Alignment of Learning Competencies, Instruction and Summative Assessment in Mathematics 10: A Basis for Curriculum Implementation Monitoring Plan

Deo Pasion Urbano, Saint Mary's University, Philippines

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Abstract
Using mixed method design, this study determined the extent of the implementation of the curriculum guide in Mathematics 10 classes, the alignment of learning competencies, instruction and summative assessment, identified the challenges encountered by the teachers, and developed a Curriculum Implementation Monitoring Plan. Questionnaires and documents of teachers from eight public schools in the Division of Nueva Vizcaya during School Year 2017-2018 were utilized. The results revealed that the teachers fell short of the required time in implementing learning competencies of the K to 12 Mathematics 10 curriculum guide due to disruptions of classes, although interventions were done to address the issues. Among the learning competenceis in Mathematics 10, the least implemented were the learning competencies of statistics and probability concepts where teachers spent about one-third of the required time. Most of the instruction and summative assessment employed and administered by the teachers were aligned with learning competencies. The most pressing challenge in the implementation of learning competencies was time while in the delivery of instruction was students' skills and knowledge and the most pressing concern in developing summative assessments was related to students' attitude. A Curriculum Implementation Monitoring Plan was proposed to oversee the implementation of K to 12 Basic Education Curriculum towards development projects.

Key Words: curriculum guide, curriculum implementation, development projects, disruptions, interventions

In the teaching-learning process, assessment for students occurs at the beginning while on the side of the teacher it occurs at the end (Biggs, 2003). Through assessments, the lives of children together with their families and the level of the educational system can be influenced by the learner performance exerted. That is, if assessment is properly utilized, it serves as powerful catalyst to improve the instruction and curriculum which in turn advances the teaching-learning process (Stern & Ahlgren, 2002).

Assessment is a general term which includes all methods to gather information about learner's ability, knowledge, understanding, attitudes and motivation through quizzes, portfolio, test, oral questioning, etc. (Ioannou-Georgiou, 2012; Rathburn, 2018). The National Achievement Test (NAT) of the Philippine Republic and the Trends in International Mathematics and Science Studies (TIMSS) are some of the particular assessments conducted to measure the students' learning. The Bureau of Educational Assessment under the Department of Education (DepEd) administers the standardized NAT to measure acquired learning in the major subjects taught in schools to provide empirical information on the achievement level of grades six, ten and twelve learners to serve as benchmark in making policies, planning curriculum and administering the educational system of the country (DepEd, 2013).

The results of the NAT, TIMSS and Global Competitiveness Report of the World Economic Forum for the past years showed a low performance in the major subjects especially in the field of mathematics (CIIT CAT, 2015; dela Cruz, 2017). Out of 25 participating countries in the TIMSS 2003, the Philippines ranked 23rd in fourth grade Mathematics, while eighth grade Mathematics ranked 34th out of 38 participating countries (Gonzales, Guzman, Partelow, Pahlke, Jocelyn, Kastberg & Williams, 2004). The average score for the NAT results for School Years 2005 to 2012 for the high school students ranged from 45.55% to 51.41% while for the elementary pupils, it ranged from 54.49% to 68.88% (Ordinario, 2013; UNESCO, 2015). Furthermore, the Global Competitiveness Report of the World Economic Forum shows that the Philippines ranked 67th out of the 140 participating countries for the quality of math and science education in 2015-2016 while in the following year, the country ranked 79th out of 138 countries (dela Cruz, 2017). Accordinlgy, results from the achievement tests provide a clear picture about the performance level and quality of education in the country and allows for a useful perspective to enhance, develop or modify the educational system for a higher performance.

These results and other findings on dissatisfaction with the different schooling systems in diverse educational institutions propelled the world into many changes which called for adjustments and modifications in teaching practices (Sebate, 2011). Aiming to improve the quality of teaching and learning in educational institutions, policymakers in the industrialized countries like Netherlands continually involve themselves in reform endeavors (Uhlenbeck, Verloop and Beijaard, 2002). Moreover, the development of the standards of teacher, learner performances and assessment systems is the most significant aim of educational and curriculum reform (Sebate, 2011).

Legalized by Republic Act No. 10533, also known as the "*Enhanced Basic Education Act of 2013"*, the Philippine Republic revolutionized the country's educational system by shifting from Basic Education Curriculum (BEC) 2002 and Secondary Education

Curriculum (SEC) 2010 to the K to 12 Curriculum in order to ensure the mastery of knowledge and skills towards the attainment of intended learning outcomes (Lazaro, 2017; Okabe, 2013).

The current K to 12 curriculum of the Philippines was established from the theory of discovery learning by Gerome Bruner which espouses that students learn best by building on their existing knowledge. It is also based on Bruner's model of spiral curriculum that zeroes in on the understanding that human cognition progressed in a step-by-step method of learning, which depends on environmental interaction and experience to form intuition and knowledge.

With the curriculum shift in the Philippines, the implementation of K to 12 curriculum according to Okabe (2013) is admirable and timely but beleaguered by socioeconomic and pedagogical problems. Moreover, as Valisno (2012) elucidated, it is equivalently crucial that there is full alignment of the attitude and knowledge to the learners and the commitment of school heads together with teachers in showing their dedication towards quality education when the revised curriculum is to be implemented.

Along with the curriculum shift, studies aiming to advance teaching practices and reviews on the learning competencies towards the attainment of 21st century skills were done. Among the studies conducted to determine the 21st century skills of the students in the Philippines was done by Aguila (2015) which focused on learning and innovation skills, and information, media and technology skills as essential components of instruction.

Instruction is the transfer of learning from one person to another and is a purposeful direction of the learning process that is vital for education (Huitt, 2003). Instruction is linked with level of skills of the students that can be assessed in learning competencies. As emphasized by Wing Institute (2019) providing students with quality instructional delivery aligned to skill level of each learner is the key in maintaining a desirable classroom climate. Applied skills, understanding, knowledge and attitude that enable learners to successfully demonstrate them in every activity in the educational context is called competency (Gosselin, 2017; DO 8, s. 2015).

In connection with learning competency and instruction to assessment, Biggs (1996) recognized that assessment can enhance learning only when there is constructive alignment between learning, instruction and assessment. Likewise, it was accentuated in the study of Stern and Ahlgren (2002) and Webb, Webb, and Herman, (2006) that the key to today's standards-based reform is the alignment of the assessment that serves as both a lever and a measure to reform efforts and standards. In particular, it is ideal that both of the assessment and curriculum should be aligned with precise worthwhile learning goals or competencies. Moreover, it is important that curriculum guidelines with indicated prescribed learning competencies are implemented by the teachers through the tasks they employ with their learners. They must evaluate the constraints and affordances of their instructional materials to select those tasks that are most appropriate for their learners which may be done through alignment (Edenfield, 2010; Howson, Keitel & Kilpatrick, 1981). Biggs (2003) also emphasized that the activities of the learner and the teacher are both directed towards the same goal if curriculum that encompasses learning competencies is reflected in the assessment. Moreover, ensuring assessments and instructional strategies to be aligned

with the intended learning outcomes is vital when designing a learning experience, program or a course (Maki, 2011; Biggs and Tang, 2011).

Similarly, Spady (1994) in his book *Outcomes-Based Education* (OBE) he noted that a clear picture of desired outcomes is the starting point of curriculum, instruction and assessment planning and implementation where every component must match or align with targeted outcomes to improve and make the existing system more effective. It was also identified by SEDL (2005) that aligning curriculum, instruction and assessment with the standards is important for accomplishing clearly defined learning "ends" to strengthen and to improve an educational program, and if there is disconnection among these components, learners' achievement will not be evident. Additionally, alignment of the assessment systems with the curriculum that encompasses learning competencies and instruction through an analysis of standards, guidelines, policies, and practices in educational institutions will provide guidance to the educational sector from the national down to districts in developing or refining the educational system (Martone & Sireci, 2009; La Marca, Redfield, & Winter, 2000).

The low performances of the learners in NAT, TIMSS, and Global Competitiveness of World Economic Forum, the claims of Biggs (1996), SEDL (2005), Okabe (2005), Valisno (2012) and the anticipation of Scheerens (2016) that a better alignment precedes a better student performance encouraged the researcher to look into the alignment of the learning competencies, instruction and summative assessment as well as the challenges in the teaching-learning process as this is necessary to develop the goals for reform in the educational system. This will improve the learning experience and the success of the learners like in attaining a higher score or better performance in achievement tests.

The K to 12 curriculum features the philosophy that a learner learns best at repeated experience of concepts by continuously returning to the basic ideas added to new concepts in a subject. The K-12 curriculum is spiral where Mathematics 7 to 10 has the same key stage standard where concepts in Mathematics 7, 8 and 9 are integrated in Mathematics 10, thus the study focused on Mathematics 10.

Scheerens, Ehren, Sleegers and Leeuw (2012) and the Organization for Economic Cooperation and Development (OECD, 2005) noted that in all types of assessments, emphasis remains on summative assessment that measures what learners have learned through examination and testing as practiced in the Philippines through NAT, hence, this focus on summative assessment.

According to Bala (2017), regular monitoring and evaluation help the teachers improve their teaching performances and address their issues and concerns, hence the researcher also proposed an instrument to be used in monitoring the implementation of the curriculum.

Conclusion

In the light of the salient results of this study, the following conclusions were drawn:
1. The Grade 10 Mathematics teachers fell short of the required time in teaching the learning competencies of patterns and algebra, geometry, and statistics and probability except for one teacher who exceeded the required time in teaching geometry topics.

1.2 Teachers did not meet the required time in the implementation of learning competencies due to the disruption of classes, their instructional procedures and deviations from the memorandum mandated by the Department of Education (DepEd). Interventions were done to teach all learning competencies of the K to 12 Mathematics 10 Curriculum Guide. The least implemented concept of Mathematics 10 was the statistics part.

1.3 There was an incongruity in the required time for implementing the learning competencies of the subject with the school calendar and the expected number of class days mandated by the DepEd. This might be the reason why teachers merged learning competencies during instruction to enable them to teach all competencies that compromised the teaching-learning process. Also, teachers did not implement the learning competencies of Mathematics 10 fully which may explain why learners did not attain the knowledge prerequisite to the next lessons or grade level. This in turn requires other teachers in the next grade to again teach these competencies resulting to not meeting the required time.

2. Teachers delivered instruction and developed summative assessments that were appropriate to measure majority of the desired learning competencies and develop the students' skills but there were instances of inappropriateness among learning competencies, instruction and summative assessment.

2.1 Most of the instructions employed by the teachers were aligned with the learning competencies. Teachers used learning resources that were issued by the government through DepEd and other non-government bodies or individuals. Additionally, teachers practiced the integration of information, communications and technology (ICT) materials in teaching the lessons.

2.2 At least, half of teachers employed instructions that were aligned with the administered summative assessment to measure the learning competencies and to develop the learners' skills. Teachers designed most of their assessments considered appropriate in developing the students' mathematical skills in patterns and algebra, geometry and statistics and probability. There were instances that learning competencies were not taught but such competencies were included in the summative assessment. Also, some learning competencies were taught but no items of the same were found in the administered summative assessment.

2.3 At least 50% of the learning competencies of the Mathematics 10 Curriculum Guide were aligned with the instruction employed and the summative assessment administered by the teachers.

2.4 There were instructions that were inappropriate for learning competencies which may clarify the challenges identified by the teachers like the undeveloped skills and abilities in mathematics of the students. This might have been a factor for the low performance level of students in the tests.

2.5 There were learning competencies not included in the summative assessment thus, failing to evaluate the students' learning in the concepts. There were items reflected in the assessment even when these were not taught hence, the need for teachers to attend development programs in test construction.

3. Mathematics 10 teachers experienced pressing issues and concerns in the implementation of learning competencies, delivery instruction and developing summative assessment that challenged them in teaching the lessons and evaluating students' learning. These challenges need to be addressed as these might be the

reasons why teachers did not meet the required time of teaching the contents of the subject.

3.1 The challenges encountered by Mathematics 10 teachers in the implementation of learning competencies, delivery of instruction and developing summative assessment were categorized into various themes.

3.2 Challenges encountered by the teachers in the ***implementation of learning competencies*** were sorted into five various themes such as (a) time; (b) disruptions; (c) curriculum offered; and (d) flow of the learning competencies. Among these challenges, it was revealed that *too many learning competencies to cover in every quarter* was the most pressing.

3.3 The challenges faced by the teachers in the ***delivery of instruction*** were classified into ten various themes: (a) learning materials; (b) attitude or behaviour of students; (c) students' skills or knowledge; (d) class disruptions; (e) time; (f) psychological differences; (g) medium of instruction; (h) remedial; (i) practicality of lessons; and (d) class size. Of these ten themes, the most pressing issue was the *students' skills and knowledge* specifically on the *mastery of prerequisite subject and skills of students that were not fully attained.*

3.4 Challenges encountered by the teachers in ***developing summative assessment*** were grouped into three themes: (a) attitudes of the students; (b) test construction; and (c) student capability. The most pressing challenge faced by the teachers were related to *the students' attitudes*, particularly their *study habits.*

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Contact email: urbanodeo@gmail.com
oednoisaponabru@gmail.com