



Curriculum Design of Preservice Teacher Education for Indigenization of Elementary School Science in the Philippines

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Abstract. This paper presents proposed changes in the pre-service teacher education program for the development of skills for indigenization of elementary school science. The proposal emphasizes the need for the development of more specific competence for teaching science to indigenous people or diverse culture. There should be conscious effort to develop awareness of one's attitude towards ethnocultural groups in the foundation courses (sociology, philosophy and psychology). Moreover, there's also a need to develop skills in designing instruction, developing instructional materials using local materials to make science teaching relevant to the indigenous people and learners of diverse culture. It is also important that field experience in schools with indigenous people and diverse culture be integrated in the program.

Keywords: teacher education, indigenous elementary school science

Introduction

For several decades, the Philippine government focused its reform efforts on enrichment of the elementary school science curriculum, training of science teachers for upgrading of knowledge and teaching skills performance competence, equipping some schools through improvisation programs and instructional materials development. In spite of all these efforts, the issue of irrelevance of science remains one major concern. Science is being taught focused on the content and process with very little link to everyday life. Science learning becomes useless in improving their lives. This condition is thought to be associated with the policy of having one prescribed curriculum for all schools in the Philippines. Science teachers teach what are prescribed without attempting to provide cultural context to their science teaching.

In-service teacher (INSET) training programs on providing skills for providing local context (indigenization/localization) are conducted. While INSET is important, it is necessary also to develop skills in indigenization/localization among pre-service teachers. This year a new 5-year curriculum for teacher education is being implemented. Does this new curriculum include the development of skills needed in indigenizing/localizing the science curriculum? Are there explicit references to the development of skills in science teaching within the context of the local community?

This study aims to determine whether the new curriculum has provisions for the development of the skills for indigenization and localization of the elementary school science curriculum as contained in the document.

This study covers only the examination of the intended curriculum based on a framework drawn from the standards set from different Teacher Education Institutions (TEIs) and researches. It is limited to the competencies for the indigenization of the elementary school science curriculum since it is the perception of the researcher that it is important to build a strong foundation of science concepts and skills from which secondary school science teaching could be anchored on. Without this strong foundation, structures for quality science education would warrant more effort to make good the teaching of science.

This study is based on the framework of curriculum development process (Print, 1990) that the intended curriculum is the main document directing and influencing the implemented curriculum. In this model, the intended curriculum consists of learning intent, learning content, learning activities and evaluation methods to be employed. All of these elements are determined based on the results of a situational analysis. In this process, the curriculum developers decide drawing from three sources of influence – social and cultural orientation; understanding of theories of learning and philosophy of education.

As for the standards against which the Philippine Teacher Education Curriculum (PTEC) is evaluated and the characteristics of a suitable curriculum integrating the development of skills for indigenization, the researcher draws from the model of Ramsey (1969) showing the parameters considered in an effective instruction. His model is the result of a meta-analysis of the different researches in science education indicating the different factors that are proven to be related. The teacher is affected by factors like knowledge of theories of learning, personal philosophy of education, knowledge of subject matter, knowledge of teaching methods (strategies), knowledge of available instructional technologies, knowledge of expected instructional outcomes, knowledge of nature of students, knowledge of evaluation procedures, and knowledge of the educational system. All of these should be developed in the pre-service teacher education program. The main task of teachers revolves around the design of instruction that is effective and relevant. This depends highly on different skills and knowledge performance competence which should be developed in the 4 to 5 years of pre-service teacher education. When a teacher plans for instruction, s/he draws from all of these skills and competence making it important that these are learned as interrelated, one affecting the other.

The following curricular areas could be drawn as the main considerations in determining the standards for pre-service teacher education. The different researches in science education that were considered in the meta-analysis done by Ramsey in 1969 point to these curricular areas as the essential components in defining quality in instructional design and delivery. What are uniquely true to science teaching are those related to instructional strategies and materials and subject matter.

- Learners. (The nature of learners – their socio-cultural-economic background, gender, age, parents' educational background and profession, interests, mental ability)
- Learning Theories. (Different theories that explain how learning takes place or happen)
- Curriculum. (Defines the expected learning outcomes, content coverage, activities and evaluation approach)
- Content knowledge (what should be taught)
- Pedagogy (Instructional strategies)
- Assessment. (Methods of knowing how much learning took place and how effective instructional strategies are)
- Instructional Materials. (Different media that can be used to effect learning)

Methods and Research Design

The research method is descriptive with document analysis as the main data gathering technique employed. There are two components of the research, namely, curriculum evaluation and curriculum design. Figure 1 shows the research flowchart of this study.

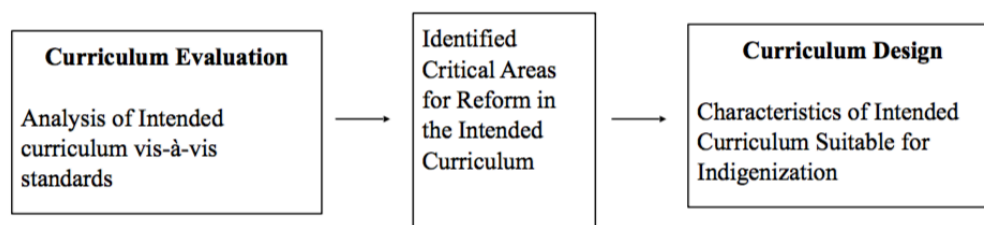


Figure 1. Research flowchart of the study

Curriculum evaluation is limited to the intended curriculum and does not include inputs and implications from instructional evaluation. In the evaluation of the intended curriculum, the following criteria are considered:

1. Presence of the elements consisting a curriculum.
2. Presence/absence of the competence for indigenization.

Results of researches on teaching diverse cultures are also culled from which implications to pre-service teacher education are drawn and related reforms are suggested.

Based on the results of the evaluation of the intended curriculum, reforms to bridge the identified gap in the pre-service teacher education curriculum are suggested.

Data and Findings

A. Competencies in the Pre-service Teacher Education Curriculum

In the Philippines, higher education is under the jurisdiction of the Commission on Higher Education. Under this office is the Technical Panel on Teacher Education (TPTE) which oversees the implementation of teacher education programs in all of the more than 800 teacher education institutions nationwide.

The move for the curricular reforms in teacher education was in response to the problem of unqualified and ill-prepared beginning teachers as shown by studies done by Pedro (1996), PNU-RC, 1999) and the rate of passing in the licensure examination for teachers (LET) which ranges from 20 to 30% per year. Thus, TPTE recommended a 5-year teacher education curriculum which is being implemented this year. CHED Memo Order No. 30, series 2004 contains the competencies and list of courses for this new curriculum.

The aim of the pre-service teacher curriculum is to **prepare professional teachers for practice in primary and secondary schools in the Philippines**. The memo enumerated the 11 competence expected of graduates of the Bachelor of Elementary Education or BEED and Bachelor of Secondary Education or BSE. Elementary school teachers are trained to be generalists, meaning they should be able to teach all the 5 prescribed learning areas (or subjects) of the basic education curriculum; while secondary school teachers are trained to be specialists in one of the 5 prescribed learning areas (or subjects).

All teacher education institutions (TEIs) except for state colleges and universities are required to abide with this minimum requirement (in terms of units). However, TEIs have the leeway to add courses, which are needed to address their schools' philosophy and vision-mission.

The researcher matched the curricular components with the competency standards, based on how these courses are generally taught in the different TEIs. It should be noted that although the memo emphasizes that all these courses should be taught interwoven with one another, reality remains that these courses are generally taught separately; although some teacher educators have consciously attempt to interweave foundational, theoretical, methodological and field experience courses together. Professional courses seem to be tasked with the development of almost all of the 11 competencies; although ideally and as emphasized in the memo, each competency should be developed in one way or another in each of the curricular components. It is the intention of the researcher to highlight the main focus of each particular curricular component without undermining the fact that each competency is also developed in all of the components. No curricular component is left out.

B. Classifying Philippine pre-service teacher education standards into curricular areas (based on Ramsey model)

Using curricular areas drawn from the model of Ramsey, the standards defined in the Philippine pre-service teacher education program were classified. Some standards contain (refer) to more than one curricular areas so these are written in more than one curricular areas. Two standards do not fall in any of the curricular areas, so they are just classified under "other standards."

C. Studies on Competency and standards for effective science teacher education for diversity

There are several studies on educating science teachers for diversity, from which the researcher drew implications to standard setting. Zeichner (1993) identifies 16 key elements for educating teachers for diversity. From these 16 elements, Shaw (2000) chose 12 (twelve) to provide organizational framework for "educating teachers for diversity." According to Shaw, each element is a piece of the jigsaw of multicultural teacher education which must be completed to see the big picture, the education of teachers for diversity must be addressed in a holistic manner.

Shaw apparently did not choose those elements related to field experience (direct exposure and policy on admission. It is the perception also of the researcher that these 12 elements can cover the other 4 elements (no. 1, 13, 14, & 15) and that there is no need to explicitly mention them.

Villegas and Lucas (2002) identified 6 salient characteristics of a culturally responsive teacher. They suggested that these characteristics should be the basis for curriculum revision in pre-service teacher education toward infusion strategy. This suggestion is an alternative approach to the prevailing practice of adding one or two courses in multicultural education or urban education (Goodwin, 1997) which are not as effective since students have the option to take or not these courses.

The researcher finds the need to emphasize the following points that should be remembered in designing and implementing pre-service teacher education program for science teachers for indigenization and localization of the prescribed curriculum:

- Pre-service teacher education program should integrate lessons on developing a clearer sense of one's own ethical and cultural identities. Villegas (2002) emphasized the importance of sociocultural consciousness of student teachers because "without this insight, teachers are unable to cross the sociocultural boundaries that separate them from their students." Zeichner & Hoeft (1996) mentioned that for teachers to understand their future students, student teachers must be able to appreciate their own sociocultural identities.
- Pre-service teacher education program should provide for opportunities for student teachers to examine their attitudes toward other ethnocultural groups. Irvine (1990), Pang and Sablan (1998) found out that teachers' attitudes toward students significantly shape the expectations they hold for student learning, their treatment of students and what students ultimately learn. Studies of Ladson- Billin (1994), Nieto (1996) show that positive attitudes of teachers support student achievement. Further, Delpit (1995) reported that teachers who respect cultural diversity tend to perceive that students from other culture can learn as well as those from dominant groups.
- Pre-service teacher education program should integrate the development of skills on knowing the culture of the community where teachers teach; and the appreciation of the culture. Villegas (2002) emphasized the need for teachers to know their students, their experiences outside the school. Moll and Gonzalez (1977) reported that teachers who are knowledgeable about their students' experiences can use these in classroom activities bridging what happens in school and house and community. This practice brings relevance to classroom learning and teaching.
- Pre-service teacher education program should not only include field experience in schools in a community with dominant culture but also exposure to schools serving communities with diverse culture. These field experiences can provide better integration of theories learned in the classroom and putting into practice these theories. Better appreciation of theories can be achieved.
- Pre-service teacher education program should incorporate into all the courses the achievement of standards peculiar to science teaching to diverse culture. Villegas (2002) emphasized the need for the "concept of diversity" to be engrained in all the courses and not just taking as a separate course.

D. Curricular Gap in the Philippine pre-service teacher education program for elementary school science teachers for indigenous people

Curricular elements. The Philippine pre-service teacher education contains the aims of the program, 11 standards (what teachers can do), the courses (in the three categories) and the number of units required for each course and per category, description of the approach in teaching the course. In addition, it has a sample of what courses are to be taken each year (for five years).

Are these elements sufficient for the different teacher education institutions to implement the intended curriculum? The present pre-service teacher education program document may contain information necessary in the development and design of specific courses; however, the information may be subject to different interpretation because the listing of courses does not provide description of each course (in terms of content coverage, expected learning outcomes). For example, there are two separate required courses for Principles of Teaching – Principles of Teaching 1 and Principles of Teaching 2. If a teacher educator is assigned to develop the syllabus for these two courses, what will be the bases and major consideration to define the differences between the two? If there are 20 different teacher educators doing the syllabus, then it is possible that there will be 20 different syllabi on the same course title. In the absence of a more specific description and substandards of competency for each course, it will be difficult for teacher education institutes to implement the intended curriculum to meet standards. Moreover, it will also be a guessing game for teacher education institutions what to focus on for the licensure examination.

The document does not also specify the standard competency for the different 5 learning areas to be taught. Although the elementary school teachers are trained to be generalists, it is not clear how much should they know and what to do for each learning areas. For elementary school science teachers, how much content knowledge and how much pedagogical knowledge should they know to be an effective beginning teacher. These things are not defined in the document. As for science teaching for diversity, the standard competencies are not also defined.

The absence of more definite standards (level of expected performance) is the subject of debate among teacher educators in the Philippines. Some heads of teacher education institutes believe that the documents (CHED Memo 30) is enough but others believe that a more specific listing of quality indicators (quality performance) of effective beginning teachers can help provide a better guidance to teacher educators in designing, implementing and assessing their courses. The question of academic freedom is raised. Some posit that the presence of detailed and specific standard competence can stifle their academic freedom. Other teacher educators (Ulchiny, 1999) contend that these defined standards can be the springboard for debate and subject for research and reform. The researcher takes the same stand and feels that there is a need for a more defined and specific standards of competence as basis for the design of the pre-service teacher education program for elementary school science teachers for diversity.

Features of Proposed Curriculum Design

Drawing from the identified curricular gaps and implications from competence standards benchmarked from other institutions and the results of different studies on science teaching for cultural diversity, the following features of a pre-service teacher education program for elementary school science teachers for indigenizing/localizing the curriculum:

1. Have more specific competence for teaching science to indigenous people or diverse culture particularly the inclusion of developing awareness of one's attitude towards ethnocultural groups in the foundation courses (sociology, philosophy and psychology); developing skills in designing instruction, developing instructional materials using local materials to make science teaching relevant to the indigenous people and learners of diverse culture.
2. Have general description of each course to include knowledge and skills needed for teaching science to indigenous people
3. Have field experience in schools with indigenous people and diverse culture

It has been mentioned in the limitation of this study that the proposed reforms are thought in such a way that there could be easily incorporated and integrated in the current curriculum.

Conclusion and Recommendation for Future Research

The proposed reforms are for the intended curriculum of the pre-service teacher education for elementary school science teachers and the effectiveness and adequacy of the reforms can be measured only when the reforms are actually implemented. Thus, it is suggested that a follow-up research be done to measure the effectiveness of the reforms in designing implemented curriculum. The results of the follow-up research can be used to better improve the existing intended curriculum of the pre-service teacher education for elementary school science teachers.

In addition to this, it is also helpful to determine how the qualities of teacher educators affect the design of the implemented curriculum. Are the teacher educators qualified to implement the reforms? What should the qualification of teacher educators be so that the reforms can be properly implemented?

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