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Development and Validation of a Design Guide for K to 12-Based Science learning Materials for Open High School Program (OHSP)

Louie-Zel M. Pedro

Philippine Normal University

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**DEVELOPMENT AND VALIDATION OF A DESIGN GUIDE FOR K to 12-BASED
SCIENCE LEARNING MATERIALS FOR OPEN HIGH SCHOOL PROGRAM (OHSP)**

**A Thesis Presented to
the Faculty of the College of Graduate Studies and Teacher Education Research
Philippine Normal University
Manila, Philippines**

**In Partial Fulfillment
of the requirements for the degree
Master of Arts in Science Education
with specialization in General Science**

**LOUIE-ZEL M. PEDRO
2020**

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ABSTRACT

Title:	Development and Validation of a Design Guide for K to 12-Based Science Learning Materials for Open High School Program (OHSP)
Researcher:	Louie-Zel M. Pedro
Degree:	Master of Arts in Science Education
Specialization:	General Science
Key Concepts:	Design Guide Open High School Program Learning Materials Modules
Adviser:	Marie Paz E. Morales, Ph.D.

The study developed and validated a design guide for K to 12-based learning materials to address the curriculum mismatch the Open High School Program (OHSP) is currently facing. This study utilized the descriptive developmental research design and went through the following fundamental phases: 1) Development of the Design Guide; 2) Validation and Evaluation of the Design Guide; 3) Development of the Sample Learning Materials; 4) Validation and Evaluation of the Learning Materials; and 4) Try-out and Finalization of the Sample Learning Materials. This study utilized purposive sampling technique in selecting the 46 curriculum experts who evaluated the design guide and sample learning materials and the 62 Grade 8 OHSP students who tried-out the learning materials. This study also made use of a 5-point Likert scale to evaluate the design guide and the learning materials. Data analyses included weighted mean, standard deviation, and percentage. Inter-rater Agreement Reliability Test, Aiken's Content Validity Index, and Fleiss' Kappa Coefficient were also used to determine the extent of consistency, reliability, and validity of the ratings made by the experts. Results showed that the developed design guide and learning

materials has high acceptability rating from the curriculum experts. The inter-rater reliability test, Aiken's CVI, and Fleiss' Kappa coefficient showed high consistency and agreement level among the experts. The OHSP learners also gave a high perception rating on the use of the learning materials crafted using the developed design guide. With the high rating of the learning materials gathered from both experts and students, the design guide has been successful in providing a set of guidelines, instructions, and standards to develop learning materials that conform with the guidelines of the Learning Resources Management and Delivery System (LRMDS) and the theories and principles of the K to 12 Basic Education Curriculum. It is recommended that the developed and validated Design Guide be used in developing more learning materials in different topics and/or learning areas. Future researchers who wishes to take the same field of investigation are encouraged to test the effect of the K to 12-Based learning materials in the achievement of the OHSP learners. Developing a design guide for OHSP Senior high School is also included in the list of recommendations. School administrators may conduct module seminar-writeshops to address the need for the program.

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Lastly is Dr. Morales, my research adviser. For the patience and unwavering support. She made me understand many things during the entire conduct of this study. She also made me realize not just things about this research but also about the mind-set of a true researcher.

DEDICATION

To those who think I cannot make it,
To my family, friends, and everyone who have supported me.

- *L.M. Pedro*

APPROVAL SHEET

This thesis entitled “**DEVELOPMENT AND VALIDATION OF A DESIGN GUIDE FOR K TO 12-BASED SCIENCE LEARNING MATERIALS FOR OPEN HIGH SCHOOL PROGRAM**” prepared and submitted by **LOUIE-ZEL M. PEDRO** in partial fulfillment of the requirements for the degree of **Master of Arts in Science Education with Specialization in General Science**, is hereby recommended for approval and acceptance.

MARIE PAZ E. MORALES, Ph.D.
Adviser

Approved in partial fulfillment of the requirements for the degree **Master of Arts in Science Education** by the Oral Examination Committee.

ADONIS P. DAVID, Ph.D.
Chairperson

SHILA ROSE D. SIA
Member

BRANDO C. PALOMAR
Member

EDEN V. EVANGELISTA, Ph.D.
Member

Accepted in partial fulfillment of the requirements for the degree **Master of Arts in Science Education**.

Date

DR. ANTRIMAN V. ORLEANS
Officer-in-Charge
College of Graduate Studies and
Teacher Education Research

CHAPTER I

THE PROBLEM AND LITERATURE REVIEW

BACKGROUND OF THE STUDY

The National Statistics Office (NSO) in 2011 reported that there were approximately 6.24 million students between age six to fifteen to have dropped from or have never gone to school before. This number of out-of-school youth (OSY) translates to about 6% of Filipinos who are not formally schooled. Albert, Quimba, Ramos, and Almeda (2012) in their discussion paper showed that survey data on the reasons of leaving or not entering school included lack of personal interest, high cost of education, illness and disabilities, work schedule, physical impairment, too old to go back to school, and absence of nearby schools. To address this soaring figure of OSY, the Department of Education (DepEd) implemented the Drop-Out Reduction Program (DORP) that primarily targets to curb the high rates of dropout in public schools by proposing alternative modes of education for Students at Risk of Dropping-Out (SARDO).

DORP's Open High School Program (OHSP) as one of its three components managed by the Bureau of Secondary Education (BSE) under DepEd is an alternative delivery mode (ADM) that uses distance-learning scheme offering different modalities of learning such as modular approach, internet-based, and blended technology for junior high school students who are not capable of going to regular classes because of job schedules, physical incapacity, distance of home and school, financial problems, and other justifiable and legitimate reasons. OHSP is a program which is in consonance with Philippine Education For All (EFA), which intends to help eradicate illiteracy in the country making every Filipino functionally literate by the year 2030.

Open High School Program (OHSP) primarily targets to attain four objectives: 1) to give a chance to graduates of elementary level, drop-outs of high school, and Philippine Placement Test (PEPT) passers to finish or attain a high school diploma; 2) to encourage students at risk of dropping out to complete the secondary level; 3) to improve schools' participation rate and reduce the number of dropouts; and 4) to give quality distance education to improve secondary schools' achievement rate.

In 1998, the Department of Education implemented OHSP only as a program of intervention for Students at Risk of Dropping Out (SARDO), but the agency eventually adopted it as one of the interventions in Drop-Out Reduction Program (DORP) in 2009 because of its capacity as an effective strategy in minimizing OSY and decongesting overcrowded schools with high drop-out rates.

The promising role of OHSP in curbing the number of OSY in the Philippines urged the Philippine government to implement Republic Act 10665 or the Open High School Act, which was signed into law by former President Benigno Simeon C. Aquino, III on July 9, 2015. Primarily, this law aims to “broaden access to relevant quality education through the employment of an alternative secondary education program that will enable the youth to overcome personal, geographical, socioeconomic and physical constraints, to encourage them to complete secondary education.” This law jives with what is written in Article XIV, Section 2, paragraph 4 of the 1987 constitution, “the state should encourage non-formal, informal, and indigenous learning systems, as well as self-learning, independent, and out-of-school study programs particularly those that respond to community needs.”

In addition, RA 10665 focuses on establishing Open High School System (OHSS) learning centers, conducting trainings, giving incentives to teachers and mandates the Department of Education to incorporate the learning competencies and content standards of the different subject areas of K to 12 in the program.

However, though the Open High School System Act was signed into law, the Department of Education seems to be insufficiently equipped to support its full implementation. In the study of South East Asian Ministers of Education Organization Regional Center for Educational Innovation and Technology (SEAMEO INNOTECH) in 2014, they found that despite the advent of implementation of the K to 12 curriculum, 129 out of 155 surveyed OHSP-implementing schools are still using the Project EASE (Effective and Affordable Secondary Education) modules since DepEd's pilot implementation in 2006. These Project EASE modules were developed guided by the previous curriculum's (Basic Education Curriculum [BEC]) concepts and principles. Thus, the path of OHSP as a program does not cohere with the primary goal of science education in the K to 12 curriculum in producing students who are scientific, technological, and environmental literate.

In addition, 61.94% or 96 out of 155 OHSP-implementing schools identified the "learning materials" as the main factor that inhibits efficient OHSP implementation next to insufficient funds and lack of support from LGUs. From this finding, SEAMEO INNOTECH (2014) suggested that revisions in the OHSP learning materials should be done and be systematically carried out to align the program with the competencies of the new curriculum. This revision and alignment of curriculum and competencies should be immediately carried out by most of the schools implementing OHSP who are using and depending on modules issued by DepEd Bureau of Secondary Education.

Sangley Point National High School (SPNHS), situated in Cavite City, started offering OHSP in the beginning of school year 2012-2013. SPNHS was in fact one of the school-respondents of the study conducted by SEAMEO INNOTECH and advocate the use of Project EASE modules as learning materials since the school saw how relevant and beneficial these modules are in the implementation of the program. The modules were found to be instructive and easily understood by the learners. Since the common learning modality of OHSP students is modular, there is an indispensable need for curriculum writers and administrators to develop a learning materials that will suit and suffice the needs of OHSP students. Due to the major reform of the curriculum, significant need to produce learning materials that are anchored on the basic learning competencies, content standards, and spiral learning approach of the new K to 12 curriculum surfaced.

Currently, all DepEd Regional Offices (ROs) are devising their own ways to address the problem of the program on learning materials through creating their own module writeshops, regional trainings and seminars, and teachers' capacity-building workshops. However, SEAMEO-INNOTECH (2019) noted that, to further institutionalize the implementation of the program, the Department of Education (DepEd) should consider creating a standardized tool such as design guides on crafting contextualized, budget-friendly, and learner-friendly learning materials for the OHSP learners. Suco (2019) also suggested the same thing on her study on the assessment of Alternative Delivery Mode (ADM) learning resources. In her study, it was found out that DepEd has no standardized guide in crafting learning materials under the K to 12 Curriculum. Such standardized design guide could definitely address the emergent needs of all OHSP implementing schools across the country to have economical and curriculum-aligned learning materials.

Hence, this study was carried out to develop and validate a design guide in developing K to 12-based science learning materials for OHSP students. This research primarily aimed to address the gaps highlighted by the studies of Taquines (2012), Simui (2014), Cuervo (2018), Ubaldo (2018), SEAMEO INNOTECH (2019), and Suco (2019) that pinpointed the incongruency of the available learning materials and learning resources of OHSP (Project EASE Modules) from competencies and standards of the K to 12 Basic Education Curriculum. This incongruency is the prime factor that suppresses the success of the OHSP (Cuervo, 2018; Suco, 2019). The design guide, as the product of this study, will help the program, through teacher-writer, to create more K to 12 aligned learning materials for OHSP to help achieve the goal of Science Education to produce scientifically literate learners who are proactive, inquisitive in nature, technological-inclined, and learners who are able to respond to the demands of our changing world.

Aside from the design guide, printed and electronic learning materials were also produced in this study to give the future users of the design guide a standard or example in crafting learning materials.

This study will not only answer the curriculum mismatch of OHSP but also restructure the program to produce scientific, technological, and environmental literate students. This study will also be very functional for the Department of Education since the outcomes of this study will serve as a benchmark and guide for the department in crafting learning materials for OHSP which are aligned to the theories, framework, and competencies of the K to 12 Basic Education Curriculum.

LITERATURE REVIEW

Past and Present Science Curricula

Curriculum, more often than not, is regarded as the listing of subjects to be taught in school. However, it was described by Cabardo (2014) that curriculum is not just a learning package for the school but also the outside community as well.

The Philippine curriculum underwent several reforms to meet the demands of our ever changing society. These changes in the curriculum does not only affect how we view the teaching and learning process, but these changes also affect the type of students the educational system wants to produce. Since the early 21st century, the Philippines used three different curricular designs which differ significantly in terms of goals, aims, strategy, and delivery of teaching and learning.

The K to 12 Curriculum

The primary aim of the Science Education in the Philippines under the K to 12 Enhanced Basic Education Curriculum is to prepare learners to become participative and informed citizens by developing scientific literacy among them. The curriculum enables students to make judgements and decisions regarding the societal, health, and/or environmental applications of scientific knowledge. It is primarily focused on the role of science and technology in everyday human affairs. Hence, the social, personal, ethical and economic aspects of life are being incorporated in the curriculum. The curricular design of Science in K to 12 preserves our country's cultural heritage by means of promoting a strong linkage between science and technology (DepEd, 2013).

Furthermore, the curriculum envisions producing members of the community who are informative, good and informed decision-makers, creative, nature-loving, and responsible citizens who are environmentally, scientifically, and technologically literate. The curriculum is supported by three domains of science learning such as 1) performing the scientific processes and skills; 2) exemplifying the scientific attitudes and values; and 3) understanding and applying localized and contextualized scientific knowledge and relate and apply those understanding in global context whenever possible. These three domains will be feasible through the facilitation of the following teaching approaches such as science-technology-society (STS) approach, problem-based approach, contextual learning, interdisciplinary approach, and inquiry-based approach. These approaches are based on and guided by the educational philosophies namely social cognition learning model, learning style theory, constructivism, and brain-based learning. The learning material of the students are presented in activity-based modules that are grounded on the approaches and educational pedagogies in the K to 12 Science Curriculum framework (Figure 1)

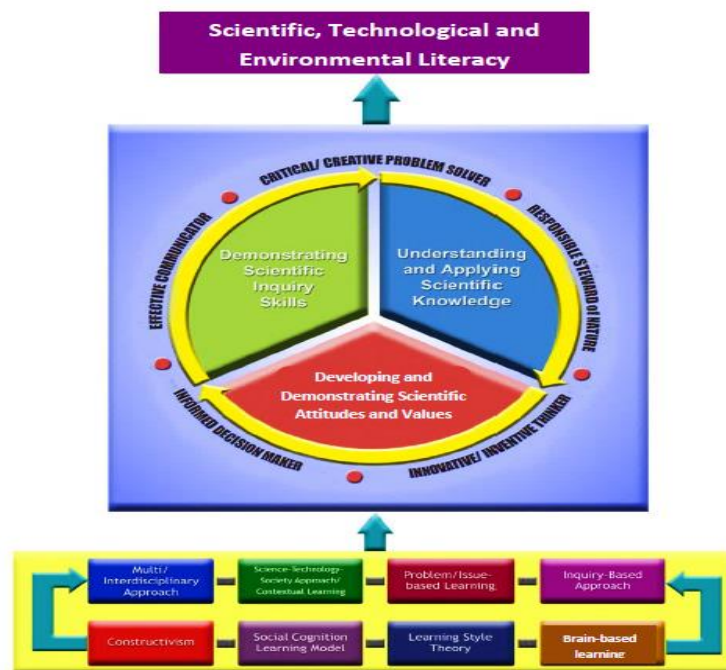


Figure 1: Conceptual Framework of K to 12 Science Education

Prior to the K to 12 Curriculum, the secondary levels used the 2010 Secondary Education Curriculum (SEC) though it was not successfully carried out by DepEd since it was properly implemented by DepEd in only two school years (i.e. SY 2010-2011 and SY 2011-2012).

The 2002 Basic Education Curriculum (BEC)

The 2002 BEC was a curricular framework implemented in school year 2002-2003 by virtue of DepEd Order No. 43, S. 2002. The curriculum envisions to help the Filipino students gain a functional understanding of basic to complex science concepts. It also links these science concepts to situations applicable to real life and promotes learners' awareness of the relevance of science in everyday life. The curriculum aims to develop the critical problem solvers. More than these things, the curriculum mainly emphasizes the application of the learnings of the students to improve the environment, the society, and their own way of living.

But since there was an observed steady decline of the achievement rate of the Filipino students in both national and international examinations and the country was left behind by the other Southeast Asian countries, the government was urged to reform the curriculum instituting a 13-year basic education (Magno, 2011) curriculum shifting from the K to 12 (10 year) program. Consequently, this major reform in the curriculum gave birth to the K to 12 Curriculum.

Comparison of BEC and K to 12 Curriculum

Like the primary aim of the K to 12 Science Education Curriculum, 2002 BEC is focused on the functional understanding of science concepts and principles. Similarly, 2002 BEC links these science concepts to situations applicable to real life, and the acquisition of scientific values, attitudes, and skills needed to solve problems on health, nutrition, sanitation and the environment

and its conservation. In both curricula, science content and science processes go hand-in-hand in developing scientific literacy among students. These curricula assume that the science process skills are best learned in context. K to 12 Science Curriculum and 2002 BEC revolves around life-like situations and problems, and are organized in such a way that students' curiosity will be tapped for them to become motivated to learn and appreciate the relevance and usefulness of science in their everyday life. Instead of relying only on printed textbooks, both curricula also empower the use of varied classroom activities that will produce holistically active learners. Obviously, the objective of 2002 BEC are carried on the K to 12 curriculum. It is just that the K to 12 curriculum gives greater emphasis on aiming for higher education, recognition abroad, and a gainful career and greater job opportunity for every Filipino graduate in the Philippines.

However, there are differences in the aforementioned curricula though both of them share common educational goals. For instance, the K to 12 curriculum in general, is both an inquiry-based and learner-centered curriculum that greatly emphasizes the use of evidence in explaining ideas. Meanwhile, the 2002 BEC is more focused on the holistic development of students through a competency-based curricular content. Thus, for a student to become promoted in 2002 BEC, he/she should meet the set performance and content standards of that level. The *Glossary of Education Reform* defines competency-based learning as combined schemes of instruction, assessment, and evaluation of student outcomes that are primarily based on the demonstration of the students' skills and traits that are expected of them as they move from one level to another. Competency-based learning uses content and performance standards to assess whether a particular student meet the competency requirement of the subject matter and/or year level. The primary goal of competency-based learning is to make sure that the students are acquiring the

basic and necessary knowledge and skills that are needed in their life after completing basic education. If learners fail to meet the expected standards, they usually receive extra tasks or remediation to help them achieve or meet the set of competencies and standards that are expected of them to master. This competency-based nature of the 2002 Basic Education Curriculum (BEC) is somehow different from the K to 12 curricular agenda, which embraces an inquiry-based and learner-centered instruction. Even though both curricular designs aim for the students to meet certain standards, the K to 12 curriculum engages the students to self-learning and discovery learning. Students in K to 12, unlike in 2002 BEC, are emerged and involved to real-life concepts to understand the world around them. In addition, 2002 BEC focuses on the content standards and how students apply those learnings in real-life scenarios. K to 12, however, focuses on the performance standards, which will define students' mastery and proficiency level. To such, students are not only expected to apply their understanding or knowledge in real-life situations on their own, but they are also anticipated to produce, manifest, and/or show products and/or performances as evidence that they are able to practice or transfer their own learning in their own lives. (DepEd Order No. 31, s.2012)

Aside from the previously mentioned differences, another notable dissimilarity between the two curricula is that the science in 2002 BEC adopts a linear approach. This scheme means that each year level in 2002 BEC, students will take up different branches or fields of science in every year level (i.e. First Year general science, Second year Biology, Third year Chemistry, and Fourth year Physics). On the other hand, the Science concepts and skills on the branches of science like earth science, biology, chemistry, and physics in the K to 12 Curriculum are to be taken by the students in increasing levels of depth, difficulty, and complexity as they move from

one level to another in spiral progression approach. Spiral progression approach is a technique in which the basic facts are introduced and discussed to the learners and increases the lesson's complexity as the lesson or level progresses. Lessons from the previous grade level are reemphasized, revisited and linked to the new lesson to reinforce what is already learned. Hence, the approach aids the students to remember and master the subject matter in a gradual manner. With the Spiral Approach, the learners will know everything that needs to be known about a subject or know how to learn whatever still has to be known. It will enable students to achieve a rich breadth and depth of knowledge of concepts. The basic idea behind the spiral progression approach is to repetitively expose the learners to the wide array of competencies, skills, and values until they are mastered. Although presented repeatedly, the core concepts are taught with deepening layers of difficulty for the learners to have an in-depth learning on the subject matter.

The *Spiral progression* curriculum has been found effective in increasing students' achievement and mastery of the subject matter. In the study conducted by Davis (2014) on the effect of experimental spiral Physics curriculum, students who are exposed to the spiral curriculum perform better in the achievement test than those who are taught using the traditional linear approach. He also found out that the students in the experimental group have better retention of concepts since learning is repeatedly done in the spiral curriculum unlike in the linear curriculum. Adanza and Resurreccion (2015) also suggested that the Spiral progression approach could really enhance science education in the Philippines because of its repetitive nature. They also found that the said approach had greatly influenced the science curriculum most especially in the content, interrelationship, and transitions of the four major learning areas of science.

The Spiral progression approach is currently adapted by the present curriculum, most learning materials for the regular program that are crafted, published, and distributed in both public and private schools nowadays also follow the spiral progression approach. The scope and sequence of the competencies are introduced to the students and are revisited in every grade level in increasing depth and complexity. Hence, the progression of the science curriculum and learning materials does not end there. The progression is not only vertical (from one grade level to another), but also horizontal. Meaning to say that the topics introduced to the students have broader range of applications from one lesson to another. In Grade 8 Science learning modules in public schools, for example, basic physics concepts on heat and thermodynamics are discussed first and turns to more complex lessons as the lesson progresses. In the first unit (Physics), the characteristics of heat as an energy in transit is described. Then, the concept of “molecules moving faster when heated” was introduced. On the second unit (Earth Science), the concept of heat is revisited during the discussion on the formation of tropical cyclones since it involves the heating and circulation of water and the surrounding air. On the third unit (Chemistry), the concept of heat is then revisited when the Phase Change of matter is discussed. Lastly, on the last unit (Biology), the concept of heat is reviewed when the cycles of matter in nature was discussed. The spiral progression of the K to 12 Science learning materials is not only evident from grade level to another grade level but are also evident from lesson to another lesson of the same grade level. Hence, in the learning materials under the K to 12 Curriculum, learning is extended, reinforced, and broaden each time a concept is revisited (Ferido, 2013).

OHSP as an Alternative Delivery Mode

The Spiral Progression Approach is very ideal to out-of-school youth because if they decide to go back to school, they will not be left behind that much in terms of the mastered topics. (Jacob, 2013) Since the Open High School Program (OHSP) as an alternative delivery mode (ADM) primarily aims to assist the students to complete basic education despite of their personal struggles, it will be easy for the students to adapt the scheme of the new curriculum. Thus, aside from aiding students to complete basic education, programs like OHSP will help the students gain the necessary knowledge and skills for them to become scientifically, technologically, and environmentally literate Filipino citizens.

Open High School Program is one of the vital components of the Dropout Reduction Program (DORP). DORP is an intervention program that aims to curb down the high dropout rate and improve learning outcomes in all schools of the country using formal, non-formal and informal approaches (DepEd, 2008). In the press release of Department of Education with The Philippine Star in 2011, Education Secretary Luistro said that 46,000 students are already saved by the program from dropping out. According to the latest data of the Department of Education, the dropout rate in secondary schools in the whole country was trimmed down from 12.51% in 2005-2006 to 7.95% in school year 2009-2010. This large decline of the drop-out rate in public school was accounted by DepEd to the remarkable success and contribution of DORP.

DORP has three major components, the Project Effective Alternative Secondary Education (EASE), School Initiated Interventions (SII), and Open High School Program (OHSP). The Project EASE is a program intended for those students who missed their classes

due to justifiable reasons. SII is the program implemented by schools for students-at-risk, which is often informal and unrecorded. The OHSP is an alternative delivery mode program run by the Bureau of Secondary Education (BSE) under DepEd for public high schools that offers learning through distance education. This program is offered to high school students who cannot attend the regular classroom schedule due to justifiable and legitimate reasons (OHSP handbook, 2008). OHSP as a part of DORP particularly aims to (1) to give a chance to graduates of elementary level, drop-outs of high school, and Philippine Placement Test (PEPT) passers to finish or attain a high school diploma; (2) to encourage students at risk of dropping out to complete the secondary level; (3) to improve schools' participation rate and reduce the number of dropouts; and (4) to give quality distance education to improve secondary schools' achievement rate. To attain these goals, OHSP was designed as a program that uses distance-learning approach and engages student to use variety of learning materials, primarily printed modules and multi-media materials, for students' independent learning tasks. Hence, before admission in the program, students must take Independent Learning Readiness test (ILRT) to determine the capability of the students on self-directed learning. They are also required to take the Informal Reading Inventory (IRI) to gauge the students' reading and comprehension level.

Although distance learning is the primary mode of the program, the OHSP is considered as a structured and formal program since students' learning are still structured around the core subjects of the curriculum (Math, English, Science, *Araling Panlipunan*, Filipino, Technology and Livelihood Education [T.L.E], Music Arts Physical Education and Health [MAPEH], and *Edukasyon sa Pagpapahalaga* [EsP]). OHSP students also take the exams and other evaluation measures for them to proceed to the next year level like the other regular students. (OHSP Handbook, 2008)

OHSP offers different modes of distance learning such as modular, Internet-based, and blended technology. In the modular setup students are given a printed text-book like learning modules by the OHSP teacher-in-charge on their agreed schedule. The students read and study these modules at home. The internet-based approach is still under development and selected schools in Baguio, Davao, and Cebu are currently the pilot implementers. Blended-technology, which is a combination of the two previous approaches, is still envisioned by BSE and DepEd. (Ubaldo, 2018)

OHSP's most salient feature as an "independent, self-pacing and flexible study" makes it a perfect intervention and strategy for maintaining low drop-out rates and encouraging the out-of-school youth to reconsider reenrolment. With this, OHSP will consequently help the country achieve its aim of developing basic education competencies for all learners. The Department of Education started the implementation of OHSP in 1998 as a program of intervention for students at risk of dropping out (SARDOs). Its potential as an intervention strategy for keeping low rates of drop out became more pronounced in the subsequent years. For instance, secondary high school dropouts increased to about 5 percent in five years from SY 2002-2003 (8.45%) to SY 2006-2007 (12.51%) (SEAMEO INNOTECH, 2014). Balmeo and colleagues (2015), in their study conducted in an implementing school in Baguio City, were able to see that OHSP is not just a typical intervention program for SARDOs and OSY, but it also gives a lot of positive effects and implications to its students. The researchers learned that positive reinforcement has great effect on students their stay in school. The researchers are also able to see that independence of students leads to a lot of positive effects on their learning. The program helped them realize how important education is and how it affects their lives. The researchers are able to see the importance of education despite of age, socio-economic status and the like. The

researchers also saw how the Department of Education caters the needs of these students to finish high school.

Modular Instruction in Alternative Delivery Mode

The primary aim of the Science Education in the Philippines under the K to 12 Basic Education Curriculum is to equip learners to become participative and informed citizens by developing scientific literacy among them. In addition, it enables students to make judgements and decisions regarding the societal, health, and/or environmental applications of scientific knowledge (DepEd, 2012). To achieve this goal, students should develop the necessary values and skills to cope up not only with the demands of the curricular framework, but of the community as well. In addition, to help them embrace the vision of K to 12 Science curriculum, students should be well guided, assisted, and facilitated using carefully developed instructional materials, such as modules and other instructional aids.

As stated by Simui et al. (2014), learning materials such as modules are the best examples of learning aids that a student can use to learn at his own pace. He also added that learning modules are suitable for a learning set-up with less teacher-student interaction, such as distance learning. Co (2010) also mentioned that the philosophy behind learning modules hinges on the fact that each child is unique, with different backgrounds, has exceptional qualities, habits, and learning styles. Modules also enable learners to grow and develop to his/her optimum potential at his/her own pace.

Instructional designs of modules as believed by Hashim (2012), are carefully designed learning module can let students work independently. He also believed that learning materials

like modules contribute to the confidence level of the learners because it enables the learner to decide on his own, receive an immediate feedback if his answer is right or wrong, and can monitor his own progress through varied activities and exercises. Moreover, it was stressed out in his study that most self-instructional materials are purpose built and are structured to meet learner's needs.

Modules have their own unique way of facilitating learning found advantageous in many aspects. According to Auditor and Naval (2014), learning modules have positive impact on the knowledge acquisition of the learners. This means that, with or without the presence of a teacher, learners can fully grasp the content of the learning material. Research also suggests that modular instruction can also be an answer to the educational system of developing countries. With modules, instruction could be individualized even with the out-of-school-youth and distance learners. In this regard, the literacy rate of the country will increase because even those individuals who cannot go to school for some personal reasons could answer modules to complete basic education (Sejpal, 2013). Cusay (2009) also have the same stand who made a study on the implementation of Alternative Learning System (ALS) in selected divisions in Cavite. In his study, he found out that among other instructional materials for out-of-school youth, self-sustained modules are the most effective and has a promising role in giving instruction and helping such type of students in completing basic education. Abad (2010) also suggested that modularized instruction helps students meet the needed competencies even though they are not physically inside the classroom. In her study, she experimentally tested a group of home-based learners with modularized instruction and a set of learners in the regular classroom set-up. Based on statistics, she found out that the achievement of home-based students is quite

higher than those who are in the regular classroom set-up having a post-test mean difference of 3.25. Hence, her study suggests that modularized instruction is really suitable for students under distance-learning modality.

Tall and Thomas (2013), in their study on the promotion of versatile learning of higher order concepts, mentioned that modules are one of the learning materials nowadays that are capable of bringing flexible learning delivery to the 21st century classroom since the said learning material regards that the multiple intelligences of the students could improve the academic achievement of students regardless of their ability and intellectual levels. Faria (2012) emphasized in her study that modules can be the best alternative method in giving instruction to the students especially to those who are at-risk of failing and dropping out. Richardson (2017) said that learning materials such as module are so versatile in a sense that it can act as both an intervention material and a supplementary material. Similarly, Macarandang (2009) and Isola (2010) also had the same point of view like Tall and Thomas and Faria about modular instruction. In both studies, it was stressed-out that prepared modules can effectively be used as self-sustained instructional material even for below average and above average learners who cannot come to school due to personal reasons. Hence, modules can be used as instructional aid not only for regular students but also for students who are at risk of dropping out. This finding is also in consonance with the study conducted of SEAMEO INNOTECH in 2014 on the versatility of Project EASE modules used for alternative delivery mode.

The study conducted by SEAMEO INNOTECH (2014) revealed that virtually all of the OHSP-implementing schools in the Philippines utilize printed modules for their students. The same study also found out that 83.23% of the OHSP-implementers in the country are using the

Project EASE modules because they found it easy to use and is very informative. Many conducted researches proved and tested the effectiveness of printed modules and most of these researches attested that modules are effective tools most significantly for students at risk (Targaza, 2014), students who are home-based (Abad, 2010), and students under Alternative Learning System and Alternative Delivery Mode (Cusay, 2009). The experimental studies of Macarandang (2009), Santonil (2011), and Shaikh (2013) found out that students taught with instructional modules perform better than those who had traditional teaching method. In fact, Abad (2010) suggested that home-based students under modularized instruction can learn as much as those students who are in the classroom only if the learning material is focused on individuals and are able to cater to their needs. It was also the modular approach as a means of instruction was effective in the teaching and learning process because it has several purposes: 1) it could be self-studied by the students; 2) it can be used to supplement students' knowledge; 3) it could be a supplementary material while the teacher is still there to monitor; and 4) extend a facilitating hand to the students (Santonil, 2011)

The cited studies of Cusay (2009), Macarandang (2009), Abad (2010), Santonil (2011), and Shaikh (2013) all suggested that modularized instruction is suited for learners who are either at-risk of failing or dropping out or those learners who are not physically in the classroom. Another common thing with the cited studies is that, all of them based their instructional materials on constructivism learning theory. According to Santonil (2011), using constructivism as a foundation in learning modules encourages interaction between learner's knowledge and new knowledge presented. He also cited that constructivism puts the interest of the students at the center of curriculum making the learning material learner-centered. The study of Jamilia (2012) also agrees with this finding that learners actively constructs or create new concepts based

on their present and past knowledge and/or experience. Hence, modules that are based on constructivism help learners to build and reflect on their own learning. Cusay (2009) ever added that constructivism-based learning material encourages independent and student-centered learning. If the student is stimulated to search knowledge through his own freewill, the retention of new concept is longer (Lucero, 2010). Also, according to her, through constructivism, the dependency of students for teachers as the main source of knowledge was also decreased.

Soner (2010) also made a constructivist learning module and observed, through his learning material, that students were encouraged to make meaning and develop understanding through inquiry, reflecting, problem solving, and applying. He recommended in his study that learning materials such as modules should incorporate constructivist learning theory because it caters the needs of learners as well as their achievement most especially those learners who are in the non-formal school set-up. This recommendation is also the same with the recommendation of the studies of Richardson (2017) and Gonzano-Quiambao (2010). Although Gonzano-Quiambao (2010) added that teachers should also make electronic versions of learning modules to provide more interactive activities and animations to tap the interest of 21st century learners. Similarly, Jamilia (2012) suggested the use of modularized instruction in adult learners and/or students who are not attending formal or regular schooling like those who are in the Alternative Learning System or OHSP.

According to Jacob (2013), since most of the enrollees of OHSP are adult learners, modules are more applicable in the intermediate level because they already have fundamental knowledge, skills and core understanding of the topics given. In his study, which uses descriptive research design, he developed and validated Science modules for OHSP, which are in line with

the K to 12 curriculum. He made his module validated by a pool of experts and his module was rated with an average mean of 3.61 which is interpreted as highly acceptable. The modules he developed, just like the previously mentioned developmental studies, undergone three phases, the development phase, evaluation phase, and finalization phase. One of the strengths of the developed module is that, it links the learners to online activities, exercises, quizzes, and video clips. Indeed, such modules are recommended for distance learning to help reduce the drop-out rate. Jacob concluded that learning modules aid in building self-confidence, self-knowledge, and encouraging students to take responsibility for working on their own.

Design Guide for Learning Materials

A design guide, also known as style guide or manual, is typically a document or a hand-out that contains set of rules, standards, and guidelines in doing a particular task. (Robertson, 2014). Also, according to Charles Sturt University in Australia (2008), a Design Guide is a set of guidelines to help an institution's academic and administrative staff in developing and designing instructional materials that are consistent, unified, usable, and accessible learning materials. It was also mentioned that tools such as design guides assist and aid curriculum writers and instructional material developers in coming up with standardized academic resources.

Design guides are very useful for people, most especially those who are first timers in doing a task. Materials, such as these, serve as a pattern or a benchmark that help users in doing their output. (Robertson, 2014). Also, according to The Economist Online (2016), design guides standardize materials to be made since the guide contains set of rules, standards, and guidelines to follow. Pinder (2012) added that design guides unify developed materials into single format,

style, elements, and image. Hence, when used by different persons, outputs are more likely within the prescribed format, criteria, and standards set on the design guide.

Most of the formats of design guides available nowadays vary depending on the type of materials that will be produced. Though, the important and indispensable parts of a typical design guides, based on the works of Abdon (2015), Robertson (2014), Pinder (2012), and Sorianosos (2012) are as follows: 1) cover page; 2) Introduction/Preface; 3) Table of Contents; 4) purpose and framework of the style guide; 5) definition of terminologies; 6) procedure or guidelines; 7) summary; 8) glossary; and 9) resources. In a procedure or guidelines section of design guide intended for developing learning materials, based on the design guides in the works of Abdon (2015), Gutierrez (2013), Sorianosos (2012), DepEd (2009), and Tanala (2014), the fundamental parts are the following: 1) statement of the purpose of the learning materials; 2) guidelines in writing the particular instructional materials; 3) prescribed format, font styles, font size, headings, color schemes, margins, size and type of illustrations, citation, and size or dimensions of the learning materials; 4) detailed explanation of each part of the learning materials which includes how the part will be made, what are the things to remember when writing the particular part or section, and options or pool of applicable activities or learning tasks that can be applied or included in that particular section of the learning material; and 5) a sample template.

Modules are proven effective and have a myriad of advantageous features than other instructional learning materials. Granted that there are properly validated and aligned to the curriculum, modules are regarded as effective and efficient learning tools to vast types of learners, including out-of-school youth and those who are not in formal schooling. Many

conducted researches proved and tested the effectiveness of printed modules and most of these researches attested that modules are effective tools most significantly on students at risk (Jacob, 2013). However, these researches have no documented standard guide in writing these modules.

Open High School Program (OHSP), as a component of the Drop-out Reduction Program (DORP), is tasked to eliminate the increasing number of out-of-school youth in the Philippines by offering an alternative delivery mode of instruction to students who are unable to attend regular classes due to various legitimate reasons. OHSP Students are taught through modularized instruction where students are given printed modules for home study and come to school if there are queries or they need the assistance of an OHSP Teacher. However, even up to this date, the OHSP still uses 2002 BEC-based printed modules, which are originally crafted for Project Effective Alternative Secondary Education (EASE). Even though Project EASE modules are user-friendly and easy to use (SEAMEO INNOTECH, 2014), they are still not aligned with the K to 12 Curriculum.

SEAMEO INNOTECH (2014) suggests that there should be a revision and reconstruction of the OHSP modules since the modules used in the program was still in 2002 BEC and not K to 12 Curriculum. Though the Science Education of the K to 12 and 2002 BEC shares a common goal and vision, the way on how the subject matter is presented, delivered and inculcated to students significantly varies. For instance, 2002 BEC is competency -based while K to 12 is inquiry-based and learner-centered. The achievement of students in 2002 BEC is based on how the students meet certain standards while K to 12 gauges the learning of students on the way how he can connect his understandings to the world around him. Lastly, 2002 BEC adopts linear

approach on curriculum content. Thus, students need to take the four major areas of Science per year level which is way different for the design of the K to 12 curriculum that adopts the spiral progression approach. This means that the science curriculum is no longer divided to elementary school to high school that way it used to be in 2002 BEC. In spiral approach, there is now vertical articulation or a seamless progression of competencies from the first grade up to the last grade of junior high school. In here, lessons are introduced and discussed in increasing complexity and depth as the level progresses. The lessons from the previous levels are reemphasized, revisited, and linked to the new lesson to reinforce what is already learned causing increased mastery of the subject matter.

SEAMEO INNOTECH (2017), admitted that a major difficulty of the Open High School Program is the lack of funding and sustainable financial support despite the urgent need to realign the program to the current curriculum. Hence, OHSP teachers were asked to look for other learning sources that are suited for the type of learners in the OHSP and are congruent with the principles and theories of K to 12 BEC. Also, various Regional Offices (ROs) of the Department of Education instructed School Division Offices (SDOs) to make modifications on the existing Project EASE modules and since up to this date, the OHSP is not yet aligned to the K to 12 curriculum.

To help the Department of Education align OHSP in the new curriculum, a design guide was developed in this study to help teacher-writers and school administrators to construct learning materials that embeds the principles, theories, and competencies of the K to 12 Curriculum. A design guide, also known as a manual or style guide, is a tool that will help

designers of instructional materials because it contains the detailed guidelines in producing a uniform and standardized output. With the help of a design guide for developing k to 12-based learning materials, the conduct of seminar-writeshops for crafting OHSP learning modules will be very easy for OHSP implementers since all of the things needed to include and considered are already written in the design guide.

Having a design guide is very useful for teacher-writers and administrators in so many ways. Most especially, in the Philippines in which most of the available learning materials are not in line with the present curriculum (K to 12 Basic Education Curriculum). In the Department of Education's Open High School Program (OHSP), the learning materials used are still under the concepts, standards, principles, and competencies of the previous curriculum. Since both 2002 BEC and K to 12 varies significantly in many ways, adapting learning materials that are not aligned with the new curriculum followed by regular students makes the OHSP somehow unsuccessful in achieving its curricular goals. Having a design guide intended for the development of learning materials that are in line with the present curriculum will help the department to successfully implement the program.

STATEMENT OF THE PURPOSE

The main purpose of this study is to develop and validate a design guide for learning materials based on K to 12 curriculum for the students of Open High School Program (OHSP). Specifically, this study aimed to:

1. Develop a design guide for a K to 12-based learning materials for OHSP;

2. Validate the design guide in terms of the following characteristics:
 - a. Format, style, and presentation;
 - b. Content, organization, and clarity of information;
 - c. Language; and
 - d. Content;
3. Develop and validate a sample K to 12-based OHSP printed and electronic modules using the design guide;
4. Determine students' perception after trying-out the learning module.

CONCEPTUAL FRAMEWORK

Curriculum encompasses not just the list of competencies to be taught to the students but also the strategies, methodologies, and approaches that will give them a complete learning experience. Consequently, teaching refers to the action of giving instruction to learners and implement the designed curriculum to achieve the desired learning experience.

In 2013, the K to 12 Enhanced Basic Education Curriculum was successfully employed by the Department of Education (DepEd), which primarily intends to holistically develop Filipino students to acquire 21st century skills. Specifically, the curriculum is tailored to develop and inculcate scientific literacy among young Filipino learners that will equip them to become participative and informed citizens. The Science curriculum also envisions to enable students to make judgements and decisions regarding the societal, health, and/or environmental applications of scientific knowledge.

The Department of Education, on its initial implementation in 2013, anchors the Science education in the K to 12 curriculum on educational theories namely constructivism, learning style theory, and brain-based learning to achieve its educational goals. However, in the latest issuances of the regional offices of the department (e.g. region IV-A CALABARZON through Regional Memorandum No. 233, s. 2016) all DepEd Schools Division Offices were mandated to implement a set of pedagogical approaches which are all constructivists in nature. Hence, the design guide was developed in the study highlights only the constructivism theory as its core foundation.

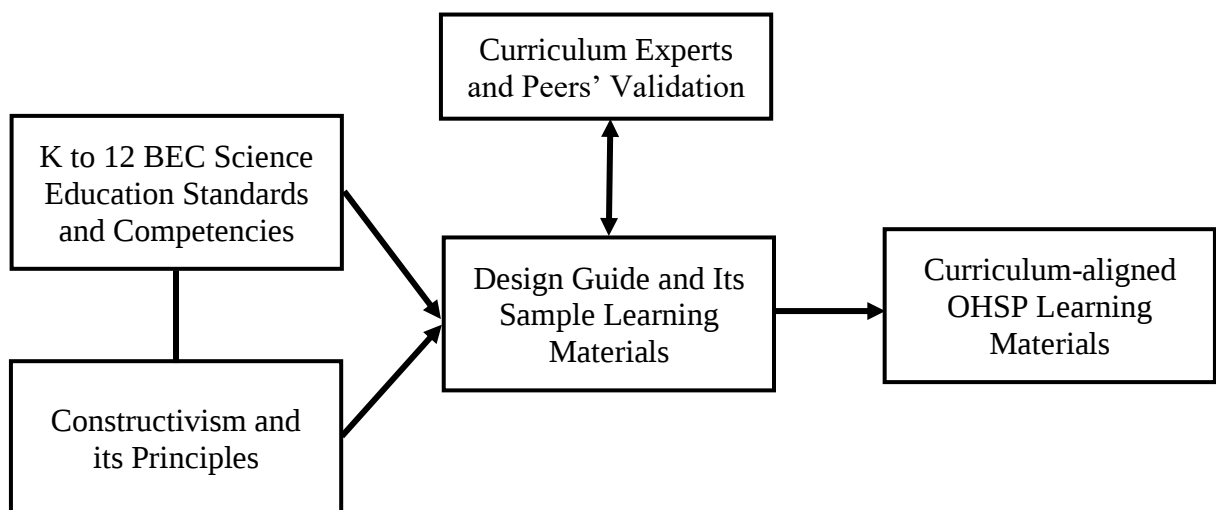


Figure 2. The conceptual framework of the study

Figure 2 shows the conceptual framework model of the entire development and validation process of the OHSP design guide and its sample printed and electronic learning materials. The framework of the study shows that, the set of standards and competencies of the K to 12 BEC Science Education Curriculum and the constructivism and its principles are the core factors considered in the development of the Design Guide. Since the intended users of the main output

of the study are the teachers in the Department of Education, the researcher used the K to 12 Basic Education (BEC) standards and competencies stipulated in the curriculum guide provided by DepEd. The educational experience of the researcher in handling OHSP students, the available learning and resource materials, nature and abilities of OHSP learners, and the collaborative ideas of the curriculum experts and peers were also considered in the entire development and validation process. Having these considered in the study, it was guaranteed that the developed and validated learning materials using the crafted design guide suits the needs and nature of the OHSP learners.

The framework also shows that the Design Guide and its sample learning materials will undergo a validation stage from the curriculum experts and peers. Hence, having considered the necessary standards, competencies, principles, and outputs from the experts and peers, K to 12 curriculum-aligned OHSP learning resources will be produced to give the program to the goals of the curriculum.

The K to 12 Science curriculum envisions students who are critical problem solvers, responsible stewards of nature, and reflective citizens. This vision of the science curriculum shows its constructivist nature. Constructivism as a theory of learning originally emerged from the work of Jean Piaget, Lev Vygotsky, and Jerome Bruner, and is typically defined as a learning theory about how an individual construct his/her knowledge, which is constructed by means of his/her own personal experiences and interactions with the world around him/her. It has been believed that humans consistently construct or build knowledge and meaning from their own experiences, while reflecting on those experiences. Constructivism is a learning theory in which educators view students as active participants who construct their understanding of concepts as meaning-makers rather than empty vessels into which someone can transfer pre-organized

knowledge. The constructivist learning theory has been the basis and core foundation in the entire development and validation process of the design guide and its sample learning materials. Specifically, some of its principles such as a) *Learning is an active process in which the learner uses sensory input and constructs meaning out of it*; b) *The crucial action of constructing meaning is mental: it happens in the mind*; c) *Learning is contextual*; d) *One needs knowledge to learn*; e) *It takes time to learn*; and f) *Motivation is a key component in learning*.

Learning is an active process in which the learner uses sensory input and constructs meaning out of it. Having this as one of the principles embedded in the study, the researcher made sure that the developed design guide included sets of instructions regarding the inclusion of set of engaging learning activities for the Open High School Program learners like hands-on activities, activities, games, puzzles, and simulations. These types of learning activities encourage interaction between learner's knowledge and new knowledge since this principle of constructivism centers on the interest of the students in the curriculum, hence making the learning material learner-centered (Santonil, 2011).

The crucial action of constructing meaning is mental: it happens in the mind. Although there is an indispensable need for teachers to involve students in hands-on activities, the over all learning of the students does not happen only happen through it. In the design guide, sets of instructions were included to inform its intended users, OHSP teachers, to include learning activities in their learning materials that will enable students to think and reflect such as journal writing. This enables teachers to determine the affective learning of the students with regards to the concepts presented.

Learning is contextual. One of the aims of the Science education in the K to 12 curriculum is to engage students in concepts that the students will find useful in their everyday

lives. To do this, teachers must ensure that the lessons are explained in a context that the students can easily relate to. Hence, the design guide included several items that give instructions to teachers to localize, indigenize, and contextualize their lessons and activities like citing local historical landmarks, famous product, delicacies, etc. This will enable learners to easily connect and relate to the lesson.

One needs knowledge to learn. Assimilation of new knowledge is not possible if it is not connected to the previous knowledge they built. Hence, teachers must ensure the horizontal articulation of the concepts he/she presenting to the students because they learn best if a previous knowledge was used as a path towards new knowledge. Hence, in the design guide, a specific part called “*Lesson Overview*” was included in every lesson to give learners a detail on what he/she should have learned from the previous grade level/ lessons and what is its connection to the new topic. In preparing the said part, the design guide instructs teachers to mention the pre-requisite that learners should have learned and discuss the vertical articulation of the previous knowledge to the new lesson.

It takes time to learn. Learning does not happen in an instant. When presenting lessons, teachers should also consider using varied follow-up activities so that the students can easily master the subject matter. Through series of activities, students are given enough time to be exposed in the lesson for them to fully grasp the idea. This is the reason why included in the design guide are suggested *Comprehension Check* activities that the module writer can choose from such as picture analysis, graph interpretation, problem solving, identification, multiple choice, true or false, etc. These comprehension check activities aim to give follow-up tasks for the learners to ensure that the students will fully grasp the lesson.

Motivation is a key component in learning. Students will have a difficulty in understanding the entire lesson if they were not engaged at the very beginning of it. Motivation is an integral part of the learning process. Students should be motivated so that it will be easy for them to grasp the learning content they are studying. Hence, teachers should give priming activities and tasks to prepare learners for a new concept. In the design guide, instructions regarding the inclusion of several priming activities were included like the Knowledge-Skills-Attitude (KSA) Chart completion to enable teachers to determine what the students know, think, and feel about the new lesson.

Incorporating these principles of constructivism in teaching enables educators to efficiently and effectively facilitate the entire teaching-and-learning process. Nowadays, these principles of constructivism and the constructivist theory in general are not only being used in teaching methodologies and strategies but are now also embedded in most teacher-made learning materials. Targaza (2014), Samonte (2014), Marinduque (2013), Shaikh (2013), Santos (2013), Espiritu (2011), Santonil (2011), Abad (2010), Macarandang (2009), and Cusay (2009) found the effectiveness of constructivist-based learning materials in self-sustained print and non-print modules. Since constructivist learning materials place students at the center of the teaching and learning process, varied and lots of activities can be included in the learning material. With this, students could be able to “learn by doing” and will be given a chance to personally experience first-hand learning and relate those current learning to the old ones. It has also been said that constructivism-based learning materials encourage students to become constructive and reflective individuals (Espiritu, 2011). Lucero (2010) and Espiritu (2011) both suggested that a designer of a constructivism-based learning material could include activities in which students will be given a chance to freely write his/her insights and reflections on what he/she learned from

the lesson. Hence, the teacher can easily assess not only the cognitive but also the affective domain of students' learning. He/she could clearly see whether the student was able to relate or link his/her learning to real life situations.

Learning materials based on constructivism are not only applicable to formal classroom set-up, but also in the non-formal class settings as well because among other instructional materials for out-of-school youth, self-sustained modules are the most effective and have promising role in giving instruction and helping such type of students in completing basic education (Cusay, 2009). The findings of the different studies on constructivism-based instructional materials jive with the student-centered characteristic of the K to 12 curriculum. The aforementioned studies prove that constructivism is not only applicable in the everyday formal classroom discussion but also through modularized instructions as well. Regardless whether a student is in formal or non-formal schooling, the above-mentioned studies recommend to craft more constructivist-based learning modules to enhance constructive, reflective, and independent learning. Hence, as per Karaduman and Gultekin (2007), constructivism as a theory of learning primarily encourages students to become learners who are reflective, independent, and responsible of their own learning. The learning theory also recognizes the nature, capability, and the learners' way of thinking. Hence, it justifies the reason why constructivism is widely used as one of the theoretical bases of learning modules nowadays for both formal and informal classroom set-up.

SIGNIFICANCE OF THE STUDY

The developed and validated design guide for K to 12-based learning materials as a product of this study will significantly address the dilemma of the Department of Education in aligning the Open High School Program to the current curriculum. This study is also of great help for OHSP teachers since they are urged to find solutions to the curriculum misalignment of the program by looking for an alternative learning resource. Moreover, the researcher believed that the findings and contributions of this study will specifically benefit the following stakeholders:

- **Teachers.** The design guide developed in this study will be very helpful to OHSP teachers in constructing their own K to 12-based learning materials for the program. The guide will give them ideas on how to construct or craft learning materials that are based and aligned with the principles, theories, and competencies of the K to 12 basic education curriculum.
- **Students.** The intended users of the learning materials produced using the design guide are the students (Open High School Program). Hence, they are the immediate beneficiaries of this study. They can use the learning materials to enhance not only their reading and listening skills, but also their computer skills. The use of instructional modules can help them correct the errors, which they committed during the regular class session. Moreover, the learning modules will also develop the students to learn independently at their own pace.
- **Administrators.** The design guide produced in this study can be used by school heads, department heads, coordinators, and other administrators as a tool in constructing more learning materials for OHSP. This will also give them input that a budget should be

allocated in organizing a seminar-writeshop for teachers in their school or division in crafting more k to 12-based learning materials for OHSP. The result of this study will help the administrators to realize that the use of learning modules could be very effective to improve and enhance the skills and interest of the students in science

- **Future Researchers.** The result of the study will give them ideas and encourage them to embark on similar research. The future researchers could use the developed printed and electronic modules to conduct a comparative study of both learning materials. Future researchers can also use the design guide in making developmental studies on k to 12 based learning materials for other learning areas.

DEFINITION OF TERMS

In order to provide clarity and to create a shared setting of orientation, the following terms and concepts were prudently defined theoretically or conceptually or both as used in the context of this study:

Content Validation. It is the process of determining the extent to which a certain material represents every single element of a given construct. In this study, this refers to the scrutiny made by curriculum experts and peers in both design guide and learning materials in terms of content, concept, organization of thought, clarify of information, and language.

Design Guide. It is a manual that indicates a set of guidelines, standards, and rules for the writing and designing of documents that can either be used in general or specific purposes. In this study, the design guide refers to the developed and evaluated manual that contains a set of

rules, guidelines, and instructions in creating a K to 12-based learning materials for Open High School Program.

Drop-Out Reduction Program (DORP). It is an intervention program initiated by the Department of Education which primarily aims to reduce the drop-out rate of both public and private schools and improve its students' learning outcomes. This program uses both formal and informal approaches.

Experts. These are persons having or showing special skills or knowledge derived from training or experience. In this study, the term refers to the Educational Program Supervisor, OHSP and ALS Coordinators, Department Head, Master Teachers, Science Teachers, and OHSP Teachers who evaluated the design guide and learning materials.

Learning Materials. These are tools used for teaching like textbooks, supplementary reading materials, workbooks, visual aids, or specimen for experiments. In this study, this refers to the researcher's developed printed and electronic learning module in Science.

Open High School Program (OHSP). It is a program of the Bureau of Secondary Education (BSE) under the Department of education which is an alternative delivery mode (ADM) of secondary level. The program provides elementary graduates, drop-outs and Philippine Education Placement Test (PEPT) passers an opportunity to complete junior high school through distance learning mode.

Perception. It refers to the belief or opinion of people based on what they observe. In this study, perception refers to the students' feeling towards the use of the developed learning materials using the design guide.

CHAPTER II METHODOLOGY

This chapter includes the research design, research locale, research instrument, the development and validation procedure of the learning materials, and the data analysis procedure of the study. Likewise, this chapter presents the implementation steps of the research and the methods on the achievement of pertinent findings.

RESEARCH DESIGN

This study aimed at developing and validating a design guide for K to 12-based Science learning materials for Open High School Program. Aside from the design guide, this study also produced a validated sample of both print and electronic learning materials. To effectively achieve its primary purpose, this study utilized Developmental Research Design and involved the following major phases for the development and validation of the learning materials: 1) development of the design guide; 2) validation and evaluation of the design guide; 3) development of learning materials using the design guide; 4) content validation of the learning materials; and 5) try-out and finalization of the learning materials.

According to Richey (1994), developmental research is an organized study that primarily involves the designing, developing, and assessing or evaluating of instructional materials, processes, curriculum, and outcomes that must meet certain standards on its content validity, effectiveness, and consistency. Developmental research has three common types 1) a developmental research that involves the analysis and description of the product-development process and the evaluation of the final product; 2) a developmental research that focuses on the

impact or the effect of the product on the organization, school, learner, or institution; and 3) a developmental research that is concerned with the over-all analysis, as a whole or as components, of the process of evaluation or design development. Hence, in this study, the type of the developmental research that will be utilized will focus on the analysis and description of the development process and evaluation of the learning materials.

RESEARCH LOCALE

The researcher conducted the study at the two secondary schools of Department of Education Schools Division of Cavite City, Sangley Point National High School (SPNHS) and Cavite National High School (CNHS). SPNHS and CNHS are the only public secondary schools in the Schools Division of Cavite City offering OHSP. Hence, both schools are automatically selected as the locale of the study.

Sangley Point National High School is located inside the Sangley Point Heracleo Alano Naval Base of Cavite City. It has a total of 23 students enrolled in its Open High School Program (OHSP) for SY 2018-2019. SPNHS is in partnership with Dynamic Teen Company's *Kariton Klasrum* spearheaded by the 2009 CNN Hero of the Year. Students from *Kariton Klasrum*, mostly street children, are enrolled as students of OHSP of SPNHS.

Cavite National High School (the second study area) is located along Chief E. Martin St. in Cavite City. The school has a total of 39 enrolled OHSP students.

PARTICIPANTS OF THE STUDY

This study utilized the following phases to systematically carry-out its purpose: 1) development of the design guide; 2) validation and evaluation of the design guide; 3) development of learning materials using the design guide; 4) content validation of the learning materials; and 5) try-out and finalization of the learning materials.

In all the phases of this study, the researcher primarily used purposive sampling technique in selecting the respondents and experts. Purposive sampling technique is a kind of non-probability sampling strategy which targets a particular or specific group of people. Samples are chosen if the researcher believes that the subjects are fitted to become respondents in the research compared to other individuals. Since the division of DepEd Cavite City is one of the smallest divisions in CALABARZON, it has only two secondary schools, and has a limited pool of curriculum experts, purposive sampling technique was the best option.

In the first phase of the study, the OHSP teachers and coordinators of Sangley Point National High School (SPNHS) and Cavite National High School (SPNHS) served as participants in a closed-door focus group discussion (FGD). The participants of the FGD went through a briefing and orientation on the study's nature, goals, objectives, and other information related to it. The researcher addressed the concerns and queries of the respondents before the discussion started. The researcher also informed the participants that they have the right to withdraw from the focus group discussion at any time they wanted. The estimated duration of the focus group discussion is one (1) hour and thirty (30) minutes, which was also mentioned to the participants during the briefing session. To ensure the participants' privacy and confidentiality, they were given a chance not to state their name and other personal information in the focus

group discussion. The researcher personally kept the result of the FGD and ensured the participants that the result or the outcome of the discussion will be entirely used for the study being conducted.

The adviser and curriculum experts from DepEd Cavite City participated in an interview since the design guide included the guidelines in designing K to 12-based learning materials for OHSP. The said curriculum experts consisted of the following: 1) secondary science teachers; 2) Science Master Teachers; 3) School Heads; 4) Science Department Head; 5) Education Program Supervisors and Specialists; 6) ICT coordinators; and 7) ALS and OHSP Coordinators and mobile teachers. The experts were expected to finish answering the interview questions within thirty (30) minutes. The experts were also given the option to choose whether they want an oral or written interview.

A set of expert-evaluators scrutinized, validated and evaluated the prototype design guide in the second phase. The following criteria selected the expert-evaluators that participated in the study:

1. Secondary teachers with bachelor's degree in science with at least five (5) years of teaching experience and has attended a division or a regional training on content and pedagogy of K to 12.
2. Science teachers with a Teacher III or Master Teacher position.
3. School administrators who are involved in academic programs in science which may include principals, department heads, Education Program Specialists, and Education Program Supervisors.

4. Division and School Information and Communications Technology (ICT) coordinators for their inputs on constructing electronic version of the learning materials.
5. School and Division Open High School Program and/or Alternative Learning System coordinators and mobile teachers.

In the third phase, the thesis adviser evaluated the developed prototype learning materials before the expert-evaluators' rating/ validation. The same set of expert-evaluators validated the design guide in the second phase and the learning materials in this phase.

Table 1. Number of Evaluators per Position and Designation

Evaluators	Frequency			Total	Population Percentage
	SPNHS	CNHS	Schools Division Office		
Science Teachers	5	12	0	17	36.96%
Master Teachers	2	4	0	6	13.04%
School Administrators	2	2	0	4	8.70%
Education Program Supervisors and Specialists	0	0	2	2	4.35%
ICT coordinators	1	1	1	3	6.52%
OHSP and ALS Coordinators	1	2	1	4	8.70%
OHSP Teachers	5	5	0	10	21.73%
TOTAL	16	26	4	46	100%

Shown in Table 1 is the number of expert-evaluators per position and designation in the Department of Education (DepEd) Schools Division of Cavite City. A total 46 expert-validators scrutinized, validated, and evaluated the design guide and the learning materials. Secondary science teachers with bachelor's degree in science with at least five years of teaching experience and has attended a division or a regional training on content and pedagogy of K to 12 has the highest population percentage of 36.96% (17 teachers). The Education Program Supervisor and

Specialist (EPS) has the lowest participant percentage because every Schools Division Offices (SDOs) of DepEd in the country has only one designated EPS for Science and one EPS for Learning Resource Management Development System (LRMDS).

In detail, the expert-evaluators consisted of five science teachers from Sangley Point National High School (SPNHS), and 12 science teachers from Cavite National High School (CNHS). These science teachers earned a bachelor's degree on Secondary Education and have been teaching the learning area for at least five years. Evaluators also consisted of two master teachers of SPNHS and four master teachers from CNHS. The study also involved the school heads and science head teachers of SPNHS and CNHS. The researcher consulted the Information and Communications Technology (ICT) of both schools as well as the ICT supervisor of DepEd Cavite City for the electronic format of the learning materials. Two OHSP coordinators from SPNHS and CNHS, ALS Coordinator of CNHS, the Alternative Delivery Mode (ADM) Coordinator of DepEd-Cavite City five OHSP teachers of SPNHS and another five OHSP teachers from CNHS also participated in the study.

Table 2. Grade 8 OHSP Enrollees in DepEd Schools Division of Cavite City in SY 2018-2019

School	Grade 8 OHSP Enrollees			Population Percentage
	Male	Female	Total	
Cavite National High School	25	13	39	62.90%
Sangley Point National High School	16	7	23	37.10%
TOTAL	41	20	62	100%

As shown in Table 2, a total of 62 learners from both secondary schools of SDO Cavite City participated in the study. The researcher distributed the sample learning materials developed using the design guide to these learners and solicited their perception after their use. This study

utilized a survey-questionnaire to measure the OHSP students' perception on the use of the developed learning materials. The Grade 8 students served as the respondents of the study since the developed learning materials are intended for their grade level. It is also the grade level handled by the researcher in OHSP and regular class.

The researcher gave the respondents the prerogative to whether write their name or not on the survey-questionnaire for their confidentiality, protection, and right to anonymity. The researcher also ensured that all of the responses gathered from them will be used only by the researcher for that particular study. Also, the researcher informed all of the respondents with regards to the extent of their participation in the study. The participants underwent a briefing and orientation about the goals, objectives/ purpose, and nature of the study being conducted.

RESEARCH INSTRUMENTS

This study utilized an interview questionnaire and an evaluation questionnaire to effectively gather necessary data from the development and validation of the design guide and learning materials.

Interview Guides

This study primarily utilized two different interview guides. The first one is for the FGD guide for the development of the design guide (see Appendix F) and another one for the development of the learning materials (see Appendix G).

The FGD interview guide for the development of design guide contained a series of questions personally designed and constructed by the researcher (see Appendix 6). The focus

group discussion went through the following steps: 1) asking for invitation in a focus group discussion (see Appendix 5); 2) introduction of the moderator and participants; 3) interview proper; 4) summary of the discussion; and 5) closing. The interview in the FGD lasted for one (1) hour and thirty (30) minutes. The researcher informed the respondents regarding the expected duration of the focus group discussion beforehand.

Like the focus group discussion interview guide for the design guide, the interview guide for the development of the learning materials consisted of a series of questions personally designed and constructed by the researcher (see Appendix 7). Based on literature search and samples gathered, the interview guide consisted of the following parts: 1) profile of the respondents, to verify if the respondents fit the criteria; 2) format and design; 3) content based on student needs; 4) content based on the learning tasks; 5) assessment; 6) language; 7) features of the module; 8) technical characteristics; and 9) other written suggestions from the experts. Depending on the convenience of the interviewee, the researcher gave an option to conduct oral or written interview.

The Research and Planning Education Program Supervisor of DepEd Cavite City, a Graduate student with a specialization in Measurement and Evaluation, and a university professor teaching measurement and evaluation thoroughly validated both the interview guides for the design guide and learning materials. The researcher adapted the validation checklist that the experts used from the work of Morales (2014) though the researcher made some modifications for it to become more suited to the type of instrument being validated. The researcher also considered the comments and suggestions of the validators of the design guide and incorporated it in the second version of the interview guide. The instrument underwent a

second and final round of validation before its finalization. The study ensured that the interview guides for the design guide and learning materials are free from gender, class, ethnic, cultural, religious biases. The fifth statement from the adapted validation checklist (see Appendix 13) stated “All statements are free from biases (gender, ethnicity, class, cultural, etc.)”. Hence, the instrument used are ensured free from biases before the intended respondents’ use.

Evaluation Questionnaire for the Design Guide

The curriculum experts used an evaluation questionnaire for the validation process of the design guide (see Appendix 8). The researcher based the evaluation tool on literature search, applicability on the study, and gathered samples from the studies of Abdon (2015), Sorianosos (2012), and Tanala (2004). The said tool is a five-point Likert scale survey questionnaire and measures the extent of validity of the design guide in terms of: 1) Format, Style, and Presentation; 2) Content, Organization and Clarity of Information; and 3) language. The evaluation questionnaire consisted of written suggestions, recommendations, and feedbacks of the experts, which was incorporated in the next revised version of the learning material.

Evaluation Questionnaire for the Learning Materials

The curriculum experts used an evaluation questionnaire adapted from the Learning Resource Management and Development System (LRMDS) of DepEd (2009) for the validation process of the learning modules (see Appendix 9). The researcher adapted the said evaluation tool from DepEd because it is very applicable and useful for the study since the learning materials developed is intended for the OHSP of the Department of Education. It is also the only tool used by all DepEd offices in validating all types of learning materials developed by teachers and experts although the researcher made some modifications to suit the needs of the learners

and the nature of the learning materials developed since this study aimed to produce both printed and electronic copies of the learning materials. The said tool is a five-point Likert scale questionnaire and measures the validity of the learning materials in terms of: 1) content; 2) instructional quality; 3) format; 4) presentation; 5) accuracy and up-to-datedness of information; and 6) technical quality. The last part, which is about the technical characteristics, is only applicable if the electronic copy of the learning material is to be evaluated. Included also in the evaluation questionnaire are the written suggestions, recommendations, and feedbacks of the experts, which was incorporated on the next revised version of the learning material. The expert-evaluators evaluated both printed and electronic versions of the learning materials before answering the evaluation questionnaire, the experts were expected to finish answering the questionnaire for two (2) hours.

Like the interview guides, the study used the same evaluation process in validating the evaluation questionnaires for learning materials and the design guide.

The researcher used the following scale value and verbal interpretations to interpret the data gathered from the evaluators.

Table 3. Scale Value and Verbal Interpretation for the data Gathered from Expert-evaluators

Scale Value	Interval Scale	Verbal Interpretation
5	4.50 – 5.00	Highly Acceptable
4	3.50 – 4.49	Acceptable
3	2.50 – 3.49	Moderately Acceptable
2	1.50 – 2.49	Needs Improvement
1	1.00 – 1.49	Not Acceptable

Perception Questionnaire for OHSP Students

For the fifth phase, this study utilized a questionnaire to determine the students' perception after they tried-out the learning materials (see Appendix 10). The questionnaire measured students' perception on the use of the developed and validated learning materials. The questionnaire is a five-point Likert scale, and is be adapted from the study of Yamauchi (2008) because of its applicability although some modifications were made to suit the needs of the learners, and the nature of the learning materials to be developed since this study aimed to produce both printed and electronic copies of the learning materials. The student-respondents completed answering the perception survey in 20 minutes. Like the other research instruments in the study, the same tool evaluated the validity of the perception questionnaire used.

Table 4 shows the scale value and verbal interpretations used to interpret the data gathered from the student-respondents.

Table 4. Scale Value and Verbal Interpretation for the data Gathered from Student-respondents

Scale Value	Interval Scale	Verbal Interpretation
5	4.50 – 5.00	Strongly Agree
4	3.50 – 4.49	Agree
3	2.50 – 3.49	Undecided
2	1.50 – 2.49	Disagree
1	1.00 – 1.49	Strongly Disagree

Like in the interview guides, this study ensured that the evaluation instruments for the design guide and learning materials and perception survey are free from gender, class, ethnic, cultural, religious biases. All of the checklists used to validate the learning material evaluation questionnaire (see Appendix 11), design guide evaluation questionnaire (see Appendix 12), and

perception survey questionnaire (see Appendix 14) have common statement that says “All statements are free from biases (gender, ethnicity, class, cultural, etc.)”. Hence, the instrument may be considered as gender-sensitive and free from biases before the intended respondents’ use.

Procedure

The study primarily involved five important phases in the development and validation of a design guide for the K to 12-based learning materials intended for the students of Open High School Program (OHSP). The five phases are: 1) development of the design guide; 2) validation and evaluation of the design guide; 3) development of learning materials using the design guide; 4) content validation of the learning materials; and 5) try-out and finalization of the learning materials. The first phase included the planning stage and designing and developing stage. Figure 3 shows the overview of the phases and processes that the study will undergo.

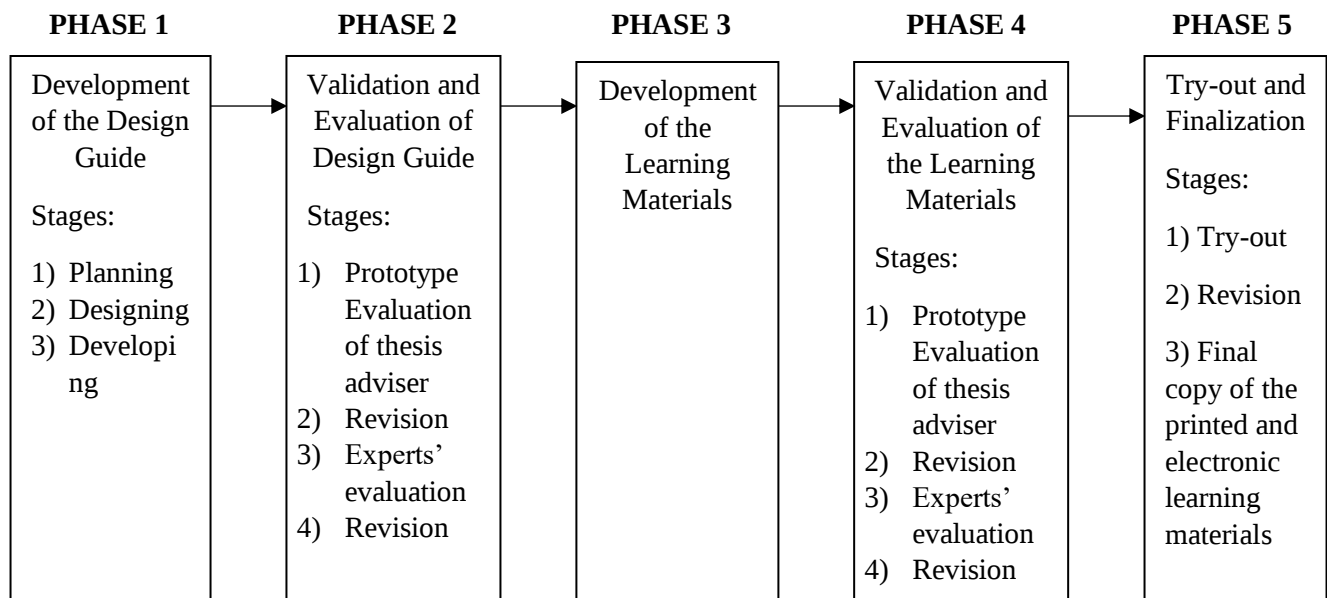


Figure 3. Flow Chart of the Development and Validation of the Learning Module

PHASE 1: Development of the Design Guide

This phase consisted of the several stages as follows:

STAGE I: Planning Stage

This stage consisted of the preparation of the materials needed for the development of the design guide. The following steps summarized the process in this stage: 1) review of both conceptual and research literature to have a clear view of what steps have to be undertaken in the study; 2) review of sample design guide from similar studies; 3) analysis of available samples and determining the format of the design guide; and 4) focus group discussion with the OHSP coordinators and teachers to gain full insights and consultation on what to include and consider in developing the design guide.

STAGE II: Designing and Developing Stage

The study synthesized and analyzed the inputs from the focus group discussion and incorporated such inputs in the prototype design guide. Since the design guide included procedural guidelines in constructing the learning materials of OHSP students, the researcher interviewed the curriculum experts on the things to consider in developing K to 12-based learning materials for OHSP. This study synthesized the result of the interview from the experts and incorporated this result in the design guide.

This stage utilized the gathered pertinent data and information from various sources such as interview guides from the experts and thesis adviser and other reference materials in designing the design guide. This stage also considered the reader friendliness as well as the clarity and organization of the content/concepts of the design guide.

The design guide prototype underwent an evaluation for corrections, modifications, and revision, which was repeated twice. The developed design guide in this stage principally contained the following instructional design:

A. Introduction. This section discusses the rationale or purpose of the design guide.

This part tackles the conceptual paradigm of the design guide.

B. Terms and Definitions. This enumerates the technical terms that can be found in the design guide as well as their operational definition.

C. Guide to Preparation of Printed OHSP Module. This will thoroughly discuss the phases and vital parts of the K to 12-based printed module. Things to consider in preparing the vital parts such as introduction, pre-assessment, learning tasks, activities, and assessment were illustrated and discussed in detail.

D. Guide to Preparation of Electronic OHSP Module. This includes the phases in designing an electronic module. Included in this are the set of techniques on how to add text-boxes, macros, hyperlinks, audios, videos, shockwave flash applications, etc. Just like in the preparation of printed modules, the preparation for the important parts such as introduction, pre-assessment, learning tasks, activities, and assessment were illustrated and discussed in detail.

E. Validation of the Learning Materials. This presents the copy of the evaluation tool of the Learning Resource Management Development System (LRMDS) for validating learning materials for Department of Education (DepEd).

PHASE 2: Validation and Evaluation of the Design Guide

This phase involved the selection of evaluation materials which was used by the experts in scrutinizing the first version of the design guide. The curriculum experts evaluated the design guide in terms of: 1) format, style, and presentation; 2) content, organization and clarity of information; and 3) language.

The thesis adviser first evaluated and scrutinized the prototype design guide before sending it to the curriculum experts for evaluation. The revised prototype design guide went through two rounds of thorough evaluation by the experts using the evaluation questionnaire. The design guide incorporated the corrections, suggestions, recommendations of the experts after each evaluation.

PHASE 3: Development of Learning Materials using the Design Guide

The developed and validated design guide served as the basis in developing the print and electronic learning materials. In this phase, the researcher prepared the materials needed for the development of the modules. This phase included identification of topic that will be used for the sample learning materials. The researcher selected Lesson 3: Heat and Temperature of Unit 1: Force, Motion, and Energy of Grade 8 Science because it is one of the top 3 least mastered competencies of Grade 8 Science for three consecutive years based on the result of the Division Achievement Test (DAT). The Curriculum and Learning Management Division (CLMD) of DepEd Region IV-A CALABARZON also identified the topic Heat and Temperature as a Critical Content in Science 8. After determining the topic, the researcher identified the core competencies and standards that will be used in the learning materials with the use of the curriculum guide provided by the Department of Education.

This phase also included the review of available instructional materials and other learning tools available in the internet in crafting the sample learning materials. The result of the interview of the experts on the things to consider in developing learning materials served as a basis in this phase.

After information gathering and careful planning, the researcher translated the written storyboard into the first module prototype using Microsoft Word 2013 for the printed copy and Microsoft PowerPoint 2013 for the electronic copy. This study considered the following guidelines in designing the learning module: 1) reader friendliness; 2) must be interesting and applicable to the level of the learner; and 3) embedded tasks can be done within the appropriate time allotted.

The learning module prototypes underwent an evaluation for corrections, modifications, and revision, which was repeated twice until the materials were rated acceptable. Both the printed and electronic learning modules contained the following instructional design:

- A. Standards and Competencies.** Presents the content standards, learning competency, and lessons of the module. These standards and competencies are provided in the curriculum guide of the Department of Education.
- B. Module Overview.** Presents the focus of the module and what the students are expected to learn from the material. This also presents the specific objectives that has to be attained.
- C. Pre-Test.** Assesses the students' prior knowledge on the lesson.
- D. Self-Reflection.** This is given before and after each lesson. This worksheet will allow the student to reflect on what he already knows about the topic and what he

wants to know more, what he will do to learn, and what he feels about the lesson.

This part also enables the learner to reflect his/her learnings in the module and its applications to his daily life.

E. Lesson Proper. This part of the learning materials will upgrade student's knowledge about the topic. Presented in this portion are series of questions, activities, and explanations for the learners master the set standards and competencies.

F. Key Concepts. A summary of the concepts and/or ideas will be presented to the students.

G. Comprehension Checks. These are self-tests given to assess how much the students understood the lesson and/or concepts given.

H. Post-Test. A test will be given to check/ determine whether the students learned from the module.

PHASE 4: Content Validation of the Learning Materials

This stage involved the selection of evaluation materials which experts used in scrutinizing the first version of the learning modules. The curriculum experts evaluated the developed sample printed and electronic learning materials in terms of: 1) content; 2) instructional quality; 3) format; 4) presentation; 5) accuracy and up-to-datedness of information; and 6) technical quality.

The thesis adviser evaluated and scrutinized the prototype learning modules before sending it to the curriculum experts for evaluation. The revised prototype learning modules went through two rounds of thorough evaluation of the experts using the evaluation questionnaire. The learning materials incorporated the corrections, suggestions, recommendations of the experts

after each evaluation. The curriculum experts utilized the same evaluation tool in validating both electronic and printed modules.

PHASE 5: Try-out and Finalization of the Learning Module

In this phase, the students tried-out the learning materials to determine if the developed learning materials suit the interest and learning style of grade 8 students of Open High School Program. After trying-out the learning materials, this study surveyed the perception of the students. The perception survey of the students determined the strengths and weaknesses of the learning materials and their specific suggestions for its improvement. The researcher also considered the student's perception and common suggestion to arrive at the final printed and electronic versions of the learning materials.

The researcher confidentially collected and kept all of the used research instruments to keep the privacy, protection, secrecy, and anonymity of the respondents. After tallying the responses gathered, the researcher kept the used research instruments inside an envelope and were stored with the other archived documents of the researcher in his storage cabinet in the Alternative Delivery Mode office in the institution where he is stationed. This is to ensure that no other person will see, scan or use the gathered research instruments.

DATA ANALYSIS PROCEDURE

To come up with a generalized idea on the style and structure of the design guide and learning materials, this study analyzed and synthesized the result of the focus group discussion conducted with the curriculum experts. The research instruments (i.e. evaluation questionnaires

and interview guides) went through reliability and validity tests using the adapted validation checklist for research instruments from the work of Morales (2014) though some modifications were made to suit the nature of research instruments to be validated. After the determination of the validity and reliability of these instruments, curriculum experts and student-evaluators used these instruments to assess the design guide and learning materials.

The researcher tallied and tabulated the evaluation responses of the curriculum experts in the design guide and learning materials. The Aiken's Content Validity Index determined the content validity index of the ratings of the curriculum experts. Aiken (1980) proposed this statistical test and used to generalize the content validity of ratings obtained from a pool of experts. The Content Validity Index (CVI) of this test lies between 0 and 1. If the CVI of the ratings is equal or above 0.80, it is said that the relevance of the content is acceptable.

The researcher also utilized the Fleiss Kappa Coefficient to determine the inter-rater reliability and the extent of consistency of the responses gathered from the respondents. The Fleiss Kappa Coefficient is a statistical measurement used to determine the extent of reliability of agreement between a fixed set of raters. Table 6 shows the Fleiss Kappa Value and its corresponding level of agreement and percentage of data reliability used to interpret the inter-rater reliability of the curriculum experts' responses.

Table 5. The Fleiss Kappa Coefficient Value and its Corresponding Level of Agreement and Percentage of Data Reliability

Value of Kappa	Level of Agreement	Percentage of Data Reliability
<0.00	Poor Agreement	0-4%
0.00 - 0.20	Slight Agreement	4-15%
0.21 - 0.40	Fair Agreement	15-35%
0.41 - 0.60	Moderate Agreement	35-65%
0.61 - 0.80	Substantial Agreement	65-81%
0.81 - 1.00	Almost Perfect Agreement	81-100%

Lastly, the study utilized a 5-point Likert scale to determine the perception of the learners on the use of the developed K to 12-based learning materials using the design guide. The researcher tallied the responses of the students. The computation of the mean and standard deviation of the responses followed the tallying and tabulation of scores for further analysis and interpretation.

After the pertinent data has been carefully analyzed and interpreted, the researcher communicated and shared the result of the study to the participants through a newsletter. The newsletter included all of the data in the study including its comprehensive interpretation and the researcher's recommendation. The curriculum experts, student-respondents, school heads, Open High School Program (OHSP) coordinators, Schools Division Superintendent, and Education Program Supervisor for Research received a copy of the said newsletter. The Learning Resource and Development System (LRMDS) office of the Schools Division Office (SDO) of Department of Education (DepEd) Division of Cavite City and the Alternative Delivery Mode (ADM) offices of the two participating secondary schools in the study also received a copy of the newsletter, including the abstract of this study, the sample learning materials, and the design guide. The Stakeholders and other members of the community who wished to know the result also received

the data. The researcher sent the abstract of the study to the DepEd-Schools Division of Cavite City to include the study in the division's research journal.

OHSP coordinators and teachers can use the developed design guide in the study to craft more K to 12-based learning materials not only for the Sciences but in the other learning areas as well. The outcome of the study can also be a basis for the conduct of in-service trainings and seminar-workshops in developing K to 12-based learning materials for OHSP. Through the study, OHSP can now be aligned to the current curriculum (the K to 12 Basic Education curriculum).

Presented in Table 6 is the summarized matrix that describes the participants, research instruments, and data collection and analysis per phases of the study.

Table 6. Design Guide and Learning Materials Development Phases, Participants, Instruments, and Data Collection and Analysis

Phases	Participants	Instruments	Data Collection/ Analysis
A. Development of the Design Guide			
STAGE I: Planning Stage	A. Thesis Adviser B. The Researcher C. Experts on the field of Alternative Delivery Mode (ADM) - OHSP Teachers - OHSP and ALS Coordinators	The researcher conducted a focus group discussion with the OHSP teachers and coordinators of both public schools in DepEd Cavite City to gather ideas on the things to consider in developing a design guide and learning materials intended for OHSP students.	Adviser and ADM experts' Focus Group Discussion interview Document analysis and synthesis
STAGE II: Designing and	A. Thesis Adviser B. The Researcher C. Curriculum	The study considered the inputs of the result of the focus group discussion in	Adviser consultation and interview.

Development Stage	Experts from DepEd-Cavite City	designing and developing the design guide.	Tallying and tabulation of the evaluation result.
	• Science Teachers • Master Teachers • School Administrators (Department Heads, School Heads, Educational Program Supervisors and Specialists) • ICT Coordinators • OHSP Teachers • OHSP and ALS Coordinators	The researcher used his constructed interview questionnaire to gather the curriculum experts' ideas on the things to consider in developing learning materials for OHSP. Inputs from the interview were included in the design guide. The thesis adviser evaluated the prototype design guide first before sending it to the curriculum experts for evaluation. The adviser and the experts used the same evaluation tool	Computation of the mean and analysis and interpretation of the data collected
B. Validation and Evaluation of the Design Guide	Curriculum Experts from DepEd-Cavite City	The researcher constructed the evaluation questionnaire that the expert-evaluators used to validate the design guide.	Computation of the mean and analysis and interpretation of the data collected
	• Science Teachers • Master Teachers • School Administrators (Department Heads, School Heads, Educational Program Supervisors and Specialists) • ICT Coordinators • OHSP Teachers		

• OHSP and ALS Coordinators			
C. Development of Learning Materials using the Design Guide	A. Thesis Adviser B. The Researcher	The developed and validated design guide served as a basis in developing the learning materials for OHSP since it already contained experts' ideas on the things to consider in developing learning materials for OHSP students The thesis adviser evaluated the prototype design guide first before sending it to the curriculum experts for evaluation. The adviser and the experts used the same evaluation tool.	Adviser consultation and interview. Tallying and tabulation of the evaluation result. Computation of the mean and analysis and interpretation of the data collected
D. Content Validation of the Learning Materials	D. Curriculum Experts from DepEd-Cavite City • Science Teachers • Master Teachers • School Administrators (Department Heads, School Heads, Educational Program Supervisors and Specialists) • ICT Coordinators • OHSP Teachers	The evaluation tool that the expert-evaluators used was adapted from the Learning Resource Management and Development System (LRMDS) of DepEd (2009).	Computation of the mean and analysis and interpretation of the data collected

-
- OHSP and ALS Coordinators

E. Try-Out and Finalization of the Learning Module	Grade 8 Students from NHS and Sangley Point NHS	OHSP	To measure students' perception after trying-out the learning material, the researcher used an adapted tool from the work of Yamauchi (2008).	Computation of the mean and analysis and interpretation of the data collected.
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ETHICAL CONSIDERATIONS

Since the study involved development and validation of a design guide for K to 12 learning materials for Open High School Program (OHSP), it was inevitable for the learning materials to contain photos, tables, data, diagrams, and illustration not created by the researcher himself. Also, lesson activities and/or exercises, experiments, songs, and poems that appeared on the learning module may have been adopted or similar to the published work of other authors. To address this potential ethical issue, the researcher asked permission from the author(s) or include a proper citation in every figure or text that appeared in the module to acknowledge the original owners of the said work.

The researcher sought the permission and endorsement of the Schools Division Superintendent (SDS) to conduct the study in Cavite National High School and Sangley Point National High School (See Appendix A). After the release of the endorsement from the SDS, the researcher asked permission for the school heads to conduct the study in their respective schools (See Appendices B and C). Through a formal letter, the curriculum experts and grade 8 OHSP students in both schools were formally requested to be the respondents of the study. They will

also be allowed to withdraw from being a respondent anytime they want for any justifiable reasons. The curriculum experts, depending on their availability, were gathered and were oriented on the rationale, nature, and goals of the research. In case there is no common available time for the experts, an appointment was scheduled for individual conversations. The potential student-respondents were gathered for orientation and briefing on the nature, objectives, and goals of the study. The students who voluntarily want to become a respondent were first in the selection list. Afterwards, a letter of consent was sent to the parents of the students to formally ask their permission to allow their child to become part of the study as participant. (See Appendix 4). The letter was given to the students and were asked to have their parents sign the consent letter. Those students who were able to submit the letter with their parent's signature allowing their child to become a student-respondent were allowed to become respondents of the study. Those students who failed to submit the consent letter were excluded from the data gathering process. The students and the rest of the evaluators were given a chance for anonymity or an option whether they like to write their names in the evaluation questionnaires or not. The names and data gathered from the evaluators were kept confidential. They were ensured that data gathered were used for the study only.

CHAPTER III RESULTS AND DISCUSSION

This chapter presents all pertinent surveyed and gathered data from the curriculum experts and students involved in this study and their corresponding interpretation and discussion.

Development of the Design Guide for Open High School Program (OHSP) Learning Materials

The first phase of the study, the Development of the Design Guide, went through two stages namely Planning Stage (stage 1) and Designing and Developing Stage (stage 2).

In the Planning Stage, the researcher reviewed and analyzed several conceptual research literatures and format and styles of design guides from existing similar studies. Specifically, the researcher used the works of Abdon (2015), Gutierrez (2013), Pinder (2012), Robertson (2014), Sorianosos (2012), and Tanala (2014) as bases to come-up with a standardized format, parts, and contents of the design guide.

A Focus Group Discussion (FGD) with the OHSP coordinators and teachers followed the solicitation of ideas from existing studies and resources. The researchers conducted the FGD to consult and gain full insights on what to include and consider in developing a design guide. Table 7 displays the summarized result of the conducted FGD with the OHSP coordinators and teachers.

Table 7. Summary of the Focus Group Discussion with the OHSP Coordinators and Teachers

Question Theme	Response	English Translation
A. Experiences in the Program	<i>“Kulang na kulang yung mga modules namin. Madalas kami na yung gumagastos para makapag pa-photocopy ng modules and mga bata” (OHSP Teacher)</i>	Modules are insufficient. More often, we spend our own money so that the students will have their own modules.
	<i>“Minsan naboboringan yung mga bata sa modules to the extent na hindi na nila minsan sinasagutan yung ibang parte ng learning material” (OHSP Teacher)</i>	Sometimes, the students find the modules boring to the extent that they no longer answer some of the parts of the learning material.
	<i>“Budget talaga yung problema kasi minsan di afford magpa-photocopy ng modules” (OHSP Coordinator)</i>	Budget is really the problem because, sometimes (students) cannot afford to photocopy the modules.
B. Learning Materials	<i>“Hindi suited sa curriculum yung modules, halos puro discussions lang” (OHSP Teacher)</i>	Modules are not suited to the curriculum. It only has discussions.
	<i>“Project EASE Modules yung ginagamit naming learning materials sa school pero ang problema namin minsan walang available na LM na suited sa curriculum guide ng K to 12” (OHSP Teacher)</i>	Our school uses Project EASE modules. Our problem is that there are no available LMs that suits the curriculum guide of the K to 12.
	<i>“Gumagawa na lang kami ng sarili naming learning materials na nakalinya sa K to 12 pero di na namin yun napapa-validate at iba iba kami ng format” (OHSP Coordinator)</i>	We craft our own learning materials aligned to K to 12 but we were not able to validate them and we have different formats.
	<i>“Mas interesado yung mga bata kapag nagpapakita kami ng videos at nakakapag-download ng e-modules” (OHSP Coordinator)</i>	Students are more interested when we show them lesson videos and whenever we download e-modules.
	<i>“Yung mga students ko mas prefer nila yung soft copy na modules para di na sila gumastos sa photocopy” (OHSP Teacher)</i>	My students prefer soft copies of the modules so that they will no longer spend their own money in photocopying.

C. Designing a Guide	<i>“Kung gagawa ng standardized na design guide dapat comprehensive sya at madaling intindihin ng mga guro”</i> (OHSP Teacher)	If a standardized design guide will be crafted, it should be comprehensive and easy to understand for us teachers.
	<i>“Dapat may samples din na kasama”</i> (OHSP Teacher)	There should be samples included.
	<i>“Dapat pwede syang gamitin pang printed at electronic format kasi di talaga ako marunong sa computer”</i> (OHSP Teacher)	It could be used for both printed and electronic formats because I am not good in using the computer.
	<i>“Dapat based sa existing rules and guidelines ng LRMDs yan”</i> (OHSP Coordinator)	It should be based on the existing rules of LRMDs.
	<i>“Dapat complete set of instructions from typography hanggang sa kung ano ang dapat na ilagay per part ng module”</i> (OHSP Teacher)	It should have complete set of instructions from typography up to what should be included per part of the module.
	<i>“Dapat may kasamang tool na pwede naming gamitin or checklist man lang para ma-validate din naming yung nagawa naming learning material”</i> (OHSP Coordinator)	It should include a tool or checklist that can be used to validate our own crafted learning material.
D. Designing a Learning Material	<i>“Dapat yung suited sa interest nila para di boring. Pwedeng mag include ng KPOP, cartoons, anime. Ganun”</i> (OHSP Teacher)	It should suit their interest so that it will not become boring. It could include something like KPOP, cartoons, and anime.
	<i>“Dapat ito ay localized and contextualized”</i> (OHSP Coordinator)	It should be localized and contextualized
	<i>“Dapat may mga simple experiments and activities din and yung materials dapat madali lang makita para nagagawa din nila sa bahay”</i> (OHSP Teacher)	It should have simple experiments and activities. The materials should also be readily available so that they can still do it at home.
	<i>“Dapat may mga instructional videos din para in case na di nila gawin personally yung activity, meron parin silang alternative na pwedeng panoorin”</i> (OHSP Teacher)	It should have instructional videos in case they fail to do the activity personally, there are still alternatives that they can watch.

<i>“Dapat makuha nito yung interest ng mga mga learners”</i> (OHSP Coordinator)	It should catch the interest of the learners.
<i>“Dapat madaling ma-replicate”</i> (OHSP Teacher)	It should be easy to replicate.
<i>“Dapat yung mga examples relatable sa mga bata para mas madali nilang magets yung lesson”</i> (OHSP Teacher)	The given examples should be relatable to the students so that they will easily understand the lesson.
<i>“May review at dapat naipapakita yung interconnection ng lessons”</i> (OHSP Teacher)	It should have a review and should show the interconnection of lessons.

Based on the summary of suggestions and insights of the respondents in the FGD as presented in Table 7, the lack of fund is the primary problem of the OHSP coordinators and teachers in implementing the program. Due to financial constraints of the OHSP students, teachers were forced to shell-out their own resources to provide students the copy of the learning materials. This jives with the findings of SEAMEO INNOTECH (2014) that *Lack of Fund* is one of the factors that inhibits the effective implementation of the 155 OHSP-implementing schools in the country. This finding was also concurred by Balmeo (2015) in her study regarding the implementation of the program.

In terms of learning materials, the respondents admitted that the learning materials that they were using were not aligned with the K to 12 Curriculum. Hence, they are trying to look for alternative learning resources, unfortunately, these resources are often unvalidated. Although based on the studies of Cusay (2009), Macarandang (2009), Abad (2010) Santonil (2011) and Shaikh (2013), modules were regarded as the best learning material for the type of learners in the OHSP. But such learning material must be properly scrutinized and validated to ensure that they suit the interest and nature of the learners and possesses accurate content (Jacob, 2013).

Aside from the curriculum misalignment of the learning materials used in the program, the respondents of the FDG also mentioned that students prefer electronic modules due to their portability and hassle-free replication. Students are also more interested in electronic modules that contains videos to watch to reinforce their learning in the module. These statements of the respondents matched the findings of Richardson (2017) and Gonzano-Quiambao (2010) that teachers should consider developing electronic modules because our 21st century learners are more technologically inclined and are more interested in computer-based instructions.

Aside from the respondents' view on the program and the learning materials used, the FGD also discussed about constructing a design guide that will be used in crafting learning materials for OHSP. The respondents suggested that the design guide should be standardized and based on existing guidelines of Learning Resources Management System (LRMDS) of DepEd. The respondents also suggested that the design guide should not only focus on crafting printed learning materials but electronic learning materials as well since we are dealing with learners in the 21st century. They also noted that the design guide should include sample learning materials (both printed and electronic) so that its user will have a sort of pattern while constructing his/her own learning material. OHSP Coordinators, even suggested that the design guide should contain a tool that will be used in determining the extent of validity of the developed learning material.

Lastly, when the crafting of learning materials has been discussed, the respondents gave several suggestions for its design and content. They mentioned that the learning materials should be based on the interest of the learners (i.e. use of anime, cartoons, etc.) so that students will not find it boring. This suggestion concurs the claim of by Sejpal (2013) that teachers should use examples, figures, images, and characters that are known to the learners so that they will become

more interested in using the learning materials. The study also mentioned about the contextualization and localization of learning materials, which was also one of the suggestions of the respondents. According to the study, if teachers would use examples and instances in the lesson that are very much familiar or relatable to the learners, understanding of the subject matter will be easily mastered by the students. He also added that lessons should be indigenized, localized, and contextualized as much as possible so that students will find the lesson related and useful in their every life.

After the conduct of the Focus Group Discussion (FGD), the researcher started to develop and prototype design guide for OHSP Science learning materials. The researcher synthesized and analyzed the suggestions made by the OHSP coordinators and teachers, several conceptual research literatures, and format and styles of design guides from existing similar studies, and the guiding principles of constructivism that served as the theoretical basis of the design guide.

Based on the aforementioned method, the researcher came up with a design guide that contained the following feature: a) Introduction; b) definition of terms; c) Guide to Preparation of Printed OHSP Module; d) Guide to Preparation of Electronic OHSP Module; and e) Validation of Learning Materials.

To align the design guide to constructivism theory, the researcher identified certain guiding principles of constructivism that were considered in the development of the design guide. Table 8 presents the matrix on how the principles of constructivism were used in the development of the design guide.

Table 8. The Features of the Design Guide with its Corresponding Principles of Constructivism

Principle of Constructivism	Features of the Design Guide	Page in the Design Guide
a. Learning is an active process in which the learner uses sensory input and constructs meaning out of it.	The design guide included sets of instructions to incorporate varied and engaging learning activities to assist learners to grasp the subject matter. For instance, the design guide suggested the use of 2C-2I-1R (Constructivism, Collaborative, Inquiry-Based, Integrative, and Reflective) Approach in presenting the lesson. This urges the teachers/ module writers to think of varied, relatable, hands-on, and engaging learning activities for the learners.	Pages 16-18, 25-26
b. The crucial action of constructing meaning is mental: it happens in the mind.	Included in the design guide are descriptions on how the module writers/ teachers can facilitate the construction of meanings to their students. For example, a portion of the design guide mentioned about the use of reflective journals to determine the affective side of the learners. It also enables learners to reflect on what they have learned in the lesson and connect/ relate these learnings in his/her everyday life.	Page 20 and 27
c. Learning is contextual.	For the OHSP learners to easily understand and relate to the lesson, the design guide included features that instruct teachers to contextualize, indigenize, and localize their lesson. For instance, in the part of constructing activities in learning materials (page 17) it was mentioned that the module writer should use localized, improvised, and locally available materials in the experiment/ activity. Discussions should be based on the locality or what is observable in the environment of the learners. Through this, it will be easy for the learners to understand and comprehend the lesson since the teacher is using contextualized and localized examples in presenting the lesson.	Page 17 and 25
d. One needs knowledge to learn.	To help the learners to assimilate new knowledge, the design guide included a specific part called “ <i>Lesson Overview</i> ” for every lesson to give learners details on what he/she should have learned from the previous grade level/ lessons and what is its connection to the new topic. In preparing the said part, the design guide encourages teachers to mention the pre-requisite that	Page 14 and 24

learners should have learned and discuss the vertical articulation of the previous knowledge to the new lesson.

- | | | |
|---|---|--------------------|
| e. It takes time to learn. | Since the design guide considered that learning does not happen in an instant, it included instructions to guide teachers in creating series of follow-up activities and comprehension checks for the learners. Through this, it will be ensured that the students will fully grasp the lesson. | Pages 19-20, 26-27 |
| f. Motivation is a key component in learning. | It has been regarded that motivation is an essential part of the teaching-and-learning process. Students comprehend the lesson if they felt engaged and connected at the very start. Hence, the design guide included instructions to persuade teachers to include priming activities and tasks to prepare students for the new lesson/concept. Also, in the design guide, instructions regarding the inclusion of several priming activities were included like the Knowledge-Skills-Attitude (KSA) Chart completion to enable teachers to determine what the students know, think, and feel about the new lesson. | Page 15 and 25 |
-

After considering all inputs from literature, available resources and ideas from the experts and peers, the prototype design guide has been developed. This prototype design guide went through the scrutiny of the thesis adviser before it was sent to the curriculum experts and peers. Shown in Figure 4 are some of the corrections made by the thesis adviser in the primary evaluation of the prototype design guide.

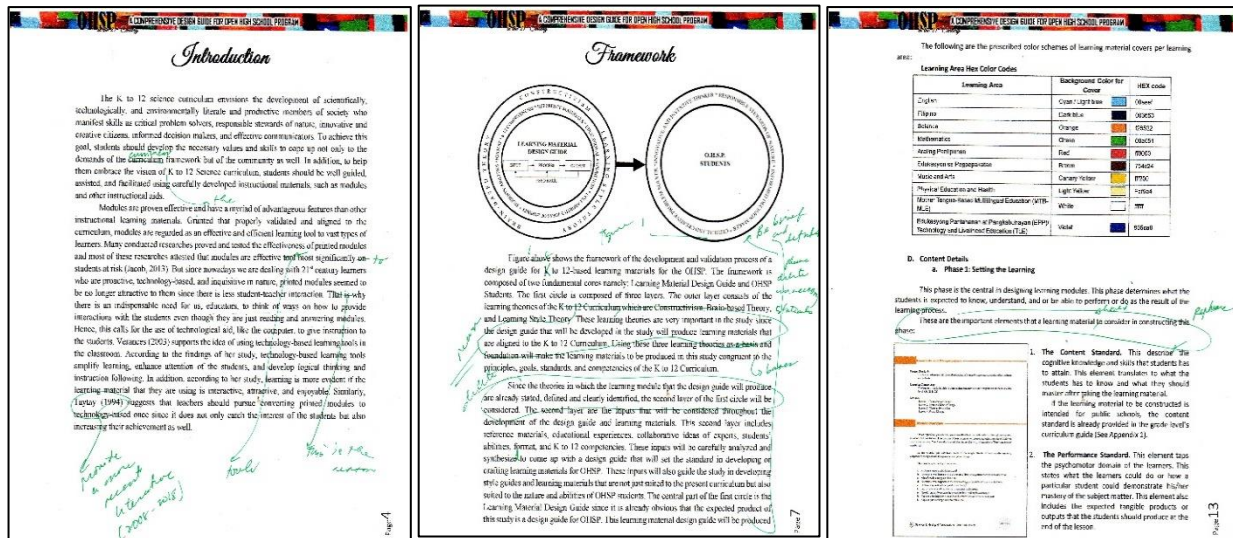


Figure 4. Sample corrections made by the thesis adviser in the prototype design guide.

As shown in Figure 4, the thesis adviser primarily made major corrections on the first parts of the design guide which are the Introduction and Framework part. In the introductory part of the design guide, there were minor corrections made and the adviser suggested to provide more literatures that will support the need on having design guides like this. In the Framework, on the other hand, the adviser suggested to provide more brief and concise theoretical bases and omit unnecessary statements. Other corrections made by the thesis adviser primarily focused on minor grammatical flaws and the clarity of the instructions in the development of learning materials. The researcher incorporated these corrections in the second version of the prototype and sent the revision to the adviser for approval.

After being approved, copies of the design guide were sent to curriculum experts and peers for the validation process. Table 9 shows the summary of major corrections and suggestions made by the curriculum experts and peers and the action taken by the researcher.

Table 9. Summary of Curriculum Experts and Peers' Corrections and Suggestions in the Prototype Design Guide and Actions Taken by the Researcher

Evaluators	Corrections/ Suggestions	Action Taken
Evaluator 1	Further elaborate the Setting the Learning Phase (Phase 1) of the Design Guide.	Rephrased and further elaborated the Setting the Learning Phase of the Design Guide. The researcher added more tips and suggestions in developing this phase.
Evaluator 2	Incorporate the guidelines set by LRMDs in using specific color schemes, typographies, etc. in the Physical Attributes part of the Design Guide.	The researcher used the guidelines set by LRMDs on the suggested Physical Attributes of DepEd Learning Resources as reference and incorporated it on the first part of the Design Guide.
Evaluator 3	Incorporate in the second phase the DepEd issuances on the suggested pedagogical approaches for K to 12 Curriculum.	Incorporated the Regional Memorandum 233, s. 2016 on Phase 2: Facilitating Learning.
Evaluator 4	Include the basic system requirements needed by e-module developers to avoid compatibility issues.	Included the minimum system requirements need to develop an electronic module.
Evaluator 5	The images in the design guide should be clear and easily seen. Remove unnecessary clip arts.	The researcher enlarged the images in the design guide and removed unnecessary clip arts and images.
Evaluator 6	Some of the instructions are vague.	Rephrased some of the vague statements in the design guide.

The corrections made by the curriculum experts focused mainly on the clarity of the set of instructions in the design guide and its congruence to existing DepEd policies and guidelines. Most of the evaluators of the design guide advised to incorporate the guidelines set by the Learning Resource Management Development System (LRMDs) on the Physical Attributes of DepEd Learning Materials. Some evaluators also noted to adopt and include Regional Memorandum 233, s. 2016 or the *Implementation of the Pedagogical Approaches Mandated by*

RA 10533 as a basis in creating activities in OHSP learning materials. Some of the evaluators also made grammatical corrections, typography, formatting of images and texts, and omission of inconsistent and vague statements in the design guide. Figure 5 shows sample corrections made by the curriculum experts in the design guide.

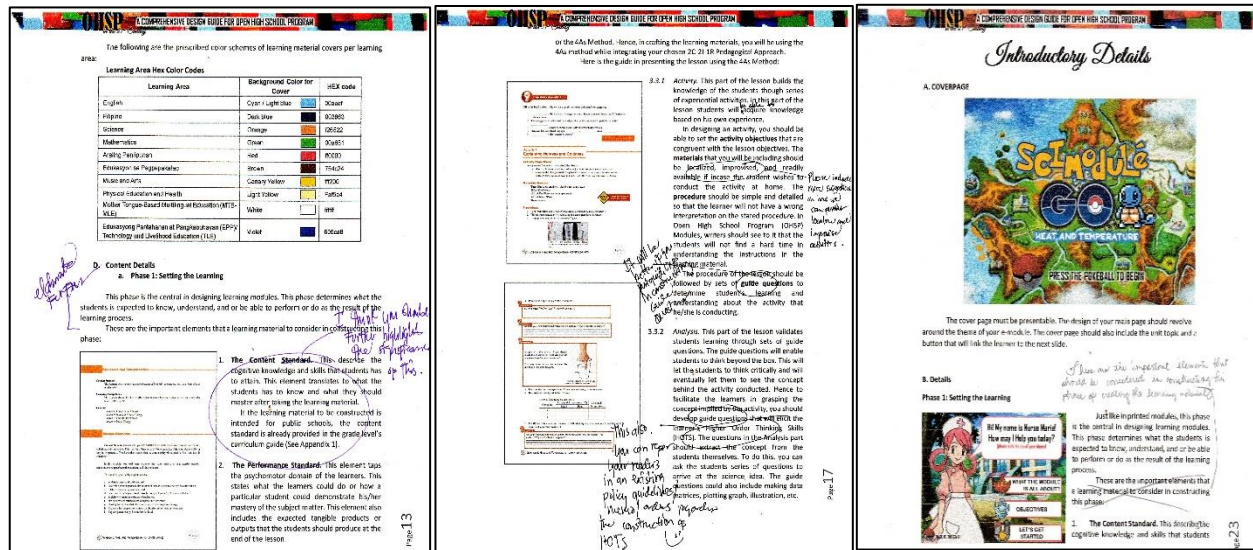


Figure 5. Sample corrections made by the curriculum experts and peers in the prototype design guide.

The researcher revised the prototype design guide depending on the corrections made by the experts and peers. All corrections were considered to come-up with an improved version of the prototype design guide. After finishing the revised design guide, another set of copies were sent to the curriculum experts and peers for another set of validation. After the second round of validation, the experts and peers made no corrections hence, the final copy of the design guide was then prepared by the researcher.

The developed design guide (See Appendix P) consists of the following instructional designs: 1) Introduction; 2) Terms and Definition; 3) Guide to Preparation of Printed OHSP

Module; 4) Guide to Preparation of Electronic OHSP Module; and 5) Validation of Learning Material

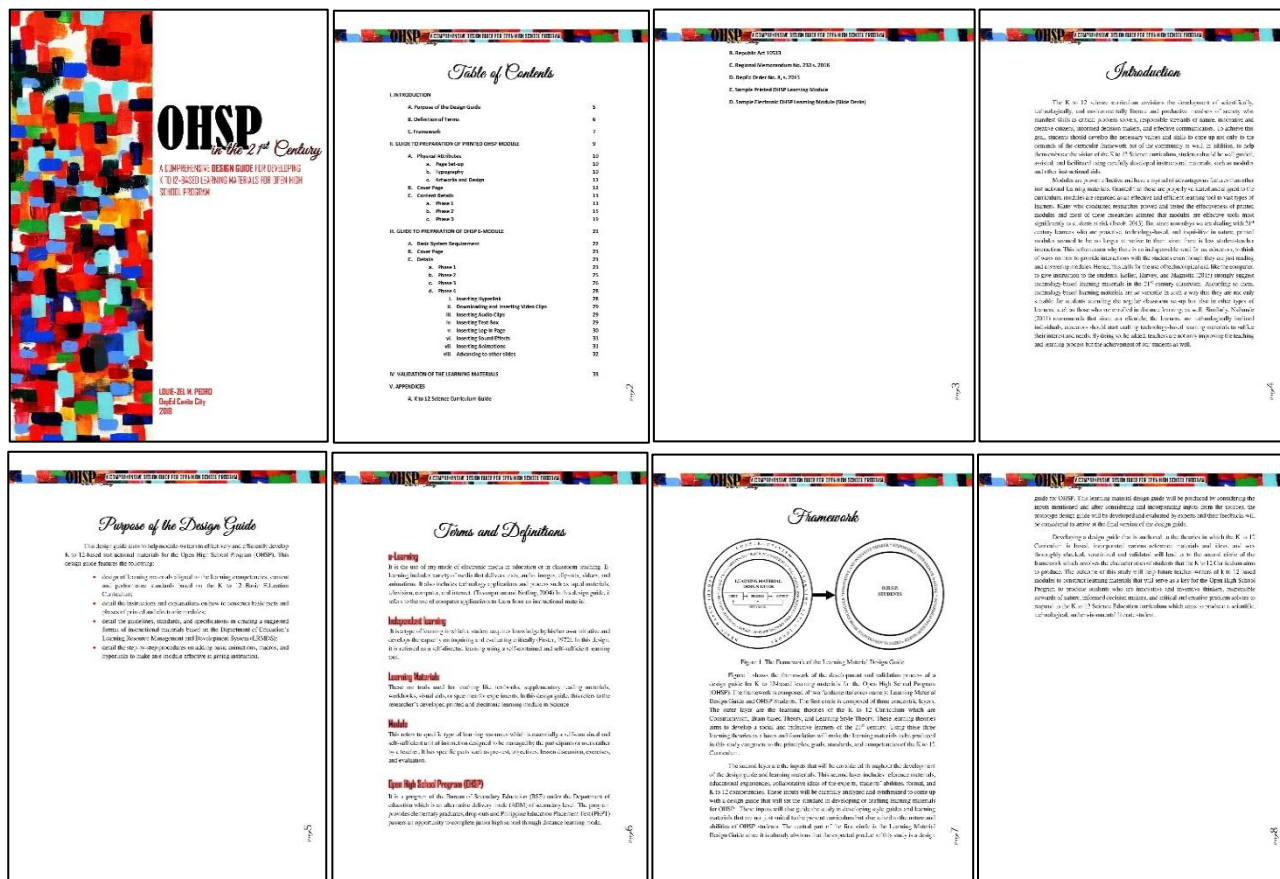


Figure 6. The first pages of the design guide.

Shown in Figure 6 are the introductory pages of the design guide, which consist of the following: Title Page; Table of Contents; Introduction; Purpose of the Design Guide; Terms and Definition; and Framework. This first few pages of the design guide give the readers an overview. It also explains the rationale of constructing learning materials for Open High School Program (OHSP) as well as the need for educators to construct learning materials in both printed and electronic format. The first few pages also include the Definition of the terminologies used in the guide. Also included is the Framework, which presents the theoretical bases of the design guide.

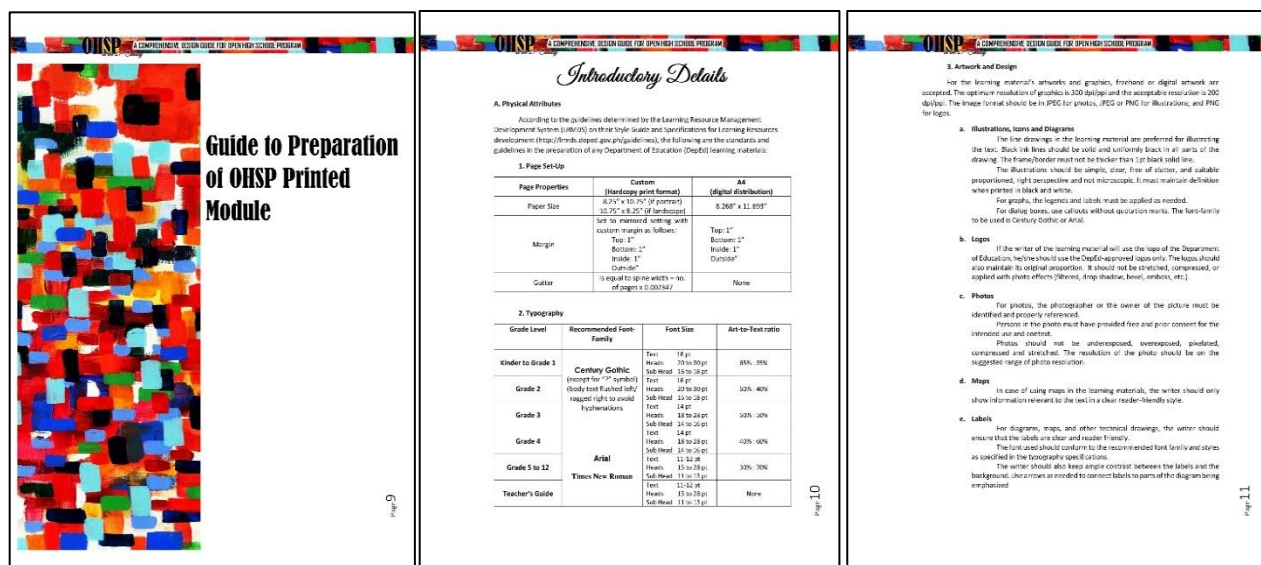


Figure 7. Sample Pages for the Guide to Preparation of OHSP Printed Module

Depicted in Figure 7 are the sample pages for the Guide to Preparation of the OHSP Printed Module. This part of the design guide discusses the detailed guidelines in constructing printed learning materials. It consists of the following sub-parts: a) Physical Attributes; b) Cover Page; and c) Content Details.

The *Physical Attributes* part explains the technicalities set by the Learning Resource Management Development System (LRMDS) in developing learning materials for the Department of Education. It includes the specific margin sizes of the learning materials per intended grade level, the typography, and the use of artworks and designs including the use of DepEd logos, illustrations, icons, diagrams, photos, maps, labels, and footers, headers, and pagination.

The *Cover Page* part describes the default appearance and presentation of every DepEd learning material. This part of the design guide presents the specific color scheme and their corresponding HEX code per learning area set by LRMDS.

Lastly, the *Content Details* part of the design guide present the detailed guidelines in structuring the whole content of the learning materials. This part consists of the following phases, namely: 1) Setting the learning; 2) Facilitating the learning; and 3) Assessing the Learning.

Phase 1: Setting the Learning presents what the students is expected to know, understand, and or be able to perform or do as the result of the learning process. This part of the design guide consists of the standards and competencies set by the Department of Education.

Phase 2: Facilitating the Learning centers on the delivery of the modular instruction. It implements the standards, competencies, goals, and objectives set in the first phase. The Facilitating the Learning Phase is designed to scaffold the learner in achieving the mastery of the learning content and standards. The following parts include each lesson of the module: 1) Specific Objectives; 2) Self-Reflection); 3) Lesson Proper; and 4) Key Concepts.

Lastly, Phase 3: Assessing the Learning details how teachers will be able to determine if the learner satisfactorily met the standards and competencies set by DepEd through various assessment strategies. This phase of the design guide presents the guidelines in constructing Pre-Tests, Comprehension Checks, Reflective Journals, and Post-Tests since the Department of Education mandates all learning institutions to evaluate learning before, during, and after the lesson.

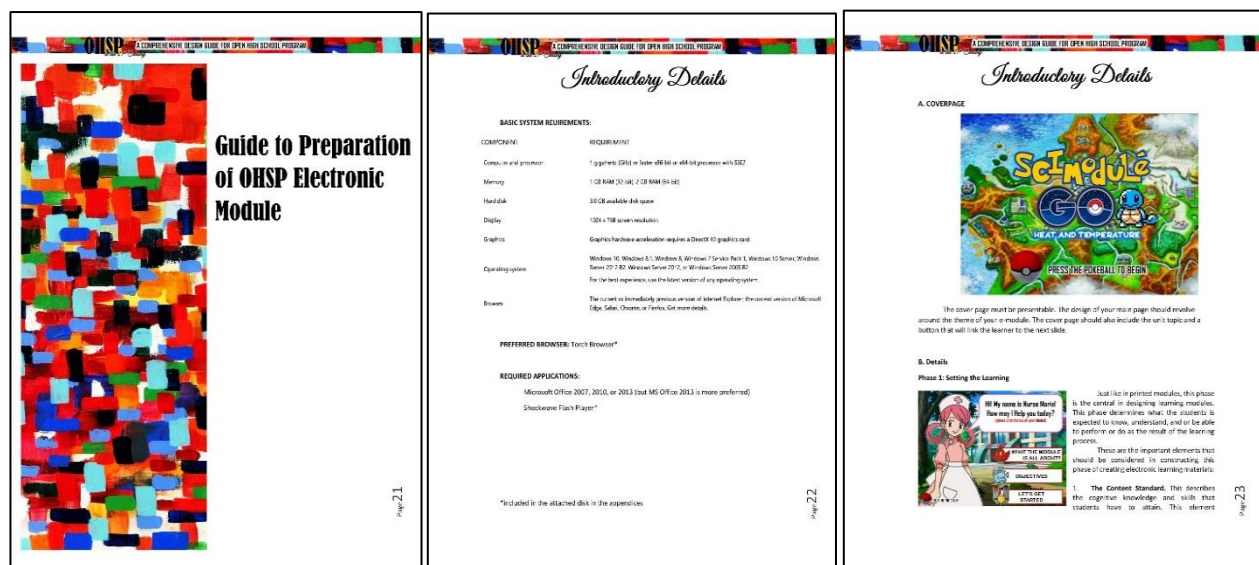


Figure 8. Sample Pages for the Guide to Preparation of OHSP Electronic Module

Displayed in Figure 8 are the sample pages for the Guide to Preparation of the OHSP Electronic Module. This part of the design guide presents the detailed guidelines in constructing electronic learning materials. It consists of the following sub-parts: a) Basic System Requirements; b) Cover Page; and c) Details.

The *Basic System Requirements* part of the design guide details the recommended computer specifications including the processor, memory, hard disk, display, graphics, operating system, and browser to smoothly play an electronic module.

The *Cover Page* part explains the characteristics of an electronic learning materials title page. This part presents a sample cover page that includes the title of the module, the unit, and a button that will link the learner to the other parts of the electronic module.

The *Details*, like the *Content Details* part of the Guide to Preparation of OHSP Printed Module, consists of the following phases 1) Setting the learning; 2) Facilitating the learning; 3) Assessing the Learning; and 4) Technicalities in the Development of Electronic Module. The

first three phases of this part of the design guide is just the same with the guidelines presented on the *Guide to Preparation of OHSP Printed Modules*. The only added phase in this part is the fourth phase or the Technicalities in the Development of the Electronic Module.

The Phase 4: Technicalities in the Development of Electronic Module presents the detailed instructions on how to add animations and effects in the electronic module. Specifically, it shows guidelines on the following: 1) Hyperlinking; 2) Downloading and Inserting Videos; 3) Inserting Voice Overs and Video Clips; 4) Inserting Text Box; 5) Inserting Log-In Page; 6) Adding Sound Effects; 7) Inserting Animations; and 8) Advancing to other Slides.

VALIDATION OF THE LEARNING MATERIALS

Validation of the Learning Materials

Do ensure that the learning materials developed using this design guide is valid and accurate. It should undergo series of validation with the curriculum experts before it was used by the program for instruction delivery. The following validation tool will be used to determine the validity of the learning materials in terms of content, instructional quality, format, presentation, accuracy and up-to-date status of information, and technical quality.

I. Assessment of Learning Materials in Science

Direction: Please go over the learning materials in science and assess them in terms of the content based on the student needs and phases of the module, assessment, language, technical characteristics, and special features of the module. Rate the module based on the given scale and check the box of your choice.

5 Strongly Agree - This means the learning material meets the criteria outstandingly.
4 Agree - This means the learning material meets the criteria very satisfactory.
3 Undecided - This means the learning material meets the criteria fairly.
2 Disagree - This means the learning material partly meets the criteria.
1 Strongly Disagree - This means the learning material does not meet the criteria.

Criteria	5	4	3	2	1
1. Content is suitable to the student's level of development.	☒				
2. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.				☒	

A. Content

Criteria	5	4	3	2	1
1. Content is suitable to the student's level of development.					
2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.					
3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.					

Instructional Quality

Criteria	5	4	3	2	1
1. Purpose of the material is well defined.					
2. Material achieves its defined purpose.					
3. Learning objectives are clearly stated and measurable.					
4. Level of difficulty is appropriate for the intended target user.					
5. Graphics / colors / sounds are used for appropriate instructional purposes.					
6. Material is enjoyable, stimulating, challenging, and engaging.					
7. Material effectively stimulates creativity of target user.					
8. Feedback on target user's responses is effectively employed.					
9. The lessons are anchored in the theoretical bases of the curriculum.					

Figure 9. Sample pages of the Validation of the Learning Materials

Figure 9 shows the sample pages of the last part of the design guide, which is the Validation of the Learning Materials. This part of the design guide presents the assessment tool prescribed by the Learning Resource Management Development System (LRMDS) in evaluating DepEd learning resources. This tool evaluates the learning materials of the following aspects: 1)

Content; 2) Instructional Quality; 3) Format; 4) Presentation; 5) Accuracy and Up-to-Datedness of Information; and 6) Technical Quality (applicable only to electronic learning materials).

Overall, the researcher made sure that the developed design guide was aligned with the of guidelines set by the Learning Resources Management and Development System (LRMDS) of the Department of Education. This is to ensure that the learning materials that will be developed using the design guide will be suited for the types of learning resources used in the department. Following the suggestions of Abdon (2015) and Robertson (2014), the instructions, guidelines, and tips included in the design guide are easy to understand and follow. This made the design guide more user-friendly and comprehensive. Hence, according to Pinder (2012), one of the characteristics of a good design guide is being user-friendly, easy to follow, and comprehensive.

Validation of the Design Guide for Open High School Program (OHSP) Learning Materials

A total of 46 curriculum experts and peers (See Appendix O) from the Department of Education, Schools Division of Cavite City evaluated and validated the design guide (see Appendix P) for the learning materials for OHSP. The researcher selected the 46 curriculum experts and peers based on the criteria and qualifications set during the first phase of the development process.

A total number of 33, Science teachers with a teaching experience of five years and above comprised the majority of the curriculum experts who evaluated and validated the design guide and learning materials. These 33 Science teachers consist of Master Teacher II (1), Master Teacher I (5), Teacher III (8), Teacher II (3), and Teacher I (16). The Education Program

Supervisors (EPS) garnered the least number having only two participants since every School Division Offices of DepEd has only one EPS for Science and one EPS for LRMDs.

These curriculum experts rated the design guide in terms of: a) Style, Format and Presentation; b) Content, Organization, and Clarity of Information; and c) Language.

Table 10. Summary Curriculum Experts' Evaluation on the Design Guide for Learning Materials of OHSP

Aspect of the Design Guide	Mean	Standard Deviation	Interpretation
1. Format, Style, and Presentation	4.96	0.15	Highly Acceptable
2. Content, Organization, and Clarity of Information	4.95	0.19	Highly Acceptable
3. Language	4.98	0.12	Highly Acceptable
Overall	4.96	0.15	Highly Acceptable

As presented in Table 10, the curriculum experts gave an overall rating of 4.96 [$SD=0.15$] on the developed design guide for OHSP learning materials (please refer to Appendix S for the detailed result). The high rating of the experts signifies the high acceptability of the design guide. The high rating of the experts holds true with the average rating in the different aspects of the design guide namely Format, Style, and Presentation ($m=4.96$, $SD = 0.15$); Content, Organization, and Clarity of Information ($m=4.95$, $SD=0.19$); and Language ($m=4.98$, $SD=0.12$).

In detail, the experts gave a perfect mean rating of 5.00 [$SD=0.00$] on the design guide's overall design and user-friendliness. They also gave a perfect mean on the clarity and understandability of the texts of the design guide. In terms of the Content, Organization, and Clarity of Information, the experts gave a high mean rating of 5.00 [$SD=0.00$] on the statement "The procedures and guidelines provided are well explained and illustrated". In terms of

language used the experts gave a high rating on the statement “The language used is clear and simple”.

The researcher used the inter-rater agreement to determine the extent of agreement of the curriculum experts in evaluating all aspects of the design guide. The researcher also utilized Aiken’s Content Validity Index to determine the content validity index of the ratings of the curriculum experts in the design guide.

Table 11. Summary Inter-Rater Agreement of the 46 Experts and The Aiken’s Content Validity Index Value per Questionnaire Item

Aspect of the Design Guide	% of Agreement		Aiken’s Content Validity Index
	Rating of 5 (Strongly Agree)	Rating of 4 (Agree)	
1. Format, Style, and Presentation	96	4	0.991
2. Content, Organization, and Clarity of Information	95	5	0.988
3. Language	98	2	0.995
Average	96	4	0.991

As shown in Table 11 (See Appendix T for the detailed result), the average percentage of agreement for the rating of 5 ranges from 96% (on format, style, and presentation) to 98% (on language). Across the different aspects of the design guide, the curriculum experts show consistency and high CVI with their rating of strongly agree on the clarity and understandability of the text of the design guide (1.1) and the user-friendliness of the overall format and design of the design guide (1.6). Similarly, the curriculum experts display high consistency and CVI on the illustration and explanation of procedures and guidelines in the design guide (2.3) and the clarity and simplicity of the language used (3.1).

Aside from the Inter-Rater Agreement and the Aiken’s Content Validity Index, the researcher also determined the Fleiss’ Kappa to further assess the extent of the reliability of the ratings made by the curriculum experts. As shown in Table 12, the researcher obtained a Kappa

Coefficient (K) value of 1.000 from a rating scale with 17 number of items (n), which was rated by 46 experts (m). This Kappa Coefficient value of 1.000 translates that the ratings made by the curriculum experts are of almost perfect agreement.

Table 12. Fleiss' Kappa Coefficient Value of the Responses Made by the Curriculum Experts in their Evaluation on the Design Guide and Its corresponding Interpretation

No. of Raters (<i>m</i>)	No. of Questionnaire Items (<i>n</i>)	P _a Value	P _e Value	K	Interpretation
46	17	0.924354	77161.63	1.000	Almost Perfect Agreement

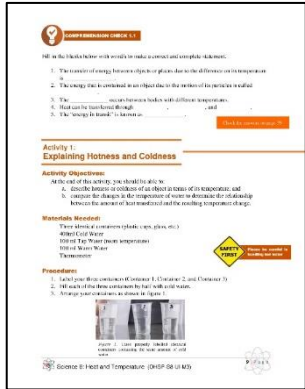
In sum, the curriculum experts rated the design guide with an overall mean rating of 4.96 and a standard deviation of 0.15. Meaning, the overall design, style, and presentation, content, organization, and clarity of information, and the language if the design guide are of high value of acceptability. The high inter-rating agreement and content validity index of the ratings made by the 46 experts signifies the overall commendable characteristic of the design guide in its various aspects. The high inter-rating agreement could be attributed to the series of interviews, consultations, and literature search made by the researcher before developing the design guide. As what Robertson (2014) mentioned, use of various references, benchmarks, and thorough dialogue with experts in the field is essential in developing a commendable type of design guide.

Development of Sample K to 12-Based Learning Materials for Open High School Program (OHSP)

To determine the efficacy of the design guide, the researcher crafted sample printed and electronic learning materials using the developed and validated design guide for OHSP Science learning materials.

Table 13 shows how the researcher used the instructional content of the design guide in crafting the sample learning materials for OHSP.

Table 13. The Design Guide's Instructional Contents and Its Corresponding Part in the Sample Printed and Electronic Learning Materials

Instructional Content of the Design Guide	Implementation in the Sample Learning Materials	Sample Image of the Learning Material
A. Physical Attributes	The sample learning materials utilized the format and typographies mentioned in the first part of the instructional content of the design guide. The sample learning materials were formatted in 8.25" x 10.75" paper with a margin of 1" in all sides. The learning materials used the font type <i>Times New Roman</i> with a font size of 12. The Image-Text ratio used was 30%:70%.	
B. Cover Page	Based on the Design Guide, the cover page of electronic modules should clearly near the title of the material. The design guide suggested that the cover page should entice the interest of the intended users but there should be no over-styling of fonts and effect-explosions of images and wordings. For printed modules, it should have the Logo of the Department of Education, DepEd Header, Intended grade level, module code, unit and module number, unit title, and main topic or lesson. Included also in the design guide are the prescribed color schemes of Learning Resource Management Development System (LRMDS) for learning materials per learning area. Since it is indicated that for Science, the color scheme should be Orange (Hex Code: f26522), the researcher used Orange as the color of the cover of the printed module	 

C. Content Details
Phase 1: Setting
the Learning

As mentioned in the design guide, the learning materials contained important elements to set the learning standards so that the learners will know, understand, and able to perform what was set to them by the Department of Education. Included in the learning materials are set of standards such as the content standard, performance standard, and the learning competency. The learning materials also included the general overview of the lesson and general instructions to the learners.

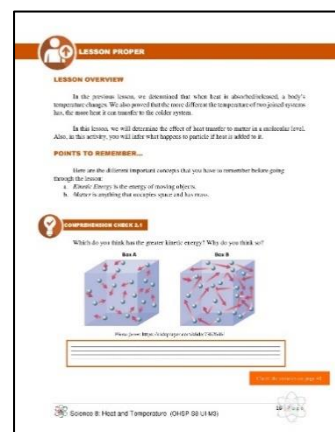
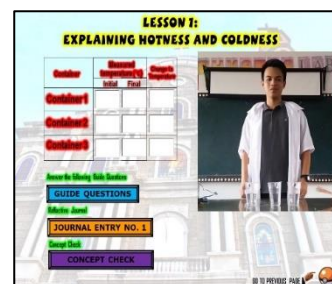


Phase
Facilitating
Learning

2: The sample learning materials incorporated the set of instructions stated in the design guide with regards to this phase. The learning materials included Specific Objectives, Self-Reflection, as well as the Lesson Proper.

The Lesson Proper part of the design guide followed the suggestions mentioned in the design guide specifically the utilization of the 4As (Activity, Analysis, Abstraction, and Application) Teaching Methodologies.

The design guide served as the basis in formulating the Activity, Analysis, Abstraction, and Application parts of the lessons in the sample learning materials. The tips specified in the design guide were thoroughly followed in creating the facilitating learning part of the learning materials.



Phase 3: Assessing
the Learning

As suggested in the Design Guide's Phase 3: Assessing the Learning, each lessons or modules in the sample learning materials included assessment methods such as Pre-

Test, Comprehension Check, Reflective Journal, and Post-Test.

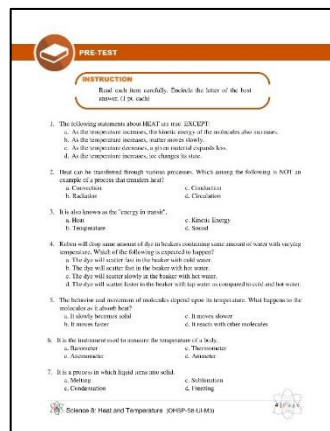
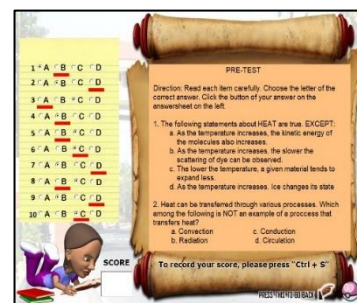
Also, the sample learning materials keenly followed the tips and suggestions specified in the design guide in terms of creating assessment to determine if the intended users of the learning materials successfully met the standards and competencies set by the Department of Education.

The learning materials contains a validated 20-item pre-test and 25-item post-test. Each lesson in the sample learning materials contain at least three comprehension checks (before, during, and after the lesson proper). All lesson starts with filling a Knowledge-Skills-Attitude (KSA) Chart as part of the learner's self-reflection and ends with a Reflective Journal writing.

D. Technicalities in the Development of the Electronic Module

The developed and validated design guide comprised an instructional content on the technicalities in the development of electronic modules. This technical instructional content in the design guide includes hyperlinking, downloading and insertion of video clips, insertion of voice-overs and audio clips, insertion of macro-enabled text boxes, insertion of log-in page, adding sound effects, insertion of animations, and links to advance in next slide.

All of the instructions specified in this part of the design guide were followed in creating the electronic learning material hence it became inter-active type of learning resource.



The researcher followed all of the instructional contents of the design guide in verbatim

to create the sample learning materials. This is to ensure that the module-writers, or the future

users of the design guide, will have a perfect benchmark on what the design guide intends them to craft. As seen in Table 13, the researcher carefully transcribed the instructional content of the design guide to the sample learning materials. It was ensured that all explanations, tips, and guidelines were followed so that there will be congruence with what is stated in the design guide and what appeared in the sample learning materials.

After the researcher crafted the first prototype of the sample learning materials based on the developed and validated design guide, copies of the prototype learning materials were sent to the research adviser for the firsthand evaluation and scrutiny

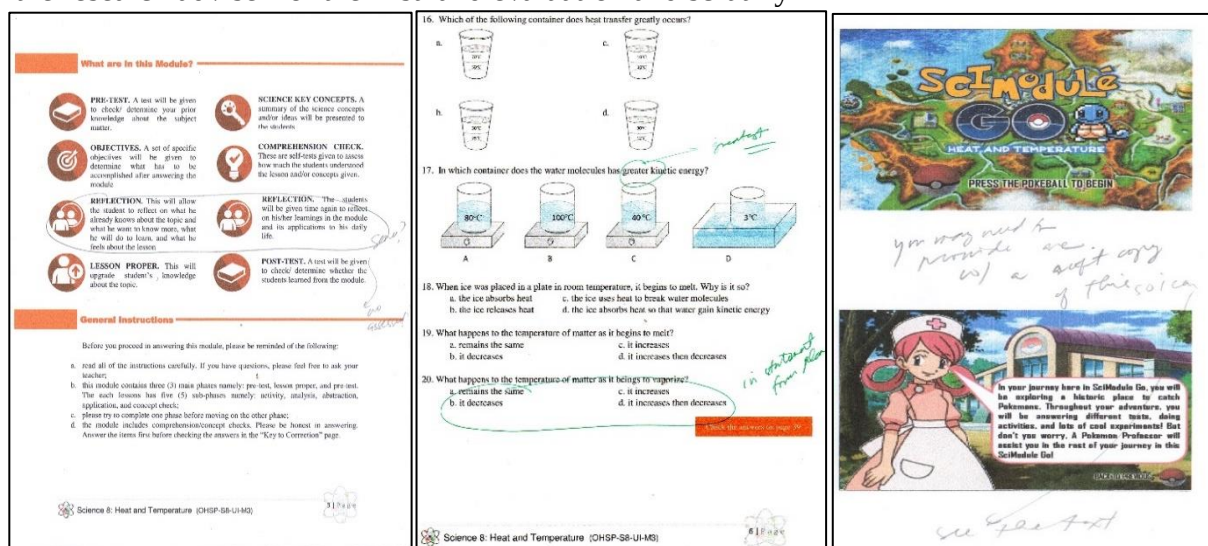


Figure 10. Sample corrections made by the research adviser in the prototype learning materials.

Figure 10 shows, the corrections made by the research adviser primarily focused on how the design guide was used in creating the learning materials. In the printed learning material, the research adviser made some corrections on the form and content of the assessment, specifically the pre-test and comprehension checks. There were also corrections on the explanation of the science concepts in the first module. In the electronic module corrections made focused on the clarity of text and the color schemes of the slides because there were some texts that were either

too small or difficult to see because of dark color background. After the first revision, the researcher sent the second draft of the prototype learning materials to the research adviser. After no corrections made, the researcher sent the draft prototype to the curriculum expert and peers to validate the learning materials. In this phase, the experts and peers who validated the design guide were the same set of people tasked to check and validate the learning materials.

Both the printed (See Appendix Q) and electronic (See Appendix R) modules consist of the following instructional design: 1) Standards and Competencies; 2) Module Overview; 3) Pre-Test; 4) Self-Reflection; 5) Lesson Proper; 6) Key Concepts; 7) Comprehension Checks; and 8) Post-Test.

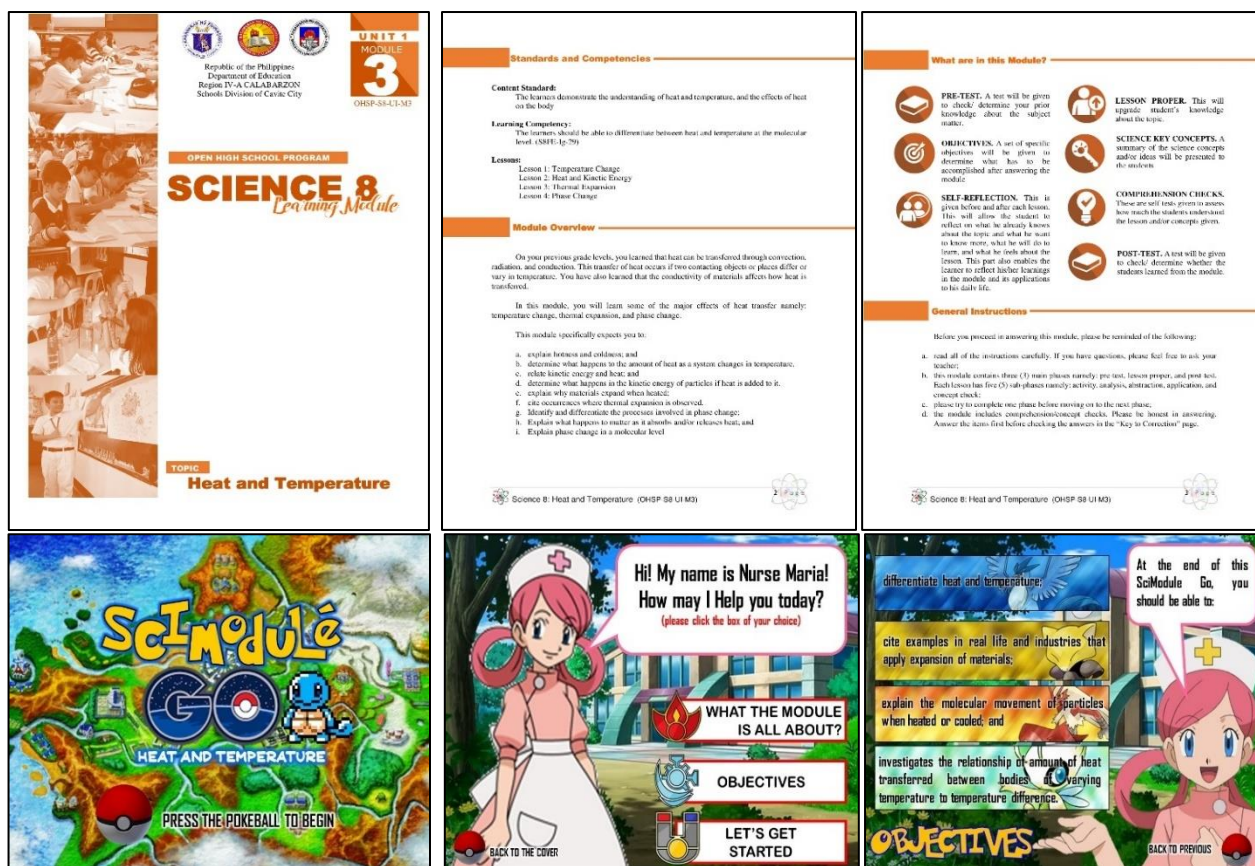


Figure 11. First pages of the printed module (first row) and electronic module (second row)

Figure 11 shows the introductory pages of the learning materials, which consist of the following: Title Page; Standards and Competencies; Module Overview; and Specific Objectives. This first few pages of the learning materials give the learners an overview on what the module is all about. It also informs the learners on what to expect in and how to accomplish the entire module. The standards, competencies, and objectives included in the first pages of the learning materials are the standards set and determined by the Department of Education in the curriculum guide.

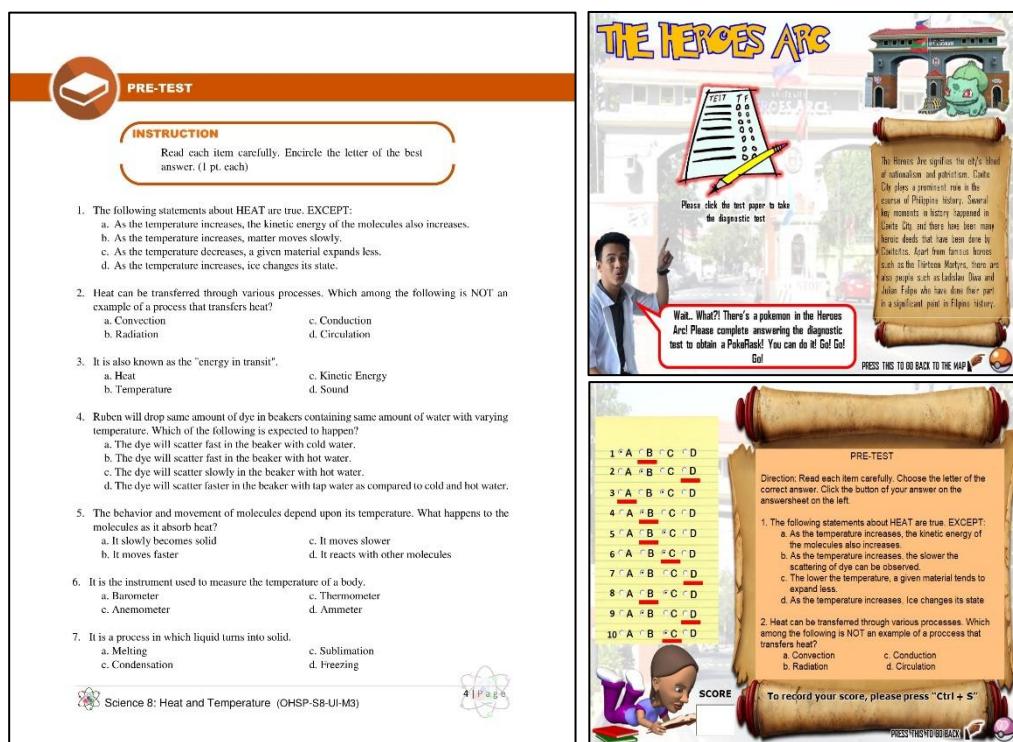


Figure 12. Pre-Test parts of printed module (left) and electronic module (right).

Figure 12 shows the sample pages of the printed and electronic modules containing the pre-test. Pre-test is a type of assessment given at the beginning of every lesson. This assessment determines the prior knowledge of the learners on the new lesson (DepEd, 2015). This part of the learning material gives teachers an overview on the level of mastery of the learners. A high pre-

test score indicates that the learner already has knowledge about the topic. A low pre-test score, on the other hand, implies that the learner has no knowledge on the topic yet.

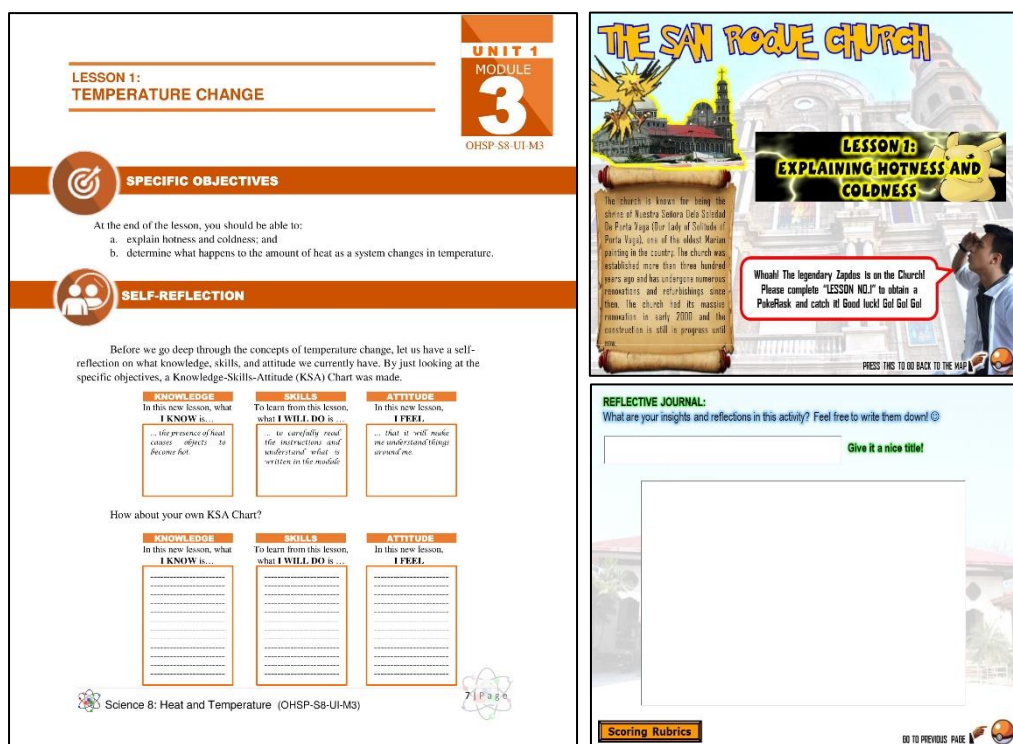


Figure 13. Sample Pages of the printed module (left) and electronic module (right) containing the Self-Reflection.

Figure 13 depicts the *Self-Reflection* part of the learning materials. This part of the learning materials determines the affective side of the learners and gives the teacher an insight on what the learners feel about the new lesson. This part of learning is in consonance with the works of Lucero (2010), Espiritu (2011), Santonil (2011), and Jamilia (2012). These researchers suggested that activities such as reflective journal writing give learners a chance to freely write their own insights and reflections on what they learned or felt from the lesson. Including such activities makes a learning material constructivist in nature. It also lets the teacher easily assess

not only the cognitive but also the affective domain of the students' learning. The teacher could clearly see whether the student had related or linked their learning to real life situations.

The figure displays two side-by-side sample pages from a science module, labeled 'Lesson Proper'.

Left Page (Printed Module):

- LESSON PROPER** header.
- LESSON OVERVIEW** section with introductory text about heat and temperature.
- POINTS TO REMEMBER...** section listing key concepts.
- COMPREHENSION CHECK 2.1** section with a question: "Which do you think has the greater kinetic energy? Why do you think so?"
- Two diagrams labeled **Box A** and **Box B** showing molecular motion.
- A text box for the answer: "Photo from: <https://stockphoto.com/stockphoto/7602646>".
- A "Check for understanding" button.
- Footer: "Science 8: Heat and Temperature (OHSP 98 UI M3)".

Right Page (Electronic Module):

- COMPREHENSION CHECK 1.1** section with a question: "Fill in the blanks below with words to make a correct and complete statement."
- A list of five numbered questions about energy and temperature.
- A "Check for understanding" button.
- Activity 1: Explaining Hotness and Coldness** section.
- Activity Objectives:** At the end of this activity, you should be able to:
 - describe hotness or coldness of an object in terms of its temperature; and
 - compare the changes in the temperature of water to determine the relationship between the amount of heat transferred and the resulting temperature change.
- Materials Needed:** Three identical containers (plastic cups, glasses, etc.), 400ml Cold Water, 100 ml Tap Water (room temperature), 100 ml Warm Water, Thermometer.
- Procedure:**
 - Label your three containers (Container 1, Container 2, and Container 3).
 - Fill each of the three containers by half with cold water.
 - Arrange your containers as shown in Figure 1.
- A video player showing a teacher in a lab coat.
- A "Safety" warning: "Please be careful in handling hot water".
- Figure 1: Three identical containers labeled 1, 2, and 3, each containing water.
- Figure 2: Three identical containers labeled 1, 2, and 3, each containing water.
- Footer: "Science 8: Heat and Temperature (OHSP 98 UI M3)".

Figure 14. Sample Pages of the printed module (left) and electronic module (right) containing the Lesson Proper

Figure 14 provides the sample pages of the printed and electronic module containing the *Lesson Proper*. This part of the learning materials presents the concept to the learners through varied and differentiated learning activities. The teacher, as the module writer, can present this part using the 2C-2I-1R (Constructivist, Collaborative, Inquiry-based, Integrative, and Reflective) Pedagogical Approach. The 2C-2I-1R Pedagogical Approach is the teaching

approach recommended by the Department of Education in compliance with the Republic Act 10533 or the Enhanced Basic Education Act of 2013.

The sample learning materials produced using the design guide utilizes the 4As (Activity, Analysis, Abstraction, and Application) Teaching Methodology under the 2C-2I-1R Pedagogical Approach. The 4As teaching method is Constructivist, Inquiry-Based, Integrative, and Reflective in nature. In this method of lesson presentation, a priming activity will be given to the learners to experience and observe the scientific concept (Activity). It will be followed by a series of questions to elicit the basic concepts from the learners (Analysis). After eliciting the basic science concepts from the learners through a series of questioning, the teacher will concretize learning and correct students' misconceptions through a thorough discussion (Abstraction). It will then be followed by a supplementary activity to apply what students have learned (Application).

The 4As Teaching Method is the most common and widely used teaching methodology both in structured and unstructured classrooms in public schools because it hits the fundamental learning theories of the K to 12 Curriculum. Similarly, Jacob (2013) utilized the same methodology in his developed and validated Grade 7 learning modules due to its versatility.

Figure 15 shows the sample pages of the printed and electronic module containing the *Key Concept* and *Comprehension Check* of the learning materials. The *Key Concept* part of the learning material summarizes the importance science ideas presented in the lesson. It provides the learners a gist of every concept discussed in the lesson. It also gives students convenience in recalling whenever they want to revisit the lesson. This part of the learning material is in accordance to the studies of Saleh (2012) and Valda (2015). According to Saleh (2012), the

summarization of lessons through textual/ narrative forms, concept maps, semantic webs, diagrams, and other graphic organizers are brain-based activities that promote convenience to the way of thinking of the learners for better retention. She also added that presenting chunked ideas makes learning more easy, convenient, and accessible. The researcher adapted the *Key Concept* part of the developed learning materials in the work of Valda (2015). One of its salient features is the *Lesson Summary* part. In this part of his module, he summarizes the lesson through either enumerated concept, concept maps, or diagrams. He concluded by putting such parts in the learning material that make the brain comfortable in organizing and acquiring knowledge. Like Saleh (2012), he also noted that summarizing lessons promotes high retention rate of concepts because it makes learning more convenient.

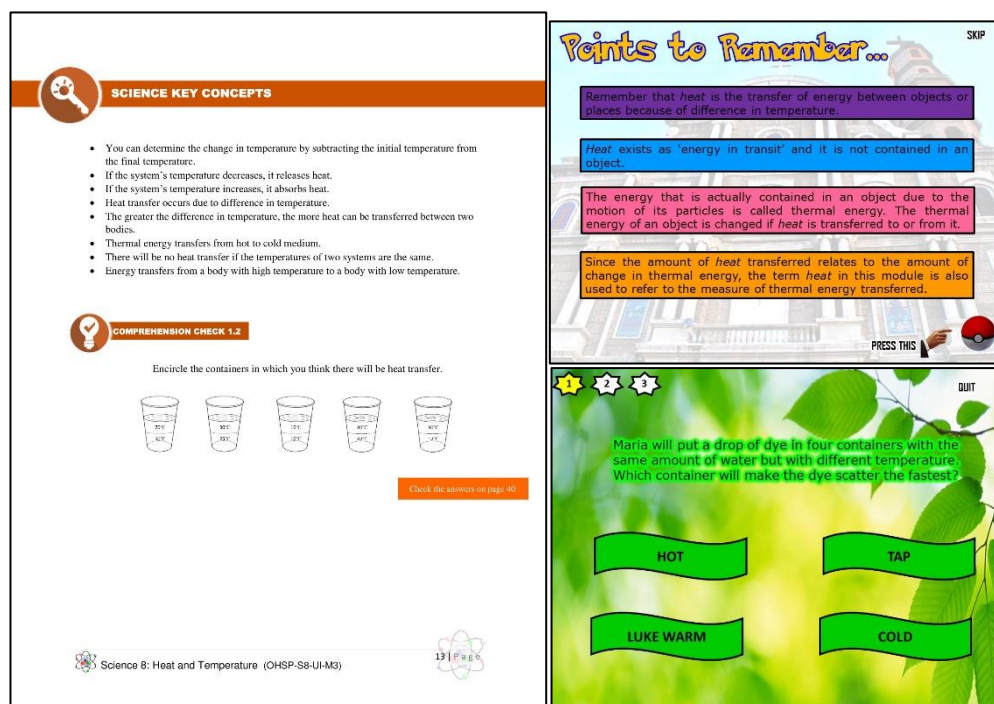


Figure 15. Sample pages of the printed module (left) and electronic module (right) containing the Key Concepts and Comprehension Checks

The *Comprehension Check* of the learning materials, on the other hand, is a type of formative assessment that measures the level of understanding of the learners. DepEd (2015), mandates all leading institutions to give formative assessments to the learners. Formative assessments are both beneficial to teachers and students. Through formative assessments, teachers will have an idea whether the learners fully understood the lesson and whether he/she will proceed to the next lesson. It also gives the teacher an idea whether the instruction has been effective or not. On the other hand, formative assessment is beneficial to the students since it will enable them to reflect on his/her own progress and how well they are learning through the whole process. UNESCO (2015) cited that formative assessment is characteristically informal and is intended to help the learners identify his/her own strengths and weaknesses in order to learn from the assessment experience. The addition of various *Comprehension Checks* in the learning materials was adapted and patterned from the existing Project Effective and Affordable Secondary Education (EASE) Modules and the works of Cusay (2009), Santonil (2011), Jacob (2013), and Buena (2016).

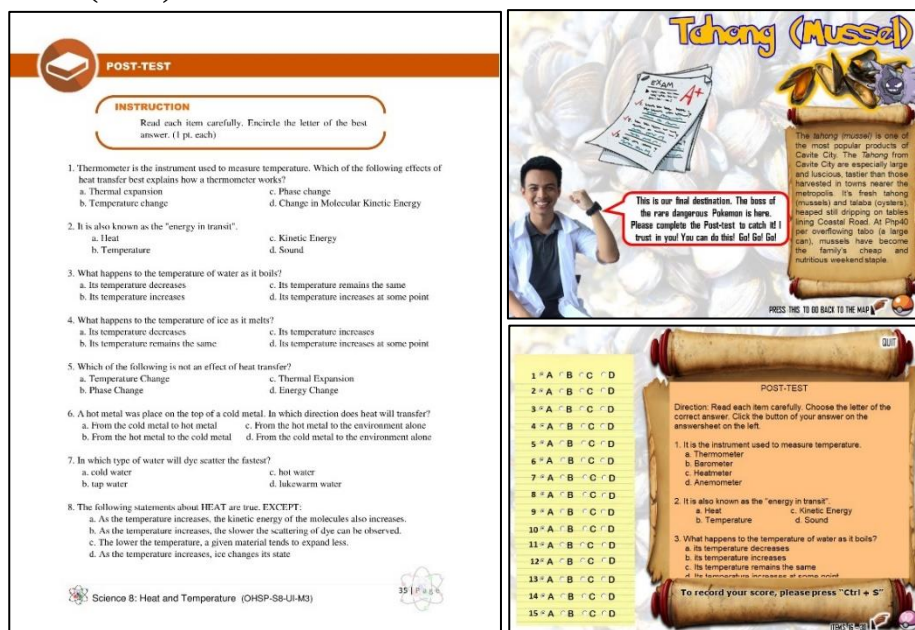


Figure 16. Sample pages of the printed module (left) and electronic module (right) containing the Post-Test

Figure 16 shows the sample pages of the printed and electronic module containing the post-test. A post-test is an example of a summative test that assesses the whole learning of the students after going through the module. A summative test like the post-test determines whether learning has taken place or not and indicates whether the students met the set standards and competencies. The researcher patterned the post-test of the developed learning to the post-tests in the Project Effective and Affordable Secondary Education (EASE) Modules and in the works of Cusay (2009), Lucero (2010), Santonil (2011), Jamilia (2012), Tamayo (2012), Jacob (2013), Tanala (2014), and Buena (2016). On the other hand, Sorianosos (2012), Targaza (2014), and Valda (2015) presented the post-test of their learning materials in a different way. Instead of a traditional paper-and-pen test, they made their post-test a performance-based assessment. They let the students choose how they wish to present their acquired skill or concept from the lesson (i.e. thru poem, jingle, drawing/illustration/ sketch, or narrative). According to Valda (2015), differentiated method of assessment enables learners to fully express their understanding of the lesson. He also added that one student can be good at memorization and excel in traditional assessment and one student can be good at illustrating his learning and not of memorization of facts. Sorianosos (2012) mentioned that module-writers should not stick with the traditional paper-and-pen type of summative assessment and should explore on other feasible methods of authentic assessment of learning.

Validation of Sample K to 12-Based Learning Materials for Open High School Program (OHSP)

The same set of curriculum experts, who validated the design guide, evaluated the developed sample, both printed (see Appendix Q) and electronic (See Appendix R) learning materials. The curriculum experts evaluated the following aspects of the printed module: a) Content; b) Instructional Quality; c) Format; d) Presentation; and e) Accuracy and Up-to-Datedness of Information. Meanwhile, the curriculum experts assessed the electronic module on the following aspects: a) Content; b) Instructional Quality; c) Format; d) Presentation; e) Accuracy and Up-to-Datedness of Information; and f) Technical Quality.

Table 14 shows the summary of major corrections and suggestions made by the curriculum experts and peers in the prototype printed and electronic learning materials and the action taken by the researcher.

Table 14. Summary of Curriculum Experts and Peers' Corrections and Suggestions in the Prototype Printed and Electronic Learning Materials and Actions Taken by Researcher

Evaluators	Corrections/ Suggestions	Action Taken
A. PRINTED LEARNING MATERIAL		
Evaluator 1	The Pre-Test item number 4 was not explicitly discussed in the learning material. Consider replacing the test item.	Replaced item number 4 with a question with a topic discussed in the module.
	Item 14 of the Posttest is the same with the Item 2 of Pre-Test.	Revised item number 12 of the Posttest.
Evaluator 2	The options A and B of the Pre-Test item number 12 are both correct.	Changed option A into a wrong statement.
Evaluator 3	Please specify in the abstraction part of lesson 1 that "Heat is not a form of energy" to avoid misconception.	Explicitly discussed that heat is not a form of energy in the abstraction part of the first lesson.

Evaluator 4	The questions in Module 3, Activity 3 are too technical and confusing.	Revised the three activity questions of Activity 3 into simpler language.
Evaluator 5	Discuss and differentiate Thermal Energy, Heat Transfer, Energy Flow and Heat in the abstraction part to avoid confusion.	Discussed and differentiated Thermal Energy, Heat Transfer, Energy Flow and Heat in the abstraction part of Module 2.

B. ELECTRONIC LEARNING MATERIAL

Evaluator 1	Item No. 2 in the Comprehension Check 3.1 of Lesson 3 has no correct answer.	Revised the options of the Comprehension Check question.
Evaluator 2	Questions in Activity 4 of Lesson 4 does not solicit Higher Order Thinking Skills. Consider Revising.	Revised the question to transform it into a HOTS Question.
Evaluator 3	Link to the next activity of Lesson 3 is not working.	Fixed the hyperlinking of buttons in the electronic module.
Evaluator 4	Discuss and differentiate Thermal Energy, Heat Transfer, Energy Flow and Heat in the abstraction part to avoid confusion.	Discussed and differentiated Thermal Energy, Heat Transfer, Energy Flow and Heat in the abstraction part of Module 2.
Evaluator 5	The background and text color used in Comprehension Check of Lesson 2 are too dark.	Changed the background into a lighter one to highlight the texts in the Comprehension Check.

Generally, the corrections made of the curriculum experts and peers revolved around the assessment part of the learning materials and its scientific content.

In the assessment part, the curriculum experts and peers noted that there are items in the pre-test that are not explicitly explained in the module. There were also test items with no correct answer and there were options in the test items that are both correct. In the comprehension checks of the learning materials, validators made no major corrections. However, they noted some typographical errors and text formatting. In the post-test, validators suggested that items

from the pre-test should not re-appear in the post-test. They revised some test items so that it will be different from the pre-test and at the same time, the same competency will be asked to the students.

In terms of the content, the validators suggested that *heat is not a form of energy* to avoid learners' misconception. They also noted some parts in the Abstraction part of the module in which the researcher should be careful in using the terms *Thermal Energy*, *Heat Transfer*, *Energy Flow*, and *Heat*. In using the terms, the validators suggested to discuss and differentiate them thoroughly so that learners will not become confused.

In the activities, some questions were revised as they are not HOTS (Higher Order Thinking Skills) questions and some questions were simplified so that learners can easily answer them and grasp the scientific idea since learners who will use the learning materials are not attending regular schooling. Hence, validators suggested to use simpler questions in the activities but at the same time, using HOTS type of questioning.

In terms of technical aspect in the electronic module, some of the corrections made by the evaluators are the broken hyperlinks, uncomplimentary color schemes, and not functioning buttons or home menus. The researcher fixed this through decoding and reviewing of hyperlinks weaved throughout the electronic learning material. There were also compatibility issues raised by the curriculum experts and peers. Thus, the researcher set the electronic module to Compatibility Mode so that it will be playable to other versions of the Microsoft software.

PRE-TEST

INSTRUCTION

Read each item carefully. Encircle the letter of the best answer (1 pt. each)

- The following statements about **HEAT** are true. EXCEPT:
 - As the temperature increases, the kinetic energy of the molecules also increases.
 - As the temperature increases, the slower the scattering of light can be observed.
 - The lower the temperature, a more gradual number of speed is lost.
 - As the temperature increases, the changes in state.
- Heat can be transferred through various processes. Which among the following is NOT an example of a process that transfers heat?
 - Convection
 - Conduction
 - Radiation
 - Circulation
- It is also known as the "energy in transit".
 - Heat
 - Temperature
 - Kinetic Energy
 - Flow
- Ruben will put drops of dye in beakers with the following and same amount of water but with varying temperature. What Color, Taps. Which of the following is expected to have the fastest dye diffusion?
 - The dye will scatter fast in beaker with cold water.
 - The dye will scatter fast in beaker with hot water.
 - The dye will scatter slowly in beaker with hot water.
 - The dye will scatter faster in beaker with tap water as compared to cold and hot water.
- The behavior and movement of molecules depend upon its temperature. What happens to the molecules as it absorbs heat?
 - It slowly becomes solid
 - It gets more disorderly
 - It gets more disorderly
 - It gets more disorderly
- It is the instrument used to measure the temperature of a body.
 - Rheometer
 - Thermometer
 - Acoustometer
 - Fluorimeter
- It is a process by which liquid turns into solid.
 - Melting (Condensation)
 - Sublimation
 - Condensation
 - Freezing (Solidification)

LESSON OVERVIEW

Heat transfer occurs in our environment. We may not see the actual process of heat transfer, but its effects are very evident. As a matter of fact, these heat transfer phenomena have been applied to us in many aspects of our lives. Hence, understanding the different concepts of heat transfer will enable us to further understand the world around us.

During your grade 7 science, you have learned that heat moves from warmer bodies to cooler bodies with different temperatures. You also learned that heat flows from an object of high temperature to an object with lower temperature. You have also learned that heat can be transferred through conduction, convection, and radiation. Lastly, you have also learned from grade 7 that the conductivity of materials is one of the factors that affect the transfer of heat.

This time, in your 8th grade in learning Science, you will discover more about heat transfer and its effects in different materials. Also, in this new lesson, you will discover that the amount of heat that an object can release or absorb has different factors and conditions and how these factors and conditions relate to the amount of heat being transferred.

POINTS TO REMEMBER...

Here are the different important heat concepts that you have to remember before going to the lesson:

- Heat is the transfer of energy between objects or places due to the differences on its temperature;
- Heat exists as an "energy in transit" and is not contained in an object;
- Thermal energy is the amount of energy that is contained in an object due to the motion of its particles;
- The thermal energy of an object changes if heat is transferred to or from it; and
- In this module, since the amount of heat transferred relates to the amount of change in thermal energy, heat is also used to refer to the measure of thermal energy transferred.

Science 8: Heat and Temperature (CHSP-S8-UJ-M3)

Science 8: Heat and Temperature (CHSP-S8-UJ-M3)

After the first round of validation with the curriculum experts and peers, the researcher noted all corrections, suggestions and recommendations and incorporated them in the learning material to come up with the second version of the learning materials prototype.

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Table 15. Curriculum Experts' Overall Evaluation on All Aspects of the Printed and Electronic Learning Materials for OHSP

Learning Material	Aspects	Mean	Standard Deviation	Interpretation
Printed Module	1. Content	4.96	0.16	Highly Acceptable
	2. Instructional Quality	4.92	0.18	Highly Acceptable
	3. Format	4.92	0.18	Highly Acceptable
	4. Presentation	4.89	0.35	Highly Acceptable
	5. Accuracy and Up-to-Datedness of Information	4.90	0.31	Highly Acceptable
	Overall	4.92	0.23	Highly Acceptable
Electronic Module	1. Content	4.93	0.22	Highly Acceptable
	2. Instructional Quality	4.95	0.21	Highly Acceptable
	3. Format	4.93	0.22	Highly Acceptable
	4. Presentation	4.93	0.25	Highly Acceptable
	5. Accuracy and Up-to-Datedness of Information	4.78	0.60	Highly Acceptable
	6. Technical Quality	4.88	0.36	Highly Acceptable
	Overall	4.84	0.33	Highly Acceptable

*see Appendices U and V for the detailed ratings.

Table 15 shows the overall evaluation of the curriculum experts on all aspects of the printed and electronic learning materials for OHSP. Based on the ratings made the curriculum experts on the aspects of the printed module (See Appendix U), the printed module got an overall mean rating of 4.92 ($SD=0.23$) on all aspects of the learning material. The Content Aspect of the said learning material got the highest mean rating of 4.96 [$SD=0.16$]. This high acceptability rating from the curriculum experts signifies that the overall content of the printed learning material adhered to the K to 12 standards set by the Department of Education. Specifically, the experts find the learning material suitable to the level of development (item 1.1), consistent with the topics and skills (item 1.2), and contributes to the achievement of specific objectives of the subject are and grade level for which it is intended (item 1.3).

The overall mean rating of the curriculum experts in all of the aspects of the printed module ranges from 4.89 ($SD=0.35$) to 4.96 [$SD=0.16$]. All of these ratings garnered a high level

of acceptability from the experts. This also indicates that the printed learning module met the standards set by the Learning Resource Management Development System (LRMDS) in crafting learning resources for the Department of Education.

Based on the ratings made by the curriculum expert on the aspects of the electronic module (See Appendix V), on the other hand, the electronic module got an overall mean rating of 4.84 ($SD=0.33$). The overall ratings given by the curriculum experts on all aspects of the electronic module ranges from 4.78 ($SD=0.60$) to 4.95 ($SD=0.21$). The Instructional Quality Aspect, among other aspects, received the highest rating from the experts having an average mean of 4.95 ($SD=0.21$). Specifically, the curriculum experts find that the graphics, colors, sounds are used for appropriate instructional purpose (item 2.5). They also find the material as enjoyable, stimulating, challenging, and engaging (item 2.6).

The experts also noted that the lessons included in the electronic learning material are anchored in the theoretical bases of the curriculum (item 2.9). This signifies that the electronic learning material is successful not only in presenting the lesson in an engaging manner but as well as aligning its whole package to the underlying principles of the K to 12 curriculum.

The high ratings achieved by both printed and electronic learning materials indicate that the design guide has good instructional features. The high rating also indicates that the design guide has been successful in setting the guidelines on how to construct modules that are bounded with the standards of LRMDS and the theories and principles of the K to 12 Basic Education Curriculum.

The sample printed and electronic learning materials does not only integrate the learning standards, competencies, theories, and principles of the K to 12 Basic Education Curriculum. It also includes set of desirable values that every Filipino learner should possess.

Table 16 shows the perception of the curriculum experts on the desirable Filipino values enhanced by the sample printed and electronic learning materials.

Table 16. The Desirable Filipino Values Enhanced by the Sample Learning Materials as Perceived by the Curriculum Experts

Desirable Filipino Values	Printed Learning Material		Electronic Learning Material	
	Percentage (%)	Rank	Percentage (%)	Rank
1. Pride in being a Filipino	89.13	8	95.65	4.5
2. Scientific attitude and reasoning	97.83	1	100.00	1.5
3. Desire for Excellence	91.30	6.5	89.13	6
4. Love for country	95.65	2.5	97.83	3
5. Helpfulness/ teamwork/ cooperation	26.09	11	84.78	9.5
6. Unity	21.74	12	82.61	11
7. Desire to learn new things	93.48	4.5	91.30	7
8. Honesty and trustworthiness	93.48	4.5	86.96	8
9. Ability to know right or wrong	91.30	6.5	100.00	1.5
10. Respect	58.70	10	78.26	12
11. Critical and Creative Thinking	95.65	2.5	95.65	4.5
12. Productive work	86.96	9	84.78	9.5

Based on the responses of the curriculum experts on the printed learning material, the values on “scientific attitude and reasoning” garnered the highest response with a percentage of 97.83%. This figure was expected since the learning material developed is for the Science Learning Area. Tied on the second highest rating are the values “love for country” and “critical and creative thinking” with a response percentage of 95.65%. Again, the high percentage of responses in these values was expected since the learning material was contextualized and localized and contains higher order thinking skills to elicit critical and creating thinking and reasoning. The values “helpfulness/ teamwork/ cooperation” and “unity” got the lowest percentage response garnering 26.09% and 21.74%, respectively. This low percentage response

of these values attribute to the independent learning characteristic of the Open High School (OHSP) learning materials since more often than not, students work alone in the OHSP Center or at home. Hence, they experience less interaction with the other students enrolled in the program.

In the electronic learning material, on the other hand, 100% or 46 out of 46 expert evaluators responded that the developed electronic learning material enhances the intended user's scientific attitude and reasoning and ability to know right or wrong. This 100% percentage on the said desirable values is expected since the learning area used in the developed electronic learning material, like the printed one, is science and the concept checks and quizzes in the module gives an immediate feedback to the users through animations and hyperlinking. Meanwhile, the desirable value "respect" got the lowest response garnering a percentage score of 78.26%, which is in fact is still the margin of acceptability range of 75% to 100% according to LRMDS.

Table 17 presents the average inter-rater agreement of the 46 experts on the validation of the sample learning materials and the corresponding Aiken's item content-relevance validity index values per aspect of the learning material. This study utilized the Inter-rater agreement to determine the extent of consistency among the ratings made by the curriculum experts in evaluating the sample learning materials. The Aiken's item content-relevance validity, on the other hand, indicates the degree of validity of the ratings made by the curriculum experts.

Table 17. Average Inter-Rater Agreement of the Experts in the Validation of the Sample Learning Materials and The Average Aiken's Content Validity Index Value per Learning Material Aspect

Learning Material Type and Its Aspects	% of Agreement			Aiken's Content Validity Index
	Rating of 5 (Strongly Agree)	Rating of 4 (Agree)	Rating of 3 (Undecided)	
PRINTED MODULE				
1. Content	96	4	0	0.988
2. Instructional Quality	92	8	0	0.980
3. Format	93	7	0	0.980
4. Presentation	91	7	3	0.972
5. Accuracy and Up-to-Datedness of Information	93	4	3	0.974
Overall	93	6	1	0.979
ELECTRONIC MODULE				
1. Content	95	4	1	0.983
2. Instructional Quality	96	2	2	0.987
3. Format	92	6	2	0.977
4. Presentation	95	4	1	0.984
5. Accuracy and Up-to-Datedness of Information	87	8	5	0.946
6. Technical Quality	91	6	3	0.969
Overall	93	5	2	0.974

**See Appendices W and X for the detailed data*

All of the ratings made by the curriculum experts lies along the rating of 3 (undecided) up to the rating of 5 (strongly agree). Data shows that the majority of the 46 experts consistently gave both the printed and electronic materials a rating of 5 (strongly agree) having an average inter-rater agreement range of 91% to 96% for the printed learning material and 87% to 96% for the electronic learning material. This high average inter-rate agreement translates that the curriculum experts who evaluated the sample printed and electronic learning materials has been consistent with their judgement on the said materials.

The calculated average Aiken's Content Validity Index values per aspect of the sample learning materials further justify the high inter-rater reliability of the ratings made by the

curriculum experts. The CVI values of the printed learning material ranging from 0.972 to 0.988 and 0.046 to 0.987 of the electronic learning materials translates that the ratings made by the curriculum experts are of high validity. According to Retnawati (2016), if the CVI of the ratings is equal or between 0.800 to 1.000, the relevance of the content is acceptable. With the CVI result acquired from the ratings of the curriculum experts, it can be said that the content validity of the responses of the experts are of almost perfect validity.

To further validate the result acquired from the inter-rater reliability and Aiken's content validity index, the researcher calculated the Fleiss' Kappa Coefficient of the responses made by the experts in their evaluation on the sample learning materials.

Table 18. Fleiss' Kappa Coefficient Value of the Responses Made by the Curriculum Experts in their Evaluation on the Sample Learning Materials and Its corresponding Interpretation

Learning Material	No. of Raters (<i>m</i>)	No. of Questionnaire Items (<i>n</i>)	P_a Value	P_e Value	K	Interpretation
Printed Module	46	46	0.954732	4577676.57	1.000	Almost Perfect Agreement
Electronic Module	46	59	0.930914	11603379.64	1.000	Almost Perfect Agreement

Table 18 shows the result of the Fleiss' Kappa Coefficient statistical test. Data shows that both printed and electronic learning materials obtained a Kappa (K) value of 1.000 which are interpreted as "Almost Perfect Agreement". This means that the 46 expert-raters (*m*) has been consistent with their ratings in the scale that validates the sample learning materials. This almost perfect agreement obtained from the Kappa coefficient further validates the calculated result from the previously discussed statistical tests and analyses.

In summary, both the printed and electronic materials obtained a high mean rating score of 4.92 ($SD=0.23$) and 4.84 ($SD=0.33$), respectively. Both sample learning materials received a high inter-rater reliability score of 93% for the rating of 5 (Strongly Agree), it means that the majority of the curriculum experts who validated the sample learning materials has been consistent with their evaluation. The Fleiss' Kappa coefficient supported the high inter-rater reliability of the responses as it got a Kappa value of 1.000, which means an "Almost Perfect Agreement". Meanwhile, the responses made by the experts got a high content validity index of 0.979 and 0.974 for the printed and electronic learning materials, respectively. This indicates the high level of validity, consistency, and reliability of all of the responses made by the experts as they evaluate the learning materials.

Students' Perception on the Developed Learning Materials for OHSP

After the content validation phase of the learning materials, both printed and electronic modules were administered to the sixty-two (62) Grade 8 students enrolled in Open High School Program (OHSP). In the last phase of the study, the Try-Out and Finalization Phase, the students used and answered the learning materials. It was followed by a perception survey to determine the OHSP students' thoughts on the use of the developed learning materials.

Table 19 presents the students' perception on the use of the developed printed learning material for OHSP. Data shows that the OHSP students gave an overall mean perception rating of 4.59 for the printed learning material after its use. This means that the OHSP students has a positive attitude towards the use of the developed learning materials.

Table 19. Students' Perception on the Use of the Developed Printed Learning Material for OHSP

Items	Mean	Standard Deviation	Interpretation
1. I can easily read and understand the content of the module	4.69	0.53	Strongly Agree
2. The module is suited to my age and grade level	4.58	0.83	Strongly Agree
3. I am able to complete the task on time	4.53	0.86	Strongly Agree
4. I found the module very interesting	4.53	0.56	Strongly Agree
5. The instructions are clear and easy to follow	4.66	0.65	Strongly Agree
6. I can finish the learning module within the allotted time.	4.55	0.69	Strongly Agree
7. The module is presentable and attractive	4.61	0.68	Strongly Agree
8. If given a choice, I prefer to use learning materials like these.	4.45	0.98	Agree
9. I can manipulate and answer the learning material even without the help of my teacher.	4.53	0.76	Strongly Agree
10. I think, learning materials like these make students learn more.	4.32	0.93	Agree
11. I found the learning materials convenient	4.55	0.80	Strongly Agree
12. I found the pictures helpful in understanding the lessons	4.56	0.80	Strongly Agree
13. The activities in the learning material are suited to my needs	4.52	0.73	Strongly Agree
14. I can relate the lesson to real-life situations	4.77	0.68	Strongly Agree
15. I found the activities fun and interesting	4.74	0.57	Strongly Agree
16. The learning material makes me reflect and connect my understanding to the things around me.	4.79	0.51	Strongly Agree
17. I can freely choose what type of activity I will do depending on my talent	4.56	0.84	Strongly Agree
18. I think there should be no changes could be made in the instructional episodes of the learning material.	4.73	0.63	Strongly Agree
Overall	4.59	0.72	Strongly Agree

The mean perception rating of the OHSP students in all of the statements in the perception survey ranges from 4.32 to 4.79. The statement “the learning material makes me reflect and connect my understanding to the things around me” got the highest mean score of 4.79 interpreted as Strongly Agree. This means that the printed module embraced the constructivist theory of the K to 12 curriculum. The statement “I can relate the lesson to real-life situations” obtained the second highest mean score of 4.77 interpreted as Strongly Agree. This

means that the lessons tacked in the learning module are contextualized and are relevant to the lives of the learners. Lastly, the statement which garnered the third highest mean score was “I found the activities fun and interesting” with 4.74 mean value. This means that the learners enjoyed and had fun while answering the learning material.

On the other hand, the statement “I think, learning materials like these make students learn more” got the lowest mean rating of 4.32 interpreted as Agree. Even though it is still within the range of acceptability, the low rating of the statements could be attributed to the nature of the learners in the 21st Century who are technologically-inclined individuals. Going back to the findings of Gonzano-Quiambao (2010), although modular approach has a promising role in increasing the achievement and meeting the needs of the learners, printed instructional modules are no longer attractive to the learners since their generation is already inclined with technology-based learning materials. Hence, students preferred electronic learning materials more than the printed ones.

Table 20, on the other hand, shows the result of the students’ perception on the use of the developed electronic learning material for Open High School Program (OHSP). The OHSP students gave an overall perception mean rating of 4.89 interpreted as strongly agree for the electronic learning material. This is 0.30 higher than the mean rating of the printed module. In spite of having a slight difference between the two overall mean scores, it can still be inferred that the OHSP student-respondents preferred electronic learning materials than the printed ones.

Table 20. Students' Perception on the Use of the Developed Electronic Learning Material for OHSP

Items	Mean	Standard Deviation	Interpretation
1. I can easily read and understand the content of the module	4.81	0.47	Strongly Agree
2. The module is suited to my age and grade level	4.90	0.47	Strongly Agree
3. I am able to complete the task on time	4.81	0.56	Strongly Agree
4. I found the module very interesting	4.97	0.25	Strongly Agree
5. The instructions are clear and easy to follow	4.95	0.28	Strongly Agree
6. I can finish the learning module within the allotted time.	4.71	0.58	Strongly Agree
7. The module is presentable and attractive	4.94	0.30	Strongly Agree
8. If given a choice, I prefer to use learning materials like these.	4.95	0.28	Strongly Agree
9. I can manipulate and answer the learning material even without the help of my teacher.	4.97	0.25	Strongly Agree
10. I think, learning materials like these make students learn more.	4.95	0.28	Strongly Agree
11. I found the learning materials convenient	4.73	0.60	Strongly Agree
12. I found the pictures helpful in understanding the lessons	4.69	0.85	Strongly Agree
13. The activities in the learning material are suited to my needs	4.92	0.41	Strongly Agree
14. I can relate the lesson to real-life situations	4.98	0.13	Strongly Agree
15. I found the activities fun and interesting	4.95	0.28	Strongly Agree
16. The learning material makes me reflect and connect my understanding to the things around me.	4.94	0.30	Strongly Agree
17. I can freely choose what type of activity I will do depending on my talent	4.97	0.25	Strongly Agree
18. I think there should be no changes could be made in the instructional episodes of the learning material.	4.79	0.65	Strongly Agree
Overall	4.89	0.40	Strongly Agree

In detail, the statement “I can relate the lesson to real-life situations” got the highest mean rating of 4.98 among all statements in the perception survey. This result signifies that the electronic learning material presents lesson that are relevant and applicable to their lives. In addition, statements such as “I found the module very interesting”; “I can freely choose what type of activity I will do depending on my talent”; and “I can manipulate and answer the learning material even without the help of my teacher” got tied in the second highest mean rating of 4.97.

This high perception rating of the students on the said statements indicate that the learning material addresses their individuality and enables them to work freely on their own. Just like what Abad (2010) stated, students learn best if they are given freedom on how to learn. Achievement of learners will also increase if their individual differences are religiously catered.

These results of the perception of the OHSP students are congruent with the results of the validations of the curriculum experts and peers in the design guide. This highlights that the content, instructional quality, format, presentation, accuracy and up-to-datedness of information, and technical quality of the learning materials are of high significance and acceptability. These congruence and findings provide initial evidence of the effectiveness of the design guide used in the development of these learning materials.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary of the study, conclusions drawn from the results of the validation phase and try-out phase, and the recommendations for future researchers who wishes to take the same field of inquiry.

SUMMARY OF THE STUDY

Despite the implementation of K to 12 Basic Education Curriculum in 2011, the learning materials used for the OHSP are still based on the 2002 Basic Education Curriculum (BEC). This resulted to the curriculum mismatch delivered by the said program. Hence, this study developed and validated a design guide in creating K to 12-based learning materials for the OHSP.

Aside from the design guide, this study also produced sample K to 12-based printed and electronic learning materials. The design guide and its sample learning materials went through the following phases: 1) Development of the Design Guide; 2) Validation and Evaluation of the Design Guide; 3) Development of the Learning Materials; 4) Validation and Evaluation of the Learning Materials; and 5) Try-out and Finalization.

The developed design guide contained the following instructional designs: 1) Introduction; 2) Terms and Definition; 3) Guide to Preparation of Printed OHSP Module; 4) Guide to Preparation of Electronic OHSP Module; and 5) Validation of Learning Materials. A total of 46 curriculum experts and peers from DepEd Schools Division of Cavite City evaluated the design guide in terms of: a) format, style, and presentation; b) content, organization, and clarity of information; and c) language.

After the development and validation of the design guide, the researcher translated its contents to create sample printed and electronic learning materials. Both the sample learning materials contained the following instructional designs: 1) Standards and Competencies; 2) Module Overview; 3) Pre-Test; 4) Self-Reflection; 5) Lesson Proper; 6) Key Concepts; 7) Comprehension Checks; and 8) Post-Test. Like the design guide, the same pool of curriculum experts validated the learning materials. The curriculum experts and peers evaluated the learning materials in terms of the following aspects: 1) content; 2) instructional quality; 3) format; 4) presentation; 5) accuracy and up-to-datedness of information; and 6) technical quality.

After two rounds of validation with the curriculum experts and peers, the researcher came up with the finalized versions of the printed and electronic learning materials. After the finalization of the developed and validated learning materials, a group of 62 grade 8 OHSP students tried-out the learning materials. The study surveyed the perception of the learners.

SUMMARY OF RESULTS

Based on the result of the validation of curriculum experts and perception of the OHSP students, this study determined that the instructional content of the design guide are aligned to the underlying principles and theories of the K to 12 Basic Education Curriculum and the design guide includes guidelines set by the LRMDs in designing learning materials for the Department of Education. Hence, the developed design guide has a high level of acceptability from the curriculum experts. Hence, based on the individual ratings on 1) Format, style, and presentation; 2) Content, organization, and clarity of information; and 3) Language, the design guide is ready for use in developing K to 12-based learning materials for OHSP.

The instructional designs of the sample learning materials include features that are aligned to the principles and theories of the K to 12 Curriculum. With that, the sample learning materials produced using the design guide attained a high level of acceptability from the curriculum experts who evaluated them. Hence, the design guide has been effective in giving set of instructions and guidelines in crafting learning OHSP materials.

Both the developed design guide and sample learning materials acquired a high level of reliability and validity based on Inter-rater agreement, Aiken's content validity index, and Fleiss' Kappa coefficient. Lastly, the developed learning material got high perception rating from the OHSP students who used them. Thus, the learning materials developed using the design guide is suitable and caters to the needs of the learners under the said program.

LIMITATIONS OF THE STUDY

This study concerns primarily on the development and validation of a design guide for K to 12 based learning materials for Open High School Program (OHSP) in Science. Aside from the design guide, this study also developed and validated sample printed and electronic learning materials. The sample electronic module utilized Microsoft PowerPoint© Macro-Enabled Show Presentation as a platform. It also included Shockwave flash animations, experiment simulations, downloaded videos, and interactive activities and quizzes.

The researcher decided to choose Grade 8 Science since it is the current grade level he is handling. The learning materials developed in this study is limited only to Lesson 3: Heat and Temperature of Unit 1: Force, Motion, and Energy. The researcher selected the topic because it consistently belongs to one of the top 3 least mastered competencies of Grade 8 Science for three

consecutive years based on the result of the Division Achievement Test (DAT). The Curriculum and Learning Management Division (CLMD) of DepEd Region IV-A CALABARZON also identified the topic Heat and Temperature as a Critical Content in Science 8. The learning materials utilized the learning competencies and content standards set by the Department of Education Central Office for Grade 8 Science under the K to 12 Basic Education Curriculum.

To determine the perception of its intended users, the researcher administered the developed and validated learning materials to the enrollees of the Open High School Program (OHSP) of the secondary schools of DepEd Schools Division of Cavite City SY 2018-2019. Both electronic and printed learning materials were administered to both set of students since the study is only limited in determining students' perception on the use of the learning materials. Determining students' achievement scores and the effect of such learning materials to the learning of the students are beyond the scope of this study.

The same set of curriculum experts evaluated both the design guide and learning materials. The curriculum experts and peers consisted of: Division Science Educational Program Supervisor, Division Education Program Specialists, Science Department Head, Science Master Teachers, OHSP and ALS Coordinator, Science Teachers and OHSP teachers. The evaluation of the curriculum experts and peers was only limited to the face and content validity of both design guide and sample learning materials using a modified rating tool. Suggestions and recommendations on the improvement of the design guide and learning materials were considered and incorporated during the whole development and validation process.

CONCLUSIONS

After the entire development and validation process of the design guide and sample learning materials for Open High School Program (OHSP), the researcher learned that there are a lot to consider in developing a design guide intended for the students of OHSP. Aside from considering the theoretical bases into which the K to 12 Basic Education Curriculum was anchored, a design guide developer should also consider the nature, type, abilities, and needs of the learners under the program. Understanding these characteristics of OHSP learners is vital in the creating the instructional content of the design guide so that proper tips, references, and guidelines will be properly included. Thus, intended users of the guide, module writers, will be able to craft a learning material that places the needs of the OHSP learners at the center.

The researcher also learned that developed learning materials should engage and entice the interest of the learners. Hence, the researcher designed the learning materials with utmost simplicity with the use of simple languages and basic explanation of science concepts. This made the sample learning materials developed in the study lighter and easy to comprehend unlike the traditional learning materials used in the program that are bombarded with facts and concepts which are, according to the interviewed curriculum experts and peers, boring and not suitable for the types of learners under the OHSP. Aside from simplicity, the researcher also learned that lesson activities in the learning materials should also be less intensive and technical so that the intended users will not lose their interest in answering/ using the learning materials. The researcher also contextualized and localized the design of the learning activities so that OHSP students will find the learning materials relatable and easy to accomplish. Following the suggestions of experts and peers, the researcher wrote the guide questions in a simple and clear manner yet still stimulating higher order thinking skills.

Overall the researcher learned that design guides for creating learning materials intended for OHSP should not only be anchored to learning theories in which the K to 12 Basic Education Curriculum was aligned but should also be user-friendly, cater the needs of the learners under the program and anchored to the existing policies and guidelines. This is to ensure that the learning material produced using the design guide will be very suitable to address the type, abilities, and nature of learners we have in OHSP under the K to 12 Basic Education Curriculum.

RECOMMENDATIONS

Based on the findings gathered from this study, the researcher recommends that the Department of Education (DepEd) should hold seminars, trainings, and workshops on development of learning resources for the Open High School Program (OHSP) or at the very least, a conduct of seminar-workshops or in-service trainings in learning material development in the division or school levels.

Teacher Education Institutions, on the other hand, should integrate the teaching of the development of K to 12-based instructional materials in their curriculum. This will equip pre-service teachers the necessary knowledge and training in crafting modules that caters the needs of their learners in the future.

The researcher recommends that the developed and validated design guide should be used in developing other science lessons, topics, and/or competencies in other grade levels as recommended also by the studies of Ubaldo (2018) and Suco (2019). The use of the developed design guide in other learning area and in crafting OHSP learning materials in Senior High School should also be explored. Experimental studies involving the developed and validated

design guide and sample learning materials should also be conducted to determine its effect on the students' achievement under the OHSP and to determine if there is a difference between the achievement of OHSP learners who are still using 2002 BEC learning materials than those learners who are now using K to 12-based learning materials. This will serve as a baseline data for education specialists in conducting more learning material development trainings and seminars.

Lastly, this study recommends to review the studies conducted by SIMEO INNOTECH (2014a, 2017, & 2019) regarding the status of implementation of OHSP in the Philippines to determine other factors should be examined and given emphasis to further strengthen the execution of the program and alternative delivery mode in general.

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APPENDIX A
LETTER TO THE SCHOOLS DIVISION SUPERINTENDENT

Celedonio B. Balderas, Jr.
Schools Division Superintendent
DepEd Division of Cavite City

Dear Sir;

Greetings!

I am presently working on my research entitled “*Development and validation of a design guide for K to 12-based Science learning materials for Open High School Program (OHSP)*”. This study primarily aims to develop a design guide that will serve as a tool or pattern in developing learning materials for OHSP that are aligned in the K to 12 Basic Education Curriculum.

In line with this, may I request your good office to allow me to conduct my research in Sangley Point National High School and Cavite National High School. Rest assures that all information or data gathered among the respondents will be kept confidential.

I am hoping for your most favorable response regarding this matter. Thank you and God bless!

Respectfully yours,

LOUIE-ZEL M. PEDRO
Researcher

Noted:

MARIE PAZ E. MORALES, Ph.D.
Thesis Adviser

Approved:

CELEDONIO B. BALDERAS, Jr.
Schools Division Superintendent

APPENDIX B
LETTER TO THE SCHOOL HEADS

AUGUSTO D. FERMA, Jr.
Principal IV
Cavite National High School

Dear Sir;

Greetings!

I am presently working on my research entitled “*Development and validation of a design guide for K to 12-based Science learning materials for Open High School Program (OHSP)*”. This study primarily aims to develop a design guide that will serve as a tool or pattern in developing learning materials for OHSP that are aligned in the K to 12 Basic Education Curriculum.

In line with this, may I request your good office to allow me to conduct my research and gather data from your teachers and enrolled OHSP students? Rest assures that all information or data gathered among the respondents will be kept confidential.

I am hoping for your most favorable response regarding this matter. Thank you and God bless!

Respectfully yours,

LOUIE-ZEL M. PEDRO
Researcher

Noted:

MARIE PAZ E. MORALES, Ph.D.
Thesis Adviser

Approved:

AUGUSTO D. FERMA Jr.
Principal IV, CNHS

APPENDIX C
LETTER TO THE SCHOOL HEADS

BERNARDITA H. BENCITO
Principal II
Sangley Point National High School

Dear Ma'am;

Greetings!

I am presently working on my research entitled “*Development and validation of a design guide for K to 12-based Science learning materials for Open High School Program (OHSP)*”. This study primarily aims to develop a design guide that will serve as a tool or pattern in developing learning materials for OHSP that are aligned in the K to 12 Basic Education Curriculum.

In line with this, may I request your good office to allow me to conduct my research and gather data from your teachers and enrolled OHSP students? Rest assures that all information or data gathered among the respondents will be kept confidential.

I am hoping for your most favorable response regarding this matter. Thank you and God bless!

Respectfully yours,

LOUIE-ZEL M. PEDRO
Researcher

Noted:

MARIE PAZ E. MORALES, Ph.D.
Thesis Adviser

Approved:

BERNARDITA H. BENCITO
Principal II, SPNHS

APPENDIX D
PARENTAL CONSENT

Dear Mr./Mrs. _____;

Greetings!

I am presently working on my research entitled “***Development and validation of a design guide for K to 12-based Science learning materials for Open High School Program (OHSP)***” This study primarily aims to develop a design guide that will serve as a tool or pattern in developing learning materials for OHSP that are aligned in the K to 12 Basic Education Curriculum.

May I inform you that your child is one of the possible beneficiaries of this research in the future and is qualified as student-respondent in the researcher. In line with this, may I request your permission to allow your child to become a student-respondent in the study. Rest assures that all information or data gathered from your child will be kept confidential.

I am hoping for your most favorable response regarding this matter. Thank you and God bless!

Respectfully yours,

LOUIE-ZEL M. PEDRO
Researcher

☐

I am allowing my child to become a respondent in the study.

☐

I am not allowing my child to become a respondent in the study because of the following reasons: _____

(Parent/Guardian’s Signature over Printed Name)

Appendix E
LETTER OF INVITATION FOR FOCUS GROUP DISCUSSION

MA. CARMELA L. SALONGA
OHSP Coordinator
Cavite National High School

Dear Ms. Salonga;

Greetings!

I am presently working on my research entitled “*Development and validation of a design guide for K to 12-based Science learning materials for Open High School Program (OHSP)*”. This study primarily aims to develop a design guide that will serve as a tool or pattern in developing learning materials for OHSP that are aligned in the K to 12 Basic Education Curriculum.

In line with this, may I request your presence in a focus group discussion to share your insights and expertise in developing a design guide for learning materials of OHSP? The focus group discussion primarily hopes to attain the following objectives:

- a. to hear personal experiences in handling the program;
- b. to gain insights on what to include in a design guide for k to 12-based learning materials for OHSP; and
- c. to identify the things to consider in developing learning materials intended for OHSP students.

Rest assures that all information or data gathered from this focus group discussion will be kept confidential.

I am hoping for your most favorable response regarding this matter. Thank you and God bless!

Respectfully yours,

LOUIE-ZEL M. PEDRO
Researcher

Noted:

MARIE PAZ E. MORALES, Ph.D.
Thesis Adviser

Appendix F
FOCUS GROUP DISCUSSION PROTOCOL

PERMISSION LETTERS, REGISTRATION FORM/ ATTENDANCE SHEET ARE FILLED OUT BEFORE THE FOCUS GROUP DISCUSSION BEGINS

Good morning/afternoon. Thank you lending me your executive time for joining this focus group discussion of the experts in the field of Alternative Delivery Mode of Department of Education, Division of Cavite City

My name is LOUIE-ZEL M. PEDRO, and I will be your moderator for today. I am conducting research about my study entitled Development and Validation of a Design Guide for K to 12-based Learning Materials for Open High School Program. In particular, this focus group discussion seeks to attain the following objectives: 1) to hear personal experiences in handling the program; 2) to gain insights on what to include in a design guide for k to 12-based learning materials for OHSP; and 3) to identify the things to consider in developing learning materials intended for OHSP students.

Before we begin, let me suggest some things to make our discussion more productive. May I inform you that we will be recording this conference, it is important that you speak up and that you only speak one at a time. We do not want to miss any of your comments. We will only use first names here. No reports will link what you say to your name, department, or institution. In this way, we will maintain your confidentiality.

In addition, we ask that you also respect the confidentiality of everyone here. Please don't repeat who said what when you leave this room. During the one hour we'll be here, I will ask you questions, and I will listen to what you have to say. Please, feel free to respond to each other and to speak directly to others in the group.

We want to hear from all of you. We are interested in both majority and minority viewpoints, common and uncommon experiences. So I may sometimes act as a traffic cop by encouraging someone who has been quiet to talk, or by asking someone to hold off for a few minutes.

If it is OK with you, I will turn on the recorder and start now.

This focus group is being conducted in [Venue] on [DATE] by __MODERATOR__.
START TIME - _____.

I. Introduction

Let's begin with an introduction. Please tell us your first name, your school and designation and how long you have been in the program.

II. Interview Proper

A. Experiences in the program

1. Please tell me about your experiences in the program.
2. What are the common characteristics of OHSP students do you observe?
3. What are the problems you commonly experience in the program?

B. Learning Materials

1. What are the learning materials used in the program? Do you find these learning materials useful?
2. Do you think the available learning materials in your school is in line with the present curriculum of DepEd? What are your plans to address this?

C. Designing a Guide

1. If we are going to make a design guide in constructing k to 12-based learning materials, what important features/ elements/ and characteristics should it possess?

D. Designing a learning material

1. Considering the nature of OHSP students, what salient characteristics should a learning material for OHSP possess?
2. How do you think a learning material like module can address OHSP students' needs?

III. Summary

To summarize what we discussed, you said... SUMMARIZE THE IDEAS GATHERED FROM THE EXPERTS

IV. Closing

As what I have told you earlier, this focus group discussion seeks to attain the following objectives: 1) to hear personal experiences in handling the program; 2) to gain insights on what to include in a design guide for k to 12-based learning materials for OHSP; and 3) to identify the

things to consider in developing learning materials intended for OHSP students. Is there anything we left out?

Thank you again for taking the time to participate in this discussion.

END TIME - _____.

Appendix G
INTERVIEW GUIDE FOR LEARNING MATERIALS

Dear Respondents:

I would welcome your views, ideas, and creative insights on the things that should be considered in designing learning materials in Science for Open High School Program. Your words are extremely appreciated. You may or may not indicate your name in the respondent's profile for the confidentiality of your identity.

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO
Researcher

PART A. Respondent's Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B.

A. Format and Design

1. What quality do you think are to be considered in designing learning materials?

2. What do you think should a learning material possess to catch the attention of its users?

3. What are your specific tips or things to consider in designing a module?

B. Content: Student Needs

1. Do you think illustrations and videos (if applicable) can help pupils understand the lesson and attain its objectives?

2. How do you think can a learning material catch the interest of the learners?

3. What qualities should a learning material possess for it to cater the students' needs?

C. Content: Learning Tasks

Please give your suggestions on the things to consider when designing the following learning tasks in the module

Learning Tasks	Suggestions
Activities	
Analysis	

Abstraction	
Application	

D. Assessment

1. What types of assessment should be included in learning materials for OHSP? Do you think this type of assessment is effective? Why do you think so?

2. What are the points to consider in developing an assessment in learning materials?

E. Language

What are your suggestions in using or choosing the right words/language in the learning materials?

F. Features of the Module

What salient features do you wish to include in learning materials to enhance student learning?

G. Technical Characteristics (of the electronic version)

What technical considerations should a learning material developer consider in designing electronic copies of learning materials

- a. in terms of format and design;

b. in terms of navigation;

c. in terms of being manipulative and user-friendliness;

d. in terms of style of presentation?

H. Other suggestions

What other suggestions and points to consider can you give in developing learning materials for OHSP?

APPENDIX H
EVALUATION QUESTIONNAIRE FOR DESIGN GUIDE

Dear Respondents:

I would welcome your views, comments, suggestions and evaluation on the prototype design guide for k to 12-based learning materials for Open High School Program. Please be honest in your views and base your answers on your personal observations in the design guide. You may or may not indicate your name in the respondent's profile for the confidentiality of your identity.

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO

Researcher

PART A: Respondent's Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B

I. Assessment of Design Guide

Direction: Please go over the design guide and assess them in terms of the format, style, and presentation; content, organization, and clarity of information; and language. Rate the module based on the given scale and check the box of your choice.

- 5 Strongly Agree–This means the learning material meets the criteria outstandingly.
- 4 Agree – This means the learning material meets the criteria very satisfactory.
- 3 Undecided – This means the learning material meets the criteria fairly
- 2 Disagree – This means the learning material partly meets the criteria.
- 1 Strongly Disagree – This means the learning material do not meets the criteria

Example:

Criteria	5	4	3	2	1
1. The layout is attractive and proportional	✓				
2. Over-all format and design is user friendly			✓		

A. Format, Style, and Presentation

Criteria	5	4	3	2	1
1. Texts are clear to be read and understood					
2. The layout is attractive, presentable, and proportional					
3. The font style, font size, and color schemes are formal and appropriate					
4. Contextual terms are defined at the beginning of the design guide					
5. The purpose of the design guide is well explained					

6. Over-all format and design is user friendly					
--	--	--	--	--	--

B. Content, Organization and Clarity of Information

Criteria	5	4	3	2	1
1. The guidelines in constructing the learning material in the design guide are well explained					
2. Illustrations or samples related to textual content in the design guide are given or provided to the readers					
3. The procedures and guidelines provided are well explained and illustrated					
4. The procedures and guidelines are clear and easy to follow					
5. The procedures and guidelines are logically and orderly arranged.					
6. The discussion of phases and parts of the learning materials in the design guide are detailed					
7. The guidelines in constructing the learning material in the design guide are well explained					
8. A sample template is provided or attached in the design guide					

C. Language

Criteria	5	4	3	2	1
1. The language used is clear and simple.					
2. The language is appropriate to the level of its target readers.					
3. The texts are free from grammatical errors.					

II. Recommendation

1. The design guide can be recommended to a friend or associate
 - I highly recommend the learning materials
 - I would use or recommend use of this with little or no change (please note suggestions for effective use below)
 - I would use or recommend these learning materials only if certain changes were made (please note changes under weaknesses and other comments)
 - I would not use or recommend these learning materials. (note reasons under weaknesses)

Strengths:

Weaknesses:

Other comments:

2. Have you noticed inaccuracies or editorial errors in the design guide? If so, please indicate what these are:

APPENDIX I
EVALUATION QUESTIONNAIRE FOR LEARNING MATERIALS

Dear Respondents:

I would welcome your views on the learning materials in Science. Please be honest in your views and base your answers on your personal observations of the modules. You may or may not indicate your name in the respondent's profile for confidentiality of your identity.

Rest assured that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO

Researcher

PART A

Respondent's Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B

I. Assessment of Learning Materials in Science

Direction: Please go over the learning materials in science and assess them in terms of the content based on the student needs and phases of the module, assessment, language, technical characteristics, and special features of the module. Rate the module based on the given scale and check the box of your choice.

- 5 Strongly Agree—This means the learning material meets the criteria outstandingly.
- 4 Agree – This means the learning material meets the criteria very satisfactory.
- 3 Undecided – This means the learning material meets the criteria fairly
- 2 Disagree – This means the learning material partly meets the criteria.
- 1 Strongly Disagree – This means the learning material do not meets the criteria

Example:

Criteria	5	4	3	2	1
1. Content is suitable to the student's level of development.	✓				
2. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.				✓	

A. Content

Criteria	5	4	3	2	1
1. Content is suitable to the student's level of development.					
2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.					
3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.					
4. Material provides for the development of higher cognitive skills such as critical thinking,					

creativity, learning by doing, inquiry, problem solving, etc.					
5. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.					
6. Material has the potential to stimulate interest of target reader.					
7. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of concern.					
8. Content is relevant to real-life situations.					
9. Material enhances the development of desirable values and traits such as: (Put a check mark only to the applicable values and traits)					
☐ 9.1 Pride in being a Filipino ☐ 9.2 Scientific attitude and reasoning ☐ 9.3 Desire for Excellence ☐ 9.4 Love for country ☐ 9.5 Helpfulness/ teamwork/ cooperation ☐ 9.6 Unity ☐ 9.7 Desire to learn new things	☐ 9.8 Honesty and trustworthiness ☐ 9.9 Ability to know right or wrong ☐ 9.10 Respect ☐ 9.11 Critical and Creative Thinking ☐ 9.12 Productive work ☐ 9.13 Other: (please Specify) _____				

B. Instructional Quality

Criteria	5	4	3	2	1
1. Purpose of the material is well defined.					
2. Material achieves its defined purpose.					
3. Learning objectives are clearly stated and measurable.					
4. Level of difficulty is appropriate for the intended target user.					
5. Graphics / colors / sounds are used for appropriate instructional purposes					
6. Material is enjoyable, stimulating, challenging, and engaging.					
7. Material effectively stimulates creativity of target user.					
8. Feedback on target user's responses is effectively employed.					
9. The lessons are anchored in the theoretical bases of the curriculum					
10. Instruction is integrated within target user's previous experience.					

C. Format

Criteria	5	4	3	2	1
1. Prints					
1.1 Size of letters is appropriate to the intended user.					
1.2 Spaces between letters and words facilitate reading.					
1.3 Font is easy to read.					
1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration).					
2. Illustrations					
2.1 Simple and easily recognizable.					
2.2 Clarify and supplement the text.					
2.3 Properly labelled or captioned (if applicable).					
2.4 Realistic / appropriate colors.					
2.5 Attractive and appealing.					
2.6 Culturally relevant.					
3. Design and Layout					
3.1 Attractive and pleasing to look at.					
3.2 Simple (i.e., does not distract the attention of the reader).					
3.3 Adequate illustration in relation to text.					
3.4 Harmonious blending of elements (i.e., illustrations and text).					
4. Paper and Binding					
4.1 Paper used contributes to easy reading.					
4.2 Durable binding to withstand frequent use.					
5. Size and Weight of Resource					
5.1 Easy to handle.					
5.2 Relatively light.					

D. Presentation

Criteria	5	4	3	2	1
1. Presentation is engaging, interesting, and understandable.					
2. There is logical and smooth flow of ideas.					
3. Vocabulary level is adapted to target reader's likely experience and level of understanding.					
4. Length of sentences is suited to the comprehension level of the target reader.					
5. Sentences and paragraph are varied and interesting to the target reader.					

E. Accuracy and Up-to-datedness of Information

Criteria	5	4	3	2	1
1. The Learning material is free from conceptual errors					
2. All facts stated are correct					
3. The grammar is free from error					
4. The information given are up to date and not obsolete					
5. The learning material is free from typographical and other minor errors (i.e., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).					

F. Technical Quality (For electronic copy only)

Criteria	5	4	3	2	1
1. Audio enhances understanding of the concept.					
2. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.					
3. There is complete synchronization of audio with the visuals, if any.					
4. Music and sound effects are appropriate and effective for instructional purposes.					
5. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.					
6. Visual presentations (non-text) are clear and easy to interpret.					
7. Visuals sustain interest and do not distract user's attention.					
8. Visuals provide accurate representation of the concept discussed.					
9. The user support materials (if any) are effective.					
10. The design allows the target user to navigate freely through the material.					
11. The material can easily and independently be used.					
12. The material will run using minimum system requirements.					
13. The program is free from technical problems.					

PART C: Recommendation

- ☐ I / We recommend the approval of this material for possible use in public schools provided that the corrections / revisions included in this report are made. (For commercial resources (non-DepEd owned resources) the Publisher must implement all recommended corrections / revisions in their next printing or provide errata.)
- ☐ ☐ I / We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.)

(Please sign below and at the back of each page.)

I/We certify that this evaluation report and recommendation are my/our own and have been made without any undue influence from others.

Evaluator(s): _____ Signature(s): _____

Date: _____

APPENDIX J
PERCEPTION SURVEY

Dear Respondents:

I would welcome your views on the learning materials in Science. Please be honest in your views and base your answers on your personal observations in the modules. You may or may not indicate your name in the respondent's profile for the confidentiality of your identity. Your participation in this survey is completely voluntary. You may stop at any time during the survey. All information on this survey is anonymous. Participation is not associated with your grade and your teacher will not know who completes the survey.

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO

Researcher

PART A: Respondent's Profile

- a. Name (optional): _____
- b. School: _____
- c. Grade and Section: _____
- d. Gender: _____
- e. Age: _____
- f. Level:
 - ☐ Junior High School
 - ☐ Senior High School

g. Curricular Program:

- ☐ Abot-Alam Program
- ☐ Alternative Learning System
- ☐ Open High School Program
- ☐ Regular Curriculum
- ☐ Science, Technology, and Engineering
- ☐ Special Program for the Arts
- ☐ Others, please specify: _____

PART B: Perception Survey

Direction: Please try out the learning materials provided. After answering or using the learning materials, please take time to answer the following questions about your feeling or perception on the use of these learning materials. Indicate your level of agreement or disagreement with each statement by selecting the option that best describes your feelings. Please use the response code given below.

5 – Strongly Agree
4 – Agree

3 – Undecided
2 – Disagree

1 – Strongly disagree

Example:

Criteria	5	4	3	2	1
1. I can easily read and understand the content of the module	✓				
2. The module is suited to my age and grade level				✓	

STUDENT'S PERCEPTION

Criteria	5	4	3	2	1
1. I can easily read and understand the content of the module					
2. The module is suited to my age and grade level					
3. I am able to complete the task on time					
4. I found the module very interesting					
5. The instructions are clear and easy to follow					

6. I can finish the learning module within the allotted time.					
7. The module is presentable and attractive					
8. If given a choice, I prefer to use learning materials like these.					
9. I can manipulate and answer the learning material even without the help of my teacher.					
10. I think, learning materials like these make students learn more.					
11. I found the learning materials convenient					
12. I found the pictures helpful in understanding the lessons					
13. The activities in the learning material are suited to my needs					
14. I can relate the lesson to real-life situations					
15. I found the activities fun and interesting					
16. The learning material makes me reflect and connect my understanding to the things around me.					
17. I can freely choose what type of activity I will do depending on my talent					
18. I think there should be no changes could be made in the instructional episodes of the learning material.					

If you answered 2 (disagree) or 1 (strongly disagree) in statement number 17 above, please provide some suggested changes in the space below:

APPENDIX K
VALIDATION CHECKLIST (for LM Evaluation Questionnaire)

Dear Evaluator:

This checklist is intended for use by expert evaluators to determine the extent of standardization and validity of the “*Evaluation Questionnaire for Learning Materials*” instrument. It aims to help in the development of a valid and reliable evaluation instrument for the development and validation of a K to 12-based learning materials for Open High School Program (OHSP).

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO
Researcher

PART A: Respondent’s Profile

- g. Name (optional): _____
- h. Present position: _____
- i. No of years in the position: _____
- j. Highest educational attainment: _____
- k. Subject specialization: _____
- l. Working Institution: _____

PART B: Research Instrument Validation

Direction: Please go over the research instrument and use the questions below to determine the extent of its standardization and validity. Rate the instrument based on the given scale below and tick the cell of your choice. Thank you very much.

- | | | |
|---|---|-------------------|
| 5 | - | Strongly Agree |
| 4 | - | Agree |
| 3 | - | Undecided |
| 2 | - | Disagree |
| 1 | - | Strongly Disagree |

Criteria	5	4	3	2	1
1. Language used is simple and easy to understand.					
2. Statements are simple and direct to the point.					
3. In general, unnecessary difficult vocabulary is avoided.					
4. All statements are free from grammatical, spelling, punctuation, and typographical errors.					
5. All statements are free from biases (gender, ethnicity, class, cultural, etc.)					
6. Lay-out and format of the items are clear and in a consistent manner.					
7. The evaluation tool is easy to administer.					
8. Directions are clear and easy to understand by the intended users.					
9. Readability of the text is appropriate for the intended users.					
10. Time allotment for the instrument to be completed by a respondent is within the 10-min standard.					
11. There are enough statements about the physical and technical aspects of the learning materials (readability, format, style, layout, color, etc.)					
12. There are given statements that ensures the alignment of the learning materials to the principles, competencies, theories, and goals of the K to 12 Curriculum.					
13. There are enough given statements necessary to measure the validity of the instructional quality of the learning materials.					
14. Most statements are aimed at producing good quality of k to 12 based learning materials for OHSP					

General Comments:

- Are there statements or parts of the instrument needed to be revised or improved to assure that it will truly produce good quality of learning materials?
- Are there items that need to be included in the evaluation tool?
- What are the strengths and weaknesses of the evaluation tool?

APPENDIX L
VALIDATION CHECKLIST (for DG Evaluation Questionnaire)

Dear Evaluator:

This checklist is intended for use by expert evaluators to determine the extent of standardization and validity of the “*Evaluation Questionnaire for Design Guide*” instrument. It aims to help in the development of a valid, reliable, and standardized evaluation instrument for the development and validation of a design guide for constructing K to 12-based learning materials for Open High School Program (OHSP).

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO
Researcher

PART A: Respondent’s Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B: Research Instrument Validation

Direction: Please go over the research instrument and use the questions below to determine the extent of its standardization and validity. Rate the instrument based on the given scale below and tick the cell of your choice. Thank you very much.

- | | | |
|---|---|-------------------|
| 5 | - | Strongly Agree |
| 4 | - | Agree |
| 3 | - | Undecided |
| 2 | - | Disagree |
| 1 | - | Strongly Disagree |

Criteria	5	4	3	2	1
1. Language used is simple and easy to understand.					
2. Statements are simple and direct to the point.					
3. In general, unnecessary difficult vocabulary is avoided.					
4. All statements are free from grammatical, spelling, punctuation, and typographical errors.					
5. All statements are free from biases (gender, ethnicity, class, cultural, etc.)					
6. Lay-out and format of the items are clear and in a consistent manner.					
7. The evaluation tool is easy to administer.					
8. Directions are clear and easy to understand by the intended users.					
9. Readability of the text is appropriate for the intended users.					
10. Time allotment for the instrument to be completed by a respondent is within the 10-min standard.					
11. There are enough statements about the technical aspects of the design guide (readability, format, style, color, etc.)					
12. There given statements are necessary to measure the validity of the design guide in terms of content and clarity the information it contains.					
13. The survey includes statements on the physical lay-out of the design guide.					
14. Most statements are aimed at producing a good quality of Design guide for a k to 12 based learning materials for OHSP					

General Comments:

- Are there statements or parts of the instrument needed to be revised or improved to assure that it will truly produce a good quality of design guide?
- Are there items that need to be included in the evaluation tool?
- What are the strengths and weaknesses of the evaluation tool?

APPENDIX M
VALIDATION CHECKLIST (for Interview Guide)

Dear Evaluator:

This checklist is intended for use by expert evaluators to determine the extent of standardization and validity of the “***Interview Guide***” instrument. It aims to help in the development of a valid, reliable, and standardized evaluation instrument for the development and validation of a design guide for constructing K to 12-based learning materials for Open High School Program (OHSP).

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO
Researcher

PART A: Respondent’s Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B: Research Instrument Validation

Direction: Please go over the research instrument and use the questions below to determine the extent of its standardization and validity. Rate the instrument based on the given scale below and tick the cell of your choice. Thank you very much.

- | | | |
|---|---|-------------------|
| 5 | - | Strongly Agree |
| 4 | - | Agree |
| 3 | - | Undecided |
| 2 | - | Disagree |
| 1 | - | Strongly Disagree |

Criteria	5	4	3	2	1
1. Language used is simple and easy to understand.					
2. Statements are simple and direct to the point.					
3. In general, unnecessary difficult vocabulary is avoided.					
4. All statements are free from grammatical, spelling, punctuation, and typographical errors.					
5. All statements are free from biases (gender, ethnicity, class, cultural, etc.)					
6. Lay-out and format of the items are clear and in a consistent manner.					
7. The evaluation tool is easy to administer.					
8. Directions are clear and easy to understand by the intended users.					
9. Readability of the text is appropriate for the intended users.					
10. Time allotment for the instrument to be completed by a respondent is within the 10-min standard.					
11. The questions are enough to extract respondents' ideas on what to consider in the physical and technical aspect in developing a design guide/ learning materials.					
12. The questions are enough to extract respondents' ideas on what to consider in the content and instructional aspect in developing a design guide/ learning materials.					
13. The questions are enough to extract respondents' ideas on what to consider in the learning materials' aspect of measuring students' learning outcomes.					
14. Most statements/questions are aimed at producing a good quality of Design guide/ K to 12 based learning materials for OHSP					

General Comments:

- Are there statements or parts of the instrument needed to be revised or improved to assure that it will truly produce a good quality of design guide/ learning materials?
- Are there items that need to be included in the evaluation tool?
- What are the strengths and weaknesses of the evaluation tool?

APPENDIX N
VALIDATION CHECKLIST (for Perception Survey)

Dear Evaluator:

This checklist is intended for use by expert evaluators to determine the extent of standardization and validity of the “*Students’ Perception Survey*” instrument. It aims to help in the development of a valid, reliable, and standardized evaluation in determining the views, feelings, or perception of the Open High School Program (OHSP) students after they use developed and validated K to 12-based learning materials intended to them and the program they are enrolled at.

Rest assure that your responses in this instrument will be kept confidential. Thank you for taking time to complete this questionnaire.

Respectfully Yours,

LOUIE-ZEL M. PEDRO
Researcher

PART A: Respondent’s Profile

- a. Name (optional): _____
- b. Present position: _____
- c. No of years in the position: _____
- d. Highest educational attainment: _____
- e. Subject specialization: _____
- f. Working Institution: _____

PART B: Research Instrument Validation

Direction: Please go over the research instrument and use the questions below to determine the extent of its standardization and validity. Rate the instrument based on the given scale below and tick the cell of your choice. Thank you very much.

- | | | |
|---|---|-------------------|
| 5 | - | Strongly Agree |
| 4 | - | Agree |
| 3 | - | Undecided |
| 2 | - | Disagree |
| 1 | - | Strongly Disagree |

Criteria	5	4	3	2	1
1. Language used is simple and easy to understand.					
2. Statements are simple and direct to the point.					
3. In general, unnecessary difficult vocabulary is avoided.					
4. All statements are free from grammatical, spelling, punctuation, and typographical errors.					
5. All statements are free from biases (gender, ethnicity, class, cultural, etc.)					
6. Lay-out and format of the items are clear and in a consistent manner.					
7. The evaluation tool is easy to administer.					
8. Directions are clear and easy to understand by the intended users.					
9. Readability of the text is appropriate for the intended users.					
10. Time allotment for the instrument to be completed by a respondent is within the 10-min standard.					
11. There are statements about the perception of the students on the use of the given learning materials.					
12. There are several statements on the belief of the student regarding the content and delivery of the lesson.					
13. There are statements on the doability or workability of the learning materials.					
14. The survey includes statements on the pedagogical constructs such as assessment, skill development, and content.					
15. Most statements are aimed at determining students' perception or views on the use of the developed k to 12 learning materials for OHSP					

General Comments:

- Are there statements or parts of the instrument needed to be revised or improved to assure that it will truly measure the perception or views of the students on the use of the developed learning materials?
- Are there items that need to be included in the evaluation tool?
- What are the strengths and weaknesses of the evaluation tool?

APPENDIX O
PROFILE OF THE CURRICULUM EXPERTS WHO VALIDATED THE DESIGN
GUIDE AND LEARNING MATERIALS FOR OHSP.

Expert	Gender	Degree/ Specialization	Position/ Designation	No. of Years in the Position
Expert 1	Male	BS Physics for Teachers	Principal I, OIC Education Program Supervisor in Science Education Program Supervisor in Learning Resource Management Development System (LRMDS)	2
Expert 2	Female	M.A. Educational Management	Senior Education Program Specialist in Alternative Delivery Mode (ADM)	2
Expert 3	Female	M.A. Educational Management	Senior Education Program Specialist, Division Research and ICT Coordinator	4
Expert 4	Male	Doctor of Education with specialization in Industrial Education	Principal IV	4
Expert 5	Male	M.A. Educational Management	Principal II	5
Expert 6	Female	Doctor of Education with specialization in Educational Management	Head Teacher IV, Science Department	2
Expert 7	Female	M.A. Educational Management	Head Teacher III, Science and Mathematics Department	1
Expert 8	Female	M.A. Educational Management	Master Teacher II	5
Expert 9	Female	M.A. Science Education	Master Teacher I	3
Expert 10	Female	M.A.T. Science	Master Teacher I	2
Expert 11	Female	M.A. Educational Management	Master Teacher I	3
Expert 12	Female	M.A. Educational Management	Master Teacher I	2
Expert 13	Female	M.A. Educational Management	Master Teacher I	2
Expert 14	Female	M.A. Educational Management	Master Teacher I	1
Expert 15	Male	B.S. Information Technology	Teacher III, ICT Coordinator	9
Expert 16	Female	BSEd Technology and Livelihood Education	Teacher II, ICT Coordinator	7
Expert 17	Female	BSEd Mathematics	Teacher III, School OHSP	5

Expert 18	Female	BSEd English	Coordinator Teacher III, School OHSP Coordinator	7
Expert 19	Female	BSEd Technology and Livelihood Education	Teacher III, School ALS Coordinator	15
Expert 20	Female	BSEd Biology	Teacher III	8
Expert 21	Female	BSEd Biology	Teacher III	5
Expert 22	Female	BSEd Chemistry	Teacher III	13
Expert 23	Female	BSEd Chemistry	Teacher III	9
Expert 24	Female	BSEd Chemistry	Teacher III	7
Expert 25	Female	BSEd General Science	Teacher III	8
Expert 26	Male	BSEd Physics	Teacher III	1
Expert 27	Male	BSEd Physics	Teacher III	1
Expert 28	Female	BSEd Chemistry	Teacher II	1
Expert 29	Female	BSEd Physics	Teacher II	1
Expert 30	Male	BSEd Physics	Teacher II	5
Expert 31	Female	BSEd Biology	Teacher I	6
Expert 32	Female	BSEd Biology	Teacher I	6
Expert 33	Female	BSEd Biology	Teacher I	5
Expert 34	Female	BSEd Biology	Teacher I	5
Expert 35	Female	BSEd Chemistry	Teacher I	5
Expert 36	Female	BSEd Chemistry	Teacher I	5
Expert 37	Female	BSEd General Science	Teacher I	13
Expert 38	Female	BSEd General Science	Teacher I	8
Expert 39	Female	BSEd General Science	Teacher I	7
Expert 40	Female	BSEd General Science	Teacher I	7
Expert 41	Female	BSEd General Science	Teacher I	6
Expert 42	Male	BSEd General Science	Teacher I	5
Expert 43	Female	BSEd Physics	Teacher I	12
Expert 44	Female	BSEd Physics	Teacher I	6
Expert 45	Female	BSEd Physics	Teacher I	8
Expert 46	Female	BSEd Physics	Teacher I	5

APPENDIX P
THE DEVELOPED AND VALIDATED DESIGN GUIDE

Please contact the researcher for the full copy of the design guide.

LOUIE-ZEL M. PEDRO
Louiezel.pedro001@deped.gov.ph

APPENDIX Q
SAMPLE DEVELOPED AND VALIDATED PRINTED OHSP MODULE

APPENDIX R
SAMPLE SLIDE DECK OF THE DEVELOPED AND VALIDATED ELECTRONIC
MODULE

APPENDIX S
CURRICULUM EXPERTS' EVALUATION ON THE DESIGN GUIDE FOR
LEARNING MATERIALS OF OHSP

Aspect of the Design Guide	Items	Mean	Standard Deviation	Interpretation
1. Format, Style, and Presentation	1. Texts are clear to be read and understood	5.00	0.00	Highly Acceptable
	2. The layout is attractive, presentable, and proportional	4.96	0.20	Highly Acceptable
	3. The font style, font size, and color schemes are formal and appropriate	4.93	0.25	Highly Acceptable
	4. Contextual terms are defined at the beginning of the design guide	4.96	0.20	Highly Acceptable
	5. The purpose of the design guide is well explained	4.93	0.25	Highly Acceptable
	6. Over-all format and design is user friendly	5.00	0.00	Highly Acceptable
	Overall	4.96	0.15	Highly Acceptable
2. Content, Organization, and Clarity of Information	9. The guidelines in constructing the learning material in the design guide are well explained	4.98	0.15	Highly Acceptable
	10. Illustrations or samples related to textual content in the design guide are given or provided to the readers	4.87	0.34	Highly Acceptable
	11. The procedures and guidelines provided are well explained and illustrated	5.00	0.00	Highly Acceptable
	12. The procedures and guidelines are clear and easy to follow	4.93	0.25	Highly Acceptable
	13. The procedures and guidelines are logically and orderly arranged.	4.96	0.20	Highly Acceptable
	14. The discussion of phases and parts of the learning materials in the design guide are detailed	4.93	0.25	Highly Acceptable
	15. The guidelines in constructing the learning material in the design guide are well explained	4.96	0.20	Highly Acceptable
	16. A sample template is provided or attached in the design guide	4.98	0.15	Highly Acceptable
	Overall	4.95	0.19	Highly Acceptable
3. Language	1. The language used is clear and simple.	5.00	0.00	Highly Acceptable
	2. The language is appropriate to the level of its target readers.	4.98	0.15	Highly Acceptable
	3. The texts are free from grammatical errors.	4.96	0.20	Highly Acceptable
	Overall	4.98	0.12	Highly Acceptable
Overall Response of the Experts in the Design Guide	1. Format, Style, and Presentation	4.96	0.15	Highly Acceptable
	2. Content, Organization, and Clarity of Information	4.95	0.19	Highly Acceptable
	3. Language	4.98	0.12	Highly Acceptable
	Overall Average Rating	4.96	0.15	Highly Acceptable

APPENDIX T
INTER-RATER AGREEMENT OF THE 46 EXPERTS AND THE AIKEN'S CONTENT
VALIDITY INDEX VALUE PER QUESTIONNAIRE ITEM

Aspect of the Design Guide	Items	% of Agreement		Aiken's Content Validity Index
		Rating of 5 (Strongly Agree)	Rating of 4 (Agree)	
1. Format, Style, and Presentation	1. Texts are clear to be read and understood	100	0	1.000
	2. The layout is attractive, presentable, and proportional	96	4	0.989
	3. The font style, font size, and color schemes are formal and appropriate	93	7	0.984
	4. Contextual terms are defined at the beginning of the design guide	96	4	0.989
	5. The purpose of the design guide is well explained	93	7	0.984
	6. Over-all format and design is user friendly	100	0	1.000
	Average	96	4	0.991
2. Content, Organization, and Clarity of Information	1. The guidelines in constructing the learning material in the design guide are well explained	98	2	0.995
	2. Illustrations or samples related to textual content in the design guide are given or provided to the readers	87	13	0.967
	3. The procedures and guidelines provided are well explained and illustrated	100	0	1.000
	4. The procedures and guidelines are clear and easy to follow	93	7	0.984
	5. The procedures and guidelines are logically and orderly arranged.	96	4	0.989
	6. The discussion of phases and parts of the learning materials in the design guide are detailed	93	7	0.984
	7. The guidelines in constructing the learning material in the design guide are well explained	96	4	0.989
	8. A sample template is provided or attached in the design guide	98	2	0.995
	Average	95	5	0.988
3. Language	1. The language used is clear and simple.	100	0	1.000
	2. The language is appropriate to the level of its target readers.	98	2	0.995
	3. The texts are free from grammatical errors.	96	4	0.989

Average		98	2	0.995
Overall	Format, Style, and Presentation	96	4	0.991
	Content, Organization, and Clarity of Information	95	5	0.988
	Language	98	2	0.995
	Average	96	4	0.991

APPENDIX U
CURRICULUM EXPERTS' EVALUATION ON THE PRINTED LEARNING
MATERIAL

Aspect of the Learning Material	Items	Mean	Standard Deviation	Interpretation
CONTENT	1. Content is suitable to the student's level of development.	5.00	0.00	Highly Acceptable
	2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	5.00	0.00	Highly Acceptable
	3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.	5.00	0.00	Highly Acceptable
	4. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	4.96	0.21	Highly Acceptable
	5. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.	4.87	0.34	Highly Acceptable
	6. Material has the potential to stimulate interest of target reader.	4.85	0.42	Highly Acceptable
	7. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of concern.	4.98	0.15	Highly Acceptable
	8. Content is relevant to real-life situations.	4.98	0.15	Highly Acceptable
	Overall	4.96	0.16	Highly Acceptable
INSTRUCTIONAL QUALITY	1. Purpose of the material is well defined.	5.00	0.00	Highly Acceptable
	2. Material achieves its defined purpose.	4.98	0.15	Highly Acceptable
	3. Learning objectives are clearly stated and measurable.	5.00	0.00	Highly Acceptable
	4. Level of difficulty is appropriate for the intended target user.	4.85	0.36	Highly Acceptable
	5. Graphics / colors / sounds are used for appropriate instructional purposes	4.65	0.48	Highly Acceptable

	6. Material is enjoyable, stimulating, challenging, and engaging.	4.87	0.34	Highly Acceptable
	7. Material effectively stimulates creativity of target user.	4.89	0.31	Highly Acceptable
	8. Feedback on target user's responses is effectively employed.	5.00	0.00	Highly Acceptable
	9. The lessons are anchored in the theoretical bases of the curriculum	5.00	0.00	Highly Acceptable
	10. Instruction is integrated within target user's previous experience.	4.98	0.15	Highly Acceptable
	Overall	4.92	0.18	Highly Acceptable
FORMAT ASPECT	1. Prints			
	1.1 Size of letters is appropriate to the intended user.	5.00	0.00	Highly Acceptable
	1.2 Spaces between letters and words facilitate reading.	4.98	0.15	Highly Acceptable
	1.3 Font is easy to read.	5.00	0.00	Highly Acceptable
	1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration).	4.96	0.20	Highly Acceptable
	Overall	4.99	0.09	Highly Acceptable
	2. Illustrations			
	2.1 Simple and easily recognizable.	4.87	0.34	Highly Acceptable
	2.2 Clarify and supplement the text.	5.00	0.00	Highly Acceptable
	2.3 Properly labelled or captioned (if applicable).	5.00	0.00	Highly Acceptable
	2.4 Realistic / appropriate colors.	4.83	0.38	Highly Acceptable
	2.5 Attractive and appealing.	4.89	0.31	Highly Acceptable
	2.6 Culturally relevant.	4.91	0.35	Highly Acceptable
	Overall	4.92	0.23	Highly Acceptable
	3. Design and Layout			
	3.1 Attractive and pleasing to look at.	4.96	0.20	Highly Acceptable
	3.2 Simple (i.e., does not distract the attention of the reader).	5.00	0.00	Highly Acceptable
	3.3 Adequate illustration in relation to text.	4.87	0.34	Highly Acceptable
	3.4 Harmonious blending of elements (i.e., illustrations and text).	4.76	0.43	Highly Acceptable
	Overall	4.90	0.24	Highly Acceptable
	4. Paper and Binding			
	4.1 Paper used contributes to easy	5.00	0.00	Highly Acceptable

	reading.			
	4.2 Durable binding to withstand frequent use.	4.54	0.62	Highly Acceptable
	Overall	4.77	0.31	Highly Acceptable
	5. Size and Weight of Resource			
	5.1 Easy to handle.	5.00	0.00	Highly Acceptable
	5.2 Relatively light.	5.00	0.00	Highly Acceptable
	Overall	5.00	0.00	Highly Acceptable
	Overall rating for Format Aspect	4.92	0.18	Highly Acceptable
PRESENTATION ASPECT	1. Presentation is engaging, interesting, and understandable.	4.85	0.42	Highly Acceptable
	2. There is logical and smooth flow of ideas.	4.96	0.20	Highly Acceptable
	3. Vocabulary level is adapted to target reader's likely experience and level of understanding.	4.93	0.25	Highly Acceptable
	4. Length of sentences is suited to the comprehension level of the target reader.	4.91	0.28	Highly Acceptable
	5. Sentences and paragraph are varied and interesting to the target reader.	4.78	0.59	Highly Acceptable
	Overall	4.89	0.35	Highly Acceptable
ACCURACY AND UP-TO-DATEDNESS OF INFORMATION	1. The Learning material is free from conceptual errors	4.96	0.20	Highly Acceptable
	2. All facts stated are correct	4.98	0.15	Highly Acceptable
	3. The grammar is free from error	4.80	0.54	Highly Acceptable
	4. The information given are up to date and not obsolete	5.00	0.00	Highly Acceptable
	5. The learning material is free from typographical and other minor errors (i.e., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).	4.74	0.64	Highly Acceptable
	Overall	4.90	0.31	Highly Acceptable

APPENDIX V
CURRICULUM EXPERTS' EVALUATION ON THE ELECTRONIC LEARNING
MATERIAL

Aspect of the Learning Material	Items	Mean	Standard Deviation	Interpretation
CONTENT	1. Content is suitable to the student's level of development.	4.80	0.54	Highly Acceptable
	2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	5.00	0.00	Highly Acceptable
	3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.	4.85	0.46	Highly Acceptable
	4. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	4.91	0.35	Highly Acceptable
	5. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.	4.98	0.15	Highly Acceptable
	6. Material has the potential to stimulate interest of target reader.	5.00	0.00	Highly Acceptable
	7. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of concern.	4.91	0.28	Highly Acceptable
	8. Content is relevant to real-life situations.	5.00	0.00	Highly Acceptable
	Overall	4.93	0.22	Highly Acceptable
INSTRUCTIONAL QUALITY	1. Purpose of the material is well defined.	4.98	0.15	Highly Acceptable
	2. Material achieves its defined purpose.	4.93	0.32	Highly Acceptable
	3. Learning objectives are clearly stated and measurable.	4.91	0.35	Highly Acceptable
	4. Level of difficulty is appropriate for the intended target user.	4.80	0.54	Highly Acceptable
	5. Graphics / colors / sounds are used for appropriate instructional purposes	5.00	0.00	Highly Acceptable
	6. Material is enjoyable, stimulating, challenging, and engaging.	5.00	0.00	Highly Acceptable

	7. Material effectively stimulates creativity of target user.	4.98	0.15	Highly Acceptable
	8. Feedback on target user's responses is effectively employed.	4.98	0.15	Highly Acceptable
	9. The lessons are anchored in the theoretical bases of the curriculum	5.00	0.00	Highly Acceptable
	10. Instruction is integrated within target user's previous experience.	4.89	0.43	Highly Acceptable
	Overall	4.95	0.21	Highly Acceptable
FORMAT ASPECT	1. Prints			
	1.1 Size of letters is appropriate to the intended user.	4.93	0.25	Highly Acceptable
	1.2 Spaces between letters and words facilitate reading.	4.98	0.15	Highly Acceptable
	1.3 Font is easy to read.	4.96	0.20	Highly Acceptable
	1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration).	4.96	0.20	Highly Acceptable
	Overall	4.96	0.20	Highly Acceptable
	2. Illustrations			
	2.1 Simple and easily recognizable.	4.98	0.15	Highly Acceptable
	2.2 Clarify and supplement the text.	4.83	0.48	Highly Acceptable
	2.3 Properly labelled or captioned (if applicable).	4.74	0.49	Highly Acceptable
	2.4 Realistic / appropriate colors.	4.70	0.46	Highly Acceptable
	2.5 Attractive and appealing.	5.00	0.00	Highly Acceptable
	2.6 Culturally relevant.	5.00	0.00	Highly Acceptable
	Overall	4.88	0.26	Highly Acceptable
	3. Design and Layout			
	3.1 Attractive and pleasing to look at.	4.93	0.32	Highly Acceptable
	3.2 Simple (i.e., does not distract the attention of the reader).	4.85	0.42	Highly Acceptable
	3.3 Adequate illustration in relation to text.	4.87	0.49	Highly Acceptable
	3.4 Harmonious blending of elements (i.e., illustrations and text).	4.83	0.48	Highly Acceptable
	Overall	4.87	0.43	Highly Acceptable
	4. Size and Weight of Resource			
	5.1 Easy to handle.	5.00	0.00	Highly Acceptable
	5.2 Relatively light.	5.00	0.00	Highly Acceptable
	Overall	5.00	0.00	Highly Acceptable
	Overall rating for Format Aspect	4.93	0.22	Highly Acceptable
PRESENTATION ASPECT	1. Presentation is engaging, interesting, and understandable.	5.00	0.00	Highly Acceptable
	2. There is logical and smooth flow of ideas.	4.93	0.32	Highly Acceptable

	3.	Vocabulary level is adapted to target reader's likely experience and level of understanding.	4.85	0.42	Highly Acceptable
	4.	Length of sentences is suited to the comprehension level of the target reader.	4.98	0.15	Highly Acceptable
	5.	Sentences and paragraph are varied and interesting to the target reader.	4.91	0.35	Highly Acceptable
		Overall	4.93	0.25	Highly Acceptable
ACCURACY AND UP-TO-DATEDNESS OF INFORMATION	1.	The Learning material is free from conceptual errors	4.74	0.74	Highly Acceptable
	2.	All facts stated are correct	4.83	0.56	Highly Acceptable
	3.	The grammar is free from error	4.80	0.54	Highly Acceptable
	4.	The information given are up to date and not obsolete	4.76	0.70	Highly Acceptable
	5.	The learning material is free from typographical and other minor errors (i.e., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).	4.78	0.46	Highly Acceptable
		Overall	4.78	0.60	Highly Acceptable
TECHNICAL QUALITY	1.	Audio enhances understanding of the concept.	4.93	0.25	Highly Acceptable
	2.	Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	4.91	0.28	Highly Acceptable
	3.	There is complete synchronization of audio with the visuals, if any.	4.98	0.15	Highly Acceptable
	4.	Music and sound effects are appropriate and effective for instructional purposes.	4.80	0.65	Highly Acceptable
	5.	Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	4.78	0.59	Highly Acceptable
	6.	Visual presentations (non-text) are clear and easy to interpret.	4.85	0.46	Highly Acceptable
	7.	Visuals sustain interest and do not distract user's attention.	4.83	0.52	Highly Acceptable
	8.	Visuals provide accurate representation of the concept discussed.	4.93	0.32	Highly Acceptable
	9.	The user support materials (if any) are effective.	4.93	0.25	Highly Acceptable
	10.	The design allows the target user to navigate freely through the	5.00	0.00	Highly Acceptable

material.			
11. The material can easily and independently be used.	5.00	0.00	Highly Acceptable
12. The material will run using minimum system requirements.	4.78	0.55	Highly Acceptable
13. The program is free from technical problems.	4.67	0.66	Highly Acceptable
Overall	4.88	0.36	Highly Acceptable

APPENDIX W
INTER-RATER AGREEMENT AND AIKEN'S CONTENT VALIDITY INDEX OF THE
EVALUATION ON THE PRINTED LEARNING MATERIAL

Aspect of the Learning Material	Items	% of Agreement			Aiken's Content Validity Index
		Rating of 5 (Strongly Agree)	Rating of 4 (Agree)	Rating of 3 (Undecided)	
CONTENT	1. Content is suitable to the student's level of development.	100	0	0	1.000
	2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	100	0	0	1.000
	3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.	100	0	0	1.000
	4. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	96	4	0	0.989
	5. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.	87	13	0	0.967
	6. Material has the potential to stimulate interest of target reader.	87	11	2	0.962
	7. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of	98	2	0	0.995

	concern.				
	8. Content is relevant to real-life situations.	98	2	0	0.995
	Overall	96	4	0	0.988
INSTRUCTIONAL QUALITY	1. Purpose of the material is well defined.	100	0	0	1.000
	2. Material achieves its defined purpose.	98	2	0	0.995
	3. Learning objectives are clearly stated and measurable.	100	0	0	1.000
	4. Level of difficulty is appropriate for the intended target user.	85	15	0	0.962
	5. Graphics / colors / sounds are used for appropriate instructional purposes	65	35	0	0.913
	6. Material is enjoyable, stimulating, challenging, and engaging.	87	13	0	0.967
	7. Material effectively stimulates creativity of target user.	89	11	0	0.973
	8. Feedback on target user's responses is effectively employed.	100	0	0	1.000
	9. The lessons are anchored in the theoretical bases of the curriculum	100	0	0	1.000
	10. Instruction is integrated within target user's previous experience.	98	2	0	0.995
	Overall	92	8	0	0.980
FORMAT ASPECT	1. Prints				
	1.1 Size of letters is appropriate to the intended user.	100	0	0	1.000
	1.2 Spaces between letters and words facilitate reading.	98	2	0	0.995

	1.3 Font is easy to read.	100	0	0	1.000
	1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration).	96	4	0	0.989
	2. Illustrations				
	2.1 Simple and easily recognizable.	87	13	0	0.967
	2.2 Clarify and supplement the text.	100	0	0	1.000
	2.3 Properly labelled or captioned (if applicable).	100	0	0	1.000
	2.4 Realistic / appropriate colors.	83	17	0	0.957
	2.5 Attractive and appealing.	89	11	0	0.973
	2.6 Culturally relevant.	93	4	2	0.978
	3. Design and Layout				
	3.1 Attractive and pleasing to look at.	96	4	0	0.989
	3.2 Simple (i.e., does not distract the attention of the reader).	100	0	0	1.000
	3.3 Adequate illustration in relation to text.	87	13	0	0.967
	3.4 Harmonious blending of elements (i.e., illustrations and text).	76	24	0	0.940
	4. Paper and Binding				
	4.1 Paper used contributes to easy reading.	100	0	0	1.000
	4.2 Durable binding to withstand frequent use.	61	33	7	0.886
	5. Size and Weight of Resource				
	5.1 Easy to handle.	100	0	0	1.000
	5.2 Relatively light.	100	0	0	1.000
	Overall rating for Format Aspect	93	7	0	0.980
PRESENTATION ASPECT	6. Presentation is engaging, interesting, and understandable.	87	11	2	0.962
	7. There is logical and smooth flow of	96	4	0	0.989

	ideas.				
	8. Vocabulary level is adapted to target reader's likely experience and level of understanding.	93	7	0	0.984
	9. Length of sentences is suited to the comprehension level of the target reader.	91	9	0	0.978
	10. Sentences and paragraph are varied and interesting to the target reader.	87	4	9	0.946
	Overall	91	7	3	0.972
ACCURACY AND UP-TO-DATEDNESS OF INFORMATION	1. The Learning material is free from conceptual errors	96	4	0	0.989
	2. All facts stated are correct	98	2	0	0.995
	3. The grammar is free from error	87	7	7	0.951
	4. The information given are up to date and not obsolete	100	0	0	1.000
	5. The learning material is free from typographical and other minor errors (i.e., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).	85	4	11	0.935
	Overall	93	4	3	0.974

APPENDIX X
INTER-RATER AGREEMENT AND AIKEN'S CONTENT VALIDITY INDEX OF
THE EVALUATION ON THE ELECTRONIC LEARNING MATERIAL

Aspect of the Learning Material	Items	% of Agreement			Aiken's Content Validity Index
		Rating of 5 (Strongly Agree)	Rating of 4 (Agree)	Rating of 3 (Undecided)	
CONTENT	1. Content is suitable to the student's level of development.	87	7	7	0.951
	2. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	100	0	0	1.000
	3. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.	89	7	4	0.962
	4. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	93	4	2	0.978
	5. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.	98	2	0	0.995
	6. Material has the potential to	100	0	0	1.000

	stimulate interest of target reader.				
	7. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of concern.	91	9	0	0.978
	8. Content is relevant to real-life situations.	100	0	0	1.000
	Overall	95	4	1	0.983
INSTRUCTIONAL QUALITY	1. Purpose of the material is well defined.	98	2	0	0.995
	2. Material achieves its defined purpose.	96	2	2	0.984
	3. Learning objectives are clearly stated and measurable.	93	4	2	0.978
	4. Level of difficulty is appropriate for the intended target user.	87	7	7	0.951
	5. Graphics / colors / sounds are used for appropriate instructional purposes	100	0	0	1.000
	6. Material is enjoyable, stimulating, challenging, and engaging.	100	0	0	1.000
	7. Material effectively stimulates creativity of target user.	98	2	0	0.995
	8. Feedback on target user's responses is effectively employed.	98	2	0	0.995
	9. The lessons are anchored in the theoretical bases of the curriculum	100	0	0	1.000
	10. Instruction is integrated within target user's previous	93	2	4	0.973

	experience.				
	Overall	96	2	2	0.987
FORMAT ASPECT	1. Prints				
	1.1 Size of letters is appropriate to the intended user.	93	7	0	0.984
	1.2 Spaces between letters and words facilitate reading.	98	2	0	0.995
	1.3 Font is easy to read.	96	4	0	0.989
	1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration).	96	4	0	0.989
	2. Illustrations	0	0	0	
	2.1 Simple and easily recognizable.	98	2	0	0.995
	2.2 Clarify and supplement the text.	87	9	4	0.957
	2.3 Properly labelled or captioned (if applicable).	76	22	2	0.935
	2.4 Realistic / appropriate colors.	70	30	0	0.924
	2.5 Attractive and appealing.	100	0	0	1.000
	2.6 Culturally relevant.	100	0	0	1.000
	3. Design and Layout	0	0	0	
	3.1 Attractive and pleasing to look at.	96	2	2	0.984
	3.2 Simple (i.e., does not distract the attention of the reader).	87	11	2	0.962
	3.3 Adequate illustration in relation to text.	93	0	7	0.967
	3.4 Harmonious blending of elements (i.e., illustrations and text).	87	9	4	0.957
	4. Size and Weight of Resource				
	4.1 Easy to handle.	100	0	0	1.000
	4.2 Relatively light.	100	0	0	1.000

	Overall rating for Format Aspect	92	6	2	0.977
PRESENTATION ASPECT	1. Presentation is engaging, interesting, and understandable.	100	0	0	1.000
	2. There is logical and smooth flow of ideas.	96	2	2	0.984
	3. Vocabulary level is adapted to target reader's likely experience and level of understanding.	87	11	2	0.962
	4. Length of sentences is suited to the comprehension level of the target reader.	98	2	0	0.995
	5. Sentences and paragraph are varied and interesting to the target reader.	93	4	2	0.978
	Overall	95	4	1	0.984
ACCURACY AND UP-TO- DATEDNESS OF INFORMATION	1. The Learning material is free from conceptual errors	87	4	4	0.935
	2. All facts stated are correct	89	7	2	0.957
	3. The grammar is free from error	87	7	7	0.951
	4. The information given are up to date and not obsolete	89	0	9	0.940
	5. The learning material is free from typographical and other minor errors (i.e., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).	80	17	2	0.946

		Overall	87	8	5	0.946
TECHNICAL QUALITY	1.	Audio enhances understanding of the concept.	93	7	0	0.984
	2.	Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	91	9	0	0.978
	3.	There is complete synchronization of audio with the visuals, if any.	98	2	0	0.995
	4.	Music and sound effects are appropriate and effective for instructional purposes.	91	0	7	0.951
	5.	Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	85	11	2	0.946
	6.	Visual presentations (non-text) are clear and easy to interpret.	89	7	4	0.962
	7.	Visuals sustain interest and do not distract user's attention.	89	4	7	0.957
	8.	Visuals provide accurate representation of the concept discussed.	96	2	2	0.984
	9.	The user support materials (if any) are effective.	93	7	0	0.984
	10.	The design allows the target user to navigate freely through the material.	100	0	0	1.000
	11.	The material can easily and independently be	100	0	0	1.000

used.				
12. The material will run using minimum system requirements.	85	9	7	0.946
13. The program is free from technical problems.	76	17	4	0.918
Overall	91	6	3	0.969

LOUIE-ZEL MAÑALAC PEDRO

522-D T. Gomez St., Brgy. 16, Sta. Cruz, Cavite City
E-mail Address: louiezel.pedro001@deped.gov.ph
louiezelpedro@yahoo.com
louiezelpedro@gmail.com



EDUCATIONAL ATTAINMENT

Graduate: Philippine Normal University – Manila
Taft Avenue, Manila
Master of Arts in Science Education (Major in General Science)
Year Graduated: 2020

College: St. Joseph College-Cavite City
Plaridel st., San Roque, Cavite City
Bachelor in Secondary Education (Major in Physical Science)
Year graduated: 2011

Academic Distinction
Best in Teaching Demonstration
Service Awardee
Dean's Lister – first year to fourth year
Talangpaz Scholar
Commission on Higher Education Full-Merit Scholar (2007-2009)

Secondary: Sangley Point National High School
La Naval Road, Sangley Point Naval Base, Cavite City
Year Graduated: 2007

Elementary: Florentino Joya Elementary School
Brgy. Biga, Tanza Cavite
Year Graduated: 2003

RELATED LEARNING

Teaching Experiences

Cavite National High School
Chief E. Martin St., Caridad, Cavite City
Teacher III (Environmental Science and Research)
June 25, 2012 – Present

School-Based Management Coordinator
Youth for Environment in Schools Organization Adviser

Sangley Point National High School
La Naval Rd., Heracleo Alano Naval Base, Sangley Point, Cavite City
Teacher I (Grade 8 Science)

**TRAININGS AND
SEMINARS**

June 25, 2012 – April 1, 2016

Basic Education Information System (BEIS) Coordinator

Theresian School of Cavite

Agueda Lane, Tirona Hi-way, Habay, Bacoar Cavite

High School Faculty (Mathematics)

May 16, 2011 - Present

Boy Scout Moderator

Cavite National High School

Cavite City

Student Teacher (General Science)

November 23, 2010 – February 28, 2011

Regional K to 10 Training of teachers on Critical Content (Grade 8 Science)

May 14-16, 2019

DepEd Cavite City

Division Training-Workshop on Enhanced School Improvement Plan (E-SIP)

2019-2021 Cycle Cum SBM Updates

January 21-22, 2019

DepEd Cavite City

Regional K to 10 Training of teachers on Critical Content (Grade 8 Science)

May 22- June 2, 2018

DepEd Region IV-A CALABARZON

Division Orientation Seminar on Philippine Professional Standards for
Teachers (PPST) Batch II, Cluster 5- Teachers I-III

April 23-25, 2018

DepEd Cavite City

SKILLS

- Ability to make use of Microsoft applications in order to create instructional materials and video presentations.
- Photography and Basic graphic designing
- Initiative with a high level of energy.
- Tolerant and flexible to different situations

**PERSONAL
INFORMATION**

Full Name: Louie-Zel M. Pedro

Birth Date: March 8, 1991 Age: 29

Birth Place: Cavite City

Mother's Name: Lurita Mañalac Pedro (Housewife)

Father's Name: Nephie Luna Pedro (OFW)

**CHARACTER
REFERENCES**

Augusto D. Ferma Jr.
Principal IV
Cavite National High School

Randie L. Salonga
Principal II
Sangley Point National High School

Madelaine F. Gatchalian
Head Teacher VI
Cavite National High School

I hereby certify that the above information are true and correct to the best of my knowledge and belief.


LOUIE-ZEL MAÑALAC PEDRO