Research Article

Pedagogical Competence of Science Pre-Service Teachers: Baseline for Training Program

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ABSTRACT

This descriptive survey aimed to explore the pedagogical competence of science pre-service teachers (PSTs). The study involved 35 PSTs in a state university in Central Luzon, Philippines. In accordance to the National Competency-Based Teachers Standard (NCBTS) domains, science PSTs were assessed using an adapted NCBTS survey questionnaire to find out the pedagogical areas they do best and the areas that they have to develop. Results revealed that a typical science PST is a female, aged 21 years old and below from college. The study concluded that the pedagogical competence of Science pre-service teachers is moderately evident in terms of social regard for learning, learning environment, diversity of learners, curriculum, community linkages and personal growth and professional development domain. The findings on this study served as basis in constructing a training program for science PSTs which could enhance their pedagogical competence as they embrace the actual workplace after graduation.

Keywords: *Pedagogical competence, Pre-Service teacher, Training program*

Introduction

The Ramon Magsaysay Technological University (RMTU) envisions itself to be a progressive learner-centered Research University recognized in ASEAN region 2020. The State university is continuing its vision and mission in preparing the students to be globally-competitive, very efficient to promote education and enhancing the professional competence and holistic standards.

Filipino teachers follow the National Competency-Based Teacher Standards (NCBTS).

Sweethen (2008) outlines NCBTS as theoretical paradigm in highlighting effectivity of teaching-learning practices and it is categorized in seven domains, these domains include (a) Social Regard for Learning;(b) Learning Environment; (c) Diversity of Learners; (d) Curriculum; (f) Planning, Assessing, reporting; (g) Community Linkages and (h) Personal growth and Professionalism.

Social Regard for Learning domain deals on the ideology that educators serve as good example and influential role models of the value

aligned with different efforts to acquire learning. The action of teachers, types social interaction

Among students exemplify this ideology. Learning Environment domain refers on on significance of giving a social, psychological and physical environment within which all students, regardless of their individual differences in learning, can engage in various learning activities in both processed-based and product-based outputs and aiming towards achieving greater standards of education. Diversity of learners pertains to capability of teachers to administer learning process in spite of learner's diversity, through respecting and recognizing individual differences. It also includes teachers' skills to design different learning instruction that will ensure knowledge attainment among students. The Curriculum domain deals to teaching-learning process element that helpful in convergence to nurture among students the importance of understanding the objectives and goals of the curriculum. This is to achieve high standards of learning in accordance to the constructed curriculum. These elements include the knowledge of teachers on subject matter and the teaching process, different teaching approaches, activities, instructional materials and sources of learning.

The alignment of evaluation and designing the curriculum was due to Planning, Assessing & Reporting. Particularly, it focuses on (a) data assessment and revisions of teaching and learning plans. (b) utilization of assessment process in the implementation of learning plan and learning evaluation among students during the teaching-learning process, and (c) reports on actual behavior and achievement of the learners. Community Linkages domain pertains to the ideal that activities in the classroom are meaningfully connected to the aspirations and experiences of the students in their homes as well as communities. Thus, this domain deals on effort of teachers concentrated at strengthening the linkage between educational institution and communities to support in the attainment of the curricular goals. Personal Growth & Professional Development domain focuses the ideal that teachers give great importance on

improving their teaching pedagogy as professional teachers as they are in teaching service (NCBTS, 2008).

According to SEI-DOST & UP NISMED (2011), success of science teachers is determined mostly by their confidence in the content of the subject, pedagogy, and attitude. Truthful scientific teaching starts when a teacher possess enthusiasm about the subject matter and if the teacher truly understands the topic to be taught in order to utilize effective teaching among learners. This statement indicates that in order to accomplish the teaching goals for the benefit of the pupils, a good scientific teacher must have mastery of the material to be taught.

Professional knowledge, professional practice, and professional qualities are the three categories used to identify competent science instructors, which were borrowed from ASTA. Teachers should strive for the behaviors listed in each category since they are deemed standards of performance for which they can strive. Teachers' standards are broad statements of what they should know and be able to do (UP NISMED & DepED JICA, 2007). This suggests that a scientific teacher's behavior has a significant impact on his or her efficiency, implying that a teacher's behavior must be planned and improved.

A teacher's educational competence is influenced by his or her attitude in addition to his or her behavior. According to Hussain et al. (2011), attitude can be defined as a good or negative reaction to any situation, event, or object. It also includes on the way people feel about their jobs has an impact on their performance.

Standard in teacher preparation for secondary schools can be set only when the pre-service teachers are groomed to become academically and pedagogically competent. When we talk about teacher competencies, we're talking about the skills that make a teacher effective in the classroom and at school (Erden, 1998; O'Brien, 2008). This demonstrates how the pre-service teacher preparation program is relevant in preparing people for the field of teaching.

According to Hudson and Skamp (2002), Personal characteristics, system requirements, pedagogical knowledge, modeling, and feedback are crucial to a mentor's work in training preservice teachers. To put it another way, achieving holistic pedagogical competency necessitates a strong and collaborative connection between an instructor and a student teacher. Likewise, Henry, Bastian and Fortner (2011) stated that Peer and self-assessment, as well as reflecting on one's development and determining what needs to be improved, are all part of a teacher training program that can produce high-quality teachers.

It was mentioned from the study conducted by Eshach (2007) that education entails two types of learning processes: formal (at school) and informal (outside of school). Informal and non-formal science learning can be further separated. However, according to Aziz and Said (2011), science education in schools is mostly centered in the classroom, and as a result, students' cognitive talents and scientific skills may not be properly developed owing to time constraints.

Falk and Dierking (2010) discovered that in the United States, the primary source of scientific information is non-formal education, such as science centers (museums), aquaria, mass media, and other resources involved in scientific investigation. This means that science education extends beyond the four walls of the classroom in a variety of ways, most notably through exploration outside the classroom or beyond the institution.

This study was conducted to aim the enhancement of the pedagogical competence the assessment of academic competence of science pre-service teachers to have reliable bases in creating and designing future worth training program. To be able to know the specific area of professional practice and attributes of Sceince pre-service teacher, thus, this study was relevant to measure their competences in specific educational domain. At the end of this study, areas in NCBTS that was needed to establishe shall be enumerated thorough with the help of a survey questionnaire developed and modified.

Studies about pedagogical competence had already been conducted such as the study of Velacado, Andres, Carag and Caranguiain (2017) in Cagayan State University where they assessed the teaching competence and Academic performance of the Elementary pre-service teachers. Their study was conceptualized to determine the relationship between the pedagogical competence of the respondents and their academic performance. A high correlational association between pedagogy and academic performance were revealed based on the results and findings of their study.

The goal of the present study is to evaluate the pedagogical competence of science pre-service teachers enrolled in the College of Education Arts and Sciences (CEAS) which herby aiding as basis in designing and creating a training educational intervention which could help the University and the Philippines, as whole, elevating the pedagogical competence of pre-service teachers.

Purpose of the Study

This study aimed to determine the pedagogical competence of science pre-service teachers of the College of Education Arts and Sciences of Ramon Magsaysay Technological University, San Marcelino Campus, for the school year 2017 – 2018 that will serve as baseline for training program.

Specifically, the study aimed to answer the following questions:
1. Determine the pedagogical competence of science pre-service teachers of the College of Education Arts and Sciences of Ramon Magsaysay Technological University, San Marcelino Campus?
2. Determine the profile of the respondents in terms of: Age; Sex; and Year level?
3. Ascertain the pedagogical competence of pre-service teachers in terms of: Social Regard for Learning; the Learning Environment; Diversity of Learners; Curriculum; Planning, Assessing and Reporting; Community Linkages; and Personal Growth and Professional Development?
4. Is there a significant difference in the pedagogical competence of the respondents when grouped according to profile variables?

5. Is there a significant relationship among pedagogical competence variables?

Science Pedagogical Competence

According to Kunter et al, (2013), pedagogical competence was defined as the integration of teaching skills, attitudes, motivation and knowledge which are being acquired through from educational institutions though trainings and teaching. Meanwhile, Umar (2013) stated that pedagogical competence can be summarized as the ability of teachers to develop curriculum, facilitate learning, carry out the study and assess the learning outcome. To put it another way, pedagogical competence refers to the attributes that a teacher must possess and which can be acquired through an institution's training programs for student teachers.

As shown in a related study by Ambag (2014), competence is a basic motivation since people despise failure, and teacher competency is defined as the overall skills possessed among teachers that match to the best instrument of the instructor. The process of refining this "tool" must begin with instructors or pre-service teachers. Psychologically, Lukyanova (2001) emphasized Pedagogical competence of the teacher as a set of particular qualities of teachers' personality with a high extent of readiness to pedagogical practices and significant interaction with among learners in the teaching and learning process. This shows the importance of the attitude factor as a pedagogical competency.

On the other hand, Jones (2015) found that teachers with high pedagogical competence generated good academic performance and taught and guided well-rounded students. Competent teachers have served as a link between the curriculum and the students throughout the educational process.

The cited statements from various researches and studies related or significant to pedagogical competence strongly emphasized the role of an institution that will nurture the qualities that pre-service teachers can be innate from the academic or curriculum program.

National Competency-Based Teacher Standards (NCBTS)

National Competency-Based Teacher Standards was a theoretical framework that discussed the various dimensions of effective teaching in seven area: 1). Social Regard for Learning 2). Learning Environment 3). Diversity of Learners 4). Curriculum 5). Planning, Assessing, Reporting 6). Community Linkages7). Personal growth and Professionalism development. This serves as framework in establishing competency standards for teachers' teaching performance. This promotes positive behaviors, attitudes and skills among teachers and future teachers.

Ambag (2014) stated that NCBTS instrument should be discussed in the immersion study courses for further preparation of pre-service teachers in accordance to the tasks that will be assigned to them and upon in service training of teaching program. Likewise, the coordinators should discuss the NCBTS tool contents. The researcher emphasized that pre-service teacher education will be the key factor in quality of education in the Philippine education. It is important that high standards are set in determining the components, objective, successes of the teacher country's educational curriculum.

According to Alderite, Busquit, and Mejica (2008), the NCBTS should be used as a guide in developing a program for recruiting and retaining young teachers with aptitude and promise for teaching. These criteria must be the focus of in-service trainings and seminars, particularly in the areas of planning, assessing, and reporting. Hence, according to Tiangco (2014) teachers' community ties and networking should be clearly established, and teachers should seek for more involvement in educational research. NCBTS also serves as a "guide for instructors in their commitment and accountability to offer classroom instruction that results in good student learning outcomes,"

Furthermore, Biong (2013) compares the (NCBTS) extent of competence between graduating students and graduates of the College of Education base on the standards set by CHED per CMO #30, s2004 and CMO #52, s2007 in his study about College of Education (CED) among 26 graduating and 44 graduates, as well as all

CED administrators and administrators of private and public schools that recruited CED alumni. According to the findings, both graduating and graduates gained excellent extent of competency, as judged by the student-respondents, teachers, and administrators. In accordance to NCBTS standards, the graduates outperformed the graduating students, owing to the fact that they had already been hired as instructors.

The cited studies used graduates and graduating student, which is also similar to the present study that will include the second year and third year and fourth year Bachelor of Secondary Education (BSEd) students as respondents and specifically biological science major. From the stated insights about the NCBTS, it shows that it plays vital role in the standard of teaching in our country as it tackles not just the skills of professional but the values that a teacher must have.

Skills of Science Pre-service Teachers

Scientific thought and research are built on the foundation of scientific process skills (Mutlu and Temiz, 2013). Furthermore, science teaching skills are the thinking skills we employed to acquire information (Karamustafaolu, 2011). According to Ewers (2001), if science these skills are not mastered, it will be a hinders to science literacy given that science literacy is more than just reading and listening; it also involves efficient application of science process skills.

Teachers should possess certain competencies in order to do their tasks, as teaching is a profession that demands specialized knowledge and abilities. Teachers should receive special training before beginning their careers to learn the fundamental teaching abilities they will need to deliver and navigate their lessons. Teacher education thus entails the acquisition of a repertoire of teaching skills through observation of experienced instructors and, in many cases, practice teaching in a controlled context utilizing activities such as microteaching or peer teaching. In terms of training, good teaching is defined as the mastery of a set of abilities or competences (okanlawon,2014).

Concerning competency, according to a study by Lederman, Schwart, Khalick, and Bell (2010), the four most important criteria influencing teaching efforts are (1) knowledge of Nature of Science (NOS), (2) subject matter knowledge,(3) pedagogical knowledge, and (4) intentions to teach NOS. Participants, regardless of NOS views or science background, did not teach in accordance with their NOS ideas if they had not absorbed the value of teaching NOS, according to their findings. Those who have a clear intention to address NOS were more successful.

Emereole (2009) examined at the conceptual understanding of science process skills among high school pre-service science teachers in Botswana in a related study. According to Emereole's research, pre-service high school science instructors lack a conceptual understanding of science process skills. Similarly, several studies have looked into teachers' comprehension of inquiry and found that they don't have a good grasp of the process (Lotter, Harwood, & Bonner, 2007). Similarly, Scharmann (1989) claims that science process skills provide considerable advances in subject matter understanding and science content knowledge, and that science content and science process skills should be taught together because they are complementary.

Padilla (2011) has described Science Process Skills as a collection of broadly transferable qualities that are relevant to science disciplines and reflect what scientists do. Students can develop the skills they need to tackle everyday challenges by learning science process skills (Kazeni, 2005).

Miles (2008) studied pre-service elementary teachers' mastery, interest, knowledge, and performance on basic science pedagogical skills (measuring, classifying, observing, inferring, communicating and predicting) as well as intervention of science teaching skills (data interpretation, controlling and identification of variables, models formulation, experimenting and hypothesizing).

In the study that was presented, it is highly accepted that Science process skills was very methodical that indicated its relevant in teaching and learning process. The result of the pre-

sent study dealt with the pedagogical competence of science pre-service teachers that contributed a huge aid in designing and creating a training program that will enhance the pedagogical competence of science pre-service teachers as well as their science process skills.
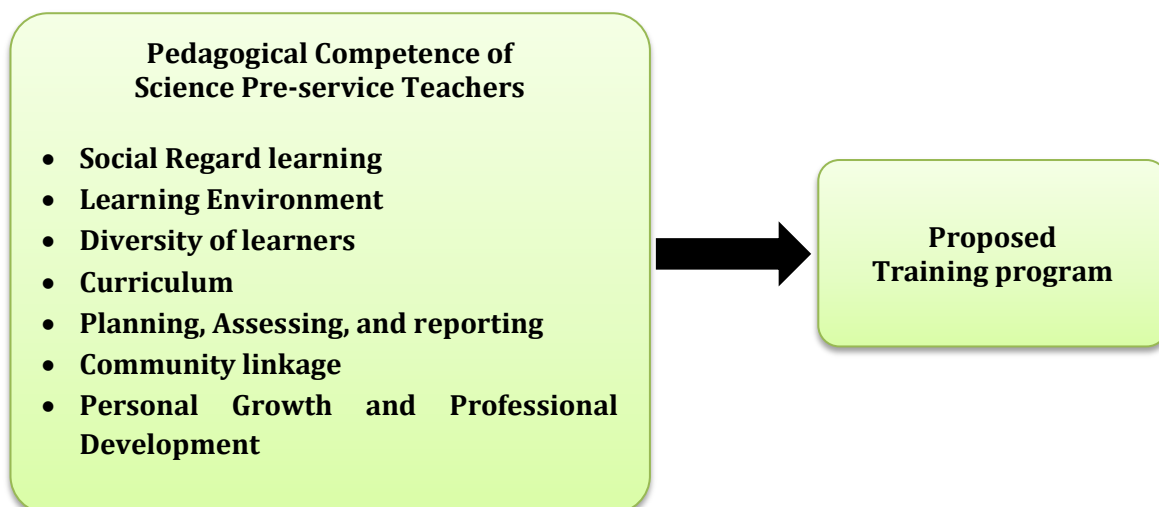
Conceptual Framework

Individual's ability using a coordinated, synergistic combination of tangible resources (e.g., instruction materials such as books, articles, and cases, as well as technology like software and hardware) and resources which are intangible (e.g., knowledge, skills, and experience) to achieve efficiency and/or effectiveness in pedagogy is referred to as pedagogical competence (Madhavaram & Laverie, 2010). Furthermore, the term pedagogical competence is mostly used to refer to a particular professional standard mandated by law, that must enable a person to actualize and perform a specific position in the profession of teaching (Gliga, 2002).

Pedagogical competence defined by Apelgren and Giertz (2010) as the capacity and willingness to consistently use the attitude, knowledge, and abilities that best foster the learning of the students. This must be in compliance with the appropriate goals and within the framework provided in this study, and it requires the teacher's own expertise and instructional design to be continually developed. According to Ryegrd (2010), pedagogical competency represents the teacher's ability to collaborate, see the big picture, and contribute to the

growth of higher education pedagogy. Pedagogical competence is defined as the capacity and willingness to consistently use the attitude, knowledge, and abilities that best support the development of the teacher's students. This will be in line with the objectives.

Pedagogical competency is divided into three parts, according to Ryegard, Apelgren, and Olsson (2010). First, it must be found on what aids students' learning. Second, it should contain a teacher's ability to deepen their practice with the help of theory and to make it public - Scholarship of Teaching and Learning. Third, it should allow for the description of a threshold value (the lowest level) as well as a progression of pedagogical competency. Pedagogical competence, according to Giertz (2003), is the capacity and willingness to consistently use the attitude, knowledge, and abilities that facilitate the learning of the teacher's students. This will take place in accordance with the aims being pursued as well as the current structure, and it will necessitate the continuing evolution of the system.

From cited description, it emphasizes the qualities of a preservice teacher which consist of skills, knowledge, attitude, and values. The aspects of Pedagogical competence lie in form of the NCBTS domains. It serves as the main teachers guide in their accountability and their commitment of providing classroom teaching instructions that ensures good students' learning outcomes (Tiangco, 2014).

Pedagogical Competence of Science Pre-service Teachers

- **Social Regard learning**
- **Learning Environment**
- **Diversity of learners**
- **Curriculum**
- **Planning, Assessing, and reporting**
- **Community linkage**
- **Personal Growth and Professional Development**

Proposed Training program

Figure 1. The Research Paradigm

Figure 1 shows the Pedagogical Competence of respondents in teaching of NCBTS's domains that will serve as bases on constructing a training program to be proposed in the College of Education of Ramon Magsaysay Technological University, San Marcelino Campus.

Social Regard for Learning domain deals on the ideology that educators serve as good example and influential role models of the value aligned with different efforts to acquire learning.

Learning Environment domain pertains on the importance of building a social, psychological, and physical environment wherein all students will enjoy conducive learning place.

Diversity of learners pertains to capability of teachers to administer learning process in spite of learner's diversity, through respecting and recognizing Individual differences.

The Curriculum domain deals to teaching-learning process element that helpful in convergence to nurture among students the importance of understanding the objectives and goals of the curriculum.

Planning, Assessing & Reporting domain refers to the alignment of assessment and planning activities. Particularly, it focuses on (a) data assessment and revisions of teaching and learning plans. (b) utilization of assessment process in the implementation of learning plan and learning evaluation among students during the teaching-learning process, and (c) reports on actual behavior and achievement of the learners.

Community Linkages domain pertains to the ideal that activities in the classroom are meaningfully connected to the aspirations and experiences of the students in their homes as well as communities.

Personal Growth & Professional Development domain focuses the ideal that teachers give great importance on improving their teaching pedagogy as professional teachers as they are in teaching service.

Methodology
Research Design
The study used quantitative descriptive-survey research design. According to Salaria (2012), a descriptive survey is focused with the features of the entire sample, not just the characteristics of individuals. This design provide knowledge that is helpful in solving local issues or difficulties. In mathematical or verbal form, a survey could be a quantitative or qualitative that provides valuable information.

Descriptive survey is a research design that applies the procedure of inquiry-based disciplined through collection and analysis of significant data, and each aims to acquire knowledge, and the phrase descriptive research has been wrongly applied to three distinct methods of investigation. Their differences may have been hidden by their superficial similarities. Each one uses the process of disciplined inquiry to obtain and analyze empirical facts, and each one tries to develop knowledge. Each demands the knowledge of a meticulous and systematic investigator to be completed effectively (Best & Kahn, 2007 as cited in Salaria, 2012).

According to Aggarwal (2008, cited in Salaria, 2012) The purpose of descriptive research is to gather knowledge regarding timely relevant events or occurrences to give description and interpretation on particular issues. This method of research entails more than just collecting and tabulating data; it also requires correct analysis, interpretation, comparisons, and trend and relationship discovery.

Respondents and Sampling Technique
The respondents of this study was the 35 pre-service science teachers of the Ramon Magsaysay Technological University (RMTU) San Marcelino Campus on the first semester SY 2017-2018.The respondents school year 2017-2018 through comprehensive sampling. It refers to sampling plan which deals on the entire target population. Specifically, the researcher has chosen all the science pre-service teachers from second year to fourth year.

Table Frequency and Percentage Distribution of Respondents

District	No. of Respondents	Percent
BSEd-II Biological Science	11	31.43
BSEd-III Biological Science	09	25.71
BSEd- IV Biological Science	15	42.86
Total	**35**	**100.00**

Research Locale

The study was conducted in Ramon Magsaysay Technology University, San Marcelino Campus, Nagbunga, San Marcelino, Zambales. RMTU SM Campus is a state university in Zambales.

Research Instrument

The pedagogical competence questionnaire served as the main instrument in gathering the data. It is composed of two parts.

The first part consists of the demographic profile of the respondents. The profile of the Science pre-service teachers includes name, age, sex and year level.

The second part assessed the pedagogical competence of the pre-service Science teachers based on the NCBTS domains. The survey tool was adapted from the questionnaire of Ambag (2014) of the Polytechnic University of the Philippines.

Data Gathering Procedure

The study was guided by the following p rocedures:

Phase 1. Secured permission and approval.

The researcher secured permission and approval from the BSED Chairperson of the College of Education Arts and Sciences. The researcher did seek an approval from the BSED Chairperson of the CEAS to conduct the research in the BSED department.

Phase 2. Administered an adapted survey questionnaires.

The researcher contacted and ask permission to adapt the survey questionnaire from Polytechnic University of the Philippines (PUP) to Prof.Sylvia C. Ambag the head of PUP research center. The researcher asked the respondents to answer the survey questionnaire on their free time.

Phase 3. Analyzed and interpreted the data gathered.

The researcher used statistical tool to analyze and interpret the data and hypotheses.

Phase 4. Wrote the research report.

The researcher made a conclusion based on the findings on study to be conducted align to the statement of the problem.

Data Analysis

The statistical tools which was used in the analysis and interpretation of data and hypotheses testing include the following.

Frequency and Percent Distribution. This was employed to determine the frequency counts and percent distribution of the raw scores of the respondents.

Weighted Mean. This was utilized to determine the average of the responses. The survey questionnaire responses will be analyzed using the rating scale analysis below:

Rating Scale Analysis of the Pedagogical Competence Questionnaire

Arbitrary Values	Statistical Limits	Symbol	Verbal Description
4	3.50-4.00	HE	Highly Evident
3	2.50-3.49	ME	Moderately Evident
2	1.50-2.49	SE	Slightly Evident
1	1.00-1.49	NE	Not Evident

Standard Deviation. Since the mean was chosen as the measure of center, this was used to measure the spread of how far the observations are from their mean. It is the square root of the variance.

ANOVA. This was used in determining if there is a significant difference between the two or more groups of respondents.

Pearson r Correlation Analysis. This was used to investigate the correlation (r) between variables according to the answers of the respondents. The qualitative interpretation is shown below.

Qualitative Interpretation of the Computed Pearson Correlation Coefficient r

Pearson Correlation Coefficient	Verbal Interpretation
±0.81 to ±1.00	Very High Correlation
±0.61 to ±0.80	High Correlation
±0.41 to ±0.60	Moderate Correlation
±0.21 to ±0.40	Low Correlation
0.00 to ±0.20	Slight Correlation

Results and Discussion
Profile of Science Pre-service Teachers

The profile of Science Pre-service Teachers were determined to give a more comprehensive background of their age, sex and year level.

Sex. Presented in Table 1 is the frequency and percentage distribution of the Students-respondents by their sex.

Table 1. Frequency and Percentage Distribution of the Students-Respondents by Sex (n=35).

Sex	Frequency	Percent
Male	17	48.57
Female	18	51.43
Total	35	100

As shown in the table, out of 35 student-respondents, 17 or 48.57% are male and 18 or 51.43% are female. Both male and female are in equal frequency and percentage distribution.

Age. Table 2 presents the frequency and percentage distribution of the students-respondents by their age.

Table 2. Frequency and Percentage Distribution of the Students-Respondents by age (n=35)

Age	Frequency	Percent
18 and below	16	45.71
19-21	16	45.71
22-25	2	5.71
26 and above	1	2.86
Total	**35**	**100**

As shown in the table, out of 35 student-respondents, 16 or 45.71% are 18 and below, 16 or 45.71% are 19-21 years old, 2 or 5.71% are 22-25 years old and only one or 2.86% have the age of 26 and above.

Year level. Table 3 presents the frequency and percentage distribution of the students-respondents by their year level. As shown in the table, out the 35 student-respondents, 11 or 31.43% are second year, 9 0r 25.71 % are third year and 15 or 42.86% are fourth year.

Table 3. *Frequency and Percentage Distribution of the Students-Respondents by year level (n=35).*

Year level	Frequency	Percent
Second year	11	31.43
Third year	9	25.71
Fourth year	15	42.86
Total	35	100

Pedagogical Competence of Science Pre-service Teachers

The Pedagogical competence of science pre-service teachers based on NCBTS Domains namely: 1). Social Regard for Learning 2). Learning Environment 3). Diversity of Learners 4). Curriculum 5). Planning, Assessing, reporting 6). Community Linkages 7). Personal growth and Professionalism development are presented in the succeeding tables.

As shown in the table 4, Social Regard for Learning Domain had the highest score of 3.46 as overall weighted mean as Highly Evident (HE), while Planning, Assessing and Reporting had gathered the lowest weighted mean of 3.04 as Moderately Evident (ME).

Table 4. Pedagogical Competence of Science Pre-service teachers

NCBTS Domains	Mean	SD	VD
Social Regard for learning	3.46	1.98	HE
Learning Environment	3.24	0.62	ME
Diversity of Learners	3.13	0.69	ME
Curriculum	3.21	0.72	ME
Planning, Assessing and Reporting	3.04	0.75	ME
Community linkages	3.24	0.66	ME
Personal Growth and Professional Development	3.34	0.67	HE
Mean	**3.23**	**0.13**	**ME**

Legend: Highly Evident (HE) 3.26-4.00; Moderately Evident (ME) 2.51-3.25; Slightly Evident (SE) 1.76-2.50; and Not Evident (NE) 1.00-1.75.

Social Regard for Learning. As shown in the table, the weighted average for all responses in this domain is 3.46 *which* is interpreted as Highly Evident (HE). This indicates that that as future educator the know that they should serve as a role model having positive attitude. This is essential because, as Durmuolu et al., (2009) Terzi and Tezci (2007) have indicated that teacher's attitude toward their profession is vital in fulfilling the profession's demands.

Learning environment. The weighted average of all responses in the Learning Environment Domain was 3.24, which is interpreted as Moderately Evident in the table (ME). Based from the findings of this study, Pre-service teachers recognize the value of a positive school atmosphere in fostering student learning. However, the outcomes of the study show that respondents are struggling to grasp the art of questioning in accordance to Higher Order Thinking Skills.

According to Dillon (2017) the art of questioning is an educated question which advance classroom processes, pedagogical purposes, facilitate student higher order thinking skills. Hence, it is important that teachers know the art of questioning in honing students critical thinking skill.

Diversity of Learners. Table 4 shows that the weighted mean for this domain is 3.13 and is interpreted as Moderately Evident (ME). In this domain, it was revealed that pre-service teachers have sense of respect and concern for students' individual differences which is very important knowing that students possess different aspect of differences that could affect and manifest on their learning styles. According to Hall 2002, student diversity can be seen in terms of their learning style,

interests, talents, and their cultural background. Knowledge on this could guide the teachers through final decision concerning the kind of differentiated teaching to be used.

Curriculum. Table 4 presents that the weighted mean for this domain is 3.21 and is interpreted as Moderately Evident (ME). High extent of competence among respondents in terms of ICT-based lesson planning were revealed in the findings of this study. According to Correos (2014), educators must receive comprehensive ICT-based training in order to be equipped with ICT knowledge. School administrators and stakeholders may adopt solutions to improve the school's ICT-based resources for optimum teaching and learning. Most significantly, a broader school-wide ICT development plan could be implemented to ensure that ICT is used consistently in teaching and learning process. Meanwhile, the findings of the study shows that respondents have to develop knowledge about multidisciplinary, integrative modes and techniques of teaching.

Planning, Assessing, Reporting. The mean obtained for this domain was 3.0, and is considered as Moderately Evident (ME). according to the findings in this domain, Pre-service teachers have a broad understanding of how to use technological tools for assessment, but they need to improve their skills in terms of creating assessment tools for evaluating students' academic achievement. In this regard, Yorke (2003) stated that assessment aids students in appreciating the expectations placed on them. This emphasizes that science pre-service teachers should study to become proficient in this subject.

Community Linkages. Table 4 shows that the grand weighted mean for this domain was 3.24 and is interpreted as Moderately Evident (ME). Under this domain, it shows that teachers have great recognition in the support of community resources towards students' learning. This means that the learning of the students should not end in the four-cornered class room and it is necessary for them to learn outside the

school. This area is aligned to the study of Kolstoe (2001) where contends and features the importance of engaging students in thoughtful decision-making on controversial socio-scientific issues as one means of guiding students towards effective learning.

Personal Growth and Professional Development. Table 4 shows that weighted mean for this domain was 3.34 as Highly Evident (HE). In terms of this domain, the findings of this study shows that pre-service teachers are open-minded to recent developments and transitions in education. This indicates a positive attitude among pre-service teachers. It is necessary for a teacher to engage in a continuous learning that can be used in guiding students towards progressive learning. This shows that Science pre-service teachers are aware that as teacher professionals, they are required to have a continuous learning and actualize the professional competence needed in the profession. According to Darling and Hammond (2000 cited from Goodlad, 2008), development of this profession would not only make teachers feel better about their practice, but it also reaps learning gains for students, especially in the kinds of more challenging learning that new standards demand.

Difference of the pedagogical competence of the respondents when grouped according to profile variables

Based from the computed data shown in Table 12, it is evident to conclude that all of the profile variables has no significant difference to the Pedagogical Competence of the Respondents when grouped according to profile variables.

In this regard from the study conducted by de Leon (2010) where it was found out that in terms of Social Regard for Learning on the NCBTS which reveal that department heads have "satisfactory" qualities when it comes to being a positive role model for teachers. However, further training and development would benefit them.

Table 12. Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of social regard for learning domain when grouped according to profile variables

Social Regard for Learning		Df	F	P-value	Mean square
Age	Between Groups	3	1.912	0.148	.224
	Within Groups	31			.117
	Total	34			
Sex	Between Groups	2	1.516	0.235	.186
	Within Groups	32			.123
	Total	34			
Year	Between Groups	3	0.949	0.429	.121
Level	Within Groups	31			.127
	Total	34			

Table 5 shows that there is no significant difference in the pedagogical competence of respondents in terms of learning environment domains regardless of age, sex and year level.

Table 5. *Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Learning Environment domain when grouped according to profile variables.*

Learning Environment		Df	F	P-value	Mean squaree
Age	Between Groups	3			.310
	Within Groups	31	1.939	0.144	.160
	Total	34			
Sex	Between Groups	2			.186
	Within Groups	32	1.082	0.351	.172
	Total	34			
Year	Between Groups	3			.225
Level	Within Groups	31	1.340	0.279	.168
	Total	34			

This mean that regardless of the students' profile there is no significant relationship in the competence of the respondents which can be relate from the study conducted in Australia by Lizzio (2013) wherein it was found out that students regardless of their profile share on same perception in terms of learning environment.

Table 6 shows that there is no significant difference in the pedagogical competence of respondents in terms of diversity of learners' domains regardless of age, sex and year level.

Table 6. *Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Diversity of Learners domain when grouped according to profile variables*

Diversity of Learners		Df	F	P-value	Mean square
Age	Between Groups	3			.267
	Within Groups	31	1.039	0.389	.257
	Total	34			
Sex	Between Groups	2			.502
	Within Groups	32	2.073	0.142	.242
	Total	34			

Diversity of Learners		Df	F	P -value	Mean square
Year Level	*Between Groups*	*3*			*.108*
	Within Groups	*31*	*0.396*	*0.757*	*.272*
	Total	*34*			

Table 7 shows that there is no significant difference in the pedagogical competence of respondents in terms of Curriculum domains regardless of age and year level but has a significant difference in sex.

Table 7. Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Curriculum domain when grouped according to profile variables

Curriculum		Df	F	P -value	Mean square
Age	*Between Groups*	*3*	*1.199*	*0.326*	*.413*
	Within Groups	*31*			*.344*
	Total	*34*			
Sex	*Between Groups*	*2*	*1.356*	*0.021*	*1.274*
	Within Groups	*32*			*.292*
	Total	*34*			
Year	*Between Groups*	*3*	*0.540*	*0.659*	*.197*
Level	*Within Groups*	*31*			*.365*
	Total	*34*			

There is a significant difference in the pedagogical competence of respondents in terms of Curriculum domains in terms of sex variable. It was found out that more Male respondents confidently assess their self on a higher extent compare to Female respondents in this particular area. This finding contradicts to the study conducted by Woolley and Malone (2011), as they contend that Teams with more women tended to fall above the average while teams with more men tended to fall below. However, it is still relevant that all future teachers must be competent in this domain.

On the other hand, from the study conducted by Burger (2009), A number of authors have investigated the impact of early childhood education and care programs on the development of children. Often they have focused on the effects on children from socio-economically disadvantaged families. In this regard both male and female educator must be equipped in this competency to provide an effective service in teaching.

Table 8. Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Planning, Assessing and Reporting domain when grouped according to profile variables

Planning, Assessing and Reporting		Df	F	P -value	Mean square
Age	*Between Groups*	*3*			*.530*
	Within Groups	*31*	*1.592*	*0.226*	*.347*
	Total	*34*			
Sex	*Between Groups*	*2*			*.981*
	Within Groups	*32*	*3.028*	*0.062*	*.324*
	Total	*34*			
Year	*Between Groups*	*3*			*.333*
Level	*Within Groups*	*31*	*0.910*	*0.448*	*.366*
	Total	*34*			

The refined Quality In Prognosis Studies tool may be useful to assess the risk of bias in studies of prognostic factors. It is relevant that future educators must know or must have the knowledge in this domain as one of the competency that will be needed in the profession.

Table 8 shows that there is no significant difference in the pedagogical competence of respondents in terms of Planning, Assessing and Reporting domain regardless of age, sex and year level. Regarding this domain, in the study conducted by Hayded and et.al (2013) Most reviewers (74%) reported that reaching consensus on judgments was easy. Median completion time per study was 20 minutes; integrator agreement (statistic) reported by 9 review teams varied from 0.56 to 0.82 (median, 0.75). Some reviewers reported challenges making judgments across prompting items, which were addressed by providing comprehensive guidance and examples.

Table 9. Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Community Linkages domain when grouped according to profile variables.

Community Linkages		Df	F	P -value	Mean square
	Between Groups	3			.159
Age	Within Groups	31	0.717	0.549	.222
	Total	34			
	Between Groups	2			.378
Sex	Within Groups	32	1.835	0.176	.206
	Total	34			
Year Level	Between Groups	3			.292
	Within Groups	31	1.400	0.261	.209
	Total	34			

Table 9 shows that there is no significant difference in the pedagogical competence of respondents in terms of community linkages domain regardless of age, sex and year level

It is very important to actualize this system linking education to community. Institutional reforms of school committees that enhance its social capital in the community show positive effects on learning (Pradhan & et.al, 2014).

Table 10. Analysis of Variance (ANOVA) on the Difference in the students' Level of pedagogical competence in terms of Personal Growth and Professional Development domain when grouped according to profile variables

Personal Growth and Development		Df	F	P –value	Mean square
	Between Groups	3			.291
Age	Within Groups	31	1.085	0.370	.268
	Total	34			
	Between Groups	2			.193
Sex	Within Groups	32	0.701	0.504	.275
	Total	34			
Year Level	Between Groups	3			.324
	Within Groups	31	1.223	0.318	.265
	Total	34			

Table 20 shows that there is no significant difference in the pedagogical competence of respondents in terms of Personal growth and professional development domain regardless of age, sex and year level.

On the study conducted by Avalos (2011) regarding this domain, he stated that learnings among professional teacher is a complex process because it requires emotional and cognitive involvement of teachers collectively and individually and their willingness and capacity to examine themselves for continuous professional and personal growth.

Correlation among Pedagogical Competence Variables

Table 21 shows the correlation among the variables of NCBTS domains.

Table 11. Correlation Coefficients among pedagogical competence variables Relationship (Pearson R)

Variables	1	2	3	4	5	6	7
1. Social Regard for learning	1						
2. Learning Environment	0.678**	1					
3. Diversity of Learners	0.564**	0.794**	1				
4. Curriculum	0.367*	0.417*	0446**	1			
5. Planning, Assessing and Reporting	0.366*	0.451**	0.392*	0.868**	1		
6. Community linkages	0.511**	0.568**	0.620**	0.673**	0.648**	1	
7. Personal growth and professional Development	0.458**	0.600**	0.534**	0.474**	0.506**	0.693**	1

Legend: Legend: Very High Correlation (VHC) 0.81-1.00; Highly Correlation (HC) 0.61-0.80; Moderate Correlation (MC) 0.41-0.60; Low Correlation (LC) 0.21-0.40; and 0.00-0.20 (SC).
**significant at $p<0.05$
*significant at $p<0.01$

As shown in the table all variables are inter-correlated from each other but differ in correlational verbal description. Thus, it shows that there is a significant relationship among the pedagogical competence of science pre-service teachers.

Social Regard for Learning. Table shows that social regard for learning has high correlation with the learning environment (r=0.678; p<0.01) and diversity of learners (r=0.654; p<0.01). This means that as the students' social regard for learning competence increases, students' competence in terms of learning environment domain and diversity of learners domain increases.

Learning Environment. As shown in the table, a high correlation of learning environment domain with social regard for learning (r=0.678; p<0.01) and diversity of learners (r=0.794; p<0.01) was recorded. It concludes that as students' competence in terms of learning environment domain increases, there will also be an increase in students' competence in terms of social regard for learning domain and diversity of learners domain.

Diversity of Learners. It was noted from the table 19 above that diversity of learners domain has a high correlation with the learning environment domain (r=0.794; p<0.01) and community linkages domain (r=0.620; p<0.01). This contends that as the students' competence in terms of diversity of learners domain increases, students' competence in learning environment and community linkages domain increases.

Curriculum. Visible correlation in students' competence in terms of curriculum domain to all domains, but a very high correlation of curriculum domain in planning, assessing and reporting has been noted (r=0.868; p<0.01). This interpretation leads to a fact that as the students' competence in curriculum domain increases, students' competence in planning, assessing and reporting domain increases as well.

Planning Assessing and Reporting. A very high correlation was shown in the table 9 in planning, assessing and reporting domain to curriculum domain (r=0.868; p<0.01). This extent of correlation means that as the students'

competence in planning, assessing and reporting domain increases, students' competence in curriculum increases.

Community linkages. As shown in the table 19, a high correlation of community linkages domain in diversity of learners (0.620; p<0.01), curriculum domain (r=0.673; p<001), planning, assessing and reporting domain (r=0.648; p<0.01) and personal growth and professional development (r=0.693; p<0.01). This means that as the students' competence in community linkages domain increases, students' competence in diversity of learners, curriculum domain, planning, assessing and reporting domain and personal growth and professional development increases.

Personal growth and Professional Development. A high correlation between personal and professional development domain and community linkages (r=0.693; p<0.01) was recorded. This means that as the students' competence in personal growth and professional development domain increases, students' competence in community linkages domain also increases

Conclusion

From the mentioned findings, the following conclusions are derived:

1. Based from the results and findings of the study, it shows that construction of learning plan was not easy among the pre-service teachers. Hence, it indicates the necessity of trainings and workshops among the future teachers.
2. It also shows from the findings of the study that further assistance in developing testing tools are very important to be inculcated among future teachers in assessing students acquired knowledge and knowing the areas that students need to be developed.

3. The respondents showcase little awareness in the process of providing reports to student's parents with regards on their academic status.
4. The respondents show low mastery in terms of grading system in accordance to Department of Education guidelines.
5. The respondent shows high competence skills in the usage of technological tools in performing learning assessment among students.
6. The pre-service teacher's knowledge in term of finding the areas that need development among students.
7. Enhancement program that will uplift respondents' skills in constructing accurate and reliable diagnostic test among respondents were shown based from the results and findings of the study.
8. Teachers' knowledge in determining adequate learning instructional plans in every learning situation must be given development.

Recommendations

In view of the findings and conclusions, the researcher offers the following recommendations:

1. Seminars and trainings should be implemented. The researcher proposes the training constructed based on the results and findings on the study which could help in enhancing science pre-service teachers' pedagogical competence if accepted by the College of Education Department.
2. The Planning, Assessing and Reporting domain should have great focus among the seven domains since it gathered the lowest weighted mean.
3. The constructed Training program is open for suggestions and constructive criticisms which can help to improve it.

Proposed Training Program
TRAINING PROGRAM FOR SCIENCE PRE-SERVICE TEACHERS

DOMAINS	Activities	Objectives	Persons Involved	Time Frame Duration	Output
Social Regard for Learning	**''The True Educator''** Conduct a personality development program to be led by a speaker.	To internalize what teacher should be, with or without the school premises.	Faculty members and Science Pre-service Teachers.	1 ½ hours	Pre-service teachers internalized what teacher should be, with or without the school premises.
Learning Environment	**''Conducive learning environment for Teacher''** Conduct a formation activity which will help Science Pre-service teachers gain ideas what learning environment should provide for conducive learning.	To provide guide to Science Pre-service Teachers an idea regarding conducive learning environment.	Faculty members and Science Pre-service Teachers.	11/2 hours	The Science Pre-service Teachers gathered an idea regarding conducive learning environment
Diversity of Learners	**''Education for All''** Conduct a formation program that addresses differences among students.	To emphasize students' differences which has impact in their learning.	Faculty members and Science Pre-service Teachers	1 ½ hours	Pre-service teachers gathered and idea Emphasize students' differences which has impact in their learning
Curriculum	**"Intensive teaching"** Conduct a workshop activity on how refresh or integrate the goals in academe.	To understand the linkage of learning objectives toward content of subject, strategies of teaching and assessment on learning outcomes.	Faculty members and Science Pre-service teachers.	1 ½ hours	Faculty members and Science Pre-service teachers acquired understanding in terms of learning objectives connections, learning content and learning assessment.

DOMAINS	Activities	Objectives	Persons Involved	Time Frame Duration	Output
Planning, Assessing, Reporting	**"How I rate my students"** Conduct a workshop activity that will tackle the things to b consider in evaluating students.	To understand the guidelines in evaluating a student.	Faculty members and Science Pre-service Teachers	2 hours	Faculty members and Science Pre-service Teachers understand the guidelines in evaluating a students.
Community Linkages	**"The students and the community"** Conduct a formation program that tackles about the impact of school into community.	To identify the learning attributes which can get within the community.	Faculty members and Science Pre-service teachers.	1 ½ hours	Faculty members and Science Pre-service teachers identified the learning attributes which can get within the community.
Personal Development and Professional Development	**"Push limits toward effective Teaching"** Conduct an informative speech to be led by a speaker that will inform the Science Pre-service Teachers on how they will grow continuously in the field of teaching.	To emphasize the ideal teacher giving value to continuous personal and professional development as a teacher.	Faculty members and Science Pre-service teachers.	1 ½ hours	Faculty members and Science Pre-service teachers emphasize the ideal teacher giving value to continuous personal and professional development as a teacher.

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