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The Implementation of the Special Science Curriculum: Voices of Concerned Teachers

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ABSTRACT: This study aimed to picture out the implementation of the Special Science Curriculum from the teacher-implementers' point of view. 21 teachers from the different Science, Technology and Engineering-implementing schools from Region XI who served as the In-depth interview and focus group discussion participants. Their experiences included the opportunity to facilitate a special breed of learners, intensive groundwork for discipline, lack of instructional supply, need of training for the teacher-enablers, lack of supervision, regulation and control, and students' lack of singular focus. The coping mechanisms for the challenges they encountered included involvement in faculty development and formation, communicating with proper authorities, having initiative and self-motivation, and optimism and openness. Insights gathered included a need for a specialized formation of the teacher-implementers, provision of enabling facilities and technical support, a revisit of the criteria for student selection, and the teacher-implementer should be well-equipped and steadfast. As a general impression, resiliency in the field of teaching in the SSC is hard to achieve especially when the teachers are facing students who are expecting a lot from them.

Keywords: *special science curriculum, teacher-implementer, science, technology and engineering*

I. INTRODUCTION

The implementation of science curriculum is a real challenge. In fact, from an educational perspective on the challenges surrounding the implementation of mathematics and science in the education, there is a need of redefining the core nature of scientific and school disciplines. Other than this aspect, teacher implementers had noted a challenge in the funding aspect, the inadequacy of instructional materials, the need for teachers training, and a re-aligning of the curriculum standards. A study also showed that there are academic traditions that are strongly established in teacher trainings, and other variables must be explored (Samson, 2014).

The implementation of a science-oriented curriculum in schools finds its importance in the lives of the students who are destined to enroll in math- and science-related courses. For college entrants, having gone through a science-oriented curriculum in the junior years would be an edge against all others who have come from the secondary schools with the regular curriculum.

Purpose of the Study

This qualitative study aimed to find out the points of view of the different subject teachers handling the Special Science Curriculum (SSC) or those who have taught in the same curriculum for the past years. One way to bring out the picture is to document the experiences of the teachers in their work place. .

Research Questions

1. What are the experiences of the teachers in the implementation of the Special Science Curriculum (SSC)?
2. How do teachers cope with the challenges of the implementation of the

curriculum?
3. What insights can the participants share on the implementation of the curriculum?

Theoretical Lens

This study is based on three interrelated theories: self-determination theory, achievement goal theory, and functionalism theory.

Significance of the Study

The results of this study will benefit the curriculum planners, because this study can be a guide in formulating future SSC and STEM programs. A consideration of teachers' experiences and the impact of the curriculum to the society may play a very important consideration in in-depth analysis of the SSC. Its flaws and strengths may be known as the teachers share their academic experiences in the implementation of the curriculum. The results of this study can be a basis for future curriculum development.

Delimitations and Limitations of the Study

The study concerns the teachers of the S & T-oriented schools in Region XI who are teaching or have taught in the Special Science Curriculum classes from Grade 7 to Grade 10. They represent all the subject areas: Integrated Science, Mathematics, English, MAPEH, Araling Panlipunan, Filipino, and the additional subjects like Biotechnology, ICT, Research, Statistics, and Applied Chemistry. No TLE teachers are involved because, instead of the TLE subject, additional Science subjects are included in the SSC curriculum.

Another limitation of this study was its being inevitably subjective. The participants are asked about their teaching styles that they had employed, their roles, the advantages and disadvantages being teachers of the SSC, theirchallenges, impressions and insightsregarding the implementation of the SSC.Their sharing can be subjective in a way especially that they are within the system.

Another limitation of the study is the number of years of experience of the teachers. Since teachers' load vary each year, some of them may be teaching the SSC for a year or two. This experience may not be as intense compared to those who have been in service for quite a number of years.

Taking into account the role of the subject teacher, this serves as another limitation. While some of them serve as class advisers, others are plain subject teachers. Performing other different roles may mean a difference in dealing with the SSC students.

Research Design

This study made use of thequalitative phenomenological method. The goal of a phenomenological study is to describe a lived experience of a certain phenomenon written in an accessible and non-intimidating style, yet effective in bringing to fore the experiences and perceptions of individuals from their own perspectives. This design was used in this study to fully bring out the experiences of the teachers with their daily encounter with the SSC students. As they shared their stories, their voices are heard, and the power relationships that often exist between the researcher and the participants of the study are minimized to study the phenomena within their context (Creswell, 2007; Waters, 2011).

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Role of the Researcher

My role as a researcher included being an interviewer, and data recorder. I was responsible for familiarizing the origins and details of the approach, designing this study, framing the guide questions, transcribing, thematizing and analyzing the data, interpreting the data gathered, and verifying and reporting the final result. As the researcher I

considered my role vital that I must be able to present the picture of the implementation of the SSC in some STE-implementing schools in Region 11. I must present the result of my study as fairly as I should as Fink (2012) and Starks (2007) had emphasized.

Research Participants

The research participants of this study were different SSC teachers of the STE schools in Region11. The teachers concerned are teaching or have taught in the Special Science Curriculum classes from Grade 7 to Grade 10.To attain data saturation, I conducted post-interview sessions with the respondents to confirm their statements made on the questions asked of them during the interview.

Data Collection

A consent form was given to the identified participants. Their signature in the consent form meant they formed part of the research. Their refusal to be part of the research may be made by contacting the researcher through the mobile phone number and email address seen in the consent form.

Since the informants are regular employees, I gave a letter of permission to the school heads for their consent to interview my informants. An in-depth interview was conducted with each of them.

Data Analysis

The sources of my data were interviews, observations and documents, discussions and participant discourse analysis, field notesand evaluations. All the data were gathered and were interpreted and analyzed to come up with themes of the study. I kept the sample of the transcripts to increase reliability and to reduce biases. It was also important that the transcripts were reviewed to develop a clear understanding of the content. The transcription was encoded in a computer for safekeeping and analysis. It was then submitted to an accredited and expert data analyst for validity and accuracy of analysis. An Nvivo, version 8, computer software was used to analyze the data. On the same manner, it was important that back-up files were at hand to make sure that the copies are safe (Groenewald, 2004; Lester, 2016; Powell, 2013; Willies, 2007)

Ethical Consideration

I am particular with the ethical consideration in the conduct of this study. Ethical principles included respect for persons, beneficence, justice, consent, and confidentiality.

II. RESULTS

Participants

In-depth interview informants. There were thirteen (13) in-depth interview informants in the study. They were included based on their availability during the conduct of the interview, the subjects handled and their teaching experience in the SSC. Of the thirteen informants, seven of them are handling SSC subjects for less than one year to five years, four have been teaching in the SSC for six to ten years, and two had been in the SSC for eleven to fifteen years.

Focus Group Participants. Thefocus group participants are currently teaching in a Science Implementing school. All of them were females. One is currently teaching a Science-add-on subject, two teachers are teaching Mathematics, two are into teaching Filipino, one is teaching English, one is into Araling Panlipunan, and one is teaching both Mathematics and an add-on Science subject. As to the teaching experience in the SSC, five of them have been in the SSC for the zero to five years, two are already serving for six to ten years, and one has loyalty of serving the SSC for eleven to fifteen years. It must be noted again that their number of years teaching in the SSC is not their actual teaching experience in the public school. They also vary as to their designation as to Teacher I, Teacher II, Teacher III and Master Teacher I. In terms of experience of teaching in the SSC, the least experience is less than a year the longest one is twenty years.

Categorization of Data.

All the data collected were coded and each participant was assigned a pseudonym to hide their identity.

A data analyst did the job better by having a final analysis of all the data. This step was followed by verification. The means of communication to them is very accessible by the face book page, text message, or through email. To address trustworthiness in the conduct of his paper, clear strategies were conducted: these strategies were: credibility, transferability, dependability, and confirmability (Shenton, 2004).

Experiences in the implementation of the Special Science Curriculum

After a thorough go-over of the responses, they were summarized and the summary was sent to an accredited statistician. The responses of the informants and participants to each question number were noted.

Opportunity to facilitate special breed of learners

Having students who are very eager to learn. Jessica beamed with pride describing her students.

Teaching different talented personalities.

Students who are smart and are hungry for knowledge.
Students who are very participative; had no qualms asking questions.
Young and brilliant students.
Fast learners.
Students who always go beyond what is expected of them.
Classes with no drop-outs and absences.

Intensive groundwork for the discipline

Being always prepared in coming to class.
Coming out of the comfort zone to study the sciences.
Teaching different classes per day.
Hectic schedule; heavy academic preparations.
Forcing oneself to improve as students are really good.
Frequent changes in the curriculum, new topics to master.
Self-worth as a teacher.

Dearth of instructional support

Inadequacy of laboratory rooms and other physical facilities, i
Unavailability of science equipment for advance subjects.
Lack of audio-visual equipment and ICT tools with wi-fi connectivity.
Lack of gadgets in teaching the lessons.
Lack ofappropriate instructional materials and books for the additional subjects.
Lack of physical facilities like science, mathematics and computer

laboratories.

Lack of financial assistance for researches.
No regular teacher/specialist to handle the advance subjects.

Need of training for teacher-enablers

Lack of training for STE new teachers.
Lack of teacher training on the new NSTIC apparatus.

Lack of curriculum training for advanced courses.

Lack of supervision, regulation and control

Observation of classes is seldom and not so intensive.
A need for a close supervision of SSC teachers' performance.
Personal decision on what the teacher wants to implement in the class.
Full trust from the school heads
Only an outline on the add-on subjects were given.

Lack of singular focus for students

SSC students are into sports, beauty contests, singing.
Students are into other activities not aligned with the SSC.
Students lack concentration which resulted to unsatisfying result.

Too many school activities, conflict with the schedule of classes.

Coping with the challenges of the implementation of the curriculum

Involvement in Faculty Development and Formation

Attendance to the program orientations.
Attendance to trainings, seminars, and workshops

Taking up Master's degree

Communicating with Proper Authorities

Presenting the problems to the administration.
Discussing the problems with the proper authorities.
Raising the concerns to the department head and supervisors.
Seeking the help and guidance of the master teachers or department head.

Initiative and Self-motivation

Browsing the internet and do self-study.

Providing personal textbooks and reference materials.

Innovating ways for the learners to learn better.

Trying to apply interactive strategies in teaching.

Giving of assignments and activities ahead of time.
Doing research on the innovations of Mathematics.
Peer interaction and collaboration.

Optimism and Openness

Being positive.

Accepting the reality; taking it as a challenge.
Conditioning for any change.
Being open-minded.
Facing the challenges with open heart.
Accepting the changes; adapt easily.
Learning to face situations positively and squarely.

Insights on the implementation of the curriculum?

There should be a specialized formation for the teacher-implementer

There is a need for a training of all SSC teachers.

Teachers need constant updating; avoid being stagnant.

Teachers should grow professionally.

Enabling facilities and technical support should be provided

Classrooms should be conducive.

Materials, curriculum guides, modules and references should be provided to all the schools.

There should be a close monitoring whether the program is properly implemented.
Financial assistance should be consistent.

Criteria for student selection should be revisited

Give more qualifying tests for students; conduct interviews.
Selection of students must be given more intensive scrutiny.
Increase the qualifying standards for SSC aspirants
Guidelines should be followed strictly.

Teacher-implementers should be well-equipped

Always be ready as you enter the class

SSC teacher-enablers should be steadfast

Love your work; be committed to it.

Be more competitive, dedicated, and unwavering in your commitment.
Be creative in your class.

Always bring with a bag of patience.

Be the best teacher.
Always be prepared for the challenges that the curriculum will give.
Be a good role model.

Sharpen focus; instill good values and attitudes.

III. DISCUSSION

As the results of this study have revealed, the concerned teachers pointed out a crucial scenario – the dearth of instructional support.

Teaching advance subjects in science also require educational technology advancement. However, what happens in most public institutions is that the technology used in classes is far behind than what is expected. The participants have expressed their concerns on the unavailability of the ICT tools that they need in class.

Trainings for new STE teachers and even on the manipulation of new National Science Teaching Instrumentation Center (NSTIC) apparatus were revealed as lacking in the system. Teachers revealed there is no curriculum training for advanced courses. Finally, they are challenged with the implementation of research-based teaching strategies.

Teachers deem it important to undergo trainings. It's because the curriculum changes and that being unable to pace up with the changes would mean a burden for teachers. Poor performance of the students is not charged against how poor or how advanced their intellectual capacities are. Teachers are accountable for the outcomes in the academe as reflected by their level of effectiveness in affirmation with Stronge (2018).

Based on this study, observation of classes is seldom and not so intensive. The teachers are given their own academic freedom and make necessary decisions for their own classes. They are free to choose what kind of strategy they are going to use and they decide on what to implement in their class.

The consorted efforts of supervisors and the supervisee are expected to improve the instruction in school. The insufficient and/or absence of supervision in STEM classes is tantamount to academic retrogression. The support that will be provided to the teachers as an offshoot of principal/school head supervision is expected to produce positive outcomes.

Based on the responses of the participants, it can be gleaned that teachers are expected to be prepared always in coming to class. Teachers have to prove their competence and their worth as a teacher handling the special class.

Hectic schedule was also experienced by the participants with the implementation of SSC.

SSC students are into sports, beauty contests, singing competitions, and other activities not aligned with the SSC thrust. Too many school activities are in conflict with the schedule of classes that the students lack concentration which resulted to unsatisfying result.

Science teachers are challenged by the harnessing of student focus. Science requires a sense of focus and disciple: it is meticulous.

This study finding is also supported with that of Chang's (2008). In that study, it was noted that students generally lack motivation and have low self-confidence in learning STEM subjects. There are persistent achievement gaps in science and math among many student subgroups which may start as early as kindergarten and continue across grades, widening over time.

Furthermore, the findings above is in consonance with that of Hobbs, Clark, and Plant (2018). One student factor is their poor preparation and inspiration. Added to this is their lack of connection with individual learners in a wide variety of ways. Several national studies also confirm the insufficient preparation of high school graduates for either college-level work or the changing needs of the workforce.

Tessa (pseudonym) described her students as fast learners which poses a challenge on her part as a teacher.

The core business of a school is pictured by Banks (2015). In the same setting is the view of what it graduates should become. The setting is an increasingly favorable school environment and world-class outcomes. It includes what the school graduates had become, what they should become, and what else that they can become. Teachers at all levels need additional preparation in the subjects that they teach and how to teach them. This is the ideal scene that STEM student must be into. Involvement in faculty development and formation is one of the means of coping with the challenges in SSC implementation. Asubstantial evidence vouched for the direct relationship between teachers' participation and engagement in professional development and the quality of teaching-learning process, as had been with the thought ofHénard&Roseveare (2012).

Teachers communicate with proper authorities to cope with the challenges of the SSC. One way of doing this is to open up to principal and head teacher. Presenting the problems to the administration and discussing the problems with the proper authorities also help a lot. Still some raise concerns to the department head and supervisors while others seek the help and guidance of the master teachers or department head.

The participants and informants of the study have their ways of coping the challenges. Therespondents triedtheir best to make a difference in their teaching so they were able to come up with the best learning experiences. These teacherswere making a difference in the instruction, as had been in cahoots with Blades&Mcivor, (2017) and Jorge (2015). Apart from these challenges are the areas that teachers need to understand: the content and disciplines of science, learners, instruction, learning environments, and professionalism. They had been linked with that of Gillespie (2005) and Thornburg (2009).The respondents and informants deal with the challenges positively and light-heartedly. Some take it as a challenge and accept the reality. Others just keep trying their best to be more accepting. Still others are conditioned for any change. It also means being open-minded, doing the best in any situation, facing the challenges with open heart and open mind, adapting easily and learning to face the situations positively and squarely.

In this study, STEM education presented unique challenges to students and teachers alike. The landscape is constantly changing. Many areas of expertise in high demand right now didn't even exist 20 years ago. The volatility of the technology powering many STEM disciplines meant students and teachers must stay diligent or else let their education become obsolete.

This theme means there is a need for a training and constant updating of specializations of all SSC teachers at all levels. Teachers should grow professionallyand avoid being stagnant. Teachers at all levels needed additional preparation in the subjects that they teach and how to teach them, a finding in support to Wiswall,et al. (2014). This is in attest also to Ejiwale (2013) who had pointed out that the main concern of the implementation of STEM education in schools all over the world is to prepare the future teachers with scientific and mathematical backgrounds to enhance skills development across STEM disciplines.

To sum it all, organizations dedicated to STEM education should double their efforts in bringing awareness and instilling a sense of urgency with respect to how rapidly the world is changing. The respondents and informants had varied insights in terms of the facilities technical support. They considered that classrooms should be equipped with multimedia devices. Materials, curriculum guides, modules, and references textbooks in every advanced subject should be provided. Classrooms, for them, should be conducive for learning. There should be a close supervision of SSC teachers' performance and a close monitoring whether the program is properly implemented. Financial assistance should also be consistent.

The teacher-implementers, according to the respondents and informants, should be abreast with the latest trends and developments in their area of specialization.Efficient support system is found to be an essential part for instructional success in the special science curriculum. One of the support systems is through coaching. Kraft, Blazar, and Hogan (2018) affirm that teacher coaching is vital in achieving teaching effectiveness. The report of the Council for National Academies of Sciences, Engineering, and Medicine (2016) supported the assertion that teachers should make the necessary changes in their teaching practices in order to teach the subject effectively.

Implications for Practice

Based on the findings, the following implications for practice are offered:

On the experiences of the teachers handling SSC students, it is suggested that teachers may need appropriate training that will make them more liable as a special science curriculum implementer.

On the coping mechanisms of the teachers on the challenges met, it is a highly recommended that SSC implementing schools may have to provide allocations to support the improvement of the teaching-learning process.

On the insights of the teachers, it is recommended that the criteria for both teachers and students that will be part of the program may need to be revisited.

Implications for further research

Since the findings of this particular study are not generalizable beyond the 20 participants, future researches may be conducted, exploring the experiences of the participants with another group to substantiate the findings.

The experiences, challenges and insights on the perspectives of the school heads who are directly supervising the SSC teachers can also be investigated to add to the existing base findings with the seasoned school heads.

Finally, since the study is limited on the experiences of the teachers, the point of views of the graduates from the SSC can also be explored to validate the concerns and issues presented in this research.

Concluding Remarks

From the findings in this study, I can say that the teachers have exerted considerable efforts in implementing the SSC, with the best that they could. There were factors that these teachers cannot contain such as the availability of resources. Resiliency in the field of teaching is hard to achieve especially when the teachers are facing students who are expecting a lot from them. With appropriate support system, the teachers can cope with the challenges and be able to provide quality education that will produce quality and functional graduates.