AN EVALUATION OF THE CONSTRUCTIVE ALIGNMENT OF THE K TO 12 IMPLEMENTED AND ASSESSED CURRICULUM

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ABSTRACT: The study aimed to determine the constructive alignment of the implemented and assessed curriculum with the 21st Century Skills as measured by the National Achievement Test in the key area of science in Grades 3, Grade 6, Grade 10, and Grade 11/12. A total of 2 Divisions of the Department of Education responded to the request for Daily Lesson Logs in science for a whole school year to be used for evaluation of implemented and assessed curriculum. Document analysis was conducted to consider the competencies and the corresponding 21st Century skills developed by the learning activities and the assessment strategies used to measure it. The implemented curriculum develops information literacy and analytical skills more than problem-solving skills as evident in the sampled daily lesson logs. Assessments are more of an objective type of examination. However, the findings for the implemented curriculum may be limited only to the available documents and may not be true for all science teachers of the different grade levels. Recommendations are centered towards standardization of DLLs, professional development programs on assessment and activity designing as well as on writing learning outcomes and objectives.

Keywords: constructive alignment, 21st-century skills, assessment, science curriculum, science education, K to 12 curricula, problem solving skills, critical thinking skills

INTRODUCTION

The dismal performance of Filipino students in TIMSS and in National Achievement Tests are signs that there is a need to review our K to 12 curriculum and the teaching and learning practices in our public schools. The target Mean Percentage Score (MPS) in NAT for the Department of Education is 75 but unfortunately, this target has not been achieved yet overall at the national level. On average, from 2007-2012, most DepEd schools scored below 75 in the NAT. For this reason, the National Economic Development Agency (NEDA) Region 10 requested some State Universities and Colleges in Northern Mindanao to conduct a research study looking into the constructive alignment of the K to 12 curricula to the 21st-century skills as assessed in the National Achievement Test. The Philippines has made explicit its agenda for the integration of 21st-century skills into the education system. The recent DepEd Order No 21 series of 2019 specifies that the Enhanced Basic Education Program must equip students with information media and technology skills, learning and innovation skills, communication skills, and life and career skills, while simultaneously requiring that the curriculum must use "pedagogical approaches that are constructivist, inquiry-based, reflective, collaborative, differentiated, and integrative" (pp. 4-5). Furthermore, DepEd Order No. 42, Series of 2017 National Adoption and Implementation of the Philippine Professional Standards for Teachers focuses on Content Knowledge and Pedagogy and specifically mentions strategies for developing critical and creative thinking, as well as other higher-order thinking skills. However, it was found that teachers are not generally familiar with the framework and the mission statements [1].

Constructive alignment is an example of outcomes-based education (OBE) [2]. Biggs asserted that teachers should start with the outcomes that they intend students to learn, and align teaching and assessment to those outcomes. In the K to 12 curricula of the Philippines, these outcomes are communicated as learning competencies for the different topics in a subject area like science, mathematics, social studies, Filipino, and English. The checking of the extent to which the courses are aligned with the learning objective through curriculum mapping is suggested [3]. The authors stressed that curriculum mapping is a good method to evaluate the links between the curriculum content and its intended learning outcomes. The main point is to guarantee that the curriculum objectives match those that are being taught to and learned by students. Curriculum mapping is said to be beneficial for validating the alignment of the curriculum and the affirmation of the learning outcomes of the students [4].

The teachers' planned curriculum can be understood as an intermediary step between the intended and enacted curriculum [5]. Their findings indicated that teachers adhered first and foremost to their own planned curriculum and only second to the state's intended curriculum which can be the source of the gap. This means that the teacher is the major player in ensuring that the written curriculum is implemented as planned. Evaluation of curriculum using constructive alignment is deemed essential in looking into the achievement of students as reflected in the report cards and scores in large-scale assessments such as NAT and TIMSS [6]. The results of the such evaluation can lead to improvement in the way we do things in the classroom [7].

This curriculum evaluation involved the implemented and assessed curriculum. The evaluation lens is focused on the K to 12 issued learning and teaching guides, looking at the competencies required for the different topics in science across Grades 3, 6, 10, and 11/12. Constructive alignment for the implemented and assessed curriculum is considered to see the teaching and learning plans' subscription to the promotion of 21st-century skills. The findings may serve as policy inputs and a basis for improving the teaching and learning process in public schools in the country.

The study aimed to determine the constructive alignment between the enhanced basic education on its implemented

curriculum based on 21st-century skills as assessed in the NAT, particularly for the Science Curriculum of Grades 3, 6, 10, and 11/12. In addition, this study sought to identify the gaps in the implementation of the K to 12 curricula. Specifically, this study answered the following questions:

1. What is the constructive alignment of the enhanced basic education on its implemented curriculum based on the 21st-century skills as assessed in the NAT?
2. What are the common assessment practices reflected in the sampled DLLS?
3. What are the gaps in the implementation of the K to 12 curricula?

I. MATERIALS AND METHODS

This study primarily sought to determine the constructive alignment of the K to 12 Basic Education Curriculum in terms of the set learning competencies (ILOs), the pedagogy (teaching-learning activities), and the performance of learners in the National Achievement Test (NAT) in light of the 21st-century skills acquisition. Gaps in the implementation of the K to 12 curricula between these elements and relative to the 21st-century skills measured in the NAT will then be identified. This evaluation in science is focused on the key areas of Grades 3, 6, and 10 as well as the core subject areas in Grades 11 and 12. The research basically started with a data mining process to acquire all the necessary data and information with regards to the implemented and assessed K to 12 curricula in the key areas of science and its constructive alignment to the 21st-century skills assessed in the National Achievement Test specifically on problem-solving, critical thinking and information literacy. A mapping of the competencies of the above-mentioned subject areas in the different grade levels against the 21st-century skills was conducted. The primary point of the evaluation and analysis is the constructive alignment of the written curriculum-identified competencies and the 21st-century skills. The researchers examined the learning guides provided by the Department of Education to the learners. The study employed a qualitative method of research. It involved the process of data mining that included the evaluation of secondary data.

The study was conducted in Misamis Oriental. It involved Division Offices of the Department of Education who provided the sample daily lesson logs for analysis of the constructive alignment of the science curriculum.

Research Instruments

The following instruments were used in the **a**nalysis of the implemented curriculum:

1. Researcher-made Competency Alignment Analysis Matrix
2. Researcher-made Constructive Alignment for Implemented Curriculum Matrix

A formal request was made to the different divisions of the Department of Education Region X particularly Cagayan de Oro City, Misamis Oriental, Gingoog, and El Salvador to acquire sample Daily Lesson Logs (DLLs) or Lesson Plans in science for Grades 3, 6, 10 and 11/12. For this study, two divisions responded to the request by providing the complete set of materials for evaluation. for the whole year were collected for Grades 3, Grade 6, Grade 10, and Grade 11/12. The collected DLLs were evaluated for constructive alignment in terms of how the different competencies were developed in the teaching and learning activities and assessment. Bloom's taxonomy was used as the basis for determining its congruence and alignment with the 21st-century skills of information literacy, problem-solving and critical thinking skills. The study underwent a full review by the University Research Ethics Committee (REC).

Sampling Procedure

Requests for official copies of DLL were made to the different divisions of the Department of Education namely, Cagayan de Oro City, Gingoog, Misamis Oriental, and El Salvador. Due to the time constraint and the difficulty in getting a complete set of DLLs, the researchers only consider those submissions deemed to be complete. Schools in the Department of Education Division of Misamis Oriental and Division of El Salvador were the sources for the DLLs evaluated in this study. The provided DLLs were made either by one teacher or by different teachers and were considered an official source of information for the analysis of the constructive alignment of the implemented curriculum. This is in terms of the 21st-century skills of information literacy, problem-solving, and critical thinking skills that were developed in the various competencies in the science topics covered in Grades 3, grade 6, Grade 10, and Grade 11/12.

Participants of the Study

The participants of this study were the two divisions of the Department of Education and the teachers who prepared the daily lesson logs used for the document analysis on the constructive alignment of the implemented curriculum.

Statistical Technique

The study made use of frequency and percentage to quantify the number and degree of representations for each of the 21st-century skills against the enumerated competencies in the K to 12 science curriculum for Grade 3, Grade 6, Grade 10, and Grade 11 general curriculum (non-STEM). The number of times the 21st-century skills were manifested in the competencies was tabulated and counted. The frequency was converted to percentage using the total number of competencies as the divisor with the number of occurrences as the dividend.

II. RESULTS & DISCUSSIONS

Table 1. Constructive Alignment of the Enhanced Basic Education on Its Implemented Curriculum Based on the 21st Century Skills

Subject	Key Stage Area	Ranking of the 21st Century Skills based on the Competencies from the DLP/DLL		
		Critical Thinking	Problem Solving	Information Literacy
Science	3	3rd	2nd	1st
	6	2nd	3rd	1st
	10	2nd	3rd	1st
	SHS	1.5	3rd	1.5

Table 2. Constructive Alignment of the Written and Implemented Curriculum Based on the 21st Century Skills

		Problem Solving	Information Literacy	Critical Thinking
3	Written	16	32	18
	Implemented	7	18	5
	% Implemented	43.75	56.25	27.78
6	Written	2	17	3
	Implemented	1	15	2
	% Implemented	50.00	88.23	66.67
10	Written	14	29	18
	Implemented	13	27	15
	% Implemented	92.86	93.10	83.33
SHS	Written	48	143	134
	Implemented	10	29	29
	% Implemented	20.83	20.28	21.64

The DLP/DLLs of the sampled teachers showed that Information Literacy is the most represented skill in the delivery of lessons (see Table 1). On the other hand, Problem Solving is the least represented skill considered in science teaching. This raises a concern as "one of the purposes of science education is to improve criticizing thinking, logical responding and mainly to develop problem students [8]. It was stressed that the learners of the 21st century are poised to join a workforce that requires them to ask questions, problem-solve and think critically, pursue the investigation, and share and apply their findings through multisensory lenses [9]. Thus, it is critical that these skills be imparted to them at the early stage of their education. Table 2 indicates that the different grade levels have different 21st-century skills focus in terms of the implemented curriculum. For example, Grade 3 is more about information literacy and problem-solving and less about critical thinking skills. For the Grade 6 level, there is more emphasis on information literacy and just about half for problem-solving and critical thinking. It is also interesting to note that in the implemented curriculum in the senior high school, there is a need to deliver the different competencies for the different 21st Century Skills. The challenges associated with incorporating 21st-century skills into the curriculum were identified [10]. The first challenge is understanding the nature of 21st-century skills. The authors asserted that this has implications for how curriculum, pedagogy, and assessment play out in the classroom. They stressed that identifying, defining, and describing a learning domain must precede the exploration of how to integrate it into a learning system. The second challenge identified is the development of the learning progression for 21st-century skills. This is due to the fact that the development of skills requires a process through which increasingly complex applications of skills are gradually acquired and demonstrated. Thus, science teachers must be able to design the learning activities in a way that would promote the sequential acquisition of the skills in progression. Table 2. Constructive Alignment of the Written and Implemented Curriculum Based on the 21st Century Skills Grade Levels

The observed lack of alignment may be contributed by external factors that included the availability of testing materials and conceptual factors such as teachers' conceptions of language learning [11]. Constructive alignment is considered a tool to improve teaching and learning [12].

Common Assessment Practices in the Daily Lesson Logs

Document analysis revealed that the most common form of assessment across the grade levels is an objective type of test like multiple choice and true or false. The learning objectives were stated to capture keywords in the competencies but were not addressed in the assessment used. It was also found that some of the assessment tools in the daily lesson plans/ daily lesson logs are not congruent with the learning outcomes. The teachers also made use of questions that center mostly on recall and information literacy and very few in-between questions that call reasoning ability and critical thinking skills. This finding is not very conclusive as the researchers observed that many of the DLLs merely mentioned that a quiz or a test will be provided but the actual assessment document was not included. It is probable that the teachers may have provided the students with very good assessment tools that were not presented or attached to the DLL.

Actual classroom observation of lessons in science being delivered is a way to validate the assessment practices of our science teachers but the pandemic had made it impossible to observe the actual teaching and learning process. Based on the daily lesson plans/ daily lesson logs analyzed, there are many activities planned by the teacher which may affect the attainment of learning outcomes due to limited time. This could also mean that the teachers may want the students to do more activities to facilitate the understanding of concepts and to take advantage of social learning which can develop communication skills, collaboration, and teamwork. A teacher's decisions in the classroom play a significant role in creating learning opportunities for students and these instructional decisions may also influence the choice in designing teaching and learning activities targeting 21st-century skills [13].

The following assessment strategies for problem-solving were suggested [14]:

- Tasks require students to take different perspectives on an issue than the one presented; this is in contrast to where concepts or problems tend to be conceptualized from just one angle.
- Tasks that require students to identify the types of information needed to bring to a particular problem scenario; students need to understand the “problem space” and what objects, individuals, or concepts are relevant to that space.
- Tasks that challenge students to explore multiple routes to problem-solving; this requires students to hypothesize, check, iterate, and review

Furthermore, the authors added these assessment strategies for critical thinking that include the following:

- Tasks that require students to identify the similarity of structural features. Students are stimulated to organize the information they have, classify or categorize it, and evaluate common characteristics.
- Tasks that require representing concepts or arguments through alternate media such as diagrams and text. Students need to understand the concepts

or arguments in order to conceive of different ways of communicating that information.

- Tasks that require students to identify missing or alternative components and to provide rationale. This prompts the student to think logically as well as hypothesize associations between components within a model.

It is recommended that graduate attributes are expressed as learning outcomes and aligned with assessment criteria [15]. In this manner, science teachers will be able to determine the achievement of outcomes and produce the quality of graduates as needed. However, even the alignment between internal and external assessments is lacking. Even at conducive conditions, it was found that the agreement of internal and external assessments was at best moderate [16]. The importance of constructive alignment as a tool for navigating successfully learning complexities is underscored [17]. Constructive alignment is a tool to guide effective teaching and learning [18, 19].

Gaps in the Implementation of the K to 12 Curriculum

The study was able to appreciate the content of the K to 12 science curriculum for Grades 3, Grade 6, Grade 10, and Grade 11/12. The spiral progression as espoused by the K to 12 Curriculum is evident as the competencies progress from simple to complex. The lower grade delves into foundational concepts and the higher-grade levels are more on critical thinking. However, there are a few observations that may warrant ideas for intervention and improvement. Primarily, the curriculum is congested. There are too many competencies with very limited time. This may force the science teachers to rush through the lessons without the chance to deepen the understanding of students through meaningful, relevant, and contextualized science lessons. An additional challenge is understanding the curriculum especially if the teacher is not specialized in the subjects being handled. An aligned approach to 21st-century skills integration requires considerations of assessment, curriculum, and pedagogy [20]. In an aligned system, educators with expertise in curriculum development, assessment design, and pedagogical strategies formulate the support structures and substance required to form a coherent approach. For expertise to be developed among science teachers, there is a need for intensive professional development training. Therefore, a well-designed continuing professional development training program that will help non-science specialists to design their DLLS in a way that will subscribe to constructive alignment is needed. The professional development program will be able to provide the intervention on assessment skills development and on the development of thematic lessons that will allow the science teachers to help improve the conceptual understanding of the students. Developing lessons around core concepts will allow the students to appreciate the activities provided as they are intertwined and connected.

III. CONCLUSION

It was evident that the K to 12 written science curriculum for Grade 3, Grade 6, Grade 10, and Grade 12, when evaluated using the taxonomies, were able to address the development of some 21st-century skills, particularly in information literacy and critical thinking skills but was not able to address fully well the development of problem-solving skills. Thus, it can be said that the implemented curriculum as articulated in DLLs may need to be reviewed and improved to include problem-solving skills development.

V. RECOMMENDATION

The findings of this study are limited to the DLLs sampled which would make a generalization to be impossible. The DLLs provided may have been what the teacher who prepared it did in his/her classes and may not be true for all teachers of the same grade level in the Division. The researchers would like to recommend the standardization of the DLLs so that the students across the Division will be provided with the same quality of teaching and learning. This may be called an exemplar DLL. The exemplar DLLs should be able to address the concerns on constructive alignment and congruence between the implemented and assessed curriculum. In addition, it is recommended that the Department of Education may consider the development of a Continuing Professional Development Program focused on the development of skills on assessment and lesson planning and directed towards making sure of the attainment of alignment of the implemented and assessed curriculum.

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