

Science Teacher's Qualities: The Basis for a Faculty Sustainability Program

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Science education is a vital element of a country's progress. Hence, teachers of Science should be equipped with the indispensable skills to be able to effectively contribute to the development of functionally-literate and scientifically-minded citizens. This descriptive survey research determines the Science teachers' qualities which served as baseline information in the crafting of a faculty sustainability program. A total of 22 junior high school Science teachers purposively chosen from various public secondary schools of Southern Zambales, Philippines served as respondents of the study. The results of the inquiry indicate that the teachers' professional knowledge, professional practice and professional attributes are very evident. The study found out that Science teachers are less active in conducting action research and sharing the results with their colleagues. The study recommends that teachers could be encouraged to conduct action research at least annually in order to solve science pedagogy problems which would improve the quality of Science teaching in the country. Moreover, research outputs may be disseminated via fora, research colloquia and/or learning action cell (LAC). The developed faculty sustainability program is hereby recommended for implementation and further validation.

Key words: *Faculty sustainability program, Science teaching, Science teachers' qualities, Zambales, Philippines.*



Introduction

Education is the most important investment of the world. It plays a fundamental role in the development of humanity, and also to society. Alsharari (2016) concludes that public education is seen as an essential ingredient of improving life's quality and economic growth in many countries all over the world.

Science education acts as a vital part of every ebullient nation because it helps all people to improve the worth of living in society, and it also becomes substantial in third world countries. Furthermore, Science education becomes a complex subject framed through the different fields such as biology, physics, chemistry, astronomy, and earth Science. New discoveries are being made every day that contribute to Science knowledge (Zuelke, 2008). Science instruction provides students with the opportunity to know more about living organisms, non-living matter, energy, space and events that occur in daily lives, to develop scientific attitudes such as humility, responsibility, curiosity, objectivity and intellectual honesty, to generalise and discover scientific principles (Alsharari, 2016). McCall and Conaway (2008) agrees that science education is a complex discipline because it incorporates knowledge from many other disciplines (Mathematics, the Social Sciences, History, and Language Arts) and because it is a discipline that is inherently relevant to society.

Teachers play an indispensable role in the successful realisation of every educational policy initiative, yet in most parts of the world they are poorly motivated and have low identity (Agezo, 2010; Cogneau, 2003; Lambert, 2004; Ololube, 2006; Rebores, 2001; Sargent & Hannum, 2005). Teaching is the greatest profession because teachers are not just teaching children but they have the willing hands to touch every student's heart. Teachers are not just teaching individuals how to count and read but teaching them how to live. Teachers let every individual seek the joy and excitement in learning. Every teacher dabbles in the heart of the young which inspires them to have hope in dreaming of having a lighter life in the near future and having knowledge of real life, in the real world. Rogayan (2018) emphasised that teaching may not be a profitable profession but teaching has been regarded as the noblest mission, vocation and profession which contributes mainly to the non-material satisfaction of individuals who are engaged in it. Moreover, teachers play an effervescent role in society, generally in the instructional environment. In consonance, the Ministry of Education (2013) state that teachers' roles in classrooms such as, builders of a warm environment, mentors and nurturers of students, being role models, and listening and looking for signs of trouble, are very significant in giving knowledge to learners.

Unfortunately, science education is facing a bigger challenge and difficulty that will affect the quality of education in the 21st century. There are many constraints facing Science education in the Philippines schools which include: (a) a shortage of qualified Science



teachers; (b) a lack of quality textbooks; (c) inadequate equipment; (d) large classes; and (e) a lack of support from administrators (UP-NISMED, 2011). However, hiring certified teachers in critical shortage subject areas such as mathematics and Science, and recruiting teachers for schools located in poor urban areas to teach mathematics or Science, is a difficult task (Zuelke, 2008). Furthermore, recruiting new Science teachers is a short-term solution to the teacher shortage because of the low new teacher retention rate, even the most developed countries like the USA are struggling with the low retention rate of new teachers (Achinstein, 2006).

The concern of teachers' competencies and credentials, which can guarantee and take the assurance of their effectiveness, has been the great dispute for not only the Science of pedagogy but also for those in charge of conscripting schools with proficient and experienced professionals. In regards in this issue, modern studies have revealed that the way in which a teacher carries out his work is determined by the union of his personality traits and acquired knowledge (Liakopoulou, 2011). Teachers' qualifications highlight that the attitudes, professional knowledge, professional practices, attributes and the degree that teachers hold are very important regarding the teaching-learning process.

UP-NISMED (2011) defines content knowledge as the disciplinary conceptual knowledge of the teacher. Teachers require professional knowledge, which involves all pedagogical aspects learned throughout his/her teaching and also having creative teaching approaches, teaching methods, strategies and techniques that will lead to the effective teaching of a Science subject (UP-NISMED, 2011).

The present study ascertained the different qualities of Science teachers in the 21st century learning environment. The study served as the basis in developing a faculty sustainability program which could enhance Science teachers' professional knowledge, professional practice and professional attribute. Specifically, the study sought answers to the following research questions: (1) what is the profile of Science teachers? (2) how can the qualities of Science teachers be described? and (3) is there a significant relationship among the qualities of Science teachers?

The results of the inquiry may help Science teachers to become aware of the most essential qualities which could contribute to the success of the instructional process. This paper will likewise help students to appreciate Science as a fun learning adventure as provided by an innovative and enthusiastic Science teacher.

Science Teacher's Qualities

Science teacher's qualities are the basic pedagogical requirements before teaching in the field; they affect learning within the classroom and influence future student learning (Sanders & Rivers, 1996). They also have the ability to: explain concepts, engage students, summarise major points, make the class interesting and relevant (McCall & Conaway, 2008), transfer the content area knowledge to students, develop student creativity, create a well-organised classroom by planning the lessons ahead and using different techniques to establish and maintain order in the classroom (Alsharari, 2016).

Science teacher's qualities have the capability to boost students' interest, motivate them to learn, and magistrate all students with a fair judgement, with the use of holistic or analytic rubrics in their activities and outputs. They use numerous teaching procedures to meet learner's learning objectives, and most importantly, apply constructivist philosophy where students are the centre of the instructional endeavor. Inspirational science teaching occurs when a teacher is not only enthusiastic about the science topic being taught, but also understands the topic fully in order to present it in a comprehensible and meaningful way to each learner (UP-NISMED, 2011).

Twenty-first century science education entails an educator possess professional qualities broken down into professional knowledge, professional practice and professional attributes, which will be framed to be effective in teaching. Science teachers' qualities become a hindrance not only in the teaching profession but also in the learning process where Wayne and Youngs (2003) argued that student achievement is deeply dependent upon the teachers' experience, capacity and preparedness. The study of Liakopoulou (2011) emphasised the qualifications which are considered essential by teaching professionals to be effective in pedagogical work are put together based on the results of a national survey carried out in Greece, to which secondary education teachers of all subjects contributed.

Alsharari (2016) pointed out that teachers who have the ability to establish a strong and healthy relationship with students, that are understanding of student needs, intellectual potential and interest, easy to meet or deal with, fair, honest, patient, supportive and caring, are considered affective qualities of effective teachers. Furthermore, another important sentimental quality of effective teachers is their ability to use student-centered teaching methods by shifting the focus of classroom activity from the teacher to the students (Alsharari, 2016), wherein it becomes a trend in 21st century learning environments.

Another related study was also conducted by Zuelke (2008) who argued that teacher effectiveness is the key to student achievement. The signs of teacher effectiveness, which is also referred to as teacher quality, have been described as the years of experience and the

subject matter qualifications. As national and state orders continue, the practice of high recompenses of testing and placing pressure upon schools to intensify the rate of student process and product based outputs, and also for high achievement, there have been few studies that have explored the relationship between attainment and teacher quality which are very essential and have a strong rapport.

As this study discusses the science teachers' qualities, a study conducted by McCall and Conaway (2008) also lies on the same vein. The research proved that there was an attempt to hear the student voice concerning secondary science teacher effectiveness and to share that voice with those who impact the educational process. The purpose of the study was to accumulate a list of effective qualities of a secondary junior science teacher as determined through a decisive and intentional sampling of university second semester Biology students and determine the role of the secondary science teacher in promoting interest and achievement in science, as well as the teacher's influence on a student's choice of a science career. The current study attempts to evaluate the Science teacher's effectiveness through self-evaluation concerning their professional knowledge, professional practice and professional attributes. The current study will also pilot self-evaluation on the junior high school Science teachers if their professional knowledge, professional attributes and professional practices are always observed. McCall & Conaway (2008) listed the following professional qualities of the secondary science teachers of their study which include: (a) commitment to inclusion and supporting accountability for at-risk students; (b) commitment to and protection of student learning; (c) ability to translate theory and research into; (d) coping with bureaucracy; (e) creating student ownership; (f) engaging parents and caregivers as partners in student learning and community outreach; (g) not identifying themselves as saviors but focusing on students in spite of the system; (h) working with colleagues and not in isolation (collaborative skills); and (i) understanding the imperative of student success, sharing the organisation's goals, attending to student's learning styles and differentiating instruction.

Stewart (2010) highlighted teacher education knowledge, skills, and dispositions that have recently become a well-discussed topic among education scholars around the nation, mainly due to its attention by the National Council for Accreditation of Teacher Education (NCATE) over the past few years. Accrediting agencies, have sought to improve the quality of teacher education programs by examining knowledge, skills, and dispositions as factors in preparing highly-qualified teachers. The study of knowledge, skills, and dispositions is crucial to nurturing effective teaching within the classroom. One study about measuring teachers' qualities was conducted by Fike, Fike and Zhang (2015). This study characterised the psychometric properties of an instrument, named T-Q, developed to measure perceptions of teacher qualities most valued by students in the university setting. The validated instrument will be of interest to faculty who wish to better understand students' perspectives regarding

ideal qualities of the faculty. The use of the instrument may help to more broadly inform faculty and educational researchers regarding approaches to instruction and pedagogy.

As a synopsis, the study of Liakopoulou (2011) and McCall and Conaway (2008) are very similar to the present study. McCall and Conaway (2008) focused on the effectiveness of science teachers to promote interest and achievement in science, as well as the teacher's influence on a student's choice of a science career. While Liakopoulou (2011) revealed that the qualifications are considered essential by teaching professionals to be effective in pedagogical and didactic work. The present study will explore three aspects of science teachers' qualities which include professional knowledge, professional attributes, and professional practice.

The studies of Alsharari (2016) and Stewart (2010), are also similar which keened the qualities of science teachers. Alsharari (2016) aligned the qualities which science teachers should have, including: the ability to establish a strong and healthy relationship with students, understanding student needs, intellectual potential and interest, easy to meet or deal with, fair, honest, patient, supportive and caring. Stewart (2010) concluded that knowledge, skills, and dispositions are crucial for nurturing effective teaching within the classroom which turns into a hall way to improve the quality of teacher education programs.

In the study by Fike et al. (2015), they developed a measuring tool for teachers' qualities. Meanwhile the study by Wayne and Youngs (2003) and Zuelke (2008) both agreed that teacher effectiveness lifting its professional qualities are the key to student achievement thus learners will benefit upon the teachers' experience, capacity and preparedness. The effectiveness of science teachers stems mainly from their confidence of the subject matter, how to teach it, and their endeavor in developing science instruction (UP-NISMED, 2011). Atilla (2007) contended that having science teachers who know their content helps promote scientific literacy and foster an understanding and appreciation of science among students of all ages. Science teacher's qualities lead to science instruction toward success, a fun learning journey and an interesting sanctuary which are categorised into three fundamental qualities as professional knowledge. professional practice and professional attributes.

Framework of the Study

This study was based on Human Capital Theory and Social Learning Theory. Human Capital Theory was popularised by Gary Becker, an economist from the University of Chicago, and Jacob Mincer that refers to the stock of knowledge, habits, social and personality attributes including creativity, embodied in the ability to perform labor so as to produce economic value. Alternatively, human capital; is a collection of traits – all the knowledge, talents, skills,

abilities, experience, intelligence, training, judgement and wisdom possessed individually and collectively by individuals (“Human Capital Theory”, n.d.).

Basic components of the human capital theory provide the foundation for the conceptual framework explaining a person’s desire to pursue and continue in or leave the teaching profession (Hollas, 2011). Specifically, this theory focuses on the associations within training and education, establishment, and the task of finding a new position in relation to returns and investments (Baptiste, 2001; Sweetland, 1996). A major principle of human capital theory states that the more skills and knowledge one acquires, the lower one’s likelihood to leave that occupation (Ehrenberg & Smith, 2003). Decisions related to turnover are primarily directed by the beginning requirements (e.g., licensing) and prospective benefits of a potential job change such as a higher salary, improved working conditions, and job satisfaction (Baptiste, 2001). If the current benefit related to turnover exceeds the costs, the decision to change jobs is much more likely. The benefit of turnover will be greater with the following characteristics: (a) greater benefits from the new job; (b) lesser job satisfaction from the current job; and (c) low instant costs associated with the change (Sweetland, 1996).

The present investigation determined the qualities of a Science teacher as to professional knowledge, professional practice, and professional attributes in the Philippines context (Figure 1).

Figure 1. Paradigm of the study.

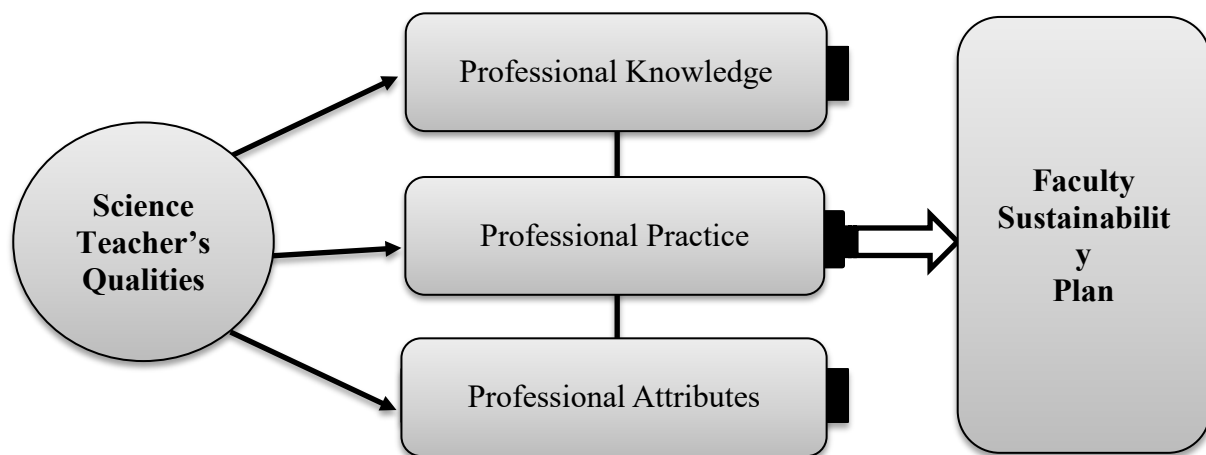


Figure 1 shows the paradigm of the study which shows the relationships of the main variables. Science teachers’ qualities are categorised into three sub aspects include professional knowledge, professional practice, and professional attribute. The professional knowledge is a level of confidence in teaching science, explore participants’ confidence in and about aspects of teaching competencies and content knowledge related to teaching. The

professional practice outlines the teachers' achievement for quality learning objective of science education. Meanwhile, the professional attributes are those characteristics that enable teachers to embrace change to develop and improve teaching practice as well as sustain professional growth. After gathering the data from the teacher-respondents, the researcher ensued to the establishment of the developed program for endorsement to the officials concerned.

Methodology

Research Design

The descriptive survey research design was used in the study with the use of a survey questionnaire. The study described the qualities of Science teachers which include their professional knowledge, professional practice, and professional attributes. A descriptive survey study was defined as a research method which concerns itself with the present phenomena in terms of conditions, practices beliefs, processes, relationships or trends invariably (Salaria, 2012).

Respondents

The respondents of this study were 22 Science teachers from national high schools in Southern Zambales, Philippines. The sampling technique used in the study was comprehensive sampling or the universal sampling method. The respondents should meet the following selection criteria: (1) science teacher for at least 1 year; (2) handling at least 2 science subjects; (3) teaching in a public school; and (4) specialise in science.

Instrument

The Likert scale-type survey questionnaire served as the main instrument in collecting the data. The survey questionnaire is composed of four parts and has a total of 91 items. The first part consisted of the demographic profile of the respondents, that is, the profile of the teachers. The second part assessed the Science teachers' professional knowledge, the third part contained the Science teachers' professional practice and the fourth part comprised of the Science teachers' professional knowledge. The concepts were taken from the Framework for Philippine Science Teacher Education UP-NISMED (2011). The survey questionnaire has been subjected to construct and content validity. Four experts were tapped to check the consistency of the items in each variable. The validators include one assessment expert and three Science experts. There were 10 respondents who participated in the pilot testing of the tool. They are not part of the study and were identified from select schools in the Schools Division of Zambales, Department of Education, Philippines.

Data Gathering Procedure

Prior to the data collection, the researchers developed and validated the research questionnaire. Afterwards, the researchers secured the necessary permission and approval from the school principals of the selected school through the endorsement letter from the College of Education, Arts & Sciences (CEAS) of the President Ramon Magsaysay State University (PRMSU) – San Marcelino Campus. After securing the approval, the administration of the survey tools followed. The survey questionnaires were given to the 22 Science teachers. The retrieval of the questionnaires lasted for about two weeks.

Results and Discussion

Profile of the Science teachers

Table 1 shows the demographic profile of the Science teachers.

Table 1: Demographic Profile of the Science Teachers

Profile	Frequency	Percent
<i>Age</i>		
51 - 55	1	4.55
46 - 50	2	9.09
41 - 45	1	4.55
36 - 40	7	31.81
31 - 35	5	22.73
26 - 30	2	9.09
25 & below	4	18.18
<i>Sex</i>		
Male	6	27.27
Female	16	72.73
<i>Teaching Position</i>		
Teacher I	12	54.55
Teacher II	5	22.73
Teacher III	1	4.55
Master Teacher I	2	9.09
Master Teacher II	2	9.09
<i>Length of Teaching Experience</i>		
31 to 35 years	1	4.55
21 to 25 years	1	4.55
16 to 20 years	1	4.55
11 to 15 years	5	22.73
5 to 10 years	7	31.82
Below 5 years	7	31.82
<i>Highest Educational Attainment</i>		
MA/MS holder	5	23.81

BS/AB with master's units	13	61.90
BS/AB holder	3	14.29
Grade Level Handled		
Grade 7	8	20.51
Grade 8	13	33.33
Grade 9	10	25.64
Grade 10	8	20.51
Specialization		
Biological Science	8	36.36
Physical Science (Physics)	4	18.18
Physical Science (Chemistry)	1	4.55
General Science	9	40.91

As shown in table 1, most (7 or 31.81%) of the Science teachers are aged 36 to 40 years old and some (5 or 22.73%) are aged 31 to 35. Only 1 (4.55%) is aged 41 to 45 and 51 to 55. This implies that most of the Science teachers are in their middle age. Hence, teachers have already gained experience in dealing with the different aspects of science instruction. There are more females (16 or 72.73%) compared to males (6 or 27.27%). This corroborates the findings of previous studies that the teaching profession is dominated by females. In terms of teaching position, majority of the Science teachers are Teacher I (12 or 54.55%) and some are Teacher II (5 or 22.73%). This connotes that the majority of the teachers are in the proficient teachers of the career stage of the Philippine Professional Standards for Teachers (PPST).

The majority of the teacher-respondents are serving for below 5 years (7 or 31.82%) and 5 to 10 years (7 or 31.82%). This imply that majority of the science teachers are still new in the teaching career. Majority of the teachers held college diploma with master units (13 or 61.90%) which may suggest that majority are pursuing advanced degrees. In terms of grade level handled, majority of the teachers handles eighth grade (13 or 33.33%), followed by ninth grade (10 or 25.64%), tenth grade (8 or 20.51%) and seventh grade (8 or 20.51%).

In terms of specialisation, the teachers were distributed in terms of specialist in General Science major (9 or 40.91%), Biological Science (8 or 36.36%), Physical Science - Physics (4 or 18.18%), and Physical Science - Chemistry (1 or 4.55%). This suggest that majority of the teachers in science have specialised in general science and biological science.

Science Teachers' Qualities

As shown in Table 2, the teacher's qualities are "always" exhibited by the Science teachers as shown in the overall weighted mean of 3.64 (SD=0.49).

The teachers “always” exhibit professional knowledge (M= 3.66; SD=0.46). Specifically, they “always” manifest the knowledge of Science content (M=3.61, SD=0.49), knowledge of general pedagogy (M=3.64, SD=0.49), pedagogical content knowledge (M=3.71, SD=0.45), and knowledge of the curriculum structure and materials (M=3.68, SD=0.45). This suggests that the Science teachers have high level of confidence in teaching science, exploring participants’ confidence in and about aspects of teaching competencies and content knowledge related to teaching. Teachers employ multitude of strategies to engage students in the classroom activities and foster critical thinking which can ignite their interest in the lesson (Rogayan & Bautista, 2019).

Table 2: Science Teacher’s Qualities

Science Teacher’s Qualities	Mean	SD	QI
<i>A. Professional Knowledge</i>			
1. Knowledge of Science content	3.61	0.49	A
2. Knowledge of general pedagogy	3.64	0.49	A
3. Pedagogical content knowledge	3.71	0.45	A
4. Knowledge of the curriculum structure and materials	3.68	0.45	A
Weighted Mean	3.66	0.46	A
<i>B. Professional Practice</i>			
1. Designs sound Science teaching and learning experiences	3.66	0.50	A
2. Creates and maintains a safe learning environment	3.67	0.49	A
3. Engages students in scientific investigations	3.60	0.50	A
4. Finds and implements students’ understanding	3.64	0.47	A
5. Builds students’ confidence and capacity	3.63	0.52	A
6. Uses a wide variety of strategies	3.67	0.48	A
Weighted Mean	3.65	0.49	A
<i>C. Professional Attribute</i>			
1. Analyses, evaluates, and refines teaching practices	3.70	0.46	A
2. Works with other teachers	3.51	0.60	A
Weighted Mean	3.61	0.53	A
Overall	3.64	0.49	A

Legend: 3.50 - 4.00 Always (A); 2.50-3.49 Sometimes (SO); 1.50-2.49 Seldom (SE); 1.00-1.49 Never (N)

In terms of professional practice, the Science teachers “always” manifest this quality (M= 3.65; SD=0.49). Specifically, the teachers “always” practice the following: design sound Science teaching and learning experiences (M=3.66; SD=0.50), create and maintain safe learning environment (M=3.67; SD=0.49); engage students in scientific investigations (M=3.60; SD=0.50); find and implement students’ understanding (M=3.64; SD=0.47); build students’ confidence and capacity (M=3.63; SD=0.52), and use a wide variety of strategies

($M=3.67$; $SD=0.48$). This may imply that the Science teachers are proficient in outlining their achievement for quality learning objective of science education. Schools, through the teachers, should serve as the learning habitats of the students that mold them to be ambassadors of the environment (Rogayan, & Nebrida, 2019), innovators, catalysts of change, and technologists.

Science teachers “always” exhibit professional attributes ($M=3.61$; $SD=0.53$). They “always” manifest analysing, evaluating, and refining teaching practices ($M=3.70$; $SD=0.46$) and working with other teachers ($M=3.51$; $SD=0.60$). This connotes that the teachers embrace change to develop and improve teaching practice as well as sustain professional growth.

On the other hand, Science teachers “sometimes” conduct their own research which can solve challenges encountered in Science teaching. This may suggest that teachers must be given capacity training to enhance their proficiency in conducting classroom-based action research (CBAR).

Relationship among the Qualities of Science Teachers

There is a statistically significant positive correlation among the qualities of Science teachers. Inter-correlations revealed that there is a significant relationship between Science teaching and learning experiences ($r=0.981$; $p<0.05$); curriculum structure and safe learning ($r=0.973$; $p<0.05$); curriculum structure and scientific investigations ($r=0.732$; $p<0.05$); curriculum structure and finds and students’ understanding ($r=0.983$; $p<0.05$); curriculum structure and students’ confidence ($r=0.943$; $p<0.05$); curriculum structure and strategies ($r=0.967$; $p<0.05$); curriculum structure and teaching practices ($r=0.981$; $p<0.05$); curriculum structure and works with other teachers ($r=0.949$; $p<0.05$).

Furthermore, significant positive relationship between have been noted between Science teaching, and safe learning environment ($r=0.982$; $p<0.05$); sound Science teaching and students’ understanding ($r=0.988$; $p<0.05$); and, Science teaching and teaching practices ($r=0.977$; $p<0.05$). In terms of safe learning, and works with other teachers ($r=0.956$; $p<0.05$); students’ understanding, and students’ confidence ($r=0.975$; $p<0.05$); students’ understanding, and teaching practices), ($r=0.980$; $p<0.05$); students’ understanding, and students’ confidence ($r=0.975$; $p<0.05$); students’ understanding, and teaching practices), ($r=0.980$; $p<0.05$); students’ confidence and teaching practices ($r=0.937$; $p<0.05$); students’ confidence, and works with other teachers ($r=0.939$; $p<0.05$); strategies and works with other teachers ($r=0.917$; $p<0.05$); and strategies, and teaching practices ($r=0.961$; $p<0.05$).

These findings corroborate the study that the pedagogical content knowledge must not be ignored in the teaching profession, pedagogical content knowledge was the determiner of

teaching practice and was the central to teachers' curriculum decision making at classroom (Jones, & Moreland, 2015).

Proposed Faculty Sustainability Program

The proposed faculty sustainability program is shown in Table 3. The program is crafted based from the results of the survey. Contextualisation and localisation of the program may be done based on the needs of the teachers in the different schools. Further validation of the program may be conducted to ensure its applicability, usefulness and congruence to the needs and interest of the faculty of science.

Table 3: Proposed Faculty Sustainability Program

Activities	Objectives	Persons involved	Duration	Output
Science Teacher's Symposium: Who am I?	To identify the different qualities of a Science teacher in the 21 st century learning landscape.	Preservice Science Teachers, Science Head Teachers, Science Teachers Principals	2 Days	Reflective Journal
Classroom-based Action Research (CBAR) Seminar	To write a CBAR proposal containing the basic rudiments research.	Preservice Science Teachers, Science Head Teachers, Science Teachers Principals	3 Days	Research Proposal
School-based Research Colloquium	To disseminate results of completed and on-going researches.	Pre-Service Science Teachers, Science Head Teachers, Science Teachers Principals Research Pannelists.	2 Days	Research manuscript

Teaching the teachers; A Content and pedagogy seminar	To demonstrate content and pedagogy knowledge in science through the use of innovative pedagogy approaches.	Science Head Teachers	3 Days	Documentation of innovative pedagogical approaches in science
Periodic Teachers' Evaluation	To assess the science teachers' qualities by students, peer and supervisor..	Students Science Teachers Head Teachers and School head	Quarterly	Evaluation Sheet
Science Teacher's Formation and Team Building	To build a strong sense of camaraderie and unity among science teachers and revisit their professional and personal potentials.	Science Teachers, Head Teachers and Principals	3 days	Reflective Journal

The proposed faculty sustainability plan generally aims to sustain the qualities which are already exhibited by the Science teachers. The plan targets the teachers' competencies in doing classroom-based action research (CBAR), knowing oneself, teachers' pedagogy and empowering teachers by developing them personally and professionally.

Conclusion

The study determined the qualities of science teachers based on the three domains: professional knowledge, professional practice and professional attributes. Based from the data gathered, the study concludes that a typical Science teacher in the Philippines is a female, aged 36-40, Teacher I, serving 1 to 10 years and a degree holder with master's units, handling Grade 8, and specialised in General Science. The Science teachers always exhibit qualities in terms of professional knowledge, professional practice and professional attributes. Based from the specific indicators, the Science teachers sometimes practice conducting their own research and share the results to other Science teachers. Furthermore, the study found out that there is a significant positive high relationship among Science teacher's qualities.



The study recommends that the teachers could be encouraged to conduct action research at least annually in order to solve science pedagogy problems towards improving the quality of Science teaching in the country. Moreover, research outputs may be disseminated via fora, research colloquia and/or learning action cell (LAC). The developed faculty sustainability program is hereby recommending implementation and further validation. The schools in the Department of Education (DepEd) could also revisit its faculty sustainability plan for the continuous improvement of the faculty. Further, higher education institutions (HEIs) may further craft policies in enhancing the offering of Bachelor of Secondary Education (BSEd) major in General Sciences to keep abreast with today's 21st century Science education which is parallel and suitable in the K to 12 curricula. The results of the study could be further validated by involving larger populations and by including other localities. The results of the investigation could be translated through an infographic to be shared with the DepEd and school administrators to address the least observed skills among the Science teachers.

Since the study is purely quantitative, future studies may utilise a qualitative approach to further validate the science teachers' qualities. Further studies may also be conducted to validate the results of this study and to explore other variables regarding science teachers' qualities.

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