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Teachers' Voices in the Implementation of the K-12 Science Curriculum

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ABSTRACT

Abstract. This qualitative study aimed at heeding the K-12 science teachers' voices in the implementation of the K-12 science curriculum. Using grounded theory, the researchers explored the issues and concerns these teachers considered as pressing or challenging in the implementation of the new science curriculum; the actions taken to cope with such implementation; as well as the forms of school-based administrative support that were extended to them to mitigate the pressing/challenging concerns and issues in the implementation of the K-12 science curriculum in a public school. Findings revealed that there was a variety of issues/concerns considered by public secondary school science teachers as pressing or challenging in the implementation of the science curriculum and these were synthesized into the following themes: (a) Lack of Facilities and Instructional Materials and (b) Personal Inadequacy of Teachers to Teach the Subject. To cope with the challenges in the implementation of K-12 science curriculum, the public, school science teachers undertook the following actions: (a) Localization and Contextualization in Teaching, (b) Peer Support, and (c) Individual-initiated Action. Moreover, modules, laboratory materials, and teacher trainings were the schoolbased administrative support extended to the teachers. Further, the K-12 science teachers in public schools recognized the administrative support extended to them; however, they still found these inadequate.

Keywords:*K to 12 Curriculum, Teachers' voice, Grounded Theory*

1. Introduction

Quality education is viewed as any country's pillar of success and in the Philippine educational system today, one of the greatest reforms is the implementation of the K-12 Basic Education Program. This seeks to provide a quality 12–year basic education program that each Filipino is entitled to making kindergarten a prerequisite to basic education. It lengthens basic schooling to include a two-year senior high school and offers technical and vocational courses to students not planning to go to college, thus, giving them more chances of getting employed in blue-collar work (Barlongo, 2015).

This move is in cognizance with Article IV Section 2 of the 1987 Philippine Constitution which states that: "The State shall establish, maintain, and support a complete, adequate, and integrated system of education relevant to the needs of the people and society".

With the noble goal to create a functional basic education system, the enhanced K-12 Basic Education Program seeks to produce productive and responsible citizens equipped with the essential competencies and skills for both lifelong learning and employment (http://www.deped.gov.ph, retrieved May 5, 2017). Despite this very noble endeavor for the Filipino people to restructure the curriculum, critics are questioning the readiness of DepEd to implement the program. Since teachers are the critical agents for bringing changes into the classrooms, they themselves play a great role in the implementation of curricular reforms (Craig, C. J., 2006; Roehrig, G. H. & Kern, K. A., 2007) and, as such, their voices must be heard.

With the aim to heed the K-12 science teachers' voices in the implementation of K-12 Science Curriculum, grounded theory approach was used to pay careful attention to the experiences of K-12 science teachers; the issues and concerns these teachers considered as pressing or challenging in the implementation of the new science curriculum; the actions they took to cope with such implementation; as well as the forms of school-based administrative support that were extended to them to mitigate, if not totally solved the pressing or challenging concerns and issues in the implementation of the K-12 science curriculum.

The working concept in this study is set into focus in Figure 1

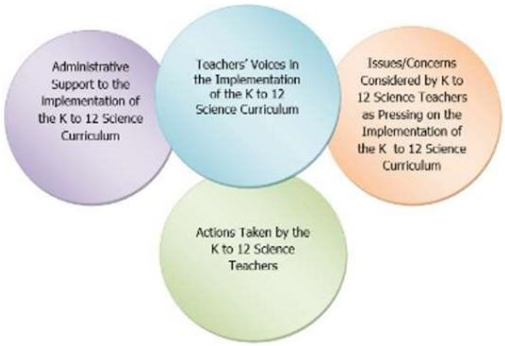

Figure 1. Working Concept of the Study

2. Materials and Methods

Early in the research planning process, the researchers questioned the best data collection approach to assess a complex problem and to create a space for teachers to voice out their concerns. The researchers believed that a qualitative approach could help frame on issues and concerns of the K-12 science teachers. Creswell (2008) defined qualitative research as a type of educational research in which the researcher relies on the views of participants, asks broad, general questions; collects data consisting largely of words (or texts) from participants; and describes and analyzes these words for themes.

The methodology adopted in this study was Grounded theory developed by Glaser and Strauss (1967) that involved data collection and analysis, grounded in reality, and well-suited to qualitative research. It is supported by the theory of symbolic interactionism, which focuses on the subjective understandings and meanings of events and situations for people (Glaser & Strauss, 1967). In the application of the method, the researchers used systematic, inductive guidelines and procedures to collect and analyze data, and to discover the theory ingrained in those data. Grounded theory allows the purposeful sampling of subjects to provide data pertinent to particular research populations. This method was chosen to explore the high school teachers' experiences in teaching K-12 science, and to generate a substantive theory reflective of those experiences.

Criterion-based sampling was used to determine the participants of this study which include: first, they should have taught K-12 science for at least a year; and second, must be willing to participate in the study. Twenty –two science teachers from five different national high schools in a division in Western Visayas, Philippines during School Year 2017-2018 were identified. Of this number, only ten fitted and qualified in the criteria. All ten teachers were invited by sending an introductory kit. Of them, only six showed interest in participating in the study and signed the Informed Consent Form to Participate; thus, there were only six research participants and a pseudonym was assigned to each of them when reporting the data. Data saturation was evident after completion of the six interviews.

3. Results and Conclusions

At their utmost, teachers' voices in the implementation of the K-12 Science Curriculum can be summarized in a schematic diagram in Figure 2.

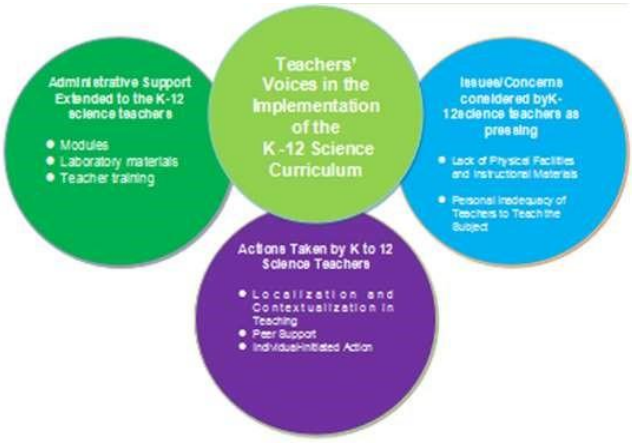

Figure2: Schematic diagram illustrating the teachers' voices in the implementation of the K to 12 science curriculum.

A variety of issues/concerns were considered by public secondary school science teachers as pressing or challenging in the implementation of the K-12 science curriculum. These were synthesized into the following themes: (a) Lack of Facilities and Instructional Materials and (b) Personal Inadequacy of Teachers to Teach the Subject.

3.1 Lack of physical facilities and instructional materials,

Insufficient facilities, instructional materials, reference materials, textbooks, modules, and laboratory equipment, limit teachers to maximize the teaching process. Without such necessities, efficiency of education and improved quality of teaching and learning cannot be achieved. The following narratives illustrate this concern:

Teacher Marie: "We were sent for training. We had hands-on activities. However, when we returned back to our stations, we didn't have our hands-on activities. It means that we could not apply what we had learned in the training because our school has insufficient facilities for such implementation. There are limited copies of students' and teachers' module so I found difficulty especially that they could not follow our lessons. So, we have to photocopy or reproduce these instructional materials."

It is evident that Teacher Marie attempted to speak out her concern regarding her own school context where she could hardly implement what she experienced and learned from teacher training sessions she has attended. Her school setting does not have the amenities of a functional science laboratory and instructional technological gadgets supportive of quality science teaching. She also sounded off her concern on the insufficient supply of both the teacher's and learner's science modules in her local school. She has to find ways to reproduce it to assist better science instruction especially when guided hand-on activities will be performed. It saves time if learners have a printout copy of an activity sheet to refer to when conducting such activities in class.

Teacher Marie strongly believes that incorporating these tools and materials can assist in presenting the science concepts with clarity support, reinforces better teaching, to promote mastery of science concepts. Students taught with instructional materials perform better than those taught without instructional materials (Esu, Enukoha, and Umoren, 2004; Nwike, 2013; Olayinka, 2016) and facilitate concretization of learned abstract concepts by stimulating students' imagination to help them participate actively in class (Williams, 2012).

3.2 Personal inadequacy of teachers

Teachers have found it hard to teach areas in science that are beyond their expertise as brought about by the spiral progression approach in science teaching, that compels the science educators to teach four science areas in a grade level and which they find difficult because of their limited content knowledge and inadequate training as evident in the following narratives:

"When I started teaching K-12 science, I found it hard for the reason that I was forced to teach science topics beyond my line of expertise and experience. I studied and taught chemistry for several years and now I'm teaching biology, physics, and earth and space aside from chemistry. I have limited background on these three other subjects."

"It is hard for me to teach biology topics since I am a chemistry major. For instance, on the Third Quarter, my topic was Central Dogma and it was difficult for me because I don't have a very good background of biology in high school and college. It was a good thing that I have a co-teacher who is a biology major, whom I asked to discuss the topic in my class and at the same time to give me a clearer understanding about the Central Dogma."

Subject matter as an essential component of teacher knowledge is neither a new nor a controversial assertion. After all, if teaching entails helping others learn, then understanding what is to be taught is a central requirement of teaching. The myriad tasks of teaching, such as selecting worthwhile learning activities, giving helpful explanations, asking productive questions, and evaluating students' learning all depend on the teacher's understanding of what it is that students are to learn (Ball and McDiarmid, 2016). It would be odd to expect a teacher to plan a lesson on, for instance, writing reports in science and to evaluate related student assignments, if that teacher is ignorant about writing and about science, and does not understand what student progress in writing science reports might mean. Philosophical arguments as well as common sense support the conviction that teachers' own subject matter knowledge influences their efforts to help students learn subject matter. Kennedy (2014), in this regard, advocates continuing professional development to answer this need of teaching inadequacy.

The Department of Education (DepEd) recognizes that the success of any education system greatly relies on the competence of its teachers. Hence, one of the primary issues that the Department of Education aims at addressing through its comprehensive implementation of the K to 12 Program, is the need for highly competent teachers in public elementary and secondary schools. (DepEd Order No. 14 s 2014). In government secondary schools, however, teachers are considering their lack of knowledge of the areas in K-12 science a pressing issue as conveyed by the teachers during the interviews.

In response to these two pressing issues and concerns in the implementation of the new curriculum, the K-12 science teachers had resorted to: First and foremost, **"Localization and Contextualization in Teaching,"** for they believe that students learn best when experiences in the classroom have meanings and relevance in their lives. Further, teachers claimed that hands-on activities that students performed in their science classes and associating these in daily living are the learnings that last forever. They also recognized that if students were exposed to an actual learning environment where they can manipulate, relate, and adapt to various learning opportunities and resources available within the locality or community, profound learning can be assured and realized. Teacher Leonie shares how she holds her science class in the absence of the required materials and books.

"I innovated materials for my lessons because the materials needed were very costly. For example, the grapes were needed and these cost too much. I saw the fruit of the palm tree and decided to let my students use its fruits for the activity last year. This school year, they used flowers. I asked them to look for objects that could represent the lungs which should have 2 branches. There should be a big branch and branch with many fruits. So they presented to me "bugnay" and "tarung-tarung" which were found around. Every year my students keep on improving and I realized that that there are many things

to be used as substitutes to the materials required in the book. The students have initiative and are very resourceful in looking for these materials. By using materials found around us, they can relate the lesson to real-life situations"

Second, **"Peer Support,"** teachers find it hard to teach areas in science that are beyond their expertise as brought about by the spiral progression approach in science teaching because of their limited knowledge and inadequate training. Peer support provides them with added knowledge, experience, emotional, social, and, practical help. They find strength by supporting and helping one another. Teacher Rose confronted the problem by collaborating with her peers. The following narrative illustrates this concern:

"I seek the help of my co-teachers who are experts in the areas where I am weak. I also ask other teachers if I don't understand. There were also instances when I had coaching from my co-teachers who were majors on certain topics that were difficult for me. I also experienced that I requested one of my coteachers to discuss topics in genetics in my class because those were difficult for me. Good thing, my co-teachers were accommodating and willing to help. Because of their help, I became confident before my students, although the topic is not my major."

Third, **"Individual–initiated Actions"** such as self-study, internet surfing, looking for alternative activities with available local materials, borrowing materials from the library, and spending time to study the teaching content are resorted to by teachers so that they have something to share with their students. In order to cope with the situation, Teacher Julieta had this to share, "I do self-studying during my free time. I also research during Saturdays and search on-line for science class activities that are useful in my lesson. Commonly, the videos are downloaded from the internet like the YouTube. Aside from self-studying, I also attend follow-up seminars. For example, during the first quarter, the Division office conducts seminars. I also try to get the soft copies of the materials and reproduce them. I would also borrow reference materials from the library and spend time studying them so that I would have something to share with my students. Sometimes I let my students pay for the photocopy of the activity sheets for the science activities printed in the book. But if they have to spend much money, I just write the activities on the board for them to copy."

Secondary high school science teachers recognize the school-based administrative support extended by the government for the proper implementation of the K-12 program. Modules and laboratory equipment were partially delivered to schools for students and teachers to use. Teacher trainings were also conducted as avenues for professional development. Teacher Fatima had these to say:

"The government is trying hard to provide all the needs of the students, like the modules but they are not enough. In my case, I teach two sections of Grade 7 with 30 students each and there are only 4 modules available. Sometimes, if there are things for my class which have to be bought, I would ask budget from the principal's office. Sometimes, I am given the amount I need, sometimes I am advised to use my own money to be refunded by the school. But most often, I am not given the refund. If there is a follow-up seminar, the same thing happens-that the school shoulders the registration fee, but sometimes it's from my own pocket. For me, there is really an inadequacy of learning materials needed by students like modules and laboratory apparatus.

The government provides but still not enough for what is needed."

While the K-12 science teachers in public schools appreciate the administrative support extended to them, they still find this support inadequate.

4. Recommendations

Based on the findings from this study, the following recommendations are advanced:

1. To mitigate the lack of physical facilities and instructional materials as well as to upgrade public school science teachers, there is a need to tap possible foundations, alumni, generous benefactors and funding agencies and other stakeholders both government organizations (GOs) and non-government organizations (NGOs) in the community. DepEd can allocate budget to send its faculty to scholarships, trainings, conferences, and conventions.
2. It is also recommended that DepEd will partner with academic institutions of higher learning in organizing and conducting in-service trainings to upgrade science teachers professionally. Forging linkages with potential community partners can assist a school's effort towards development and progress in the delivery of better services to its stakeholders. The findings may serve as springboard for further investigation in the area of K-12 science education to further address the problems confronting the K-12 science teachers. Hence, it is recommended that further follow-up be conducted on the aforementioned problems in order to explore their influence and alternative solutions.

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