

Challenges and Adaptive Strategies of Out-of-Field Mathematics Teachers in the Province of Misamis Oriental, Philippines

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Abstract If students are well-trained by teachers who are adept and confident in teaching their subject matter, certainly learners will be developed as lifelong learners and capable of helping in the fast economic development of the country. This study aimed to determine the profile, content mastery, challenges, and adaptive strategies of out-of-field (OOF) mathematics teachers in the province of Misamis Oriental, Philippines. The investigation employed a descriptive research design with a total of eighty-six (86) sampled OOF mathematics teachers assigned to the prescribed research setting. Of the 86 OOF mathematics teachers, seventy-nine (79) in the sampled junior high schools are assigned to teach subjects other than their master piece. Hence, they are labeled as “out-of-field” teachers. In terms of the mathematics content mastery, results show that the respondents had a satisfactory performance while the majority of the respondents agreed that their respective schools have limited resources, equipment, and other learning facilities needed for teaching and learning. Furthermore, the findings revealed that OOF mathematics teachers used varied teaching approaches, engaged themselves in professional development training, and kept monitoring learners’ progress using varied assessment strategies from their carefully planned lessons and improvised instructional learning materials. Since this study has established that OOF teaching was prevalent in the research locale, the researchers recommended that school principals and school district supervisors look into this matter seriously so they can hire additional teachers with specific qualifications to augment the manpower of the district. A parallel study may also be conducted considering OOF teachers across all levels from other disciplines so that strategic interventions as well as policy on recruitment based on field of specialization must be properly implemented.

Keywords: *adaptive strategies, challenges, out-of-field teaching, out-of-field teachers*

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1. Introduction

Out-of-field teaching has been a worldwide phenomenon and issue [1,2]. In Australia, according to the report of the Australian Council for Educational Research, twenty-six percent (26%) of the teachers who have been teaching Years 7–10 are teaching outside their expertise [3]. Similarly, in Washington, USA, the number of teachers assigned to teach subjects that do not match their education keeps on escalating, although almost all of them hold at least basic qualifications. Also, out-of-field teaching has worsened slightly in recent years, regardless of plenty of changes focused on enhancing teacher quality [4,5,6].

In the Philippines, out-of-field teaching is an important but long-unrecognized issue in schools and in the Department of Education in general. This might be due to the fact that the department might have practiced it over

time and may not have implemented reforms on the concerns of out-of-field teaching among DepEd schools in the country. Over the past decade, various studies, commissions, and national reports have bemoaned the qualifications and quality of teachers. However, the issue that has hampered their search for high-quality education is partly due to the vast number of teacher-education graduates who major in such subjects, as well as the great number of teachers engaged to teach subjects other than their own field of specialization [7].

The Republic Act No. 9155, known as the “Governance of Basic Education Act of 2001,” states that the state encourages local initiatives to improve schools and learning centers and provides a means by which these improvements may be achieved and sustained. This persistent proposal to solve the existing issue is the principal objective of this study. This academic inquiry needs to be pursued because, by identifying the challenges and adaptive strategies of out-of-field teachers, appropriate measures can be taken to solve the lingering

concern about out-of-field teaching. Aside from this, learners' competence could be harnessed and developed knowing that appropriate measures are at hand. This study conforms to the recommendation of Fameronag, affirming that the administrators should be objective enough in assigning teachers based on their teaching qualifications [8].

Hence, the need to conduct this study arises due to the demand for producing quality graduates who can compete and are at par in the real world with their knowledge and skills honed in their years of schooling. If students are well-trained by their teachers who are adept and confident in teaching their subject matter, then learners will certainly be developed as lifelong learners and be capable of helping in the fast economic development of the country. Thus, identifying the profile, challenges, and adaptive strategies of out-of-field teachers should be given full support and consideration in order to lessen the undesirable effect upon the learners and teachers of this issue.

2. Literature Review

2.1. Background of Out-of-Field Teaching

Out-of-field teaching was a largely overlooked phenomenon until it was coined by Ingersoll, who defined it as teachers who were assigned to teach areas in which they had little or no background, or in which their field of specialty or training did not match [9,10,11].

In a similar vein, "Teachers are out-of-field if they do not have an undergraduate major or minor in the discipline in which they teach most courses," according to the US Department of Education [12].

Out-of-field teaching was described by McConney and Prince in Western Australia as teaching in a subject/field for which a teacher holds neither a major nor minor tertiary teaching certification [13].

Out-of-field teaching is a concept used in Malaysia to describe when teachers are assigned to teach in fields that do not correspond to their educational background. In the Philippines, these are teachers who do not have either a certification or an academic major in the subject they are supposed to teach.

2.2. Causes of Out-Of-Field Teaching

There are several reasons why out-of-field teaching occurs in education. Ingersoll said the factors include mismatches between a teacher's qualification and teaching assignment, the demands of the teachers' union and the shortages of teachers [9,10,11].

Other underlying reasons for teacher shortages, according to Ingersoll, include poor compensation, student discipline issues, an insufficient supply of subject teachers, and principals forced to find substitutes. He suggested that addressing these issues would reduce teacher shortages and, as a result, the amount of out-of-field teaching in schools [9].

The teacher's union, in addition to mismatched teachers, contributed to the out-of-field teaching situation [9,10,11].

In cases where the teacher shortage indicators failed to estimate the required number of teachers qualified in specific subjects, McConney and Prince suggested that

school administrators be informed of the exact number of teachers required in each specialist area to avoid mis-assignment in the schools [12].

2.3. Studies on Out-Of-Field Teaching

Results of the National US Schools and Staffing Survey showed that while most teachers were generally qualified, a significant number of teachers, especially in disadvantaged schools, were assigned to teach classes outside of their expertise. Further, the study revealed that out-of-field teaching was not the result of a teacher shortage but of certain administrative and organizational influences [14].

Individual strategies for dealing with unoccupied classes, such as recruiting less-than-fully qualified instructors, reassigning teachers trained in other professions, or using substitute teachers, were also highlighted in the study.

Formal regulations establishing minimal training requirements are part of district strategies aimed at minimizing the rate of out-of-field teaching. In most cases, out-of-field instruction looked to be more of a convenience than a requirement in most cases [15]. McConney and Prince also stated that the lack of subject background of out-of-field teachers influences the quality of teaching and learning in the classroom [13].

For over a decade, the issue and challenges of out-of-field teachers and their teaching processes have been a prominent topic in the sphere of educational policy and reform [9].

It has been argued that the presence of out-of-field teachers reduces the desired outcomes of students, particularly their success scores. According to researchers such as Darling-Hammond, a well-prepared, highly trained teacher has a bigger and higher impact on student accomplishment than other variables such as student background and class numbers [16], [17].

However, a poll of teachers conducted by Ingvarson and Kleinhenz found that at the secondary level, roughly 15% of Studies of Society and Environment (SOSE) and science instructors admitted to being unprepared [18].

Riordan and Hannigan looked into the use of out-of-field teachers in mathematics classrooms and how they were deployed in Irish secondary schools for pupils aged 12 to 18. A total of 324 mathematics teachers from 51 schools, 26,634 students, and 25 principals made up the sample. According to the study [19], gender and teaching qualifications had no significant association. Teachers who were older were more likely to have a mathematics teaching certificate. Out-of-field teachers were largely assigned to non-exam year classes when compared to trained mathematics teachers.

As per the National Inquiry into School History, out-of-field teaching has an impact on the quality of Studies of Society and Environment (SOSE) instruction [20]. This means that if a school hires and allows teachers to teach outside of their field of competence, the school's teaching and learning methods and strategies will be compromised.

In general, the quality of teaching and learning, particularly for students in low-income neighborhoods and tiny, rural, or remote schools, is deteriorating [10,11,15]. Furthermore, many researchers believe that the quality of

a teacher is the most essential component in a student's ability to learn.

“Good teaching requires expertise in at least three areas,” according to Ingersoll, “namely, knowledge of the subject, teaching skills, and pedagogical content knowledge” [11].

Another concern of out-of-field teaching is the potential negative impact on instructors' efficacy and well-being. The Western Australian State School Instructors' Union argued that teaching outside of the classroom causes teachers stress. It is a major problem for new graduates who are faced with the additional demands of planning and implementing a curriculum for a new subject for which they have received no academic preparation [21].

Although, according to Kruger, education is now more about supporting and encouraging information discovery rather than presenting content, communication skills are essential for a good teacher to help students discover knowledge. Teachers with poor communication skills, on the other hand, have difficulty educating their students. To be a good teacher, he or she must listen carefully and attentively to the students, assess their remarks and questions, and provide useful feedback to speed up student discovery [22].

Ho said that excellent communicators are needed in the classroom to deepen thinking, explain difficult concepts in courses, and assist students to internalize and process topic knowledge. A teacher must consider the context and reason for which he and his students are talking, so it is more than just speech, tone, and articulation [23].

Poor schools, according to a report by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), lack logistical support from administrators, as seen by a lack of textbooks and other associated reading resources for students. Textbooks are a significant tool for boosting educational standards. Per the UNESCO's Global Education Monitoring Report, well-designed textbooks in sufficient quantities are the most effective way to boost students' learning.

Sambe recommends changing the school policy to address the issue of out-of-field teaching. The first step is to put in place a system that ensures that all instructors at that school are qualified to teach all subjects in all grade levels. The next step is to promote a different route to teacher certification [5].

Instead of only hiring college students who are enrolled in teaching-career courses, the policy could be changed so that any student with a bachelor's degree in one of the major fields taught in elementary and secondary schools could become a teacher.

3. Methods

This study used a quantitative descriptive research design. This design is deemed appropriate because the study involved a normative survey of the respondents' personal data and making an assessment of the content mastery of the respondents, their challenges as out-of-field teachers, as well as the adaptive strategies they have devised to enhance their teaching capability and skills, and consequently lessen the burden they experienced as OOF educators in their respective schools.

The participants were the mathematics teachers in the province of Misamis Oriental and the cities of El Salvador, Gingoog, and Cagayan de Oro.

Convenience sampling was used in this study, being the most suitable type of sampling due to the threat of the current pandemic situation. During the actual online survey, eighty-six (86) mathematics teachers accomplished the questionnaire.

This academic investigation used a three-part structured questionnaire: Part A, which dealt with the respondents' profiles; Part B, which was devoted to Content Mastery questions and used descriptive statistics; and Part C, which was reserved for the OOF teachers' challenges.

All statements were framed as closed-ended questions following the Likert scale. Each factor has a maximum of six (6) statements to be answered by the respondents. Part D of the questionnaire pertains to the adaptive strategies used by the OOF teachers. The participants replied to each statement in detail.

The questionnaire was subjected to a dry run utilizing ten (10) OOF math teachers from junior high schools not part of the sampled areas. The main purpose of the dry run was to determine the comprehensiveness, clarity of wordings, and reliability of the results. Questions which were found to be irrelevant were eliminated and longer questions were rephrased.

The validity of the content was ascertained through the judgment of some experts in the field of research; three (3) from DepEd and two (2) professors from state universities and colleges (SUCs). The Content validity index was the tool used to ensure the validity of the content of the research instrument. Some questions were eliminated, and some items were reworded to make them more understandable to the respondents. The results are: I-CVI Average = 0.97 (acceptable); S-CVI Relevance = 0.85 (acceptable).

Polit and Beck recommend a 0.83 CVI rating for at least six (6) experts [24], while Lynn recommends a 0.83 CVI rating for six (6) to eight (8) experts [25]. It was concluded that the research instrument was acceptable.

The researcher furnished the school division superintendents of Misamis Oriental, El Salvador, Gingoog, and Cagayan de Oro with a letter of intent about the study. After its approval, the researcher provided the respective school supervisors and principals of the sampled junior high schools in Misamis Oriental, El Salvador, Gingoog, and Cagayan de Oro copies of the approved letter of intent with the proper endorsement.

An online survey was used to collect the data. The researcher respectfully got from the school principals the names of the mathematics teachers who were assigned to teach subjects that were not their specialization for at least three (3) consecutive school years. The questionnaire was disseminated via Google and was completed by the respondents within one week. The researcher also sent all respondents' unsigned copies of the Informed Consent document, where they had to affix their signature at the bottom of the page, signifying their respective consent to participate in the online survey.

Part A data pertaining to participant profiles was processed using descriptive statistics such as frequency and percentage. The data obtained in Part B was computed using descriptive statistics. In Part C, data was calculated

to arrive at the statistical mean and standard deviation, followed by a verbal description of each statement result. In Part D, the data was processed using statistical mean and standard deviation, followed by a verbal description of each statement result.

4. Results and Findings

The researchers, through the research instrument, have devised several challenges and corresponding adaptive strategies to be tested statistically against the profile of the respondents. The challenges were focused on subject matter knowledge and pedagogical content knowledge. The findings revealed that OOF mathematics teachers used varied teaching approaches, engaged themselves in professional development training, and kept track of learners' progress using varied assessment strategies from their carefully planned and improvised instructional learning materials. The specific results per profile are discussed briefly below.

- **Field of Specialization.** The study found that all above-mentioned adaptive strategies were utilized by the respondents following a criss-cross pattern. The obtained overall mean was 3.40 and the standard deviation was 0.53.
- **Length of Service.** This profile was divided into 1-5 years, 6-10 years, 11-16 years, and 16 years and above. Similarly; all adaptive strategies were applied by the respondents following a criss-cross pattern, indicating no monopoly of adaptive strategies being used by the respondents belonging to a specific division of length of service. The obtained overall mean was 3.48 and the standard deviation was 0.53.
- **Position/Rank.** This profile was divided into Teachers I, Teachers II, Teachers III, and Master Teacher 1.

The findings show that all adaptive strategies were utilized by the respondents, again following a criss-cross pattern, indicating no monopoly on adaptive strategies being used by a certain group of teachers. The obtained overall mean was 3.42, while the standard deviation was 0.55. The utilization of adaptive strategies to cope with some teaching challenges is similar to management and marketing strategies used in the industry. A certain management or marketing strategy that appears effective is always being benchmarked from one company to another in the same industry. This is what happened to Problem 4, whose results followed a criss-cross pattern.

Worth mentioning is the resourcefulness of OOF teachers who improvised instructional materials for learning. According to Baldoni, a teacher who is resourceful in her teaching career always finds a way to professional growth and development [26]. Further, Briggs stated that being resourceful would mean challenging one's own ideas and the ideas of others, embracing obstacles and conflicts, and recognizing the value of discomfort [27]. Meanwhile, Johnson noted that creative teachers routinely customize their own learning activities and also glean and adapt techniques and strategies from their peers to reach particular sets of Howard Gardner's Theory of Multiple Intelligences [28].

The "criss-cross pattern" utilization of the adaptive strategies by the respondents is aligned with the ideas of Howard Gardner's Theory of Multiple Intelligences.

Similarly, the study finding on Strategy 2 (the researcher used various teaching approaches and strategies to support students in the learning process) is consistent with the findings of the study by Bayani and Gubao, which state that teachers make their instruction stimulating to students in order to capture their attention, thereby increasing their interest in the subject and helping them perform better in class [22]. Also, teachers employ classroom activities that students love to do, like dramatization, role-playing, and other group dynamics. Everyday discussions were made interesting with the frequent use of visual aids like PowerPoint presentations.

5. Concluding Statements

According to the study, all 86 respondents were assigned to teach subjects outside of their field of specialization. The Department of Education (DepEd) must look closely into the OOF teaching phenomenon and should hire enough teachers to augment its deficiency in manpower. OOF teaching mostly benefits the teacher by expanding his teaching capability and horizons, but the learning of the students is put in jeopardy.

In the challenges of OOF teachers, the majority of respondents revealed that their respective schools have limited equipment or facilities for teaching the OOF subject. Similarly, the majority of the junior high schools in Misamis Oriental have inadequate instructional materials suited to the different teaching methodologies, techniques, and strategies. Further, in their libraries, the number of local and indigenous teaching materials useful for delivery of the lesson is limited. The school principal and the librarian must see to it that their library has enough copies of books and related teaching resources needed by the teachers and students alike.

A stable internet connection should be obtained by the school to ensure that teachers and students can browse for topics not found in the old textbooks. The school library should have several units of laptops or desktop computers that teachers could use for PowerPoint presentations.

Due to a lack of instructional materials in their schools, respondents used improvised instructional materials in delivering the lesson. Also, they used their own money to purchase learning resources for their OOF subjects. In this case, OOF teachers should ask for reimbursement supported by purchase receipts from the school principal. OOF teachers should ask for funds from the school principal to purchase learning resources and materials needed for their subject.

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