Instructional Quality Level of Grade 7 Biology Modules in the K to 12 Program as Perceived by Students

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Abstract

Learners being part of the learning process play a vital role in determining the type of materials they used in school for learning. This study aimed to assess the instructional quality of the Grade 7 Biology module from the point of view of selected students in the 16 public secondary schools in the Division of Tacloban City, Leyte, Philippines. The modules are evaluated based on the seven dimensions: a) content, b.) presentation and organization, c.) learning activities, d.) evaluation activities, e.) accuracy and up-to-dateness of information, f.) format and g.) sufficient availability of materials. Findings revealed that students had a good perception and understanding in terms of the evaluation activities, accuracy and up-to-dateness of information and format, content, learning activities, presentation and organization, and sufficiency on the availability of the materials. As a whole, the modules have satisfactory instructional quality in the seven dimensions. However, students suggested improvements to the modules.

Keywords: biology; modules; students; instructional quality; K to 12

1. Introduction

Science education faces a challenging process of change. It has always been dynamic to keep abreast with the demand of the increasingly globalized environment. In the Philippines in order to respond to the challenge, Enhanced K to 12 Basic Education Curriculum in 2012 was implemented. This is due to the poor quality of basic education and congested curriculum. This is supported by the report given by TIMMS (2013) which shows the Philippines have low scores obtained on tests conducted by Trends in International Mathematics and Science Studies (TIMMS).

Before the implementation of the K to 12 programs, science is traditionally taught using traditional instructional materials like textbooks, models, pictures, chalk- and board. Under the K to 12 programs, science is categorized into disciplines namely: Chemistry, Biology, Physics, and Earth Science which are presented by each quarter or unit, which is in modular instruction. However, in Biology, one common problem encountered by students is their difficulty in understanding biological concepts. Another concern of students is the complex vocabulary that they need to memorize (Gutierrez,2013). Since the implementation in 2012, there was no evaluation regarding science modules as perceived by students. Hence this study was conducted. This study's ultimate aim is to assess the instructional quality of the module.

Specifically, the study conducted sought to answer the following questions:

1. What is the level of perception of grade 7 students on the instructional quality of the Biology module in terms of the following dimensions:

a. content
b. presentation and organization
c. learning activities
d evaluation activities
e. accuracy and up-to-dateness of the information
f. format
g. sufficiency on availability of modules

2. What are the suggestions of grade 7 students on the instructional quality of Biology module in terms of the following dimensions:

a. content
b. presentation and organization
c. learning activities
d evaluation activities
e. accuracy and up-to-dateness of information
f. format
g. sufficiency on availability of modules

The study was limited in the evaluation of the instructional quality of the module used by Grade 7 students in the study of Biology for the 2nd quarter. The said modules were the product of collaborative efforts of the National Institute of Science and Mathematics Education (NISMED).

However, knowing that the final recipients of the material are the students, it is then necessary for them to evaluate it in order to measure its effectiveness. The result of the assessment will guide the teachers and school heads if the module provided by the Department of Education possesses instructional quality as perceived by students. Evaluation results will serve as the basis for the improvement of the module.

Charles & Rajasekar (2014), defined module as a form of self-package. It enables the learner to progress at his own rate. In the modular approach, all the capabilities are closely interrelated. Ali (2010), describes modules as having instructional qualities shown by the application of ideas from the theory of learning. He further explained that modules are based on a careful application of learning principles of instructional design with a clear set of designed characteristics. As explained by Ghazi et.al.,(2005), modules encourage students to learn and actively participate in the lesson, since students have control of the lesson like when to answer the activities, to move ahead, or repeat a section not clearly understood.

Seco-Macarandan's (2014), result of an assessment of Grade 7 Araling Panlipunan modules revealed that students found the module interesting and moderately difficult. Students learned from the module and can work with teachers as facilitators and instructors.

Thus, this present study is similar to the above-mentioned studies that aimed to assess the modules used by students themselves.

Two relevant theories supported the assessment of students on the module as follows: Burrhus Frederick Skinner's Operant Conditioning Theory and Theory of Constructivism. Programmed instructional materials are the best means for teachers to carry efficiently the teaching and learning process with their students (B.F. Skinner, 1988). This lead to the idea that reinforcement procedure through varied approaches and learning materials can help in the development of knowledge and skills of students. (Mercado,2007).

The theory of Constructivism, states that learning results from exploration and discovery. Meaning is constructed and reconstructed throughout the learning experience. In a constructivist classroom, teachers function as facilitators (Alessandrinii & Larson,2002). This can be applied in a modularized classroom setting since the teacher act as a facilitator in guiding students to complete their tasks or learning activities outlined in the module. As a result, create meaningful experiences and reach mastery of the lesson.

The aforementioned context of the theories, the researcher developed a conceptual paradigm, illustrated in Figure1 , which helps visualize the entire study

2. Conceptual framework

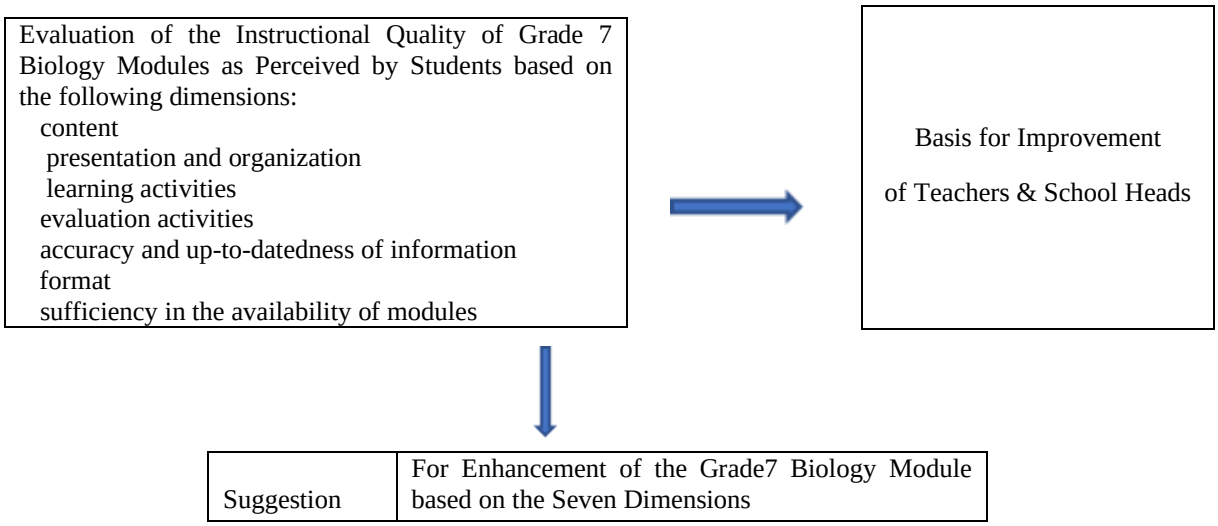

Figure 1. The Conceptual Framework of the Study

3. Methodology

Research Design

The study utilized a descriptive survey method using a survey questionnaire to collect quantitative data. It was concerned to assess the instructional quality of the Grade 7 Biology module as perceived by Grade 7 students.

Respondents

There were 5 student representatives per school, comprising the 16 public secondary schools of the entire Division of Tacloban City, who were requested to serve as respondents with the approval beforehand from the schools' division superintendent and principals.

Sampling

Purposive sampling was done in choosing the respondents based on the recommendation of the science teachers handling the Grade 7 Biology subject.

Research Instrument

A survey questionnaire made by the researchers was the main instrument used in the study. The questionnaire contains six (6) characteristics that deal with the instructional quality of the module such as content, presentation, organization, learning activities, evaluation activities, accuracy and up-to-datedness of information, format, and sufficiency of availability of materials. The said instrument was validated by 17 biology experts and pilot tested to grade 7 students who were not respondents to the study.

The researcher was guided by the following values of weighted mean and their meaning using a scale of 1-4, where 4 is equivalent to Very Satisfactory (VS), 3 as Satisfactory(S), 2 as

Poor(P) and 1 as Not Satisfactory (NS). The range used is adapted from Rodriguez (2015). While the qualitative remark is adapted from the DepEd Regional Handbook in the Content Evaluation of Supplementary Materials, IMCS(2008).

Scale	Description
3.51-4.00	Very Satisfactory (VS)
2.51-3.50	Satisfactory (S)
1.51-2.50	Poor (P)
1.00-1.50	Not Satisfactory (NS)

Figure 1: Method of Scoring:
Source: DepEd Regional Handbook in the Content Evaluation of Supplementary Materials, IMCS (2008)

Data Processing

Results were analyzed using frequency counts, percentages, and weighted mean to determine the evaluation of the instructional quality of the Grade 7 Biology module as perceived by students.

4. Results

Table 2: Summary of Students' Perception of the Instructional Quality of the Grade 7 Biology Module

INDICATORS	Module 1	Module 2	Module 3	Module 4	Module 5	WEIGHTED MEAN	PERCEPTION
1. Content	3.12	3.17	3.10	3.22	3.13	3.15	S
2. Presentation and Organization	2.97	3.01	2.97	3.14	2.98	3.01	S
3. Learning Activities	3.12	3.13	3.11	3.21	3.11	3.14	S
4. Evaluation Activities	3.18	3.24	3.22	3.29	3.12	3.21	S
5. Accuracy and Up-to-datedness of Information	3.22	3.24	3.25	3.14	3.22	3.21	S
6. Format	3.22	3.23	3.24	3.17	3.17	3.21	S
7. Sufficiency on Availability of Materials	2.88	2.92	2.97	2.95	2.80	2.90	S
OVERALL WEIGHTED MEAN	3.10	3.13	3.12	3.16	3.08	3.12	S

The summary of the assessment of the students on the instructional quality of the five modules as to evaluation activities (3.21), accuracy and up-to-datedness of information (3.21), format (3.21), content (3.15), learning activities (3.14), and sufficiency on the availability of the materials (2.90). These characteristics have an overall weighted mean of 3.12 and a description of satisfactory.

The study got similar findings to research conducted by Samonte (2004), Macarandang (2009), and Seco-Macarandan (2014) which tell us that students' assessments show that the module was able to meet the criteria set in terms of

Students consolidated the description of the instructional quality of the module

Content: Certain conditions in these aspects were not fully met like the provision of sufficient discussion of concepts and a glossary of terms.

Presentation and organization: The sequence of topics in the curriculum guide is not consistent with the series of issues in the learner's material and teacher's guide. De la Cruz International Journal of Innovation in Science and Mathematics Education, 27(5), 27-42, 2019 35 (2015) pointed out that instructional materials need to have relevance for the objective of the lesson. Ali (2010) agreed that the stated objectives of the module lead to instructional quality.

Learning activities: The students' respondents stated that the learning material presents more activities than discussion, particularly for basic science process skills. Biology Modules lack

integrated science process skills which allow them to learn what it means to do science by applying experimental skills, solving problems, and developing thinking skills. They are frustrated since most of them cannot perform the activities due to a lack of learning materials (printed textbooks), science apparatus, and specimens. Macarandang (2009) explained that enrichment activities enhance students' learning of the concepts.

Evaluation of activities: Students can download the DepEd website for the assessment of the lesson. It needs immediate action to ensure that teachers are evaluating the actual learning of students.

Accuracy and up-to-dateness of information: There is a need to correct some conceptual, grammatical, and typographical errors in the module. Chinwendu (2014) explained that lexicosyntactic errors contained in the teaching materials if not fixed would make students merely the conveyor belt of errors contained in the teaching materials.

Format: Regarding format, the clarity, illustrations, pictures, and appropriateness of colors still need enhancement. As explained by Olurinola (2015), colors have a positive effect on the attention-retention rate of students inside the classroom.

Sufficiency in the availability of modules: It needs utmost attention and action. Results were validated by the researcher herself when she conducted her pre-survey which revealed that most or 38% of the 16 schools included in the study have one book to two to five students ratio of Learner's Materials; 69% have no Teacher's Guide; and 75% have no laboratory equipment/materials, especially the microscope since typhoon 'Haiyan' destroyed it. According to Oakes and Saunders (2002), textbooks and learning materials are the primary tools for learning. It promotes efficiency in the teaching-learning process. De la Cruz (2015) pointed out that the inability of students to use books for reading negates the objective of teaching and makes the teaching-learning process unproductive.

5. Conclusion

Students rated the five Grade 7 Biology module as satisfactory together with the seven dimensions. Though the result signifies the usefulness of the instructional learning material as perceived by students, there is a need for enhancement to be able to respond to the needs and different learning styles of students.

It is suggested to conduct a follow-up study on students' perception of the other science subjects in the Grade 7 science module, regarding its instructional quality. A series of studies on module evaluation in different grade levels must be conducted. Consider also the challenges and how students overcome the challenges relative to their usage of the module. Further, since students agreed that module has a satisfactory level of instructional material quality, it is suggested that teachers should continuously use the module as a learning material in Biology.

6. References

Abolade, A. O. (2013). General techniques for evaluation of learning and Instructional materials, Department of Curriculum & Educational Technology, university of Dorin, Nigeria

Ali, R. (2010). Development and effectiveness of modular teaching in Biology at secondary level. Retrieved from http://eprints.hec.gov.

Bago, A.L. (2001). Curriculum development: The Philippine experience. De La Salle University Press, Inc. Manila, Philippines, pp.9, 175, 187

Clark, D. (2010). Types of evaluations in instructional design. Big dog and little dog's performance juxtaposition. Retrieved from http://www.nwlink.com/donclark/hrd/isd/types_of_evaluation.html

Chinwendu, P. (2014). Effects of lexico-syntactic errors on teaching materials: A study of textbooks written by Nigerians. Retrieved from http://www.journals.aiac.org.au/index.php/IJELS/article/view/235

De la Cruz, J. P. (2015). Development of an experimental science module to improve middle schools students' integrated science process skills. Retrieved from www.dlsu.edu.ph/conferences/dlsu_research_congress/2015/proceedings/LLI/018LLI

Department of Education Regional Handbook in the Content Evaluation of Supplementary Materials. IMCS., 2008.

Department of Education (2013). K to 12 science curriculum guide. Retrieved from http://depedligaocity.net/ScienceCG3-10.pdf

DepEd Regional Handbook in the Content Evaluation of Supplementary Materials, IMCS (2008)
Dick, W., Carey, L., & Carey, J. O. (2001). The systematic design of instruction (5th ed.). Allyn & Bacon. International Journal of Innovation in Science and Mathematics Education, 27(5), 27-42, 2019 41
Flagg, B. N. (1990). Formative evaluation of educational technologies. Hillsdale, NJ: Erlbaum.
Garcia, C. M. (2001). Effects of modular instruction on the performance of college students in pane trigonometry. Bulacan State University, Maolos City. Unpublished Thesis.
Gravoso, (2005). Design and use of instructional materials for student-centered learning: A case in learning ecological concepts, Vol. 7, No. 1, Visayas State University: Asia Pacific Education Researcher
Gutierrez, A. (2014). Development and effectiveness of an educational card game as supplementary material in understanding selected topics in biology. Retrieved from http://www.lifescied.org/content/13/1/76.full.pd
Hattie, J., & Timperley, H. (2007). The power of feedback. Retrieved from http://rer.sagepub.com/content/77.full
Hamona, L. A. (2002). Development of prototype pedagogical materials for teacher trainees of basic education. Philippine Normal University.
Jamwal, G. (2012). Effective use of interactive learning modules in classroom study for computer science education. All Graduate Plan B and other Reports. Retrieved from digitalcommons.usu.edu
K to 12 Basic Education Program (BEP) (2012). Presidential communication development and strategic planning office and department of education. Retrieved from http://www.slideshare.net/mojacko69/the-k-to12-basic-education-program
Koul, R., Fraser, B.J., & Nastiti, H. (2018). Transdisciplinary instruction: Implementing and evaluating a Primary- School STEM teaching model, International Journal of Innovation in Science and Mathematics Education, 26(8), 17-29, 2018
Macarandang, M. (2009). Evaluation of a proposed set of modules in principles and methods of teaching. EInternational Scientific Research Journal, Vol. 1.
Mercado Jr., R. B. (2007). Effectiveness of modularized instruction in entrepreneurship. Bulacan State University, Malolos City. Unpublished Thesis.
Naval, D. J. (2014). Development and validation of tenth Grade physics modules based on selected least mastered competencies. International Journal of Education and Research, Vol. 2.
Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. (2006). Evaluation of students and materials in educational technology for teaching and learning. Person Merrill Prentice Hall.
Oakes, J., & Saunders, M. (2002). Access to textbooks, instructional materials, equipment, and technology: inadequacy and inequality in California's public schools. Retrieved from http://www.ucla-idea.org
Olurinola, O. (2015). Colour in learning: Its effect on the retention rate of graduate students. Retrieved from http://files.eric.ed.gov/fulltext/EJ1080132.pdf
Patton, M. Q. (2011). Developmental evaluation applying complexity concepts to enhance innovation and use. Retrieved from http://www.guilford.com/books/Developmental-Evaluation/Michael-QuinnPatton/9781606238721
Pawson, R. (2013). The science of evaluation: A realist manifesto. Retrieved from https://evaluationcanada.ca/system/files/cjpe-entries/29-2-145.pdf
Peacock, J. (2007). Beyond the fashionable: Strategic planning for critical information literacy education. In S. C. Curzon & L. D. Lampert (Eds.), Proven strategies for building an information literacy program. (pp. 29- 54). New York: Neal-Schuman Publishers.
Phillips, J. A. (2013). Module 7: Evaluating the school curriculum from Chapter 8: Curriculum evaluation. Race, P. (2000). Audit your own teaching. In A. Brown and S. Homes (Ed.). Internal Audit in Higher Education (pp. 163-181). Sterling: Stylus Publishing
Ranjit, K. (2014). Research methodology: A step-by-step guide for beginners. London: SAGE Publications
Reardon, S.F., Scott, K., & Verre, J. (1994). Symposium: equity in educational assessment. Harvard Educational Review, 64 (1), 1-4.
Rodriguez, C. (2015). Status on the use of mother tongue-based and multilingual learning materials in the Division of Calbayog City (Unpublished Doctoral Dissertation). Leyte Normal University, Tacloban City, Philippines.
Ronda, R. A. (2012). Public school teachers welcome passage of kindergarten law.Philstar. Retrieved from http://www.philstar.com/Article.aspx?articleId=778647&publicationSubCategoryId=63
Rossi, P. H., Freeman, H., & Lipsey M. W. (2004). Evaluation: A systematic approach. Te, Newburry Park, Ca.
Rouse, M. (2005, September). Definition: Total quality management (TQM). Retrieved from http://searchcio.techtarget.com/definition/Total-Quality-Management.
Salandanan, G.G. (2011). Principles and methods of teaching. Quezon City, Manila: Lorimar Publishing, Inc.
Sañosa, M. (2013). Implementation of K to 12 curriculum program among Grade 7 Science Teachers in Eastern Visayas. Journal of Society and Technology, 3, 37-44
Sarem, S., Hamidi, H. & Mahmoudie, R. (2013). A critical look at textbook evaluation: A case study of evaluating an ESP course-book: English for international tourism. International Research Journal of Applied and Basic Sciences, 4(2), 372-380. International Journal of Innovation in Science and Mathematics Education, 27(5), 27-42, 2019 42
Sari, U., Hassan, A., Güven, K. & Sen, Ö. (2017). Effects of the 5E teaching model using interactive simulation on achievement and attitude in physics education, International Journal of Innovation in Science and Mathematics Education, 25(3),20-35,2017
Scriven, M. (1967). The methodology of evaluation. In R.W. Tyler, R.M. Gagne, & M. Scriven (Eds.), Perspectives of curriculum evaluation (pp. 39-83). Chicago: Rand McNally.
Sitragool, W. (2003). Project on research study and materials development of a literacy programme for ethnic minority in Omkoi, Chiang Mai (Thailand)", a Paper presented at the Conference on Language Development.
Skinner, B. F. (1988). Operant Side of Behavioural Therapy. Behaviour Therapy & Experiment Psychiatry, 19(3), 171–179.

Tomlinson, B. (2011). Introduction: principles and procedures of materials development. In B. Tomlinson (ed.) Materials Development in Language Teaching (second edition) (pp. 1-34). Cambridge: Cambridge University Press

Trends in International Mathematics and Science Studies (TIMSS): Overview (2013). National Center for Education Statistics (NCES), USA. Retrieved from http://nces.ed.gov/timss/index.asp

Villarino, G.N. (2019). Constructivist strategy, microcomputer-based laboratory, and students' alternative conceptions of force and motion. International Journal of Innovation in Science and Mathematics Education, 27(1), 47-60, 2019.

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2013). Keeping pace with K-12 online learning: An annual review of state-level policy and practice. Evergreen, CO: Evergreen Education Group. R