education	-0.165	0.039

E. A Lot of High School Biology Teachers Did not Understand the Professional Planning, Ignore Its Importance

The Table V shows that the title for the biology teacher teaching level in the lack of professional planning, secondary and high school biology teacher in first rank is also a lack of professional planning. Rating teachers are mostly not just hired a new teacher, in our survey, part of master graduate student degree, may be to their own professional development to have certain planning, but relatively senior high school biology teachers in high rank will do better professional planning, can be seen, the appropriate professional program will influence a teacher's professional development.

TABLE V. DEGREE OF TEACHERS' PROFESSIONAL PLANNING OF DIFFERENT TITLES

new teacher	teachers in second rank	teachers in first rank	teachers in high rank
47.88%	47.17%	56.23%	62.91%

V. THE ANALYSIS AND CONCLUSION

A. Dattaches Great Importance to the Professional Consciousness and Professional Ideas

A teacher's professional development cannot leave the professional consciousness, professional ideas, professional planning [3], indispensable and complement each other, can be seen in table I, professional awareness, professional thought promoted the formation of professional planning, professional consciousness and professional thought is the soul of professional planning, at the same time, professional planning is the carrier of professional consciousness and professional ideas. A good high school biology teacher must have a correct and

comprehensive professional consciousness and professional ideas, so that they will have a strong sense of autonomy, continuously producing consciously, active self-requirements and desires. Teacher's professional consciousness and professional thought can directly affect the middle school biology teachers' education teaching result, and can ensure the biology teacher professional value and function into full play, so the professional consciousness and professional ideas cannot be ignored, must pay attention to and focus on training.

B. High School Biology Teachers Also Need to Keep Learning

High school biology teachers need to learn a teacher professional development theory [4], promote it to make a long-term or short-term plan on its own development. High school biology teachers also need to develop their professional knowledge and professional skills, professional teachers must have engaged in education teaching work in basic skills, when teachers are faced with different stages of different students, its response to the teaching strategy will also corresponding change, which requires teachers to change or amend its professional planning to adapt to changing requirements of teaching, which consists of teaching design ability, expression ability, education, teaching organization and management ability, education teaching skills, education teaching wit, reflection ability, education teaching research ability, innovation ability, etc. And, still can through the establishment of teacher learning development community, through the platform of learning community between teachers to strengthen exchanges and cooperation, learn from each other, reflection on their own professional planning. In addition, the high school biology teachers may also participate in school-based curriculum development and independent research, high school biology teacher's growth cannot leave the education teaching practice. look at their own professional planning in the teaching practice. Teachers are the backbone of the school-based curriculum development and the main force. Therefore to participate in the school-based curriculum development is an inevitable course of high school biology teachers' professional development [5].

Improve teachers' professional development is in the focus of attention of our time [6]. Teachers' professional development plan because of its unique to lead, guide and motivate, control and adjust the action such as reference, on the theory and practice of the level obtained more and more people's attention. There are many factors which affect the biology teacher professional development, professional development cycle and speed depends on the mentality and as a teacher [7]. Therefore, the high school biology teachers should first have a strong sense of professional, professional ideal, thus to develop a practical professional development planning, and it's very useful!

APPENDIX

Questionnaire for biology teachers in middle school

To respectable teachers:

Hello! Thank you very much for your time to finish this questionnaire. This questionnaire aims to know about the present teaching conditions of physics teachers. It is anonymous and the answers are open. The results are just for academic research. I'd appreciate it very much you could fill in the questionnaire according to your actual situation.

Thanks again for your time and cooperation!

I. Your basic situation:

1. Gender: A. Male B. Female
2. Teaching years: A. 1-5 years B. 6-10 years
C. 11- 15 years D. 16-20 years E. Over 20 years
3. Highest academic degree: A. Technical secondary school or senior high school B. College C. Undergraduate D. Post-graduate or above
4. Major: A. Biology education B. Other education C. Biology D. Non-education
5. Job status: A. Junior high school professional B. Senior high school professional C. Junior high school part-time D. Senior high school part-time
6. Teaching quantity: _____ periods per week
7. Positional title: A. Unrated B. Second rank C. First rank D. Senior E. Master
8. Location of school: A. Downtown B. County town C. Country

II. Basic teaching condition: (Please tick "√" your choices)

(1) Professional awareness

1. (Multiple choices) of which teaching book do you think you don't master enough knowledge?

- A. Required course 1 B. Required course 2 C. Required course 3 D. Optional course 1 E. Optional course 2 F. Optional course 3 G. All good

2. Do you think your academic knowledge can totally qualify you for teaching biology in senior high school?

- A. Of course, totally.
B. Mostly. I can't understand just a few contents.
C. Just so so. I think there is still a lot for me to learn. I have to teach what I am learning.
D. I feel it is hard for me to teach. I don't know about most of the contents in the teaching books.
E. I feel totally unqualified. There is too much I don't know about.

3. (Multiple choice) Please choose your source of your biology knowledge.

- A. Experience from middle school
B. Teaching education
C. Teaching observation
D. Reading professional books and periodicals
E. Reflection on own experience
F. Training after teaching
G. Teaching and researching activities at school
H. Training before first lesson
I. Attending lectures of experts or instructed by cadre teachers
J. Daily communication with colleagues

4. (Multiple choice) what do you think are the problems and difficulties of academic knowledge during the process of your teaching?

- A. My academic knowledge is not solid enough.
B. I grasp too little academic knowledge.
C. I can't associate my own knowledge with the knowledge in the teaching materials.
D. I have forgotten the knowledge learned at university after graduating such a long time.
E. I don't know how to pass on my knowledge to the students.
F. The knowledge learned at university is hardly or even not linked with that in the teaching materials of middle school.

G. I am not familiar with the knowledge in the teaching material of middle school.

H. Compared with the previous teaching materials, the knowledge in the latest teaching materials is more difficult.

I. Other problems _____. (Please mark out.)

5. Which aspect of knowledge is most needed in the practical teaching?

- A. Basic principles, facts, concept, rules etc. of biology
B. Knowledge of the history of life sciences
C. Knowledge of experiment and technology
D. The latest knowledge of progress in biology
E. The knowledge increased in the new curriculum criteria

F. Others _____ (Please mark out.)

(2) Basic teaching condition:

1. Do you often pay attention to educational laws and regulations such as Education Act?

- A. I have never read it through.
B. I have read it through at least once.
C. I often discuss it with my colleagues.
D. I can apply it to my teaching.

2. Compared with the previous teaching materials, what is different in the latest teaching material in aspect of ideas, structure and content?

- A. I have not compared them.
B. I find they are greatly different.
C. I find they are slightly different.
D. I have never used the previous teaching materials.
E. I often compare the teaching content of some module.

3. How will you deal with what may happen in class?

- A. Deal with it the moment it happens.
B. To save time, let it be in class and deal with it after class.
C. Unable to deal with such problems.
D. Think about what may happen before class and prepare a solution to it.
E. Willing to deal with it with a period of time.

4. How many periodicals on teaching will you subscribe each term?

- A. No. B. One. C. Two. D. Three. E. Four or more.

5. If you think teaching is the career you love, how many years are you willing to follow this career?

- A. 5 B. 10 C. 15 D. 20 E. 30

6. How do you deal with the relationship between teacher and student and among students?

- A. A teacher should respect and trust every student.
- B. A teacher should give equal chances to all students to take part in various activities.
- C. A teacher should be a person of authority because strict teachers make best students.
- D. Teachers and students are friends and should get along well with each other.

7. How do you get to know the latest news and trends of science and technology of biology?

- A. I often read articles and periodicals on cnki.net.
- B. I often go to the library and bookstores to read relevant books.
- C. I often browse through resources on the Internet such as wenku.baidu.com, weibo, and blogs, etc.
- D. I often communicate with the colleagues.
- E. I will pay attention to the latest trends of Nobel Prize in medicine or physiology.

8. Do you find it difficult to instruct the students to design an experiment and research through experiments?

- A. Extremely difficult.
- B. Very difficult.
- C. Difficult.
- D. Not very difficult.
- E. Not difficult at all.

9. Do you usually make courseware with CAI?

- A. I have never heard of this software.
- B. I have learned how to use it, but haven't tried it.
- C. I have used it once or twice.
- D. I often use it.

10. Do you think you are capable of teaching middle school students with the professional knowledge in biology?

- A. Totally capable.
- B. Rather capable.
- C. Capable.
- D. Not very capable.
- E. Not capable at all.

11. How many researching articles on teaching do you publish per year?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4 or more

12. Are you capable of using different teaching means and methods to teach students according to different contents?

- A. Totally capable.
- B. Rather capable.
- C. Capable.
- D. Not very capable.
- E. Not capable at all.

13. Do you understand theoretical knowledge of students' psychology and can you grasp the psychology of the students in the process of teaching?

- A. Yes, of course I can.
- B. Basically I can.
- C. I can.
- D. A little difficult.
- E. No, I cannot at all.

(3) Future learning and training

1. Are you willing to improve your academic knowledge by continuing learning?

- A. Very willing
- B. Willing
- C. Not willing
- D. Indifferent

2. (Multiple choices) which teaching pattern(s) do you think is good for you to improve your academic knowledge?

- A. Face-to-face training
- B. Teaching and researching activities at school
- C. Experts' instruction on practical teaching process
- D. Seminar classes
- E. Lectures on special topic
- F. Correspondence course
- G. Online training

H. Browsing through books, periodicals and online materials

I. Trained by experienced teachers

J. Others _____ (please mark out)

3. Which kinds of training are most needed? _____ (put them in order according to the importance)

- A. Educational theory
- B. Educational skills
- C. Ability to master classroom activity
- D. Teaching material oriented
- E. Concept for the latest curriculum
- F. Psychological theory of students
- G. The ability to experiment and research
- H. Use of the multimedia
- I. Others _____ (please mark out)

4. What form of training do you need most if you have such a chance?

- A. short period of training at educational institutions
- B. Turnover training for 3-6 months
- C. Turnover training for one year
- D. Academic qualification training (graduates and post graduates)
- E. Full-time study

5. How often do you think a teacher have to be trained?

- A. Once half a year
- B. Once a year
- C. Once one to three years
- D. Once over three years

6. What's your plan of your teaching in the next five years?

- A. To participate in more teachers training and learn advanced teaching concepts
- B. To pay attention to books and periodicals and improve professional teaching knowledge
- C. To do a good job in teaching and think of nothing else at present because of great pressure
- D. To communicate with colleagues often and try to observe other teachers' lessons to understand teaching styles of others if time permitting
- E. To participate in more competitions to improve myself
- F. To make full use of spare time and write articles on teaching by combining theory with the teaching practice.

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