



SCIENCE TEACHING PRACTICES OF SECONDARY SCHOOLS THROUGH TEACHERS' REFLECTIVE JOURNAL: BASIS FOR A PLAN OF ACTION

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ABSTRACT

The study, which was qualitative-phenomenological in nature, aimed to prove that reflective journal, which was consist of six researcher-made and duly validated questionnaires, could be beneficial in getting the science teaching practices of secondary schools' science teachers. To interpret the data, thematic analysis was used and the following insights were derived: (1) teachers teaching science used either traditional or modern teaching practices or the combination of both to cater learners' diversity; (2) science teachers need to seek professional development and engage in capacity-building trainings to enhance teaching practices; (3) collaborative efforts from stakeholders were beneficial for the success of teaching-learning process, and; (4) through reflective journals, the records of their practices in teaching will help evaluate which area of the pedagogy needs improvement. The findings were used as basis for plan of action that will help science teachers enhance their teaching practices and use relevant resources towards teaching science subjects.

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Keywords: *Science teaching practices, Secondary schools, Reflective journal, Plan of action*

INTRODUCTION

Science requires a thorough study of the structure and characteristics of the natural world through observations, measuring and experimentations in order to formulate scientific theories and laws (Cambridge Dictionary, 2023). The K-to-12 Science curriculum, specifically in the junior high school level, from one grade level to the next, ideas and abilities in the earth sciences, physics, chemistry, and life sciences are taught at ever higher degrees of complexity (Department of Education, 2016). The necessity of learning science at all stages of education has been the emphasis of most educational systems throughout the world in today's technologically-advanced culture (Khine, Fraser, Afari, Oo, and Kyaw, 2017).

Though Science is fun and engaging to teach with, teaching Science subjects is a challenging task and in reality, science teachers in secondary schools are teaching all the subject areas of Science despite the fact that they only specialized in either biology, physics, chemistry or life science and some are hybrid secondary school science teachers teaching Science subjects both in junior and senior high school. Thus, how do science teachers in secondary schools of Alimodian reflect on their teaching practices attracts the attention of the researcher.

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Inside the classroom, the teacher has the sole responsibility to facilitate learning and its success depends mostly on the personal, emotional and social investments and how classroom was established as a learning environment that is both safe and entertaining (Kiely, Davis, Carter, & Nye in Ahsanu, Purwati, & Wardani, 2020). Ngolobo and Kanandjebo (2021) encourages instructors to be open to new ideas in order to improve their teaching practices. Therefore, plan of action was crafted to enhance science teaching practices such as participating in related trainings, and seminar-workshops are conducted year-round to capacitate teachers on how to enhance their teaching practices and how to cater learners' diversity and how they can learn best through incorporating varied teaching strategies and methodologies in the lessons.

Unfortunately, what is being taught inside the classroom is not always what students learn because of the many instances affecting the transfer of knowledge as well as on how to acquire information and skills from teachers to learners. For Hashim and Yusoff (2021), teachers in the classroom need to a thorough reflection on their own teaching practices and one of these methods is through the use of reflective journals. Reflective journaling has been used to help new or aspiring teachers identify practices they want to improve in the classroom and further change tactics shown to be ineffective (Burns, 2020). Reflection is part of the educational processes, it is found in the last page of the lesson plan, however reflective journaling is not a common practice among educators because in reality, aside from managing and delivering classroom instructions, teachers also have other responsibilities and coordinators assigned to them, therefore, they

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cannot rigorously reflect on their teaching practices or even update their preparations of the lessons. In order to practice the essence of reflection among teachers, the researcher would be using reflective journal which will serve as an instrument to record and determine the science teaching practices of science teachers in secondary schools of Alimodian.

In the study, reflective journal plays an important role as a “tool” that helped the researcher in finding out how science teachers in the secondary schools of Alimodian conduct their Science lessons. Making use of a reflective journal, the researcher was able to capture the teaching practices of science teachers by analyzing the entries that they have written.

MATERIALS AND METHODS

Research Methodology

This chapter presents the research method, research design, participants of the study, data gathering procedure, research instrument, and data analysis of the study that aimed to determine the science teaching practices of secondary schools’ science teachers in Alimodian for school year 2022-2023 using reflective journal as basis for plan of action. Through writing on their reflective journals by answering the validated researcher-made questions patterned on Gibbs Reflective Cycle, the participants had shared their science teaching practices.

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Research Method

The research study used qualitative method, specifically the phenomenological approach. The study had collated the journal entries of the participants to answer the six questions focused on.

Initially, the researcher assured the participation of the participants, two (2) participants from Gines National High School, two (2) participants from Alimodian National Comprehensive High School, two (2) participants from Bancal National High School, two (2) participants from Dalid National High School, two (2) participants from Sinamay National High School and two (2) participants from Adriano Cabardo National High School, the six secondary schools in Alimodian where the study was conducted. Secondly, with the approval of the participants, the researcher distributed the reflective journals which served as the tool to conduct the study wherein journal entries were written. Specifically, the science teaching practices were recorded by answering validated researcher-made questionnaire patterned to Gibbs Reflective Cycle in a reflective journal. After which, the journal entries were gathered, and the responses were encoded and interpreted using thematic analysis.

Research Design

The study used qualitative research design, specifically phenomenological approach. Qualitative research design uses statements in a form of interview or written pieces that can be

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analyzed and interpreted to contribute in the field of research. Qualitative researches concentrate on the understanding and interpreting situations and events based on the perceptions or viewpoints of the participants (Fraenkel, Wallen, & Hyun, 2012). Because qualitative research focuses on the particular rather than the generic, it can be challenging to organize, gather, analyze, and present findings to an audience (Kelly, 2017). This study used phenomenological approach which examines the diverse responses to the perceptions of a specific occurrence (Fraenkel, Wallen, & Hyun, 2012). Phenomenological approach will allow participants' experiences to be described without reference to the researchers' assumptions, enabling objective interpretation and enhancing the reliability of the themes found (Babate et al., 2023).

Participants of the Study

The participants of the study were twelve (12) science teachers from the six (6) different secondary schools in Alimodian wherein, two (2) participants were from Gines National High School, of whom one (1) was from junior high school and one (1) was from senior high school; two (2) participants were from Alimodian National Comprehensive High School, which was composed of one junior high school and one senior high school science teacher; two (2) participants were from Bancal National High School, which was consist of one (1) junior high school and one (1) senior high school teacher; two (2) participants were from Dalid National High School, of whom one (1) is from junior high school and one (1) senior high school; two (2) participants were from Sinamay National High School, in which one (1) came from junior high

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school and one (1) from senior high school, and; two (2) participants were from Adriano Cabardo National High School, which was composed of one (1) junior high school and one (1) senior high school science teachers, of the school year 2022-2023 who were identified using purposive sampling technique. The method gives consideration to the participants' knowledge and information and their willingness to participate in the study.

Sampling Design

The researcher used purposive sampling to determine the participants of the study. Purposive sampling was done when researcher used judgement to determine a sample that was believed, based on prior information, will provide the information needed (Fraenkel, Wallen, and Hyun, 2012). A purposive sample of the study is the one whose attributes are fitted for a particular purpose that is substantial to the study (Andrade, 2021). In this study, 12 purposively-selected science teachers were identified from the six secondary schools in Alimodian.

Research Instrument

The instrument used in the study was a reflective journal. The said journal was composed of six (6) validated researcher-made questionnaires patterned on Gibbs Reflective Cycle. After answering, the researcher collected the reflective journals from the participants. Data in a form of journal entries were encoded, analyzed, and interpreted.

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Validity of the Research Instrument

The instrument, which was a reflective journal composed of researcher-made questions patterned on Gibbs Reflective Cycle, were submitted for critiquing by the thesis adviser and were endorsed for content validation to the members of the Thesis Committee who were experts in research, instruction, and science discipline. In addition, they are professors at the Graduate School of the University of Iloilo. According to the experts' recommendations, the instrument underwent a final editing process, which included adding new features and removing unnecessary ones. Once again, these were submitted to the adviser for final checking before it was finally printed.

Data Gathering Procedures

The instrument, reflective journal, was provided by the researcher. This was used to identify science teaching practices from the participants.

The qualitative study has two stages; Stage 1: Collection of Data from the participants and, Stage 2: Formulation of themes transcribed from the data of the participants.

In Stage 1, the researcher asked permission to conduct a study to the school heads of Gines National High School, Bancal National High School, Dalid National High School, Sinamay National High School, Adriano Cabardo National High School and to the principal of Alimodian National Comprehensive High School. Upon approval, the researcher provided research consent to the participants to ensure their confidentiality and identity.

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The purposively-selected participants were given the instrument for them to answer. The said instrument is a reflective journal composed of validated researcher-made questionnaires patterned on Gibbs Reflective Cycle where the participants will record their science teaching practices by answering the six questions provided.

In distributing the instruments, the researcher went to the six secondary schools in the municipality of Alimodian and through the approval of the school heads and principals, the purposively-selected science teachers were gathered. They were oriented on how to answer the questionnaires and had given two-hour time period to answer. After which, the instruments were gathered and data were analyzed using thematic analysis.

In Stage 2, formulation of themes from the data gathered from the participants happened. After interpreting the collected data, several sub-themes were drawn out from them. In order to formulate the sub-themes, the researcher encoded the responses of the participants and try to find out the similarities of each of the participants' response. As interpretation and analysis goes on, additional sub-themes were identified. As analysis goes on, new ideas were formed to formulate another sub-theme and were sorted out to form major groups or themes. Irrelevant responses were discarded to ensure that the data gathered were significant.

Data Analyses

In analyzing and interpreting the data, a thematic analysis was used followed by set of procedures. In Clarke, Braun and Hayfield (2015), thematic analysis (TA) is a method for

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analyzing concepts and a quantitative measure of how complex thinking is. It is an accessible, tedious step-by-step approach to coding and theme development.

The procedure has six phases: familiarization, coding, searching for themes, reviewing themes, defining and naming themes and writing the report.

Phase 1: *Familiarization*. After the data has gathered, the researcher read the entries in the reflective journals and familiarized with the writings of every participant. The researcher made sure that all the collected data were included and encoded.

Phase 2: *Coding*. The collected data were sorted, and an initial list of codes about what each set of data contains and what makes it interesting was developed.

Phase 3: *Searching for themes*. The researcher analyzed the initial codes and collected data. Each code was scrutinized and similar codes were combined to form themes. A table was used to collate and sort the different codes into themes.

Phase 4: *Reviewing themes*: The researcher carefully devised and scrutinized every set of generated themes. It involved two levels. At level one, data extracts that was coded were reviewed. While reading the collated extracts of data, patterns were looked over; if none were found, new themes were developed by the researcher. The same approach was used in level two, but each themes had to be valid in light of the data collection. The full data set was once again evaluated and sorted to determine the link between the subsequent data and the themes to check

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the subsequent codes for further information inside the themes that had been previously overlooked.

Phase 5: *Defining and naming themes*: The researcher further developed and defined each theme that was given in the analysis throughout this stage. In this step, it was also defined what each theme is about and how important it is to the study, as well as what part of the data each theme captures. A record that is internally consistent and coherent was created by further organizing the themes.

Phase 6: *Writing the report*: Finally, a set of completely developed themes that included the final analysis and report writing were identified.

RESULTS AND DISCUSSIONS

Summary

The phenomenological study (Frankael, Wallen, & Hyun, 2012) was anchored on John Dewey's Reflective Thinking (Dewey, 1933-1989 in Greenberger, 2020) and Donald Schon's Reflective Practitioner Model (Schon, 1987), used thematic analysis (Clarke, Braun, & Hayfield, 2015) for data interpretation was conducted to determine science teaching practices of secondary schools through teachers' reflective journal as basis for a plan of action from the six secondary schools of Alimodian during the school year 2022-2023.

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The researcher-made questionnaire in a form of reflective journal was constructed to collect data from the participants. The answers of the participants were encoded and analyzed in order to generate codes and derived with specific themes through thematic analysis.

The following were the important findings of the study:

In the first question, the answers of the participants were categorized into three themes such as learner-centered teaching, combination of traditional and modern teaching practices and traditional teaching practices. This is a clear indication that teachers use multiple teaching strategies in their science classes.

In the second question, four themes were derived from the participants which include perception of positivity, manifestation of empathy, demand for attention and self-fulfilment. Thus, it indicates teachers is not only teaching content-driven lessons but also incorporate affective aspects of teaching in their lessons.

In the third question, the answers of the participants were summarized into three themes such as responds to learners' needs, evidence-based and well-prepared lesson planning. Thus, teachers evaluate their teaching strategies based on how the learners are able to respond and learn the lessons.

In the fourth question, three themes were created such as application of multiple teaching approaches, parallel lesson adjustment to learners' needs and continuous professional

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development. It is clear evidence that teachers need to evaluate their teaching strategies in order to create a classroom setting that favors students' engagement and learning.

In the fifth question, three themes were derived from the answers of the participants such as multiple teaching approaches, holistic approach towards learners' development and teacher-relevance in pedagogy. Thus, teachers need to be well-rounded and capacitate themselves to enhance their teaching strategies and make sure that relevant classroom activities are rendered for learners to enjoy and learn more about science.

In the sixth question, four important themes were identified based on the responses such as strengthening support mechanisms, professional development, integration of 21st century skills and catering learners' needs. Therefore, there's a need to develop strong connection and communication between internal and external stakeholders for an effective teaching-learning to take place.

Insights

Based on the foregoing findings, the following insights were drawn:

Teaching science subjects require a lot of efforts and innovative skills. The use of reflective journals plays a vital role for science teachers as they were able to share their feelings and sentiments and internalize on their capacity to teach the subject and how are they going to manage to let learners learn science-related concepts and skills. Mostly, they have used teaching

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strategies in teaching the subject which are suitable for the lesson being discussed and also based on students' learning capacity.

Science teachers need to capacitate themselves with 21st century knowledge and skills in order to cope with the evolving educational system. They should be updated with the current trends of 21st century education and along with reforms and mandates of the department, capacitate themselves through attending trainings or seminar-workshops involving integration of different teaching practices in science and enrolling in post-graduate studies to deepen their knowledge of science contents.

In designing science lessons and using suitable teaching practices in Science, it should be developed to maximize learners' full potential and address their needs. Science classroom activities should be hands-on and exploratory, engaging and interactive, contextualized and innovative and promotes inclusivity and holistic development among learners.

Lastly, enabling all mechanisms of education by encouraging full support from both internal and external stakeholders towards programs and activities can create remarkable impact towards the teaching-learning process.

RECOMMENDATIONS

In light of the findings and insights of the study, the following recommendations were proposed for secondary schools' science teaching practices:

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Science teaching practices can be improved by recommending secondary schools' science teachers to attend trainings and seminar-workshops that will help enrich their teaching strategies and content knowledge of the subject.

Furthermore, the training and seminar-workshops should focus on capacitating teachers' classroom management, integration of 21st century skills in teaching science concepts, and on how to design interesting and engaging classroom activities.

It was also recommended that the Department of Education, channeled through school administrators in the field, should hear out concerns of teachers regarding inadequate science learning resources such as books, equipment and laboratories. This should be properly addressed in order to provide learners with meaningful experiences while learning science. Moreover, the department and school administrators should design plan of actions initiating school-based programs and activities that could help enhance teachers' competence in management and pedagogical approaches towards teaching. Also, the plan of action should also be adapted and implemented not only for science teachers but also of other subject teachers.

In order for teachers to practice the art of reflecting, it was advised that the department should craft and distribute guides of the lesson to lessen the paperworks of teachers so that they'll have enough time to focus on teaching and nurturing learners. Through this, teachers can internalize the things they've conducted inside the classroom and help them improve themselves and their teaching practices.

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Lastly, writing reflections using reflective journal, although not mandatory, was highly recommended and encouraged for teachers, not only those who are teaching science but also other subjects, as it could assess classroom activities and help improve teaching practices.



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