

# Teaching Outside Science Specialism: Plight of Public-School Science Major Teachers in Montevista District

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**Abstract:** *The intent of this study was to describe the experiences, coping mechanisms and insights of the public school science teachers who encountered problems and challenges in teaching subjects outside from their field of specialization which answered the three fundamental research questions on what are the experiences of science teachers teaching subjects which is outside from their field of specialization, how do science teachers cope with their challenges, and insights of science teachers. The study utilized the qualitative phenomenological design with two data collection techniques, the in-depth interview and focus group discussion. There were 14 participants in this study who were science teachers from secondary schools in Montevista district. Triangulation was addressed through gathering of data from more than one source to gain a fuller perspective of the study. Essential themes were generated on the experiences of teachers, coping mechanisms and insights of science teachers. Previous endeavor cited mainly on the problems that the teacher encountered from teaching beyond the science specialism like Biology in major teaching and preparing lesson in the field of Physics and other science related areas. However, I have not come across various studies that deal with the challenges or problems of the science teachers teaching outside their science specialization.*

**Keywords:** Teaching science, Plight, Outside Science Specialism, Philippines

## 1. Introduction

The phenomenon of teaching outside specialism teachers assigned to teach subjects for which they have inadequate training and qualifications is a crucial, but long unrecognized problem in schools. It is a crucial issue because highly qualified teachers, may actually become highly unqualified if they are assigned to teach subjects for which they have little training or education. However, until recently there has been little recognition of this problem a situation at least partly due to an absence of accurate and comprehensive data [2].

Transformation in education ensures progressive development and avoids stagnation. Educational transformation to provide quality and equity in education requires suitably trained teachers assigned to appropriate grade levels and subjects. However, transformation in education may create new needs in schools which result in teachers are mis assigned to teach subjects for which they are not technically prepared to teach. When there is a shortage of certain teachers it is typical to replace those teachers with out-of-field teachers. The widespread occurrence of this phenomenon draws attention to its implications for quality education. Research consistently shows that there is a positive relationship between teacher academic proficiency and learner achievement.

In addition, teaching outside field subjects has been a large problem in the USA, especially in math and music. [18] stated during the school year of 2002 and 2003, only two Missouri K-12 school districts had no courses taught by inappropriately qualified teachers. [14] also refers to unacceptably high rates of out-of-field teaching in the state Georgia 37 to 40 percent of teachers teaching math had no

suitable qualifications, 27 percent of science teachers and 22 percent of English teacher are assigned without proper qualification. The out-of-field teachers unfortunately ‘skyrocketed’ in high-poverty and high-minority schools. As a result of this these students receive poor teaching in all subjects which tends to widen the achievement gap [14].

In the Philippines, teaching outside area of expertise offers considerable challenges and teachers express concern when dealing this situation. Teachers’ lack of confidence when teaching topics outside their area of expertise is manifested in different ways such as when preparing lesson plans, choosing or devising activities and analogies to aid students’ learning, answering students’ questions, setting up suitable activities, linking and applying various concepts and principles to everyday life situations, generating students’ interest and passion for the assigned area. These problems are most experienced in public schools, most especially when public school can’t find a teacher suited in that subject area like for example when Science teacher is assigned by the principal to teach Filipino subject in this case the teacher has a big challenge to adjust or to cope up with the new subject that he/she will teach [10].

## 2. Research Question

The main concept of this study was to unveil and document the different problems of science teachers teaching other subjects aside from their field of specialization in Montevista National High School – main campus, Montevista, Compostela Valley Province. Each of which is subdivided into more specific questions to guide the data collection process and analysis. Therefore, important questions that are tackled are as follows:

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- a) What are the experiences of science teachers teaching subjects which is outside from their field of specialization?
- b) How do science teachers cope with their challenges teaching subjects which is outside their field of specialization?
- c) What are the insights of science teachers who encountered problems in teaching subjects which is outside their field of specialization?

### 3. Objectives of the Study

Generally, same as the other research study output, this study hopes also to provide information for better understanding on the different problems of the science teachers teaching other subjects which is outside from their field of specialization by obtaining a complete documentation on their experiences in teaching from the day of their service until now and by gaining more insights into their sources of strength, versatility, techniques, and mechanisms which through all of these, we can better assist individuals or co-teachers in educational present situations.

The findings of this study will give a transparent background information to the Department of Education (DepED) in its implementation on the appropriate programs particularly in subject's/load assignment of teachers leading to more competitive agency in the Philippines in fighting the economic culprits through quality education as to have the same as from the other countries. This is also beneficial to the School heads and to its subordinates which are the teachers, in assessing the real situation of some teachers encountering various problems in order to cope up with plans and programs in selecting, determining, and assigning disciplines suited to the teachers dealing with the programs titling to more competitive students forming valuable citizens of the world. This is also serving as the bridge of the teachers encountering such problems to be heard and understood instead of hiding and blaming others. Their story will serve as an inspiration to other teachers.

### 4. Materials and Methods

The study will be utilizing the qualitative phenomenological design. The investigation involves 14 science teachers who encounter problems in teaching field handling subject outside from science specialization. The design of this study is qualitative and one of the approaches of this qualitative research study is the phenomenological study, an inquiry that describes the meaning for several individuals of their lived experiences of a concept or a phenomenon. Its primary purpose is to reduce individual experiences with a phenomenon to a description of the universal essence and develops a composite description of the essence of the experience [4].

In addition, it is a study of phenomena, their nature, and meanings on the way things appear through experience or consciousness to provide a plenty textured description of lived experiences. Also, phenomenology defined as a discipline that aims to focus on individual perceptions of the

world setting in which they live in and what it means to them and the way in which meaning arises in experience.

Moreover, phenomenology provides meaningful and useful design among business, educational, and social sciences research for it shows an authentic manner of representing the realities that participants experience in their lives. Since the main aspect of phenomenology is to understand the essence of the experience that participants share within a common ground. It is important to understand that participants will bring out subjective and objective experiences. The emphasis while analyzing the data is on the essence (or common experiences) and on the significance of the experiences that is why phenomenology research can be considered directive as its sampling method is purposive. However, it is important to comprehend that all qualitative research has a phenomenological aspect to it [6].

### 5. Research Participants

Informants and participants of this study were the science teachers of Montevista National High School who encounter problems and challenges teaching subjects which is outside from their field of specialization. Purposeful sampling is a technique widely used in qualitative research for the identification and selection of information rich cases for the most effective use of limited resources [17]. This involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest [13].

Participants were screened based on the following criteria listed below:

- a) Public school science teachers teaching non-science subjects;
- b) Teaching 1 to 3 years in Montevista National High School- main;
- c) Has already experience challenges in dealing with the subject or even handling the subject which is outside from their field of expertise, but are able in finding ways to cope up the problems successfully;
- d) can share relevant and significant ideas the said problems about teaching outside science specialism;
- e) and willing to participate in the study data collection

First, through employing the purposive sampling technique, qualified participants were identified. By that, they were requested and asked to fix their signature to the prescribed consent as sign of their voluntary commitment as to the condition stipulated in providing and sharing their knowledge as needed in the study. Then, through the School Principal, researcher sent letter of invitations to the participants to come and meet at designated areas for an interview and allow them read the purpose of the said interviews in conducting the study that their testimonies served as bridge or voice to all public secondary science teachers who were actually encountering challenges and problems handling with the subjects which is outside from their field of specialization. By that, the teacher became motivated that their experiences, coping strategies in dealing the problems and their insights served as an additional basis

for the government agencies and advocates to come up with a program that will address the problems that the public secondary science teachers encountered.

Second, for the reason of their confidentiality, the participants were hereby asked to give their own name title or pseudonyms and they were given sincere assurance that all of their testimonies on about the said circumstances be held as private. In-depth interview was scheduled within 30 minutes per informants and while in the focus group discussion it will probably fall on one (1) to three (3) hours. Researcher utilized interview guide questions which focuses on the participant's experiences, techniques and strategies to overcome the problems, and insights for deciding to continue the teaching practices dealing specialized subjects or discontinue the common practices happens mostly in big schools.

Third, in this study, during the conduct of the interview researcher make sure that the information shared by the participants both the in-depth and focus group discussion was noted down and their preferable speech responses was recorded to any audio devices. Consequently, the same question was be asked from the different participants so that researcher could solicit information towards data saturation in response to the problem. In-depth interviews, participants were situated in front of the researcher upon discussing and recording the information. While in the focus group discussion, participants were situated in round shape structure of any entity where uniform questions were utilized to acquire possible answers of the said problems.

Finally, after asking question from the informants and participants, the task of the researcher was to transcribe and organize the data gathered into standards. Then, have the data analyst analyze the data presented for the researcher to proceed to the next step in the conduct of the study. The use of the creative method of collecting data was the most suggested ways in enhancing and facilitating engagement among the research participants and it is important that such approach or methods provides a means to answer the corresponding questions in response to the presented problems which are coherent with the methodological approach and underpinned by an appropriate method of data analysis.

## 6. Data Analysis

After collecting and organizing data, it was analyzed and evaluated by the person in authority for the purpose of having data accuracy and validity whether it is real which is coming from the source or coming from anyone which unknown and imagine. Data analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. Also, a process of obtaining raw data and changing it into useful information that will serves as basis in decision making during the presentation of the data, answering the questions, and in accepting and disproving the given and presented theories. Moreover, the response of the participants was analyzed through the use of thematic

analysis. Thematic analysis can be used to make sense of seemingly unrelated material. With this method, it very helpful because it is flexible and more significant tool in analyzing data that can probably provide for a substantial group of data. It can be used to analyze qualitative information and to systematically gain knowledge and empathy about a person, an interaction, a group, a situation, an organization or a culture.

## 7. Ethical Consideration

In this research endeavor, the researcher was asked to provide some important documents such as informed and voluntary consent and was submitted to the authority to formally ask permission to study the problems and challenges encounter by the public school science teacher teaching other subjects outside from their science specialism in Montevista, National High School – Main Campus, Montevista, Compostela Valley Province. Therefore, researcher had ensured their individual safety, cover their individual identity, and provide them full support for the purpose of rendering their thorough trust and confidence in helping this research study and this can be established through following ethical standards in the conduct of the study such confidentiality of information, respect for persons, beneficence, justice, and consent.

Anonymity of research participants and confidentiality of information, researcher assured that the information, testimonies, details given from the participants held private. They were provided any documents that support to any statement of agreement not to upload or download their audio recorded explanations. They were asked to provide pseudonyms for the purpose of covering their individual identities and handed them with the assurance that their names will not appear in the research. Anonymity and confidentiality of participants aiming to assure participants that every effort was done to ensure that the data they were provided cannot be traced back to them in reports, presentation and other forms of dissemination [5]. Another research standard that the qualitative research must possess was the beneficence or no harm to the said participants. In this research, researcher prioritized the participant's safety by providing and closely monitoring them from their individual settings to the venue of the conduct of interview. Last research standard needs to be address in this qualitative research was the Justice. In this phase, giving due credit on what the participants contribute were expected in this particular study as to corresponds to their heartfelt effort in building and crafting the study towards success. As a sign of acknowledging their contributions, a token and certificate of participation was given to each participant to fully recognized their full force effort in the conduct of the said study. A part from recognizing their sincere contributions, participants were given assurance on the usefulness of their testimonies as an inspiration to those public-school science major teachers who encounters challenges in teaching other subjects which is outside from their science specialism.

## 8. Results and Discussion

The conduct of the study generated massive percentage of data that was very essential on this endeavour. The information was gathered from the two techniques such as in – depth interview and focus group discussion that were captured/recorded through the use of tape and cellular phone. The responses of the informants were transcribed and carefully analyzed through the process of categorization of data or through emerging themes. The gathered data was used to determine the experiences of secondary public-school science teachers teaching subjects outside from their field of specialization, their coping mechanisms as well as their insights. Consequently, this chapter was divided into four parts. The first part was all about the data of the participants from which the qualitative data were collected. The second part discussed the data analysis procedures and the steps in the classifications of the emerging themes collected from in-depth interviews and focus group discussion of the participants. The third part dealt with the answers to the in-depth interviews and the focus group discussion questions under each research problem. Lastly, was part four which includes the outline response from the different informants and the summary of participants’ findings.

**Table 1:** Experiences of Teachers Who are Teaching subjects outside from their Field of Specialization

Essential Themes	Core Ideas
Challenges in lesson preparation	<ul style="list-style-type: none"> <li>• It needs a lot of preparation and adds your time to do lesson plan. We can't say you are an effective teacher because you teach a lot of students but you didn't master the concepts upon the delivery of the lesson.</li> <li>• It affects my preparations in terms of time management and effort it's because you need more time and effort. You need to study again in preparing lesson plan, suitable activities, and motivation.</li> <li>• This affects me mentally, since you have difficulty in lesson preparations much more in detailing lessons plans for example in the content, you have hard time in understanding the content or comprehension.</li> </ul>
Challenges in the Mastery of the lesson	<ul style="list-style-type: none"> <li>• I needed confidence because I felt incompetent in teaching that subject. I am not expert on that subject and then you have nothing to impart.</li> <li>• Somehow your efforts are useless because you want to teach for your students to learn something from you but you cannot give because you, yourself is not knowledgeable in that particular subject.</li> </ul>

**Challenges in lesson preparation**

Too much lesson preparation adds burden in the part of the teachers. Because these educators instructing outside their specialized topic confronted significant difficulties in lesson readiness and during the time spent instructing. Most importantly, these instructors required to comprehend the structure and nature of the discipline and learn new substance information, which was known as subject matter knowledge. Furthermore, the competency to adjust to the diverse students' capacities has turned into a need with a specific end goal to change the substance information into reasonable exercises, analogies, exhibits or re-enactments

that would address diversity of learning styles existing in the field [19].

**Challenges in the Mastery of the Lesson**

The experience as described by my participants was the stage when they were not confident to deal with the lesson. It makes themselves doubtful on sharing the information and ideas because they are not mastered with the lesson. Also, along the duration of the discussion they were hesitant to answer the questions from the students because they don't know the content of the subject. Moreover, educating outside of field could bring about poor teaching practices and uneven and biased arrangement of educator assets. It was contended that examination into this marvel prompted a superior comprehension of the effect of the out-of-field wonder on quality instruction. Also, it gives a superior comprehension of the effect of out-of-field positions on the certainty of educators. A poor level of certainty was basic among such educators and further influences their viability as instructors [11].

**Table 2:** Coping Mechanisms of Teachers Teaching subjects outside from their Field of Specialization

Essential Themes	Core Ideas
Time Management	<ul style="list-style-type: none"> <li>• Time management and exerting effort. Although you need to give yourself some time to rest so that you can overcome stress and it will be easy for you to cope up on the problems that you've faced.</li> <li>• In preparations, you will have to make time management and of course you have to set priorities so that you will not put yourself in difficult situations. In making your subject effective or teaching effective of course you will have to think outside the box and use other strategies that will make students engage in the lessons.</li> <li>• First is time management in the sense that you don't take breaks because you are full so instead of eating you scan books, and there are times that you eat lunch with open books in front while reading</li> </ul>
Doing advance study and research	<ul style="list-style-type: none"> <li>• I find time to study, and then I need to master it though I need to extend extra time to come up with the challenges especially the subject which is not my field of specialization.</li> <li>• Means and ways to be still effective in handling subject which is not my major just like doing lots of research and in the discussion, I add some jokes for them the students to become more participative.</li> </ul>

**doing advance study and research**

In this endeavor, participants reported that in order to cope with those challenges and problems encountered from teaching subjects outside from the science specialization, doing more advance research and study on the subject handled could extend a big help in dealing the problems they have experienced in the current setting, as manifested in their responses.

**Table 3:** Insights of science teachers teaching subjects outside from their field of specialization

Essential themes	Core ideas

Alignment should be considered	<ul style="list-style-type: none"> <li>• They should give subjects to the teachers in line with the specialization. They should give to the teachers who are knowledgeable enough or expert in handling this kind of subject.</li> <li>• The school authority will make subject alignment of the teacher teaching in their field of specialization. So that, the teacher becomes effective and efficient in their field of teaching.</li> <li>• Should hire teachers who are in line with their specialization. They also need to have a control on the number of teachers in a specific field of specialization.</li> </ul>
Plan should be undertaken by the authority	<ul style="list-style-type: none"> <li>• The best plan to avoid teachers in mismatching is that the authority should hire teachers who are really a need in that subject area. They should not hire teachers who are there though they are really qualified; however, they are not the need of the school.</li> <li>• The authority will determine the specialization of the teacher to put them in their right place in their field of mastery so that the knowledge and information gained by the students will increase if the subject being taught is their field.</li> </ul>

### Alignment should be considered

A recent working paper from the National Bureau of Economic Research (NBER) explores whether the deliberate assignment of teachers' subjects like science, math, social studies, or reading will improve productivity in schools. As proposed by the proponents of specialization, sorting teachers by areas of strength will allow mastering the subject content. Hence, spending more time on lesson planning and may even increase the retention rates of teachers<sup>[12]</sup>.

In addition, while single-subject teaching is norm in middle and high school, early specialization might help ease the transition into these levels. Others caution that whilst specialized instructors teach less content, they teach it to a larger number of students. Learning outcomes might suffer when specialized teachers aren't able to get to know their students as well and tailor instruction accordingly<sup>[8]</sup>.

### Plan should be undertaken by the authority

In the Philippines, non-expert instructors in the teaching field had been expanding because of deficiencies of educators. A sufficient training for them to increase enough information about the subject and procedures to survey learning was required. Testament program was insufficient for the non-authority to pick up the fitting information. Class workshops and other fundamental trainings are important to reinforce the understanding they picked up from the program. Instructors having no adequate information in a particular zone ought not to be permitted to educate out-of-field since the students will endure at last. The Department of Education should screen the quantity of non-expert instructors in the Philippines with a specific end goal to grasp what will be the ramifications of having an expanding number of non-authority educators in the schools<sup>[1]</sup>.

Moreover, over the previous decade, there were many investigations that the commissions and national reports wept over which were discussing the capabilities and nature of educators. With this respect, reformers in numerous states have pushed harder instructor training and confirmation

benchmarks trying to guarantee the classrooms are altogether staffed with qualified educators. Also, an entire host activities and projects have jumped up which are intended to select new and skilled competitors into instructing. The worry with the quality and capabilities of educators is neither interesting nor astounding<sup>[13]</sup>.

## 9. Conclusion and Recommendation

Results showed that the science teacher participants have been involved in the Regional K to 12 Mass Trainings but not all have the trainings; and they learned teaching tips and strategies from few trainings which they have applied in the field. It also, results showed that these participants have experienced difficulties in teaching non-science subjects. Thus, additional trainings are needed for enhancement of knowledge and skills.

In addition, the outcomes of this study revealed that participants tend to become honest to the whole class if they do not know the answer to the questions asked by the students during discussions. They do not pretend for safety sake. In the same way, participants accept student's idea and appreciate them for sharing. With this, students tend to become participative because their ideas are not rejected immediately and their participation is recognized. These ways and means of teachers are enhanced with consultation from the experts of the subjects through soliciting additional opinions and ideas from them. The difficulties experienced by the respondents with some topics in the subjects handled are not reasons to give up. Instead, the respondents continue using their initiative to cope up with the situations, like when their students get low grade/ rating, they considered themselves accountable. Through remedial classes, re-teaching of topics, removal exams and giving special topics/tasks, students learning and achievements are improved. Therefore, participants have the concern and care so much about their students.

Although this phenomenon is challenging to the key informants, this indicates that this would be a worthwhile endeavor that would increase opportunities for acceptance, provide time to work hard as if neophyte in the profession, and promote confidence, which would aid shortage of teachers in the country. The supporting data from this study indicated that participants are jack of all trades, flexible, versatile, ready and willing to take the challenges.

Thus, the study encourages the Department of Education-Compostela Valley division to help teachers teaching outside specialism become brave in facing the phenomenon, by designing programs for those teachers to address the needs and problems. Thus, the department is much encouraged to do checking on the teaching staff in every school to know the lacking and needed subject specialist.

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