

Pre-Service Teachers' Experiences in Science Teaching: Input to Curriculum Enhancement

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Abstract

This qualitative research study was conducted to determine the pre-service teachers' experiences in science teaching as bases for curriculum enhancement. The participants of this study were the 8 pre-service science teachers of Capiz State University-Roxas City Campus as well as Capiz State University-Pontevedra Campus during their pre-service teaching journey in S.Y. 2018-2019. The sample was determined purposively based on criteria set by the researchers. The study found out that the pre-service science teachers experienced troubles with regards to the complexity of science topics, have difficulties in preparing a lesson plan, and have misconceptions in employing teaching strategies and facilitating classroom activities. Moreover, they are challenged with the advent of the spiral curriculum. It was evident that the informants' beliefs and attitudes in teaching science were observable in all folks of science teaching especially when it comes to their precept in teaching the subject. It showed that the informants' suggestions regarding the ways in order to mold a competent science teacher which is centered on in-depth preparation and training of teacher education students specializing in science should be considered in curriculum enhancement. The suggestions gathered during the focus group discussion with the course facilitators teaching science disciplines as discussants were considered in developing an output which is a course syllabus in the new subject in college curriculum which is the "Teaching of Science". This developed syllabus will serve as a road map in molding a future competent science teacher in the academy.

Keywords: *Beliefs, Experiences, Pre-service Teachers, Science Teaching*

INTRODUCTION

"The influence of a teacher can never be erased", this line speaks so much about the role of teachers in molding the young minds of every learner just for them to learn and be geared with knowledge and skills to face the challenges in life. Teachers' influence brings students to the zenith of their expectations which later on through that great influence will turn into reality. But still then, "You cannot give what you do not have", a famous line of inadequacy. Philosophically, students will never become intellectuals if their teachers are not great thinkers (Argote, 2016). Students will not be able to attain success if their teachers are not that competent enough in teaching. To quote Plato said that, "the beginning is the most important part of the work". If in the beginning teachers are not equipped with sufficient knowledge and skills what then can we expect from the learners?

The Philippine Basic Education Curriculum is congested. Therefore, the Former President Benigno Aquino III signed the Republic Act 10533 in 2012, also known as the Enhanced Basic Education Law which mandates private and public schools to implement Mother Tongue Based Multilingual Education (MTB-MLE), Inquiry Based Learning, Constructivist Learning, Research Based Learning, Spiral Progression Approach, and other approaches in their curriculum (Montebon,

2015).

Before the implementation of K to 12 Curriculum, science subject and even other subjects in secondary school were taught according to the year level. In the new Curriculum, things are very different, everything was refashioned. In science curriculum, like the other subjects there is a total make over, it utilizes the recently mandated Spiral Progression Approach, here teachers are ordered to teach in multidisciplinary approach as the four disciplines Biology, Physics, Chemistry, and Integrated Science changed to Earth Science will now be taught in a whole school year but of different degree of difficulty (Montebon, 2015).

In other words, a typical science teacher is forced to teach the four disciplines of science which is not his major or field of specialization like for a biology major teacher who is now expected to teach Chemistry, Physics, and Earth Science. The same as through in the context of a physical science major teacher who is forced to teach biological science subjects. Hence, the implementation of K to 12 curriculum in the country deeply affect teachers leading them to teach out of their field. Research has shown that out-of-field teachers can be concerned about the impact of their teaching that might affect students' learning, such as lower achievement scores. They have also shown concerns in things that they are unable to demonstrate content which is relevant to everyday life (Hobbs, 2015).

Since there will be grand expectations to these K to 12 graduates for the next few years, an educator should bear in mind that he is accountable enough to find ways and means in doing researches, plan for accurate contents of daily lesson and look for methods to facilitate a great teaching-learning journey to be able to transpire and share great ideas to the students who will be globally competitive citizens of our country (Montebon, 2015).

Yes, teaching science subjects is a challenge to all science teachers, since there are struggles in science teaching as of this moment, it is necessary to know the competence of the pre-service teachers in science teaching like knowing their pre-service teaching journey and how they were prepared by their teacher education institution, their struggles and their over-all science teaching experience to address any problems and to even enhance the curriculum for them to be competent science teachers in the future.

Since pre-service teaching is an integral part of any teacher education curriculum, it is a good avenue for pre-service teachers to apply the theories they learned in college in the real classroom setting. Therefore, it is the aim of this study to hear the voices and insights if not the plights of pre-service science educators in their pre-service teaching journey. The result of this study will be the basis for any curriculum enhancement in every teacher education institution specifically in science teaching.

This study aimed to determine and explore the Pre-Service Teachers' Experiences in Science Teaching in Panitan National High School during S.Y. 2018-2019. Specifically, it sought to answer the following questions:

1. What are the experiences of Pre-Service Teachers in Science Teaching?
2. What are the beliefs and attitudes of Pre-Service Teachers in Science Teaching?
3. What output can be developed after determining the experiences, beliefs and attitudes of Pre-Service Teachers in Science Teaching?

METHODS

1. Research Design

The study used a qualitative approach which is a phenomenological observation that studies human events as they are immediately experienced in real world settings like actual happenings in teaching-learning process, revisiting prior categories and concepts that might distort the experiential basis for understanding the events (Creswell, 2014). In-depth interviews were done to gather distinct concepts and views from the participants. This type of interview was used to explore in detail the respondent's own perceptions and accounts. Interview guide questions were used so that participants can share ideas regarding the needed data which is centered on their experiences in pre-service teaching with the advent of spiral curriculum. These guide questions were formulated by the researchers based from the related studies and were validated by the science teachers and experts from different public schools and institutions. This study utilized a semi-structured interview with the following guide questions:

- How was your practice teaching journey?
- What have you observed when you teach science?
- What are your experiences in preparing a lesson plan?
- What are the things you've encountered when it comes to the mastery of the subject matter?
- What have you discovered in teaching science with the advent of newly implemented spiral progression approach?
- What are the teaching methods you've employed in teaching science?
- Is there any difficulty when it comes to the teaching methods, approaches, and techniques that you've employed in teaching with regards to the subject and subject matter you teach? How can you say so?
- What are your experiences in managing a science classroom?
- What is your point of view with regards to the mode of teaching science nowadays?
- What do you think are your weaknesses in teaching science disciplines? What then are your weaknesses?
- Since there are no mistakes in life, only living opportunities. Opportunities to reveal misconceptions do not devalue one's worth as a person. So, what are your misconceptions or misinterpretations when it comes to the things you've encountered in science teaching during your practice teaching journey?
- What do you think are the ways that should be given importance in molding teacher education students, is it all the complexity of the content, teacher's strategy or teacher's competency in facilitating classes?
- What do you think should be the focus of every professional education subject in molding teacher education students?
- Does the newly implemented curriculum in science, requires more teaching reinforcement and training especially to teacher education students' welfare for them to be competent enough in teaching?
- What do you think are the best ways to mold a competent science teacher?

2. Locale of the Study

This study was conducted in Panitan National High School during S.Y 2018-2019. The school with a land area of 1.4 ha, is located in Pob. Ilawod, Panitan, Capiz, is 5 Km away from Capiz State University-Pontevedra Campus, with more or less 15 minutes of travel, 12 km away from Roxas, City, the Provincial Capital. The school has a total of 80 classrooms for instructional and non-instructional purposes. It has 130 teaching and non-teaching staff headed by the school principal; 124 is the total number of teachers. It has a total of 2,500 students enrolled for the school year 2018-2019. It has 25 Pre-service teachers coming from Capiz State University- Pontevedra Campus and Capiz State University-Roxas City Campus. It has a total of 12 pre-service teachers in science with 6 pre-service teachers from CapSU- Pontevedra Campus and 6 Pre-service teachers from CapSU- Roxas City Campus in science teaching.

3. Participants of the Study

The participants of the study were the 8 pre-service science teachers of Panitan National High School during School Year 2018-2019. The sample was determined purposively based on the criteria set by the researchers in which the respondents are pre-service teacher in science of the said school, enrolled in Capiz State University-Roxas City and Pontevedra Campus, a pre-service teacher major in biological or physical science, teaching science for at least two grading periods to see the gaps in teaching different disciplines of science and are willing to share his or her experience as well as belief and attitude in his/her journey in science teaching.

4. Data Gathering Procedure

The good source of data gathering is the in-depth interview. The participants were the pre-service science teachers who are interviewed by the researchers personally. The gathered facts and answers

were documented through written form and recorded in mobile phones. A semi-structured in-depth interview was designed to gather information about their experiences as well as beliefs and attitudes in science teaching.

An interview guide questions were formed to cover the right questions to ask and to ensure that the encoded data are drawn out from the informants. Questions to be asked have no fixed responses or options to choose from. Follow-up questions were done depending on the responses and flow of the interview. Before gathering the needed data for the study, the researchers prepared a letter of permission addressed to the principal of Panitan National High School in the 1st District of Capiz. After the principal signed the letters and needed permits to conduct the study in their school, interviews were conducted with the selected pre-service teachers in science in their corresponding area of classrooms. They were asked about their experiences as well as beliefs and attitudes with regards to their practice teaching journey in science.

5. Data Analysis Procedure

The study started through exploration in which the researchers tried to explore and get acquainted with the Pre-Service Science Teachers of Panitan National High School. The experiences as well as beliefs and attitudes of the informants were identified through an In-depth interview. Transcription was done to convert digitally recorded interview data into transcripts. The researchers then looked for important concepts and categories in the data, which formed as basic units of analysis. To ensure the quality of data being analyzed, the researchers read the transcript line by line to clearly assess the elements. Themes were formulated to come up with broader and precise information regarding the answers of the informants. Theme identification was utilized by the researchers since it is one of the most fundamental tasks in qualitative research. Composite narrative discussed the outcomes of the themes, in its broadest sense anything was told or counted; more narrowly and more respectively, something was told or recounted in the form of causally-linked set of events, the telling of happenings or connected series of happenings.

Bracketing was done by researchers to make sure that the data were not affected by the experiences and beliefs of the researchers. This will avoid gathering biased data. Bracketing is a method used in qualitative research to mitigate the potentially deleterious effects of preconceptions that may taint the research process (Creswell, 2014). Moreover, bracketing is a scientific process where a researcher suspends or holds in abeyance his or her presuppositions, biases, assumptions, theories, or previous experiences to see and describe the essence of a specific phenomenon (Given, 2012).

The researchers designed a course syllabus which will serve as a guide of teachers in teaching professional education subjects to integrate exact methodology in science teaching. This syllabus will help the teachers teaching professional education subjects to facilitate learning with the integration of accurate teaching methodology in science in order for the education students specializing in science to be equipped with the ideas on how to teach competently with different science disciplines.

RESULTS AND DISCUSSION

In this section the voices, insights, plights, beliefs, and attitudes pertaining to the experiences in science teaching of pre-service teachers is presented. The themes and narratives are revealed. The themes were divided into two, the pre-service teachers' experiences followed by their beliefs and attitudes as shown in Table 1.

1. Teaching science is challenging yet worth taking for

Science is important because we live in a world today where parts of the world around us are changing every second like the increasing use of technology. There is evidence that all children learn as individuals and that many children do not passively receive knowledge. Therefore, it is the educator's role to make science teaching worthwhile and facilitate science class well. As being asked with their over-all impression in their pre-service teaching journey, most of the informants responded that science teaching is challenging but when you are already teaching you will realize the worth and the impact of

facilitating a class to the students leading the informants into contentment.

“Teaching science is not as easy as to the other subject I need to make my lesson more valuable for my students to learn like now that there is already that spiral progression approach, it is tough or hard to teach science but the outcome is really worth it”. - PST E

Table 1 Themes derived from the participants of the study through in-vivo and inductive coding

Pre-Service Teachers' Experiences	Pre-Service Teachers' Beliefs
Teaching science is challenging yet worth taking for	Spiral Curriculum affects science teachers' competency
Teaching science requires arduous research and preparation	Lesson planning and the use of teaching strategies should be given enough attention
Teaching science is quite complicated	Training and preparation: Key to a Successful and Effective Pre-Service Teaching Journey
It's difficult to prepare a lesson plan in science	
Spiral Curriculum seems to be tricky and confusing in teachers' welfare	
Varied science teaching strategies leads to well-accomplished learning	
Lack of science teaching strategies affects learners' performance	
Well-managed class leads to well-organized learning	
Preparing teaching aids is expensive yet worthy	

2. Teaching science requires arduous research and preparation

“Failing to prepare is preparing to fail”, a quotation which motivates every pre-service teacher in preparing a certain lesson for the sake of the learners' welfare. It also tells us that every pre-service teacher should be prepared in everyday lessons and in researching for the purpose of that lesson and its application in real life situation.

The informants have almost same perspective of preparing as well as researching for the lesson to be delivered and to be discussed well during the class discussion.

“Teaching science is not as easy as to teaching English, because based on my experience I need to research more about the subject matter involved in science and of course, teaching science as to my Practice Teaching Journey Experiences, you need to be aware of everything from your preparation, to discussion and even in assessment to know if my teaching strategies are effective or I have to reteach my lesson”. -PST J

“For me teaching science is not an easy task because you need to master first a specific topic and as I experienced, preparation is a must for a teacher to teach well”. -PST L

3. Teaching science is quite complicated

When asked about the role teachers should play, Melyssa Ferro (2016) replied that "In this day of instant and global information access, it has become increasingly important for science educators to help students develop science process skills instead of focusing solely on the memorization of a body of facts. Science should be a verb instead of a noun." Some of the teaching strategies educators are using to promote science include problem-based learning, incorporating educational technology into the lesson, and project-based learning.

The informants stated that science teaching nowadays seem to be complicated and there is a need for them to prepare and to avoid complex teaching-learning process. According to them, there are factors which make science teaching even more complicated.

“I have observed that teaching science subject is quite complicated because of the implementation of Spiral progression approach. Every grading has different areas of science which is quite complicated because you need to teach the four areas of science especially if you have your own major like me, I am biological science pre-service teacher”. -PST B

4. It's difficult to prepare a lesson plan in science

A well-developed lesson plan reflects the interests and needs of students. It incorporates best practices for the educational field. The lesson plan correlates with the teacher's philosophy of education, which is what the teacher feels is the purpose of educating the students (Straessle, 2014). The informants stated that science teaching nowadays seem to be complicated and there is a need for them to prepare and to avoid complex teaching-learning process. According to them, there are factors which make science teaching even more complicated.

The informants of Capiz State University-Pontevedra Campus and Capiz State University-Roxas City Campus have different experiences when it comes to preparing a lesson plan. Informants of Capiz State University-Roxas City Campus seem to have difficulty in preparing a lesson plan. The informants shared their experiences in lesson planning in which some of them has that difficulty in preparing different aspects or components of lesson plan.

"It is really difficult when it comes to lesson planning, especially when talking about the 3 domains of learning like cognitive, psychomotor and affective domain. I think I need to learn more on how to make an effective lesson plan that will really help me in conducting a class because sometimes it's really hard to figure out a lesson plan and in thinking for the motivation during class". -PST L

5. Mastering a certain science topic needs ample time of study and research

Science is a systematic study of the structure and behavior of the physical, social, and natural worlds through observation and experimentation. It is the key to innovation, global competitiveness, and human advancement. It's important that the world continues to advance the field of science, whether it's finding new cures for cancer and other diseases or identifying and exploring new galaxies (Clark, 2012).

Beyond the potential scientific breakthroughs, there are individual benefits to learning science, such as developing our ability to ask questions, collect information, organize and test our ideas, solve problems, and apply what we learn. Even more, science offers a powerful platform for building confidence, developing communication skills, and making sense of the world around us—a world that is increasingly shaped by science and technology (Clark, 2012). Some teachers have difficulty in mastering or familiarizing a lesson in science. As to the study, the informants said that there is a need to study or prepare as well as need to research in part of the teachers for them to master a specific lesson in science.

"I need first to research in advance to master a subject matter because there are topics that I cannot really understand and I did not also encounter when I was in college like Ray Diagramming. We did not tackle that so; I need to research more about that topic so I can handle my class well". -PST P

6. Spiral Curriculum seems to be tricky and confusing in teachers' welfare

Based from the results of the study, pre-service teachers seem to be novice when it comes to the spiral progression approach. This approach seems to be useful yet others considered it as a problem in facilitating teaching-learning process. This is due to the fact that science teachers ended up teaching out-of-their-field like a typical biology teacher is required to teach physical science subjects, thus, the Commission on Higher Education has shifted its Bachelor of Secondary Education curriculum into General Science as specialization compared to the past curriculum which offers both physical and biological science to teacher education students (Montebon, 2019).

The idea in spiral progression approach is to expose the learners into a wide variety of concepts/topics and disciplines, until they mastered it by studying it over and over again but with different deepening of complexity. In relation to secondary Science curriculum, Adanza (2014) explained that, science is composed of four areas, namely Integrated Science, Biology, Chemistry and Physics. In old curriculum, Integrated Science was taught in first year, second year was Biology, third year was Chemistry and Fourth year was Physics. However, in new secondary science curriculum implemented last 2012, the concept of those four major areas is being taught all at the same time. Each year students are exposed to spiral progression approach, wherein the four areas are being taught per

grading period. Aside from that, integrated science was changed into Earth Science.

Most of the informants said that there is a great challenge in their part due to the implementation of spiral progression approach. All the informants consider science teaching nowadays as complicated due to the advent of spiral curriculum.

“I am really interested to teach Biology as a discipline in science but if other disciplines will be asked, I don’t have lots of ideas so I need to think of the ways in order to learn. I am also required to impart that to my students, I am always into researching. Sometimes, I even don’t have any idea with regards to my lesson”. -PST E

7. Varied science teaching strategies leads to well- accomplished learning

The informants of Capiz State University-Roxas Campus stated that they are adept when it comes to employing teaching strategies, they have lots of ideas when it comes to teaching approaches as well. They can manage their class as well as make ways on how to facilitate a teaching-learning process. They also stated that with the use of varied science teaching strategies they always reach or attain their learning outcomes.

This is related to the study of Miles (2015) where he asserted that it is expected of a teacher to implement a range of instructional strategies that will bring academic success to all the science students. For any method to be able to bring good result in the present age, it should be a method that promote maximum social interaction. Social interaction between students and between teacher and student plays a crucial role in learning (Nguyen et al., 2012). These authors further stressed the need for the students to be provided with a supportive, open and interactive environment as this could help them discover knowledge.

“I am well-versed when it comes to teaching strategies, I don’t have problems, I knew lots of techniques but I want to learn more. I really assure you that I am good when it comes to teaching strategies as a pre-service teacher. I am also into learner-centered approach wherein learners can participate well”. -PST J

“I am good when it comes to teaching strategies, I don’t really have any problem with it, I knew lots of them but I want to learn more about it because there are times that my strategies are not applicable which led the class into not a collaborative one and my students found it boring so I need to improve it also. But I assure that I am well-versed when it comes to teaching strategies”. -PST A

8. Lack of science teaching strategies affects learners’ performance

Other informants seem to have difficulties when it comes to employing teaching strategies, this can be observed with the informants coming from Capiz State University-Pontevedra Campus. The informants shared that they have difficulties in employing science teaching strategies, they also want to learn more teaching strategies as science teaching needs to have lots of teaching strategies. This conforms that there should be lots of strategies to be employed in science teaching not only one or two, Berry (2008) argued that if there is only a lecture method, it lacks the effectiveness of an active learning approach.

“I am really upset that I have only few strategies being employed during my practice teaching journey, I also knew experiential learning but this is not enough, I think. I tend also to apply learner-centered approach wherein learners can participate with the topics that they tend to discuss and they are also enjoying. There are times that I am using the same strategy always and I am not satisfied with that strategy.”. -PST C

9. Well-managed class results in well-organized learning

The informants seem to enjoy managing classes yet there are still problems in dealing with the students especially in facilitating classroom activity or group discussion. The informants seem to have memorable classroom management experiences yet there are times that the informants cannot manage

the class or the students especially during classroom activity or during laboratory activity. Some of them are eager to learn ways or steps on how to deal with the students well. They also value classroom management as a great factor in conducting science class. These findings conform with the study of Parsonson (2012), wherein he reiterated that a science classroom should be an environment with its own ecology, including teacher, pupils and their interrelationships, the equipment, books and a range of activities which all interact to influence the behavior of the room's inhabitants.

"I don't have problems when it comes to classroom management during class discussion but I do have problems when it comes to having discipline with my students during group activity but I am so thankful with my cooperating teacher, I learned so much about managing a class." -PST B

"I can handle my class well but I can't really control students especially those Grade 7 students, they are so noisy sometimes especially during our games in motivation". -PST A

10. Spiral Curriculum affects science teachers' competency

Aside from experiences, the informants which are the pre-service teachers in science also shared their beliefs, views and insights regarding the science teaching we have in the Philippines nowadays.

The informants have different views in terms of the mode of science teaching nowadays but most of them see that spiral curriculum is the main factor for the teachers' lack of competence in teaching for the teachers only have that one specialization but they are intended to teacher all disciplines of science.

"Teaching in science is half exciting and half complicated. Complicated in terms of the specialization. Exciting in terms of determining if I am competent enough to explore the four areas of science." - PST L

"Teaching science nowadays is better than that of the past way of teaching science, because nowadays, it already promotes things for the betterment of the students yet the problem is all about the teachers' welfare in engaging to different science disciplines". -PST J

11. Lesson Planning and Teaching Strategies should be given enough attention

The informants tend to focus on stressing their difficulties or weaknesses between lesson planning and employing teaching strategies. They are also concerned with regards to the outcome of their weaknesses in teaching. There are informants who are struggling when it comes to lesson planning while others seem to have problems when it comes to the use of teaching strategies. These findings seem to be alarming because there should be a blend between lesson planning and implementation of teaching strategies because the lesson plan depends upon the teaching strategy to be employed by a certain teacher. This conforms to the study of Miles (2015) where he stated that it is expected for a teacher to implement a range of instructional strategies that will bring academic success to all the science students, for any method to be able to bring good result in the present age, it should be a method that promote maximum social interaction. Thus, these teaching methods should be considered by teachers in preparing a lesson.

"It's really hard to teach science but I realized that teaching science is really worth taking for especially to the welfare of the learners." -PST C

"It's hard to teach science especially if you are not prepared, you need to be prepared in all things because it's difficult if you are not prepared like now, we have spiral curriculum". -PST N

"I think my very weakness is on teaching strategy and I'm best in preparing lesson plans, classroom management and in preparing instructional materials". -PST E

12. Training and preparation: Key to a Successful and Effective Pre-Service Teaching Journey

The informants' view that there should be ample training and preparation for any teacher education students specifically those future science teachers. According to their thoughts the future teachers should be geared well in different teaching aspects and even in engaging with the learners.

“More on applying what they tend to discuss, the teachers should train students on how to conduct classes per major because I know there are different strategy per major. For me, I am really concerned in working with lesson plan.”. -PST K

“Preparation is really required, the pre-service teacher should be prepared in constructing lesson plan, managing classroom, and most especially in teaching strategies. For me, lesson planning should be given consideration”. -PST E

“Preparation is the most important key since this is the best way for a pre-service teacher to be molded and in training also, there should be lots of trainings.”. -PST A

“Educational institution must train and make soon to be teachers prepared in all aspects of teaching life”. -PST C

Teaching science is challenging yet worth taking for, requires arduous research and preparation as well as quite complicated, it's difficult to prepare a lesson plan in science, lesson planning in science is not a struggle, mastering a certain science topic needs ample time of study and research, spiral curriculum seems to be tricky and confusing in teachers' welfare, varied science teaching strategies leads to well-accomplished learning, lack of science teaching strategies affects learners' performance, well-managed class leads to well-organized learning and preparing teaching aids is expensive yet worthy are the identified themes on the experiences of the informants towards science teaching. The pre-service teachers' experiences in science teaching is centered on the complexity of the subject which is science, their weaknesses in different aspects of science teaching, the need of research and ample preparation in teaching science and about the advent of spiral curriculum. Informants' experiences with their science teaching journey lead in determining some aspects that need to be given enough attention in pre-service teachers' welfare. These results regarding pre-service teachers' experiences which are mostly centered on their weaknesses in science teaching which requires proper training and preparation on their part conforms with the study of Argote (2016), wherein she described that science teachers need to be experts on the different science disciplines to deliver the curriculum effectively.

Spiral curriculum affects science teachers' competency, lesson planning and teaching strategies should be given enough attention, training and preparation a key to a great pre-service teaching journey as well as key in making competent pre-service teachers in science are the identified themes on the beliefs and attitudes of the informants towards science teaching. Almost all of the pre-service teachers' beliefs and attitudes towards science teaching are factual as it conforms to some related studies as well as in real life situation. Their beliefs include the scenarios centered on the mode of science teaching nowadays. It also includes their suggestions on how to improve science teaching based from the problems faced by science teachers. They also believed that preparation and training are the best way in molding a competent science teacher.

Development of different aspects about science teaching in future science teachers through a course syllabus in the new subject, The Teaching of Science, is the best output to be developed which were based from the result of the study and also based on the focused group discussion conducted which centered on teaching science and its aspects as a whole.

CONCLUSION

Most pre-service teachers need to be given ample attention like enough training and preparation in different aspects of science teaching. Some of their experiences were focused on complexity of teaching science subjects, lesson planning, mastery of the subject matter, managing science classroom, the use

science teaching strategies as well as in preparing teaching aids. Pre-service teachers have their beliefs towards science teaching which are observable in actual science teaching-learning process like paying attention in lesson planning and that spiral curriculum serve as contributing factor in science teachers' competency. The ways they suggested in order to mold a competent science teacher which were preparation and training should be considered for the sake of curriculum enhancement. Course Syllabus can be developed as it will serve as a roadmap or basis of teachers in improving future science teachers' competency in teaching. This syllabus is based from the result of the study and from the focused group discussion conducted with science educators. This can be used by the professional education subject facilitators as this will tackle about teaching techniques and in whole aspect of science teaching.

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DATA AVAILABILITY

Data will be made available on request.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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