

Competencies of Science Teachers in Teaching Science Subjects in the K to 12 Curriculum

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Abstract— This study was conducted to determine the competencies of the Science teachers in teaching Science in the K to 12 curriculum in Palayan City District, Nueva Ecija, Philippines.

The study found out that the respondents were very competent in teaching Science subjects in the K-12 curriculum. However, they need to improve on the following areas: in communicating effectively to parents, business industries and community to gain support to increase the learning of their students; in introducing advanced technology and its application to enhance the learning of students; in teaching the students to communicate effectively and work cooperatively in a Science project; in improving their attitude especially in reading newspapers and magazines to enhance their knowledge in Science; and in loving to watch science programs on Television to utilized in their teaching. The study also found out that the higher the educational attainment and numbers of seminars attended related to the K-12 curriculum, the higher the competence of a teacher in teaching Science subjects.

Keywords— Competencies, K to 12 curriculum, Science subjects, Teachers.

I. INTRODUCTION

“The concept of professional competence may offer a third route to understanding teacher success. Based on definitions from several domains, competence can be defined as the skills, knowledge, attitudes, and other variables that form the basis for mastery of specific situations [1] & [2]”. According to this approach, skills, knowledge and attitudes are not innate, but learnable and thus, teachable.

The author in [3] pointed out that “the previous era had required education for stability, the coming era requires education for instability”. Kress' ideas can explain why teachers' professional development should be redefined for sustainability. The aims of education change very quickly depending on the demands of the era requiring more capability. These demands directly affect the educational system. Teachers are responsible for operating the educational system and they need strong and efficient professional competencies [3].

The definition of science teacher's competencies and their taxonomy are very important in understanding the educational reform in the Philippine context, specifically, the K-12 Science curriculum. Although Science teachers are equipped with necessary competencies there is a need to improve those competencies in terms of their knowledge, attitude and skills to enhance, improve and explore their teaching practices especially in handling today's 21st-century learners.

Based on the above premises, this study was conceptualized. The researcher wanted to describe the level of competencies of the Science teachers as to their knowledge, skills and attitude. She aimed to find out weakness in the competencies to device an action plan that will strengthen the flaws of the Science teachers. Thus, this study finds meaning and significance.

II. METHODOLOGY

The researcher used the descriptive research design in presenting the competencies of Science Teachers in public high schools in the District of Palayan City. Descriptive research design is generally defined as an “attempt to describe systematically a situation, problem, phenomenon, service or program or provides information about, say, the living condition of a community, or **describes** attitudes towards an issue”[4] as cited by [5].

The 27 respondents of this study were teachers who were chosen purposively based on the following criteria [6]: must be a Science teacher; teaching at Palayan District; and handling Science subjects for more than 2 years.

The researcher-made questionnaire was the instrument utilized in this study. The questionnaire was conceptualized and constructed based on the concept of learning outcome typology by [7] that in a learning environment, KSA's counterpart is the *cognitive, psychomotor, & affective* domains that identify end states of training (objectives). The knowledge(cognitive) is about how

information and concepts are mentally arranged by an individual while skill (psychomotor) refers to routine development and procedure linkage and the ability to perform a task of an individual and lastly, attitude (affective), is about one's perception regarding ability to perform, attain goal and perception regarding an individual's motivational disposition. The respondents used the five-point Likert scale in responding to the items of the questionnaire:

5 (Strongly Agree)- The competency is Very Good; 4 (Agree) - The competency is Good

3 (Moderately Agree) – The competency is Fair; 2 (Disagree) - The competency is Poor

1 (Strongly Disagree) - The competency is Very Poor

The researcher utilized the following statistical tools in treating the data that were gathered in this study: frequency distribution, percentage, weighted mean and Pearson's r. All computations were done using Microsoft Excel and Statistical Package for Social Sciences (SPSS).

III. RESULTS AND DISCUSSION

1. Competencies of Science Teachers

1.1. Knowledge;

The data revealed that the respondents strongly agreed that Science teachers have very good knowledge in teaching Science subjects in the new curriculum. They were very good and knowledgeable in the areas of “operating science facilities and laboratory equipment (WM=4.81)”, “reflecting on professional practices and continuous efforts in increasing the quality of teaching Science (WM=4.70)” and “using prior conceptions and students' interests to promote new learning (WM=4.62)”.

Although the teachers were knowledgeable in teaching Science in the K-12 curriculum, they need to improve in the areas where “they have to apply advance technology towards practical work sessions (WM=3.39)” and “in communicating effectively to parents, business industry and community to gain support to increase the learning of their students (WM=3.26)”.

This means that the teachers should focus on achieving strong collaboration to all stakeholders of their school and in using Information Communication Technology (ICT) for the purpose of achieving optimum learning of Science by their students.

1.2. Skills;

The result of the study shows that the respondents strongly agreed that Science teachers have very good skills in

teaching Science subjects in the K-12 curriculum. They were very skilled especially in the areas of “teaching their students to draw appropriate conclusions to Science activities (WM=4.85)”, “teaching the students to collect, record and report data accurately (WM=4.85)” and “using strategies and methodologies in teaching Science subjects (WM=4.59)”.

The skills of Science teachers that need improvement are in “introducing advanced technology and its application to enhance the learning of students (WM=3.37)” and “in teaching the students to communicate effectively and work cooperatively in a Science project (WM=3.33)”. The finding implies that Science teachers were very skilled in teaching their students to be critical thinker, empirical and logical. Likewise, the result tends to convey that the respondent teachers were skilled in terms of different teaching approaches in Science.

1.3. Attitudes;

It can be noted from the table that overall, the respondents have a very good attitude towards teaching Science in the new curriculum. They have desirable attitude especially “in wanting to make their students excited in learning Science subjects (WM=4.92)” and “in encouraging to do more Scientific activities (WMST=4.96)”.

Nonetheless, the Science teachers should improve their attitude especially in “reading newspapers and magazines to enhance their knowledge in Science (WM=3.29)” and “in loving to watch science programs on Television to utilized in their teaching (WM=3.37)”.

2. Relationship between the Profile of the Respondents and their Competencies.

The data revealed that age ($r=.571$), sex ($-.065$) and civil status ($r=-.026$) were not significantly related to the competencies of the Science teachers. The finding suggests that the respondents have similar competencies regardless of their age, sex and civil status.

On the other hand, highest educational attainment ($r=.777^{**}$) and a number of seminars attended related to Science teaching in the K-12 curriculum ($r=.701^{**}$) were significantly related to the competencies of the teachers as to knowledge, skills and attitudes. This means that the higher the educational attainment and numbers of seminars attended, the higher the competency of a respondent.

The finding implies that competent Science teachers were those continuously attending higher graduate education and

those who are frequently attending seminars related to Science teaching.

The result of the current study has a resemblance in the research done by [8]. It was noted that one might reasonably expect to find a positive relationship between higher levels of subject matter knowledge and expressed willingness to teach Science, and a negative relationship between the lower level of science subject-matter knowledge and a decreased confidence in ability to teach science [8].

According to the authors in [9], "the competence to teach is defined in terms of possession of two kinds of knowledge, knowledge of subject matter and professional knowledge." Thus, in their opinion "teacher competence refers to the abilities, beliefs and knowledge a teacher possesses and brings to the teaching situation [9]".

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study, the following were concluded:

The respondents were very competent in teaching Science subjects in the K-12 curriculum. However, they need to improve on the following areas: where they should have adequate knowledge to apply advance technology towards practical work sessions; in communicating effectively to parents, business industries and community to gain support to increase the learning of their students; in introducing advanced technology and its application to enhance the learning of students; in teaching the students to communicate effectively and work cooperatively in a Science project; in improving their attitude especially in reading newspapers and magazines to enhance their knowledge in Science; and in loving to watch science programs on Television to utilized in their teaching. Lastly, the higher the educational attainment and numbers of seminars attended related to the K-12 curriculum, the higher the competency of a respondent in teaching Science subjects. Based on the above conclusions, the following are recommended: Science teachers should attend different pieces of training and seminars related to ICT integration in teaching Science subjects. Teaching strategy such as collaborative approach should be employed by Science teachers to develop teamwork among their student learners and to train the learners for increasing their analytical skills in situational settings [10]. School heads may establish linkage regarding subscriptions of their different schools to the Science publication journals and magazines. Likewise, parents and other stakeholders should be encouraged by administrators and teacher advisers to help the schools in

providing Televisions and Computers that will help in increasing the learning of their children, especially in Science.

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