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Problems and Proposed Solutions of Teachers on the Implementation of Science, Technology, Engineering, and Mathematics (STEM) Strand of Senior High Schools in Marawi City and Lanao Del Sur, Philippines

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Abstract

This study was significant in identifying the problems and proposed solutions of teachers on the implementation of Science, Technology, Engineering, and Mathematics (STEM) strand in Senior High School (SHS). It explored and evaluated the STEM-SHS in terms of Teacher Preparation, Curriculum Enhancement, Teaching Strategies and Techniques, Learning Resources, Student Preparation, and Administrative Support. This study used the exploratory-evaluative research design covering fifty (50) teachers from various public and private Senior High Schools offering STEM Strand in Marawi City and Lanao Del Sur. They were identified and selected through purposive or non-probability sampling. It also utilized triangulation of data to validate the results of one instrument with other two instruments using Survey Questionnaire, Interview Guide, and Field Notes. However, the classroom observation was not utilized due to the health restrictions against Covid-19 pandemic. The study revealed that the problems encountered, they viewed the following: (1) teacher preparations as slightly a problem; (2) curriculum enhancement as slightly a problem; (3) teaching strategies and techniques as slightly a problem; (4) learning resources as moderately a problem; (5) student preparations as moderately a problem; and (6) the administrative support as slightly a problem. Furthermore, it revealed the following proposed solutions on the implementation of STEM strand: attending various seminars and trainings on the K to 12 curriculum; mastering the competencies and skills in enhancing the curriculum; contextualizing the curriculum; allocating funds for teaching and learning resources and infrastructures; and hiring additional qualified and competent teachers needed by every Senior High School.

Keywords: STEM strand, problem, SHS teachers

1. Introduction

Quality education has been a precursor to national development. Hence, through the Department of Education (DepEd), the Philippine government asserted the implementation of the K to 12 Program to produce globally competitive learners and citizens. This program was appraised as the international standard of education. This is stated under Republic Act 10533, otherwise known as the Enhanced Basic Education Act of 2013. It mandated the DepEd to create another basic education level of two years. These two additional years in the secondary level comprised the senior high school program set by the law mentioned above. Alongside the implementation, significant issues such as lack of classrooms, facilities, and learning materials were seen as emerging challenges aside from teachers' preparedness in implementing the program.

The primary goal of the program is to prepare secondary students to master the prerequisite skills needed in professional courses for those who prefer academic tracks and to equip them with employment and industrial skills necessary for those who prefer technical-vocational and other tracks. Braza and Supapo (2014) mentioned that the new curriculum was the response of the government to the call of the educators for the standardization of the country's educational system to comply with international standards.

Furthermore, the Science, Technology, Engineering, and Mathematics (STEM) track of the Philippine K to 12- Enhanced Basic Education Curriculum was designed to produce graduates of secondary level who would take science, research, mathematics, and engineering-related courses in the tertiary level and thereby add to the scientific and scholarly workforce of the country (Philippine Basic Education, 2013). Magno (2010) said that a curriculum that is purposely designed for mathematics and science-inclined students could be the answer to a decade-long problem of a low number of mathematics and science practitioners in the country. The low number of science professionals may be attributed to the poor academic performance of students in mathematics both at the elementary and secondary levels.

The science, Technology, Engineering, and Mathematics (STEM) strand centers its education on the disciplines of science, technology, engineering, and mathematics (STEM). The STEM acronym was introduced in 2001 by scientific administrators at the U.S. National Science Foundation (NSF). The organization previously used the acronym SMET when referring to the career fields in those disciplines or a curriculum that has integrated knowledge and skills from those fields. In 2001, however, American biologist Judith Ramaley, former assistant director of education and human resources at NSF, rearranged the words to form the STEM acronym. Since then, STEM-focused curriculum has been extended to many countries beyond the United States, with programs developed in Australia, China, France, South Korea, Taiwan, and the United Kingdom (Britannica, 2019).

The Science, Technology, Engineering, and Mathematics (STEM) track of the Philippine K to 12-Enhanced Basic Education Curriculum is designed to produce graduates of secondary level who will take science, research, mathematics, and engineering-related courses at the tertiary level and thereby adds to the scientific and scholarly workforce of the country. The curriculum is purposely designed for mathematics and science-inclined students, and it is projected to be an answer to the decades-long problem of a low number of mathematics and science practitioners in the country. The low number of science professionals may be attributed to the poor academic performance of students in mathematics both at the elementary and secondary levels.

The K to 12 Program remains an issue of inquiries on its effectiveness since its implementation in Philippine primary education. It continuously solicits different responses from various individuals from the educators, students, parents, and multiple stakeholders (Villaruz et.al., 2019). Cabansag (2014) stressed that the implementation of

the K to 12 Program remains a formidable matter for schools that are unprepared to embrace the program. Teachers are made to adjust to innovative practices integrated into the preparation of lessons, actual delivery of teaching, rating student performances, and overall classroom management.

This study identified the teachers' problems and proposed solutions of teachers in the implementation of STEM strand. It sought to explore and evaluate the Senior High School in terms of teacher preparation, curriculum enhancement, teaching strategies and techniques, learning resources, student preparation, and administrative support. Although some studies were conducted about implementing the Senior High School (SHS) program, this study focused on the STEM Strand of the Senior High Schools in Marawi City and Lanao Del Sur.

Statement of the Problem

This study was primarily concerned with assessing the problems and proposed solutions in the implementation of Senior High School, particularly in the Science, Technology, Engineering, and Mathematics (STEM) strand as perceived by the teachers in Marawi City and Lanao Del Sur. Specifically, this study answered the following questions:

1. What are the problems with the implementation of the STEM strand as perceived by the teachers in terms of
    1.1 Teacher Preparation;
    1.2 Curriculum Enhancement;
    1.3 Teaching Strategies and Techniques;
    1.4 Learning Resources;
    1.5 Student Preparation; and
    1.6 Administrative Support?
2. What are the teachers' proposed solutions to the problems encountered in implementing the STEM strand?

Theoretical Framework

This study was anchored on theories and concepts relevant to this study's goal. It employed Adaptability Feed In and Feed Out Theory developed by Peter Drucker (1994), Theory of Rate of Adoption by Rogers (1995), Cognitive Theory of Learning, Constructivism Learning Theory, and Principle of Readiness by Thorndike.

Adaptability Feed In and Feed Out Theory, developed by Peter Drucker (1994), posits that "if the educational system adaptability is greater than some value, then stability decreases. If the educational system filtration increases, adaptability increases (Drucker, 1994)." According to this theory, adaptability has two main phases: change in the system, which is followed by a change in the system's compatibility. Thus, the idea implies that teachers must be knowledgeable workers. Their work involves continuous learning and the application of analytical knowledge and collaboration. This is a significant change in the system, which puts stress and pressure on schools to alter the traditional education system. The educational system must produce graduates who know how to think, learn, work in teams, and access and manipulate information. According to this theory, ignoring these demands will allow the institution to experience low compatibility. It calls to question the relevance and responsiveness of its programs. This study employed this theory as teachers needed to recognize their practices and identify their problems in implementing the Senior High School Science, Technology, Engineering, and Mathematics (STEM) strand.

This study employed the Theory of Rate of Adoption (Rogers, 1995). It suggests that an S-curve best represents the adoption of innovations on a graph. The theory holds that the adoption of innovation grows slowly and gradually in the beginning. It will then have

a period of rapid growth that will taper off and become stable and eventually decline. This theory is somewhat related to the Theory of Perceived Attributes. This other theory's attributes are based on the notion that individuals will adopt an innovation if they perceive that it has the following qualities. First, the innovation must have some relative advantage over an existing one or the status quo. Second, it must be compatible with current values and practices. Third, it cannot be too complex. Fourth, it must have the trialability. This means that the innovation can be tested for a limited time without adoption. Fifth, the innovation must offer observable results (Rogers, 1995).

In relation to the study, teachers who face problems in the implementation of the STEM strand need to adopt new teaching strategies and techniques and enhance the new curriculum in terms of instructional materials and facilities that are needed in the K to 12 program. Accordingly, Acar (2017) claimed that there are areas requiring immediate attention in the K to 12 curriculum, especially with poor evaluation by both students and teachers. These are appropriate audio-visual rooms, laboratory intended for science experiments, learning resource center/library, adequate drinking provision/washing facility, canteen space, ICT facility, computer facility for research, and study areas for students. Students have acknowledged that the teachers have a strong effort to deliver and provide interactive learning opportunities conducive to students. In terms of Instruction and Classroom Management, Acar (2017) emphasized that the students recognized the effort of the teachers in providing the most conducive learning experience for the students to become independent and competent with 21st-century skills.

Another theory used in the study is the Cognitive Theory of Learning. The explanation of learning is dominated by the connectionist view, which treats learning as a matter of developing connections between stimuli and response. Cognitive theorists view learning as a process of elaborating that the child already knows and not as a process of accumulating bits of information or skills. In relation to this study, the teacher should engage the learners to become competent and enhance the cognitive abilities that they already know. Teachers should learn to adopt new practices in 21st-century teaching. Sergio (2012) explained that the K to 12 program is timely and paves the way for increasing mobility among students and professionals across national borders. The K to 12 curriculum would make high school graduates better equipped, ready, and competent to take on any significant life choices after their preparation for primary education.

The study also employed the Constructivism Learning Theory as one of its theories. The constructivism learning theory's underlying concept is the role that experience or connection with the adjoining atmosphere plays in student education. Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of "mental construction" (Bada, 2015). In other words, students learn by fitting new information together with what they already know. This suggests that humans construct knowledge and meaning from their experiences. This theory hypothesizes that individuals make sense of all information they perceive and that each individual “constructs" their meaning from that information.

Constructivism is one of the pedagogical approaches presented in the K to 12 Basic Education Program, wherein teaching of all the subjects is anchored on the belief that the learner is not an empty receptacle who is a mere recipient of instruction. Instead, the learner is an active constructor of knowledge and meaning maker. Concerning the study, the role of the teacher becomes a facilitator or a guide on the side rather than a dispenser of information, the sage on the stage. The student becomes the active meaning-maker, not the teacher imposing meaning. This means that learners construct their knowledge and understanding of what is taught out of their experiences (DepEd, 2012). This study relates to this theory as teachers should adapt the new practices in teaching strategies and techniques to make their students independent and active learners of Senior High School.

The last theory used in this study is anchored on the Principle of Readiness. This principle asserts that there is a good time for every individual to begin new learning. When the time comes, the individual is said to be 'ready,' and appropriate learning tasks may be introduced to him. Learning, then, becomes faster, more effective, and more successful. Furthermore, Ampuan-Sani (2001) also cited Hurlock (1988), who said that when the individual is not ready to learn, no amount of effort can produce in him the desired behavioral changes; therefore, teaching becomes an ineffective waste of time and effort. It may even lead to negative behavior like truancy, learning bad habits, or simply refusing to learn. The readiness principle further contends that individuals who are ready but are not permitted or encouraged to learn may lose interest.

Thorndike's Law of Readiness states that when the learner is set for action, the activity consonant to the set is annoying or frustrating. Readiness involves the ability to participate effectively in the desired learning activity. It depends upon the maturity of the individual's physical, mental, emotional, and social being, which is a product of inheritance and experience. Such readiness for different kinds of work depends upon both maturity and training. Unfortunately, dissatisfaction emerges if educators motivate learners to 'want to do jobs beyond their ability. When the learners seek to do something for which they are not ready mentally or physically, they may become hopelessly discouraged. This study considered not only the readiness of the learners but also the vital role the teachers played in the implementation of the K-12 curriculum.

Conceptual Framework

This study conceptualized the problems and proposed solutions of the teachers on the implementation of Science, Technology, Engineering, and Mathematics (STEM) Strand in Marawi City and Lanao Del Sur. The Teachers' Problems in the Implementation of STEM Strand were determined and evaluated in the Senior High Schools (SHS), particularly in Science, Technology, Engineering, Mathematics (STEM) Strand in Marawi City and Lanao Del Sur. Consequently, the problems encountered in the Implementation of STEM Strand were determined, and possible solutions were solicited to come up with a recommendation based on the study results.

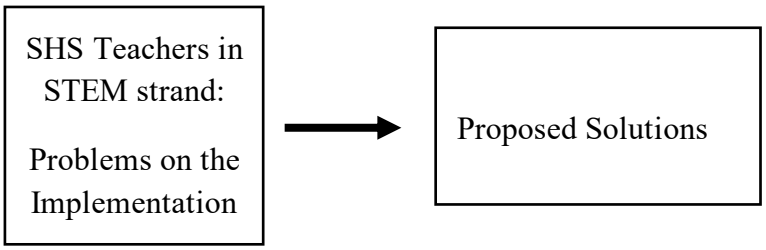

Figure 1. Schematic Diagram showing the Conceptual Framework of the Study

2. Methodology

Research Design

This study employed an exploratory-evaluative research design as it investigated the problems and proposed solutions of teachers in the implementation of Science, Technology, Engineering, and Mathematics (STEM) strand among Senior High Schools in Marawi City and Lanao Del Sur. The variables, such as Teacher Preparation, Curriculum Enhancement, Teaching Strategies and Techniques, Learning Resources, Student Preparation, and Administrative Support were explored and evaluated. This study utilized the triangulation method of data gathering to validate the results of one instrument with the other two instruments. Three research instruments were used to gather data in the

study. These were: survey questionnaires, interview guides, and field notes. The classroom observation was not applied due to the restrictions of having face-to-face classes during the school year 2020-2021 because of the threat brought by the COVID-19 virus.

Research Locale

This study was conducted in different Senior High Schools located in Marawi City and Lanao Del Sur, Bangsamoro Autonomous Region in Muslim Mindanao. Marawi City is seated about 816 km south-southeast of the Philippine's main capital Manila. Formerly known as Dansalan City, Marawi is the capital city of Lanao del Sur. There are five (5) division offices of the Department of Education in this province and Marawi City. It has more than twenty (20) tertiary schools, including the Mindanao State University. Marawi City has nine (9) public and thirty-two (32) private high schools. The city implemented the provisions of DepEd orders pertaining to the inclusion of SHS in all school curriculums found in the city (Master list of schools, 2021). Lanao del Sur has thirty-nine municipalities, with Marawi as its capital city. It has four (4) DepEd Division: Lanao del Sur I-A, Lanao del Sur I-B, Lanao del Sur II-A, and Lanao del Sur II-B, with one hundred forty-five 145 public and private high schools (Master list of schools, 2021).

Respondents of the Study

This study employed fifty (50) teachers from the different senior high schools offering Science, Technology, Engineering, and Mathematics (STEM) strand in Marawi City and Lanao Del Sur to be the respondents of the study and on whom the researcher relied on his data gathering. These teachers were handling Science, Mathematics, and other subjects offered in the STEM strand. The distribution of the respondents is shown in Table 1.

Table 1: Distribution of the Respondents of the Study

Location	Code of Schools	Teacher
Marawi City Division	School A, D, E, G, H, I and J	34
Lanao Del Sur I	School B, C, F and K	16
Total	11 Schools	50

Sampling Procedure

The Senior High Schools included in this study were identified and selected through purposive or non-probability sampling. Not all the Senior High Schools in Marawi City and Lanao Del Sur offer Science, Technology, Engineering, and Mathematics (STEM) Strand. Thus, there were only six (6) public schools and five (5) private schools offering senior high, and these schools were all included in the study.

Data Gathering Procedure

The researcher obtained permission from the DepEd superintendents, Senior High School coordinators, principals, and administrative heads of the sample schools to conduct the planned study involving the Senior High School teachers in the STEM strand. Modification, validation, and revision of instruments ensued. The survey questionnaire was adapted from the study of Combalicer (2016), but the interview guide, as well as the field notes, was crafted based on the content found on the survey questionnaire. All the research instruments were validated and revised by a pool of experts. No pilot testing was conducted due to the lockdown caused by the proliferation of the Covid-19 virus. Research assistants were hired and briefed on the roles and functions they were required to do. These research assistants helped in the administration of the questionnaires.

Questionnaires were given to the respondents of the study. These were administered during their duty time in their respective school. The researcher was present to answer

some clarifications asked by the respondents. Respondents were given enough time to answer. After that, they were asked after they finished answering the survey questionnaire individually to verify their responses. Observation using field notes was performed in the school to cross-check relevant data.

Research Instruments

To achieve the validity and reliability of findings, several instruments were utilized in the study. These were the following:

Survey Questionnaire. A survey questionnaire was utilized to gather the necessary data. This questionnaire was adapted from Combalicer (2016). It consisted of three parts. The first part contained the teacher profile of the respondents, where they checked the appropriate choice that reflected their characteristics. The second part focused on the teacher's practices in the implementation of the SHS-STEM strand in terms of Teacher Preparation, Curriculum Enhancement, Teaching Strategies and Techniques, Learning Resources, Student Preparation, and Administrative Support. The respondents decided whether the said aspects were implemented with the following attributes or choices: *Always*, *Often*, *Sometimes*, *Seldom*, and *Never*. The third part of the questionnaire was concerned with the problems encountered by the respondents in teaching the SHS-STEM strand with the following choices: *Very Much of a Problem*, *Much of a Problem*, *moderately a Problem*, *slightly a Problem*, and *Not a Problem*. The adviser and panel members of the researcher validated the instrument in terms of clarity and relevance of each indicator.

Interview Guide. The interview guide used in this study was a semi-structured interview. The questions were based on the survey questionnaire to follow up and verify the data collected from the respondents. Responses from the participants were properly documented using a voice recorder. It has two questions in interview. The first question, have you encountered any problems on the implementation of SHS in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered. And second question was what proposed solutions can you suggest to the problems that you have encountered on the implementation of Senior high School (SHS) Science, Technology, Engineering, and Mathematics (STEM) Strand? As stated in # 1.

Field Notes. This was used in this study to contain the researcher's observations on the availability of different facilities such as classroom facilities, science laboratories, computer laboratories, school libraries, etc. The main goal of field notes is to provide a systematic, detailed, and accurate record of observations made by the researcher during fieldwork.

Statistical Treatment of Data

This study utilized both quantitative and qualitative data. The researcher separately established the data based on what was to be measured quantitatively and qualitatively to guarantee the reliability of the outcome of the research data. For its qualitative aspect, the data were thoroughly consolidated, documented, and carefully reviewed for thematic analysis.

For the quantitative aspect, the Statistical Package for Social Science (SPSS) program was applied. The data gathered from the survey questionnaire and checklists were encoded for further analysis. The statistical tools used for the analysis and interpretation of the data was weighted mean. This statistical tool was employed to evaluate the problems in the implementation of Senior High School (SHS), particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand.

3. Results

Problems Encountered by Teachers on the Implementation of Senior High School STEM Strand

The problems of Senior High School STEM strand teachers were assessed on the areas of teacher preparation, curriculum enhancement, teaching strategies and techniques, learning resources, student preparation and administrative support using Teacher's Problems encountered on Implementation of Science, Technology, Engineering and Mathematics (STEM) Questionnaire.

Teacher Preparation

Table 2 represents the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on teacher preparation on the implementation of STEM strand.

Table 2: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Teacher Preparation

Indicators	Mean (n=50)	Qualitative description	Rank
Inadequate seminars/trainings related to Kto12	3.10	Moderately a Problem	1
Insufficient readings and study materials on Kto12	2.92	Moderately a Problem	2
Lack of knowledge, skills, attitudes, values pertinent to Kto12	2.52	Slightly a Problem	3
Insufficient knowledge on how to address the needs of learners	2.50	Slightly a Problem	4
Inadequate knowledge on varied teaching strategies and techniques	2.40	Slightly a Problem	5
Lack of confidence to teach Kto12 appropriately	2.36	Slightly a Problem	7
Lack mastery on teaching content and objectives	2.36	Slightly a Problem	7
Inadequate know how on the use of varied assessment tools	2.36	Slightly a Problem	7
Poor awareness on the goals, purpose, and objectives of Kto12	2.34	Slightly a Problem	9
Insufficient knowledge on educational technology	2.28	Slightly a Problem	10
Over-all Mean	2.51	Slightly a Problem	

Note. 4.21-5.00– "Very much of a Problem", 3.41-4.20– "Much of a Problem", 2.61-3.40– "Moderately a Problem", 1.81-2.60– "Slightly a Problem", 1.00-1.80-"Not a Problem"

Table 2 shows that the respondents agreed that there was a moderate problem with inadequate seminars and trainings about the K-12 program ($\bar{x}$= 3.10) and insufficient readings and study materials about the K-12 curriculum ($\bar{x}$= 2.92). The respondents also agreed that there was a slight problem on lack of knowledge, skills, attitudes, and values related to K to 12 curriculum ($\bar{x}$= 2.52), insufficient knowledge on how to address the needs of learners ($\bar{x}$= 2.50), inadequate knowledge on varied teaching strategies and techniques ($\bar{x}$= 2.40), and lack of confidence to teach K to 12 appropriately ($\bar{x}$= 2.36). The data also convey that there was a slight problem encountered by the respondents on the lack mastery on teaching content and objectives ($\bar{x}$= 2.36), inadequate knowledge on the use of varied assessment tools ($\bar{x}$= 2.86), poor awareness on the goals, purpose, and

objectives of K to 12 ($\bar{x}$= 2.34), and insufficient knowledge on educational technology ($\bar{x}$= 2.28). The over-all mean is described as 'slightly a problem' ($\bar{x}$= 2.51), which signifies that the respondents agreed that there were slight problems on teacher preparation.

The teacher respondents were faced by scarcity of seminars, workshops, and trainings regarding K to12 curriculum. Even if some teachers attended seminars and trainings, these were not related to K to12 curriculum. These might affect their teaching competencies and pedagogical knowledge. Thus, teachers should attend seminars and trainings that are related to K to 12 curriculum so that they may integrate their learnings to their classrooms.

Said-Ador (2012), in her study, suggested that DepEd ought to send their teachers on K to 12 training to prepare them for the curriculum transition. This implies that due to lack of qualified teachers who taught in the senior high school level, it may result to poor understanding about the pedagogical content of K to12 curriculum. This is also consistent with what Gumal (2012) emphasized that due to lack of funds, the teachers were not funded to attend seminars and training. There were never enough relevant training programs for these teachers to participate. Also, not all teachers were qualified to handle the modeling classes of Senior High Schools (Canezo, 2016). Crisol et. al. (2014) affirmed that the teachers had approved the implementation of the program; although, they did not find themselves equipped to teach students because they believed they need more training on the matter.

Sarmiento et al. (2016) stated that the Philippine education system is marred with issues such as scarceness of qualified teachers at the SHS level. In some education systems, standards for teachers have been established to promote professional growth in education. These standards can also help to identify factors associated with teaching profession in the Philippines. The following were some of the teachers' responses regarding the encountered problems on the implementation of SHS specifically in STEM strand in relation to teacher preparation:

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent A2:	I attended seminars but not related to K to 12, senior high school. [12/2/2020]
Respondent I24:	So far wala pa kame na ka try or pumunta to attend seminars kasi hindi po yan sinasagot ng school yung gasto. *(We could not attend seminars due to lack of financial support from the school.)* [8/18/2020]
Respondent K17:	Some of our teachers do not any training and seminars on how to handle STEM. *(Some of our teachers have not attended trainings and seminars related to STEM.)* [8/19/2020]
Respondent C11:	I have seminars but not particularly in senior high only junior high ang na attend ko na seminar. *(I attended seminars but not associated with Senior High School curriculum.)* [11/23/2020]

It was manifested from these responses of these teachers that they were not able to attend or participate on trainings and seminars related to the K to 12 program specifically in Science, Technology, Engineering and Mathematics strand. This indicates that the teachers in Senior High School STEM strand were lacked experience of participating on seminars, trainings, and workshops about the K to 12 curriculum.

They were not also totally aware of the curriculum guide for the new curriculum. It was interesting to note that most of the respondents who did not attend seminars came from private schools in Marawi City and Lanao Del Sur I. They were not given a chance to attend regional, national, and international seminars due to limited school funding. If they attended these events, they used their own money to register and participate and consequently, earn higher points for promotion. Additionally, Kyriacou & Kunc (2007)

and Roehrig, Pressley, & Talotta (2002), as cited by Towers (2012), mentioned that new teachers faced new kinds of challenges such as classroom management issues, curriculum planning and implementation, conducting assessments, and workload issues. However, mentoring is starting to emerge as a significant support for new teachers in helping them navigate these challenges.

Curriculum Enhancement

Table 3 shows the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on the curriculum enhancement on the implementation of STEM strand. The respondents agreed that there was a slight problem in simplifying the content to students' level ($\bar{x}$= 2.60), integrating the needs and interest of the learners ($\bar{x}$= 2.54), revising the content to make it relevant ($\bar{x}$= 2.48), developing critical thinking and problem-solving skills ($\bar{x}$ = 2.44), and developing students' communication skills ($\bar{x}$= 2.40). It reveals that the over-all mean is described as slightly a problem (M=2.38).

The data also convey that there were slight problems when it comes to planning project-based learning activities ($\bar{x}$ = 2.32), integrating resources and needs of the community ($\bar{x}$= 2.28), creating predetermined content mandated by the authorities ($\bar{x}$= 2.26), lack of teacher's knowledge on enhancing the subject matter ($\bar{x}$= 2.26), and lack of teacher's participation in the formulation of the curriculum ($\bar{x}$= 2.22).

Table 3: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Curriculum Enhancement

Indicators	Mean (n=50)	Qualitative description	Rank
Content is not simplified to the level of the student	2.60	Slightly a Problem	1
Integration of the needs and interest of the learners is not considered.	2.54	Slightly a Problem	2
Revision as needed to make content relevant has not been given attention	2.48	Slightly a Problem	3
Very few learning situations that develop critical thinking and problem-solving skills	2.44	Slightly a Problem	4
Activities that develop student communication skills are not enough.	2.40	Slightly a Problem	5
Project-based learning activities have not carefully planned	2.32	Slightly a Problem	6
Integration of the resources and needs of the community is not evident	2.28	Slightly a Problem	7
Mandated by authorities with predetermined content	2.26	Slightly a Problem	8.5
Teacher lacks knowledge on how to enhance subject matter	2.26	Slightly a Problem	8.5
No participation of teachers concerned in the formulation of the curriculum	2.22	Slightly a Problem	10
Over-all Mean	2.38	Slightly a Problem	

Note. 4.21-5.00– "Very much of a Problem", 3.41-4.20– "Much of a Problem", 2.61-3.40– "Moderately a Problem", 1.81-2.60–"Slightly a Problem", 1.00-1.80-"Not a Problem"

This result indicates that teachers encountered some problems on the enhancement of curriculum and need to revise the content to make it more relevant to the learners. Teachers need to adapt a constructivist approach to their instruction. Project-based learning activities must have been carefully planned and the integration of the resources and needs of the community must be evident on the curriculum enhancement. The teachers lacked

knowledge on how to enhance the subject matter and they had no participation concerning the formulation of the curriculum.

Paige (2009) suggested that adopting a 21st century curriculum should blend knowledge, thinking, innovation skills, media, Information and Communication Technology (ICT) literacy, and real-life experience in the context of core academic subjects. To achieve authentic learning, students should engage in the learning environment effectively and develop 21st century skills such as critical thinking, problem solving, and collaboration. In this way, students will be prepared with the necessary knowledge and life skills that will help them be successful in their future careers (Lombardi, 2007).

The following are some of the teachers' responses regarding the encountered problems on the implementation of SHS specifically in STEM strand in relation to Curriculum Enhancement.

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent D32:	The students are not ready for the curriculum kasi napansin ko na hihirapan sila sa mga subjects. *(Students are not prepared for the curriculum because they find it difficult.)* [11/17/2020]
Respondent A13:	Another problem is the topics in the book, some are very difficult that need to do more research for them. *(The topics presented in the book are difficult.)* [12/2/2020]
Respondent F42:	We actually lot of problems encountered during the implementation of the SHS specifically in STEM strand because students are not ready for subject dahil mahirap kasi ung subjects dito especially ung mathematics and science. For them is early to encounter this kind of subjects like calculus, talagang alam natin na hindi hasa ung mga utak nila for their age. *(Subjects are not within the students' mental capability. And they find these difficult.)* [11/9/2020]
Respondent F16:	The student is struggling with their subjects because is too advance from their level, like it seen like for college student level, but it is too high compared to their level of capacity. (*The students have struggled with the complexity of the subjects which they find hard.)* [11/9/2020]
Respondent E25:	Yung mga subjects sa STEM nahihirapan sila sa subjects like calculus and others mathematics subjects Parang nahihirapan yung mga bata. Kasi pagcollege major yun. *(The subjects in STEM strand such as Mathematics are difficult for the students. And they find these more advanced.)* [11/10/2020]

Based on the teachers', they stated that the content of curriculum was not simplified to the level of learners' capacity which caused difficulty on their part. In addition, most of the students were not competent and prepared enough for the new curriculum. Because of this, teachers must utilize variety of techniques in their teaching to allow students to adjust on the changes brought by the new curriculum. K to 12 curriculum is considered new for both teachers and students. They need time to prepare and adapt to this new and enhanced basic education curriculum. This claim is comparable to some perspectives on readiness to effectively implement a new program. People involved should be given sufficient knowledge about the changes to acclimatize to the new program (Adelman, Rogers, and Sahin (2003,1962 & 2006), as cited by Acosta et al. 2016).

Teaching Strategies and Techniques

Table 4 presents the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on teaching strategies and techniques on the implementation of STEM strand.

Table 4: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Teaching Strategies and Techniques

Indicators	Mean (n=50)	Qualitative description	Rank
Lack of appropriate technology-assisted instruction	2.70	Moderately a Problem	1
Resources of the community are not enough for student exposure	2.64	Moderately a Problem	2
Insufficiency of varied teaching strategies and techniques	2.60	Slightly a Problem	3
Various assessment tools to rate students' performance are not used	2.56	Slightly a Problem	4
Inadequate resources of the community for the students to use	2.52	Slightly a Problem	5
Students practical experience are not incorporated with the lessons	2.48	Slightly a Problem	6
Lack qualified person in the community to tap as resource person	2.46	Slightly a Problem	7
No qualified or available resource speaker to share expertise on the subject matter	2.44	Slightly a Problem	8
Groupings in accomplishing projects are not employed	2.24	Slightly a Problem	9
Team teaching to bring about effective teaching is not done	2.16	Slightly a Problem	10
Over-all Mean	2.48	Slightly a Problem	

Note. 4.21-5.00–"Very much of a Problem", 3.41-4.20–"Much of a Problem", 2.61-3.40–"Moderately a Problem", 1.81-2.60–"Slightly a Problem", 1.00-1.80-"Not a Problem"

It is evident from the findings that the respondents experienced moderate problem on the lack of appropriate technology-assisted instruction ($\bar{x}$= 2.70), and scarce resources of the community for student exposure ($\bar{x}$= 2.64). The respondents also agreed that they experienced slight problems on insufficiency of varied teaching strategies and techniques ($\bar{x}$= 2.60), unused assessment tools to rate students' performance ($\bar{x}$= 2.56), limited resources of the community for the students to use ($\bar{x}$= 2.52), and lack of incorporation of students' experiences to the lessons ($\bar{x}$= 2.48). The result reveals that the over-all mean is described as 'slightly a problem' ($\bar{x}$= 2.48).

The data also convey that the respondents perceived lack of qualified person in the community to tap as resource person ($\bar{x}$= 2.46), lack of qualified or available resource speaker to share expertise on the subject matter ($\bar{x}$= 2.44), lack of teamwork among teachers to accomplish projects together ($\bar{x}$= 2.24), and absence of team teaching to bring about effective teaching ($\bar{x}$= 2.16), as slight problems in improving teaching strategies and techniques.

Based on the results, it was evident that teachers had difficulty because of limited tools for technology-assisted instruction and scarcity of resources available for increasing student exposure to different activities. Teachers did not have ample sources of instructional materials which can be effectively used in teaching. Lack of teacher's knowledge on integrating constructivist approaches to their students, which require the students to learn as they work on their own and the difficulty of finding qualified or

available resource speakers to share expertise on the subject matter were profoundly apparent from the results.

Based on interview conducted, teachers lacked trainings, workshops, and seminars regarding the STEM strand. Thus, teachers must undergo several trainings and seminars related to teaching strategies and techniques. The DepEd must provide qualified and expert speakers to discuss about classroom management and innovative teaching strategies and techniques to be incorporated on K to12 curriculum. This is consistent with the emphasis of Combalicer (2016) on the fact that public school teachers were not well-equipped with varied teaching strategies and techniques.

Theroux (2004) also stated that the challenges most teachers face within their classrooms, such as lack of student motivation and interest on the content material and social and behavioral disruptions, can be addressed and solved by making the students engaged in the learning process. The strategies, in which teachers can employ to improve student understanding, motivation, and behavior, are quite numerous though they all have very similar characteristics and the same goal.

The following are some of the teachers' responses regarding the encountered problems on teaching strategies and techniques on the implementation of SHS STEM strand.

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent D2:	Kulang na kulang kami ng teachers, ako nga, chemistry ung major ko nagteteach ako ng Physics, nagteteach ako ng basic Math, Calculus and Stat wala silang choice sakn bo e kabganoon hindi ko sa kanila mapilit kasi compare to them mas tomo mambo sakn kahit nahihirapan ako hindi ko major sige na lang. *(We lack qualified teachers to teach major subjects.)* [11/17/2020]
Respondent C3:	Yung manpower, I mean yung teaching force because kukunti lang yung science major namin then math namin kunti din….kulang kame ng teacher. *(We lack Science and Math major teachers.)* [11/23/2020]
Respondent D1:	So far in general actually, the only problem we have encountered in our senior high school, we don't have many teachers because we are only four handling senior high subjects. *(We do not have enough teachers to handle subjects in Senior High School.)* [11/17/2020]
Respondent C5:	The most important problem we encountered is first is yung mga teachers hindi talaga mga senior high school teachers kinuha lang sa junior high and then yung…. mga teacher na punta doon is over loaded kasi lack of teachers. *(Due to the problem in teaching force, teachers from Junior High School are pushed to teach in SHS. So, they become over-loaded in teaching preparations.)* [11/23/2020]

Based on conducted interviews with some of the respondents, they stated that the limited number of teachers is one of the main problems in the implementation of senior high schools. Because of the scarcity of teachers available, they handled many subjects and sometimes, these subjects were not their fields of specialization. It can be inferred that Senior High Schools in Marawi City and Lanao Del Sur I had limited number of teachers to teach in Senior High School level, especially in STEM strand. This issue must be taken into consideration immediately because quality instruction particularly in science education can only be delivered by competent teachers.

Development Asia (2019) had a similar finding and pointed out that limited number of teachers is a major problem in education which might constrain schools' general operations. In the Division of Lanao del Sur I, there were only a few numbers of teachers

with items among national high schools in the province. Thus, there is a need to hire more senior high school teachers.

Learning Resources

Table 5 presents the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on learning resources on the implementation of STEM strand.

It is evident from the result that the respondents experienced moderate problems on lack of available laboratory rooms and laboratory equipment for laboratory activities or experiments ($\bar{x}$= 2.86), insufficient computers in school to be used in teaching ($\bar{x}$= 2.84), limited numbers of books and references in the community library ($\bar{x}$= 2.78), few available materials for projects and research work ($\bar{x}$= 2.72), absence of available projector and ICT-related materials needed, few references materials in the school library ($\bar{x}$= 2.68), and lack of textbooks needed in the lesson ($\bar{x}$= 2.62).

They also experienced slight problems on limited number of community resources as an aid for student learning ($\bar{x}$= 2.54), lack of available modules in the subjects ($\bar{x}$= 2.50), and absence of resources person to give discussion/talk about specific topic ($\bar{x}$= 2.46). However, the result reveals that the over-all mean is described as moderately a problem ($\bar{x}$= 2.67).

Table 5: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Learning Resources

Indicators	Mean (n=50)	Qualitative description	Rank
No available laboratory rooms and laboratory equipment needed in laboratory activities or experiments	2.86	Moderately a Problem	1
Insufficient computers in school to be used in teaching	2.84	Moderately a Problem	2
Limited numbers of books and references are found in the community library	2.78	Moderately a Problem	3
Few available materials for projects and research work	2.72	Moderately a Problem	4
No available projector and ICT-related materials needed in teaching learning process	2.68	Moderately a Problem	5.5
Few references materials are found in the school library	2.68	Moderately a Problem	5.5
Lack of textbooks needed in the lesson	2.62	Moderately a Problem	7
Inadequate community resources as an aid of student learning	2.54	Slightly a Problem	8
No available modules in the subjects	2.50	Slightly a Problem	9
Absence of resources person to give discussion/talk about specific topic	2.46	Slightly a Problem	10
Over-all Mean	2.67	Moderately a Problem	

Note. 4.21-5.00– "Very much of a Problem", 3.41-4.20– "Much of a Problem", 2.61-3.40– "Moderately a Problem", 1.81-2.60–"Slightly a Problem", 1.00-1.80-"Not a Problem"

The finding suggests that teachers had moderate problems on the insufficient instructional materials such as textbooks, learning materials, modules, and school facilities such as laboratory facilities, apparatuses, and computer laboratories on the implementation of Senior High School STEM strand. These challenges could greatly affect the teaching and the learning process. Acar (2017) revealed that the lack of infrastructure, facility, and learning environment had higher impact on the academic performance of the students. This implies that the limited number of computers and textbooks available for Senior High School teachers and students could impact their performances.

This is consistent with Estonanto's (2017) claim that the major problems of implementing the curriculum were on lack of facilities and instructional materials. Aside from these problems, lack of available ICT tools and instructional materials was another major struggle among teachers and students. Combalicer (2016) mentioned that technological tools and other ICT related materials that were needed for instruction were very limited which caused a big problem teachers and students. Gumal (2012) also claimed that the unavailability or insufficiency of computer and science laboratories was an evident problem among schools.

The following are some of the teachers' responses regarding the encountered problems on the lack of learning materials during the implementation of SHS.

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent A4:	First problem encountered during in that time the first year implementation is the unavailable of material, references, textbooks learning materials na walang available, usually we have to wait a month's let say a sem bago dumating dito galing sa central pababa sa region. *(The distribution of the learning materials is delayed making them unavailable.)* [11/26/2020]
Respondent D2:	Since the Senior High School, I mean the K to 12 is currently is very new in our school, we have a lot of problems, first is we don't have a laboratory room, we have equipment, but we don't have the area to perform the experiment. *(We may have equipment but no laboratory rooms ever since the implementation of K to 12.)* [11/17/2020]
Respondent J3:	We don't have computer lab, but we have computer lab there, we cannot use it because that is for junior High School. *(There is available computer laboratory room but intended for the Junior High School students.)* [11/17/2020]

Based on excerpts above, textbooks and other learning materials needed in teaching were scarce. These schools, according to the teacher respondents, did not have abundant number of learning materials such as modules, references, textbooks etc. Poor internet connection was also a major problem. These problems should immediately be addressed by stakeholders because it might affect student and teacher's performance in classrooms.

Computer laboratories and equipment were not plentiful for the students in Senior High School. Some of the respondents said that they have laboratory apparatus but no space or laboratory room to display or perform their experiments. Some of them also had laboratory apparatuses but no available chemicals to utilize. This implies that computer facility was highly needed by the respondents especially for instruction because it can improve their teaching, help students learn better, and integrate ICT to their classroom instruction. Having a computer laboratory aids in the enhancement of curriculum. It also paves way for an innovative teaching strategies and techniques of 21st century using information, communication, and technology (ICT). It helps to assist students in

developing students' critical thinking and problem-solving skills, which is one of the goals of K to 12 education.

Robles (2015), as cited by Basilan (2018) stated that R.A. 10533, also known as the Enhanced Basic Education Curriculum or the K to 12 Curriculum has doubled the needs for effective instructional materials, as this curriculum would add two (2) more years in high school. Estonanto (2017) reported that lack of facility and instructional materials ranked first among the major problems of implementing SHS STEM strand. Abasolo-Ababa (1998), as cited by Gumal (2012), discovered that those high-achieving schools had no problems when it comes to library because learning resources such as books were easily accessible and available, and students were given library time. This is contrary with low achieving schools where students were not given library time due to insufficient books and references.

These findings imply that some Senior High Schools in Marawi City and Lanao del Sur 1 were not entirely prepared on the implementation of STEM strand. Aside from lack of materials, some schools had no laboratory facility conducive to experimentation. Similarly, Asian Development Bank (2019) pointed out that lack of buildings and workshop rooms for specific strands were not fully provided for senior high school in public schools. Private schools also experienced a struggle in acquiring needed number of rooms, buildings, and laboratories intended for the different strands.

Table 6: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Student Preparation

Indicators	Mean (n=50)	Qualitative description	Rank
Poor awareness on the goals, purposes, and objectives of the Kto12 curriculum	2.82	Moderately a Problem	1.5
Lacks orientation, symposium to broaden the knowledge in Kto12	2.82	Moderately a Problem	1.5
Lacks knowledge on the rationale why the enhanced basic education curriculum is implemented	2.80	Moderately a Problem	3
Lack of understanding on concepts and class activities	2.72	Moderately a Problem	4
Various materials needed for instruction are not enough	2.62	Moderately a Problem	5.5
Lack of knowledge and poor understanding on underlying concepts and principles that can be applied to problems/situations in new contexts	2.62	Moderately a Problem	5.5
Shows passivity in class discussion and making projects	2.58	Slightly a Problem	7
No orientation about the new ways on how the lessons are presented	2.56	Slightly a Problem	8
Performance assessment tools are not clearly explained	2.48	Slightly a Problem	9
Relating personal experience for the long retention of learning are not observed	2.46	Slightly a Problem	10
Over-all Mean	2.65	Moderately a Problem	

Note. 4.21-5.00– "Very much of a Problem", 3.41-4.20– "Much of a Problem", 2.61-3.40– "Moderately a Problem", 1.81-2.60–"Slightly a Problem", 1.00-1.80-"Not a Problem"

Student Preparation

Table 6 shows the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on student preparation for the implementation of STEM strand.

Table 6 presents that problems such as poor awareness on the goals, purposes and objectives of the K to 12 curriculum ($\bar{x}$= 2.82), lack of orientation and symposium to broaden the knowledge in K to12 ($\bar{x}$= 2.82), lack of knowledge on the rationale of the implementation of enhanced basic education curriculum ($\bar{x}$= 2.80), lack of understanding on concepts and class activities ($\bar{x}$= 2.72), limited number of materials needed for instruction ($\bar{x}$= 2.62), and lack of knowledge and poor understanding on underlying concepts and principles that can be applied to problems/situations in new contexts ($\bar{x}$= 2.62), were perceived by the teacher respondents as moderate problems.

They also agreed that problems such as passivity in class discussion and project making ($\bar{x}$= 2.58), absence of orientation about the new ways on how the lessons should be presented ($\bar{x}$= 2.56), lack of explanation about performance assessment tools ($\bar{x}$= 2.48), and non-observance of relating personal experience for learning retention ($\bar{x}$= 2.46). The result reveals that the over-all mean is described as moderately a problem ($\bar{x}$= 2.65).

From these results, it can be deduced that teachers faced problems such as lack of orientation about the objectives and benefits of K to 12 program. Therefore, the teachers and the administrators must provide an orientation or seminar to the SHS students, so they can fully understand the K to12 curriculum and its concept. According to Mohammad (2016), this K to 12 program would pave the way for a generation of graduates who are equipped with skills and knowledge that they could apply to their day-to-day experiences.

The following are some of the teachers' responses regarding the encountered problems on student preparation for the implementation of SHS STEM strand,

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent D8:	Minsan nakaroon kame last year ng tatlong workshop, kasi una-una introduce sa kanila, ano itong SHS and doon sila magdecide kung anong strand na nababagay sa kanila. *(We have three workshops that conducted, and the students will decide what strand they will proceed.)* [11/16/2020]
Respondent J16:	The advisers sometimes ino-orient sila ano yung objective ng K to 12, ano ang advantages ng K+12 and give them about STEM. *(The advisers will give the students an orientation regarding with the objectives, advantages of K +12 and STEM strand.)* [11/11/2020]
Respondent B4:	Before we started our classes, we give them orientation kasi kung bago kay teachers mas bago kay students that's why we really conducted orientation before started the classes, we give them an idea what SHS is, What STEM and TVL are? So that they have idea what strand they will pursue? (*We gave the students an orientation, what is SHS, STEM and TVL? And then students will decide what strand they proceed.)* [11/12/2020]

Based on responses provided by the respondents, they stated that they had attended seminars, workshops, and orientations that were related to K to 12 and STEM Strand during the first school year of Senior High School implementation. The Local Government Unit (LGU) also provided a seminar regarding health care like drug awareness, hazard awareness, environmental issues, etc. This implies that conducting seminars, workshops, and orientations in the first years of SHS implementation would benefit both the teachers and students because they would be oriented and aware of the objectives and purpose of

K to 12 program. Students would also be directed on the specific strands and would make them assess themselves on what strand would they apply to. Students had been enthusiastic about the introduction of the K to12 program and were also hopeful that it would achieve its objectives. They were willing to invest their time and resources to know more about the curriculum (Crisol, L., et. al., 2014).

Administrative Support.

Table 7 presents the weighted mean, qualitative description and rank of item indicators assessing teachers' self-reported problems on administrative support on the implementation of STEM strand.

Based on the table, the respondents agreed that they faced 'slight problems' when the administration showed no concerns in dealing with SHS teachers about financial claims and other benefits (i.e., salaries and fringe benefits) ($\bar{x}$= 2.50) and there was a lack of support activities related to SHS teachers' professional growth ($\bar{x}$= 2.46).

The data also convey that the school administration had no harmonious relationship with SHS teachers ($\bar{x}$= 2.42); the principal lacked concerned with the problems of the SHS teachers; and handled the problems sympathetically ($\bar{x}$= 2.34); and there was also a lack of supervision among SHS teachers ($\bar{x}$= 2.32). The result reveals that the over-all mean is described as slightly a problem ($\bar{x}$= 2.41).

Table 7: Mean, Qualitative Description and Rank Distribution of Teachers' Problems on Administrative Support

Indicators	Mean(n=50)	Qualitative description	Rank
Within the limits of financial resources, the administration, shows no concerns in dealing with SHS teachers about financial claims and other benefits (i.e., salaries and fringe benefits).	2.50	Slightly a Problem	1
The administration lacks support with activities that relate to SHS teachers' professional growth.	2.46	Slightly a Problem	2
The school administration has no harmonious relationship with SHS teachers.	2.42	Slightly a Problem	3
The principal lacks concerned with the problems of the SHS teachers and handle these problems sympathetically.	2.34	Slightly a Problem	4
The school principal lacks of supervision among SHS teachers.	2.32	Slightly a Problem	5
Over-all Mean	2.41	Slightly a Problem	

Note. 4.21-5.00– "Very much of a Problem", 3.41-4.20– "Much of a Problem", 2.61-3.40– "Moderately a Problem", 1.81-2.60–"Slightly a Problem", 1.00-1.80-"Not a Problem"

This finding suggests that teachers faced slight problems on the absence of harmonious relationship, supervision, and concerns of the administrators with the problems of Senior High School teachers. Thus, school heads and the administration must have harmonious support with SHS teachers to solve the problems they are facing on the

implementation of Senior High School particularly in STEM strand. By having a harmonious relationship, teachers might demand financial support, supervision, and professional growth assistance from school heads and administrators in Senior High School program. Unfortunately, not all school principals were actively involved in supporting and mentoring the new teachers.

According to Brown and Wynn (2009), the beginning teachers continue to exit the profession in alarming numbers. However, the principals who are aware of the issues affecting new teachers, with a pro-active approach and with a commitment to professional growth for themselves, their students, and their teachers (new and veteran alike) are retaining teachers at a higher rate than their other peers. Scott (1999) also reported on the Beginning Teacher Induction Program in New Brunswick that levels of principal involvement in mentoring of new teachers varied considerably. Over half of the principals being studied were either not, or only minimally, involved. Moir (2009) also found out that good principals create a culture of learning, that effective induction programs combine high-quality mentoring with communities of practice, and that teaching conditions matter in supporting and keeping new teachers.

The following are some of the teachers' responses regarding the encountered problems on the administrative support for the implementation of SHS STEM strand.

Researcher:	Have you encountered any problems on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics (STEM) Strand in your school? If yes, please discuss the problems encountered.
Respondent E2:	Our school head is very supportive not only for teachers but also to the students, as well as our LGU nagbibigay sila ng school supplies and financial assistance for students, they give scholarships. *(Our school head is very supportive not only for teachers but also students and the LGU provided school supplies and financial assistance for students.)* [11/15/2020]
Respondent B3:	Mayroon namang support, this school is mayroon MOOE intended for improvement of school for SHS and LGU nagbibigay sila ng support in our school. *(There is MOOE from principal intended for improvement of school and LGU provides support in our school.)* [12/10/2020]
Respondent F4:	Yes, mayroon naman, from Brgy. Chairman, Division office and superintendent but not enough. (*There was support from Brgy. Chairman, Division office and Superintendent.)* [11/13/2020]

Based on their responses, the principals, the school administrations, and the Department of Education (DepEd) offices/divisions provided and supported the needs of SHS teachers. There was a support received from local government units such as the municipality mayor and *barangay* chairman to the teachers in Senior High School. However, financial support for school maintenance and other operating expenses (MOOE) was not enough for the improvements needed in Senior High School level.

This indicates that moral, harmonious relationship, supervision and financial support from the school head, administration, LGU, DepEd office are needed by the Senior High School teachers. According to Calub (2019), administrators and teachers need to work together towards a shared vision of success in the classroom. This means that knowledge and experience are needed to improve competence and positive attitude in implementing the K to 12 curriculum. This would enable schools to solve problems and implement positive change. To achieve this goal, the principals must first identify the needs of the teachers and integrate them with the needs of the school. Roberson (2009) also suggested that the principal is a critical factor in teachers' success and he or she should point the

importance of providing meaningful, instructive feedback to new teachers. Wood (2005) noted, as well, that two of the five key roles of the principal in new teacher induction are as instructional leader and as advocate for novice teachers.

The Proposed Solutions to the Problems Encountered on the Implementation of Senior High School (SHS) specifically in Science, Technology, Engineering, and Mathematics (STEM) Strand

The following were the teachers' responses analyzed thematically. These were the suggested solutions to the problems encountered on the implementation of SHS particularly in Science, Technology, Engineering and Mathematics STEM strand. Their responses demonstrated the following themes: (1) attending seminars/trainings related to K to 12; (2) simplifying the content to the level of the students; (3) providing textbooks needed in the lesson; (4) providing available laboratory rooms and laboratory equipment needed in laboratory activities; (5) providing computers in school to be used in teaching; and (6) hiring additional teachers.

A. Attending seminars/trainings related to K to 12

Researcher: What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?

Respondent F6: I want the teachers to attend training/seminars kasi talaga for I have experience for having attended a lot of seminars with my principal I noticed we have a lot to learn pa about teaching STEM. At least for the benefits to us but also for the students. *(Attending seminars/trainings is important for us, teachers, to be knowledgeable and be well-equipped in teaching STEM strand.)* [11/9/2020]

Respondent K1: Siguro the best possible solutions is we have, all the faculty or teachers they have to engage themselves more attending seminars. *(All teachers in SHS specifically in STEM strand must attend seminars.)* [8/19/2020]

Respondent E2: More training/seminars para sa mga teachers para ma exposure ang mga teacher ng Senior high school para update kame. *(Teachers shall attend seminars and trainings so that they will be updated on the Senior High School curriculum.)* [11/10/2020]

Respondent G6: Kailangna mas maganda e training and seminars sila sometimes hindi kame nagkakaroon ng seminars. *(We seldom attend seminars and trainings which is a necessity to.)* [11/19/2020]

Respondent B5: I think for teachers I think, it is much better for us to pursue higher education and master degree and attend various seminars for cope up the need of the learners. *(Aside from pursuing further studies, we should be attending seminars and trainings.)* [12/1/2020]

Based on the feedbacks given by the teacher respondents, they suggested teachers should attend more seminars and trainings to enhance their teaching competency. These could help them in making new strategies and techniques to integrate when teaching senior high school students. This is paralled to what Crisol et. al. (2014) stated that teachers approved the implementation of the program, but they needed to attend seminars and trainings to develop their pedagogical content knowledge. This finding further entails that the administration and school heads should extend their moral and financial support to

their SHS teachers who are willing to attend seminars and trainings related to K to 12. On the other hand, teachers must also have an initiative to look for ways for their professional growth.

B. Simplifying the Content to the Level of the Students

Researcher:	What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?
Respondent D17:	So as a teachers, we have to initiative, if you see we have to assess and to engage the capacity kasi kapag teacher ka alam mo ung kakayanan ng estudyante mo so kami ung nagaadjust like for example if the topic is difficult to them, kame ung nagaadjust to the point na kakayanin nila at least one step higher for their prior knowledge. *(We have to adjust to the students' ability especially if the topic is difficult.)* [11/5/2020]
Respondent E23:	Regarding doon sa pag reach ng prior knowldege, siguro ma e suggest ko jan is a peer-mentoring kasi madakl a wata mambo advance kasi hindi rin kaya lahat ng teachers mala a giugop ron na makakaroon tau peer-mentoring. Mas nagkakaintindihan sila sa level nila. *(Fast learners may help the slow learners through peer-mentoring to simplify the lesson and make it more understandable.)* [11/17/2020]
Respondent K7:	Bumababa ako sa level nila, I see to it kahit hindi namin matapos ung curriculum para maintindihan nila talaga yong current topic namin kahit slow pero naintindihan nila un ang ginagawa ko. *(I step down to the level of students' mental capacity. I discussed the lessons according to their learning pace even I have missed some topics in the Learners' Guide due to limited time.)* [11/17/2020]
Respondent D14:	So ang nagyayari is sometimes yung klase ko recalling lang ang nagyayari so recalling on the topic before tayo magprocced sa another topic alangan hindi mo ererecall paano makafofolow yung mga bata? *(Before proceeding to the next topic, we have to review the previous one. If not, students may not hook to the lecture's flow.)* [11/12/2020]
Respondent F6:	Sa teacher strategies niya e review yung mga student sa previous discussion before siya magproceed sa next topic niya para mas simply. *(Reviewing the previous discussion may make the lesson easy and simple to the students.)* [11/10/2020]
Respondent H3:	Siguro ano lang kailangan siguro e lessen difficulty ng mga subjects na ipakuha sa mga students. *(The subjects to be taken by the students must not be so difficult for them.)* [8/19/2020]

Curriculum content, according to the respondents' feedback, should be simplified, reviewed, and mentored to the level of the students to minimize students' academic burden when dealing with difficult subjects. K to 12 demanded both teachers and students to adapt and face the new curriculum. It also required learners to become proficient and globalized learners who are equipped with indispensable skills that prepare them to face the world of work and higher learning. Sergio (2012) noted that the new curriculum would correct the deficiencies among a good number of high school graduates who would like to pursue higher education yet were ill-equipped with the basic tools to face its rigors. However, this might not be realized if students already sensed adversity from the start of the STEM classes.

C. Providing Textbooks Needed in the Lesson

Researcher:	What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?
Respondent A2:	Para sa akin, una una, papaano maiparating sa DepEd national mabigyan nila magandang solution itong lack of materials at ska itong mga textbooks para maagapan o mabigya ng solution.*(The DepEd national must address the problem on the insufficiency of learning resources.)* [11/26/2020]
Respondent E22:	Siguro mas maganda available yung mga libro sa library for SHS students so that they can borrow it and bring to their house. (*Books must be provided in the library so that students can borrow.)* [11/10/2020]
Respondent E31:	Dapat sa Admin (Division) magprovide ng mga books and materials at ska dapat every teachers mayroon din sariling books na maibigay sa kanila. *(The division office should provide learning materials to teachers aside from the students.)* [11/10/2020]
Respondent B3:	Isa sa mga plano namin is magkaroon kami ng library exclusive lang sa mga SHS nandoon lahat yung mga libro at materails kailangan nila sa pagaaral. *(We plan to have library containing all learning materials needed by senior high school students.)* [12/1/2020]
Respondent C4:	Yung DepEd dapat before sila magimplement dapat, ready na sila, dapat may mga textbooks at mga modules. *(DepEd must be adequately prepared before implementing the curriculum particularly on the accessibility of learning materials.)* [11/23/2020]

Based on the answers of the teacher-respondents, they suggested that DepEd Central office must address the problems of the lack of textbooks, references, and other related-learning materials. Some of the respondents suggested that they wanted to have a library intended for Senior High School students so that they may have a convenient space to study and access some available materials.

Gumal (2012) cited that most of the schools in the Autonomous Region in Muslim Mindanao (ARMM) had libraries but lacked books. And this certainly would have a negative impact on student performance or achievement. Learning and teaching materials, according to Jocelyn Right (2014), are the resources teachers used to deliver instruction. They support student learning and increase student success. Ideally, the teaching materials are tailored to the content in which these are used. Teachers must learn how to be resourceful in making and improving learning materials.

D. Providing Available Laboratory Rooms and Laboratory Equipment Needed in Laboratory Activities

Researcher:	What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?
Respondent F6:	Dapat mabigyan kame ng attention na kailangn namin yung lab. facilities for us para effective yung teaching namin. *(For us to deliver effective teaching, we must have the needed laboratory facilities.)* [11/10/2020]

Respondent J6:	I suggest before the school offered the STEM it should have already laboratory facilities and also the local government should also provide financial support. (*Laboratory facilities must have been provided to the school before offering the STEM strand.)* [8/19/2020]
Respondent K3:	Kailangan namin ng facilities although may mga support sa amin ng LGU, I think we do not have enough lab. facilities to really give quality education as much as we want to give quality education for students kaya lang we lack of facilities. *(We need sufficient laboratory facilities to provide good quality education.)* [11/5/2020]
Respondent E1:	As much as possible mas maganda talaga na may iprovide na mag apparatuses or equipments if walang maiprovide kame na lang mga teachers magadjust so maging resourceful lang kame o mag hanap na lang kame ng paraan. *(If laboratory apparatus cannot be provided then we have to improvise or look for alternates.)* [11/10/2020]
Respondent I1:	Kailangan magprovide ng apparatus sa science lab and other materials na kailangan sa STEM. *(Laboratory apparatus must be provided in science activities for STEM.)* [11/10/2020]

Based on the feedback, the respondents suggested a solution to provide available laboratory rooms and laboratory equipment needed in laboratory activities. These facilities may help them perform experiments and may augment students' critical thinking and problem-solving skills. Thus, the DepEd should furnish chemicals and materials, as well as a conducive laboratory facility, to yield effective and efficient learning for the STEM students.

Acar (2017) stated that the infrastructure has a certain positive degree of association with academic performance. Supplementing the lack of infrastructure, facility, and learning environment would have a higher significant impact on the performance of the students. The supply of learning facilities such as learning resource center, library, laboratory, ICT room, computers, study area, and adequate classroom space (student ratio), would surely render a better effect on students' performance.

E. Providing Computers in School to be used in Teaching

Researcher:	What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?
Respondent D16:	Kailangan yung taga DepEd magprovide ng sapat na computer sa amin kasi kulang at yung iba not functional. *(DepEd must provide enough computers.)*[11/17/2020]
Respondent C33:	I think we need a computer and lab kasi luma na. (*We need new computers and laboratory room.)* [11/23/2020]
Respondent J23:	Pinapadala namin yung mga student ng laptop. Or naghihiram sila. *(Due to lack of computers, we asked students to bring their own or borrow from their peers.)* [11/10/2020]

From the respondents' feedback, it was suggested that the DepEd office must provide additional computers for the schools. Insufficient, non-functional, and outdated computers were the only available computers in schools. Every school should be provided with good quality computers or laptops by the DepEd, especially amidst the COVID19 pandemic. Teachers certainly need these gadgets for making modules and for their online classes. In addition, using ICT tools, such as computers, enable teachers to become more productive in their teaching to provide quality education for students. Acosta et al. (2016) emphasized

that the lack of computer laboratory and ICT- related materials used in teaching have been a widespread problem in the country and this problem needs to be addressed by the government immediately.

F. Hiring of Teachers

Researcher:	What solutions can you suggest to the problems that you have encountered on the implementation of Senior High School (SHS) particularly in Science, Technology, Engineering, and Mathematics (STEM) Strand?
Respondent D8:	Kailangan namin ng teachers kasi apat lang kame, ung apat dalawa lang ung science teacher so maybe kailangan ng hiring ng teachers. *(We need more teachers especially in Science.)* [11/17/2020]
Respondent D21:	Another solutions siguro namin to have more teachers who handle SHS particularly in grade 12 kasi kulang talaga kasi if marami, the more teacher na the more learning. *(Presence of more teachers in SHS may accommodate well the students.)* [11/16/2020]
Respondent C33:	So ang ginawa namin ng sulat kame sa DepEd so since we are waiting for feedback so ang ginawa namin naging solution namin is kahit hindi namin field kame din yung nagturo and then isa din sa aming solution mayroon din kaming mga……. volunteer teachers. *(We expressed to DepEd our need for more teachers. Sometimes, we tap the service of the volunteer- teachers or we teach subjects which are not our field.)* [11/23/2020]
Respondent C15:	Of course, hiring many teachers para at least hindi kame ma overload sa subjects. *(Hiring enough teachers may help to address issue on over-loading of subjects handled by the teachers.)* [11/23/2020]

The teacher-respondents suggested hiring qualified teachers who could teach in Senior High School level, specifically in the STEM strand. At the same time, hiring volunteer teachers to teach Senior High School may temporarily answer the problem of the lack of teachers; however, it could not give quality instruction if they taught outside their specialization. Ergo, DepEd must recruit teachers based on the set of qualifications and not on the "*palakasan* system". Applicants must undergo thorough screening and evaluation so that those qualified to handle major subjects can be hired.

This finding is consistent with Development Asia (2019) which pointed out that one of the issues that may constrain a school's general operations was the limited number of teachers. In the Division of Lanao del Sur I, there were only a few numbers of itemized teachers in the national high schools. There is a need to hire more qualified senior high school teachers, particularly in STEM strand.

4. Conclusion

The study explored and evaluated the problems of the teachers in the implementation of the Senior High School-STEM strand in Marawi City and Lanao del Sur. It was revealed that teachers have problems in the six areas of concern: teacher preparation, curriculum enhancement, teaching strategies and techniques, learning resources, student preparation, and administrative support. Some identified problems were revealed under the indicators of the said areas. These were: inadequate seminars/trainings related to K to 12; not simplified content to the level of the students; lack of textbooks needed in the lessons; lack of available laboratory rooms and laboratory equipment needed in laboratory activities; insufficient computers in school to be used in teaching; and lack of teachers.

Out of those problems encountered by teachers, the following solutions were proposed: (1) attending seminars/trainings related to K to 12; (2) simplifying the content to the level of the student; (3) providing textbooks needed in the lesson; (4) providing

available laboratory rooms and laboratory equipment needed in laboratory activities or experiments; (5) providing computers in school to be used in teaching; and (6) hiring additional teachers.

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