Development and Validation Of e-Learning Modules in Science 8 For Blended Modality Through Genyo e-Learning

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***Abstract:** This study is focused on developing and validating the e-learning modules through Genyo that will help grade eight (8) students learn the least-learned competency concepts in science 8 through a blended modality. Two developed e-learning modules through Genyo in the study and anchored on the DepEd's curriculum guide, based on the 3I's learning model. It consisted of the following parts: Introduction (Motivational Activity and Linking Statements), Interaction (Learning Activities and Assessment Techniques), and Integration (Transfer of Learning, Reflection, and Closure). Quantitative research and design were utilized to develop and validate the modules and guided by the Analysis-Design-Development-Implementation-Evaluation (ADDIE) model. The modules were validated by four (4) teacher-experts who validated the content quality, instructional quality, technical quality, and other findings as factors using the validation instruments and twenty (20) student users who evaluated the format and content aspects using evaluation forms and written feedback from the guide questions. The teacher-experts and student-users of the study are purposively selected. Findings revealed that both teacher-experts and student-users rated the two developed e-learning modules in Science 8 for blended modality through Genyo as very satisfactory and strongly agreed on all pertaining factors of the modules regarding content quality, instructional quality, technical quality, and other findings. The feedback of the student-users revealed well-crafted, engaging, comprehensible, and blended learning themes perceived as the characteristics of the developed e-learning modules in Science 8. As a result, it was determined that the developed e-learning modules in science 8 for blended modality through Genyo are valid, acceptable, and could be used as supplementary material for grade 8 science students. They were further recommended for possible use in other schools to cover the other least-learned concepts in Science 8.*

Keywords— Engaging modules; blended learning; development; validation; e-learning; Genyo

1. INTRODUCTION

1.1 *Background of the Study*

Even before the pandemic, technology has been a great partner in the field of education, bridging students' gaps and needs and resulting in the expansion of e-learning. In this way, teachers can facilitate and widen the students' knowledge about computer-technology literacy as one of the 21st Century learner skills. Students may have a prior understanding of technology, and we can add to it by letting them know more about some science concepts if we channel it through technology. Ultimately, it will determine how effective technology integration is in dispensing knowledge and information. With this, we can let the students compete globally regarding computer-assisted instructions. In a recently proposed academic literature, there are seven digital skills that a global competent must acquire. These are technical, information, communication, collaboration, creativity, critical thinking, and problem-solving (Van Laar, 2017).

Technology has a significant impact on the world. It introduces innovations that improve people's lives. One of the primary beneficiaries of technological impacts is education. Learning management systems (LMS) are becoming more common in educational settings. These LMSs are the best solution for meeting the pedagogical needs of the school, teachers, and students. Most schools in the Philippines face numerous educational issues and barriers to innovation. A Learning Management System, such as Genyo e-Learning, has been implemented in several Philippine private schools. Genyo could be used as a guide to convey e-content and to provide various possible outcomes for achieving unusual e-Learning online modules (Ferrer, 2022).

Learning modality has instantly changed due to COVID-19, guided by the different mandates imposed, which led to online courses becoming part of the new norm in institutions that previously used the traditional way of teaching. In order to recognize and be guided by these mandates, some institutions revised their program scopes. Most institutions reacted quickly to the phenomenon, but some still require more time to understand these new teaching approaches. Even the students' readiness for these more self-directed learning modalities and less face-to-face (F2F) contact, primarily since these changes are related to the student's academic performance (Clark, 2021).

Blended learning and other online courses involve students engaging in a self-directed learning process that varies meaningfully from traditional, F2F-only courses. Research has shown that students' blended online learning achievement is vital to student readiness (Clark, 2021). Blended learning also has a growing impact on the student's learning process because it motivates students to become competitive and more interactive with the teacher about their concerns, even if they are over a long distance. It even supports e-readiness (Wadhwa, 2022).

Readiness considers a goal orientation, being independent and persistent, using cognitive abilities, and being motivated to work independently outside class sessions. Some things need to identify to consider as an e-ready. It includes self-efficacy, self-regulation, and social and digital competence (Polat, 2022). Furthermore, each student has to determine their learning needs, construct learning goals, recognize human and material resources for learning, choose and apply appropriate learning strategies, and assess learning outcomes in order to learn. These are observable through self-directed activities, including reviewing materials, watching videos, reading cases, and taking quizzes (Polat, 2022).

Learners take advantage of e-learning because it allows them to communicate their learning points of view electronically without having to meet in person. Online learning techniques, as opposed to lectures in classrooms, allow for message sharing through chats, online conversation forms, and open spaces where students can post their information. As a result, online learning offers learning opportunities that differ from traditional lecture methods or takeaway packages (Soper, 2017).

Since the early 2000s, various educators and researchers have defined blended learning. Many of these definitions agree that At its core, blended learning is a hybrid of traditional educational approaches and online guidance. It is a series of educational activities that combines co-present (face-to-face) interactions and technologically mediated interactions between students, teachers, and learning resources (Tahir, 2022).

Blended teaching has emerged as a tool for remotely supporting students as they learn. Many educational institutions have been established to ensure continued educational opportunities at all levels. Worldwide, educational institutions have shifted to a blended mode of teaching and learning. During the lockdown, online platforms such as WebEx, Zoom, Google Meet, Say Namaste, and learning management systems (LMS) such as Moodle, Blackboard, Genyo, and others were encouraged to support students' learning in any way possible (Bordoloi, 2021). Furthermore, teachers display many learning and teaching styles in various situations, specifically in the "new normal" of education, where different Self-paced learning materials are introduced. A systematic series of instructions designed to help learners develop an entire process is what self-paced learning material is. Learners can master an extensive amount of information or a complex process by combining the results of various modalities. It can be electronic or downloaded and printed. Self-paced learning materials include, for example, LMS (Barbante Jr., 2022).

Genyo e-learning integrated with blended learning involves packets assigned or given by the teachers to the students on their accounts. The Internet develops and supports E-learning packets, promoting hands-on interaction with different lessons. Genyo is a Learning Management System (LMS) that caters to the needs of the students. With ready-made resources that are K-12 correlated. Genyo LMS includes authoring tools. It means that, in addition to the ready-made

resources available within the system, users can also use external resources and create content to promote self-directed and game-based learning with its engaging activities (Ferrer, 2022). Right after the results of national and international student performance evaluations that highlighted Filipino learners' poor performance, the country's quality of education was highlighted in 2019. While the outcomes and trends were frustrating, the Department of Education (DepEd) perceived a silver lining: those that will serve as a wake-up call to all education stakeholders to collaborate to attain the overarching goal: quality education for all learners (Gonzales, 2019).

The researchers developed e-learning modules in science 8 for blended modality through Genyo e-Learning, focusing on electricity concepts. According to research findings, the electric circuit is one of the topics where students have learning difficulties and many misconceptions outside of scientific conception (Naade, 2021). Learners understand that current flows through a conductor, yet they do not understand how it flows or what causes it to flow; it is invisible. This overexposes students' unscientific imagination, which can sometimes lead to alternative perceptions, also known as misconceptions. This study is inspired from the behavior of confused students with regards to explaining the natural phenomenon of electricity.

The COVID-19 pandemic, which demands online courses, adds a burden on improving the quality of learning electricity concepts. Science teachers are worried about those students with low concept mastery because they will teach this concept based on the DepEd - Most Essential Learning Competencies (MELCs) in Science Eight as of 2020. Students typically enter the classroom with this "personal idea," which frequently interferes with the concept presented by the teacher during a lesson and hinders proper understanding, likely resulting in concept difficulty and poor examination performance (Aligo, 2021).

Based on the Philippine National Achievement Test (NAT) result from last 2018 in region two. It was revealed in the Percentage Distribution of Region 02 Test Takers Based on the Criteria on Proficiency Level in Science 10 that no one is highly proficient among the 20 026 examinees. In comparison, only .41% are proficient. It can be gleaned from the figure that nearly 100% of the examinees do not fall under proficiency in Science. Regarding the Mean Percentage Score (MPS) of Science, in Problem Solving, Science registered the lowest MPS, pegged at 39.73, compared to the highest MPS, which is Filipino, pegged at 58.27. Information Literacy got an MPS of 37.37, almost half the highest MPS of 67.74 in Filipinos, and Critical Thinking got only an MPS of 33.62, which is also far from the highest MPS of Filipino pegged at 59.88. The overall MPS of Science results from the Philippine National Achievement Test (NAT) last 2018 in region two is 36.91 (Department of Education Regional Office 2 – National Achievement Test 6, 10, & 12 Results and Analysis, 2018).

According to the research findings of Kade in 2022, where 40 students were given a test online with five students as their participants, approximately 70 percent of students found it challenging to apply the concept of the potential vector. In the analysis, the practical significance of Ampere's law was

approximately 475 percent, the concept of the field in a cylinder was roughly 30 percent, and the Biot-Savart law was approximately 25 percent. It can be concluded that after participating in plain online learning, many students still struggle to master the concepts of electricity and magnetism. A proper tool must be needed in order for them to master the concepts of electricity.

One way of assessing students' understanding is through their outputs and performances. In line with this, the researchers developed e-learning modules through Genyo e-learning in a blended modality. It allows both the teacher and the students to evaluate what needs improvement in the learning process. This study aimed to assess the understanding of the students about Science eight concepts with the integration of technology as the learning platform. It also aimed to: know the students' ability, as well as the teachers, in the implementation of digital assessment, evaluate students' progress based on the result of their outputs and performance tasks given online, and determine the kind of approach which is effective in the use of the online platform. This research provided meaningful information and insight into the effectiveness of e-learning in implementing instructions and helping students understand further some scientific concepts.

The developed e-learning modules supported students' understanding by giving them interactive activities that excited them to learn since students are into technology. In that way, these modules facilitated learning. The modules consisted of different learning parts based on the 3Is (Introduction, Interaction, and Integration) learning model. Each module has self-made videos with the concepts and theories they need to learn from that topic. Each module contained different links that students could visit to simulate and apply what they have learned. The students can access the e-learning modules wherever they are, using their laptops, smartphones, or any gadgets. Students assessed their understanding through online interactive-collaborative quizzes and individual activities embedded in the e-learning modules through Genyo e-learning. The developed modules focused on more than just the knowledge part but also the value integration based on the school's core values. While there is evidence that online students outperform traditional students in class, researchers should keep in mind that online students are also more industrious, mature, older, and self-motivated (Perkins, 2022).

1.2 Theoretical Conceptual Framework

The researchers anchored the study on the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model of teaching and learning design. The said model allowed educators and designers to lay the groundwork for principled and practical training. This model applies to both traditional and electronic learning. It is frequently utilized to achieve academic objectives, especially as electronic learning alternatives become more popular and global distance education by means of Internet access becomes more powerful (Branch, 2009). ADDIE comprises the acronym's five phases: analysis, design, development, implementation, and evaluation (Saeidnia, 2022). ADDIE is systematic because all

process components respond to any stimulus or have the potential to respond to any stimulus. It is a validating process because it verifies all products and procedures linked to creating guided learning episodes (Branch, 2009). ADDIE was initially introduced as a linear model when it was first released in the mid-1970s (Poese, 2014). It was initially created for the United States Army by the Centre for Educational Technology and rapidly embraced by the rest of the United States Armed Forces. Instructional designers and training developers frequently employ the ADDIE model (Barbante Jr., 2022). ADDIE helps simplify the multifaceted nature of intentional learning environments in educational approach design by addressing various circumstances and relationships within and between various settings. (Branch, 2009).

The conceptual framework of this study is exemplified in Figure 1.

Figure 1. Conceptual Framework of the Study
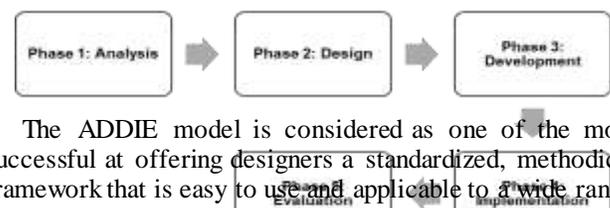
The ADDIE model is considered as one of the most successful at offering designers a standardized, methodical framework that is easy to use and applicable to a wide range of situations. The ADDIE model is an instructional design process that uses a solid basis to create a practical course or program. Using the ADDIE model to develop a program or course can assist developers in implementing a learner-centered rather than a teacher-centered approach, making the program more relevant and meaningful for learners (Peterson, 2003). ADDIE is a popular instructional design model in education and corporate training that could provide us with numerous opportunities. It is to integrate pedagogy (as previously mentioned), learning theories, and other educational principles that help develop learning material. It enables the design and development of educational instructional materials. Materials and services developed in response to an assessment process. The result of each previous phase serves as input to the next phase. It is based on a systemic model in which several Instructional Systems Design (ISD) models have been conceived (Koneru, 2010).

This study did not only show e-learning modules in Science 8 for blended modality. However, it also investigated the efficacy of the developed e-learning modules, which will be revealed using the ADDIE model. ADDIE is a pioneer in instructional system design (ISD). ADDIE is widely regarded as one of the most universally recognized models in the ISD field (Poese, 2014). A highly efficient design for instruction centers around real-world challenges, multifaceted understanding, and real-life activities. As a result, the high

quality between learning environments and actual work settings is promoted by effective instructional design (Branch, 2009). Integrating ADDIE into e-learning modules allowed educators to create practical learning modules (Koneru, 2010). The ADDIE process is centered on thoroughly examining instructional problems and objectives and laying the foundation for learning outcomes and the learning environment (Buchem, 2021).

This model suggested defining the design elements systematically and, specifically, using a logical framework for detecting and developing strategies to achieve the project's goals. The ADDIE idea's efficiency, combined with several stimulates for broad acceptance, has proven successful over and over. (Branch, 2009). For decades, ADDIE has served as a high-level mental model or scaffolding, and it will likely continue to do so in some form in the future. The best use of ADDIE in the twenty-first century, particularly in high-technology endeavors, would be recognizing some of its basic principles while augmenting them with additional structure to meet specific needs (Poese, 2014). Any teaching materials would become meaningful and effective if anchored in an ADDIE model. A development-oriented design for learning involves the creation of a learning system that includes every one of the educational components. After thoroughly understanding the ADDIE principles, numerous starting points educational designers and students attended in pertaining educational courses report that they have become more equipped to create practical training and education materials. According to a survey of instructional development applications, most instructional design models are based on ADDIE (Listiani, 2022).

1.3 *Statement of the Problem*

This study aimed to develop and validate the E-learning Modules in Science 8 for Blended Modality through Genyo e-learning of the Grade 8 Junior High School students at Saint Columban College – Junior High School Department. Hence, this study answered the following questions:

1. What is the validity of the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning as evaluated by the teacher-experts based on the following:
    1.1 Content Quality;
    1.2 Instructional Quality;
    1.3 Technical Quality; and
    1.4 Other Findings?
2. What is the validity of the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning as evaluated by the student-users based on the:
    2.1 Format; and
    2.2 Content?
3. What are the comments and suggestions of the teacher-experts on the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning?
4. What is the student-users' feedbacks on developed E-learning Modules in Science 8 for Blended Modality through Genyo e-learning?

5. Based on the study's findings, how can the developed E-learning Modules in Science 8 for Blended Modality through Genyo e-learning be improved?

1.4 *Significance of the Study*

This research study contributed to the body of knowledge, especially in Science Eight. The research's significance probed the capability to develop and validate E-learning Modules in Science 8 for Blended Modality during the new normal. The beneficiaries and the benefits they can get from this study are the following:

Administrators. The study helps the administrators improve their programs regarding implementing a new typical education. This research helps them decide and implement proper and effective learning modalities in this new normal.

Teachers. In response to the threat posed by COVID-19, the study provides teachers with ideas for better interventions for delivering classroom instruction in a secure and interactive atmosphere for learning. (DepEd Order No. 012, s. 2020).

Parents. The study will be used as a reference to parents about the students' performances and will help them guide the students in the learning transition process.

Students. The study helps the learners better understand the situations they are experiencing today during the pandemic. It encourages them to adapt to the new learning modality and understand the lessons at their own pace with their parents' and guardians' assistance.

Other Researchers. The study helps other researchers with related topics or keywords as their baseline for studying blended modality by integrating Genyo e-learning in self-learning packets.

1.5 *Definition of Significant Terms*

The following terms were utilized extensively in the context of this study and taken according to the definition given below:

Blended Modality. Blended learning incorporates instructional and educational instruction methodologies and is a prevalent and achievable curriculum delivery technique. The method of transfer, holistic and life-long learning activities, and styles of instruction are some examples of a combination of traditional face-to-face and online instruction, addressing students' diverse learning styles. It combines in-person and computer-mediated instruction (Hrastinski, 2019).

E-Learning. It occurs when teachers provide personalized attention to students while instructing them. In addition to providing students with prepared materials, the method mentioned enables teachers to communicate with students via the internet. This combination of classroom techniques ensures students correctly navigate the prepared learning materials (Izuchi, 2022).

GENYO e-learning. Technology-based educational resources will be employed in primary school educational settings. It is the first and only fully integrated and functional "online learning management system" for Basic Education in the Philippines (Baraquia, 2021). Genyo could be employed as

a guide to communicate e-content and provide various possible outcomes for achieving unconventional e-Learning online modules (Ferrer, 2022).

Grade 8 Science. Students need to be introduced to scientific concepts. Help students connect ideas about their world by increasing their understanding of scientific and technological concepts. Encourages students to explore and make meaning of their experiences through a combination of "hands-on" and "minds-on" activities in an interactive learning environment (Morris, 2016).

Interactive e-learning. These structured instructions allow learners to master a body of knowledge or a set of complex processes (Maile, 2018). These allow the learner to choose what, how, when, and where to learn (Acobo, 2022).

Students' Achievement. The extent to which students achieved their immediate or distant learning targets. Individual academic performance differences are significantly associated with cognitive and personality distinctions.

Validity. An integrated evaluative judgment of the extent to which empirical evidence and theoretical perspectives support the appropriateness of the material (Dosler, 2015) and adequacy of measurement-based inferences and actions. It is also an inductive summary of the existing evidence and the potential consequences of measuring and interpreting results (Larroulet Philippi, 2020).

2. RESEARCH METHOD

This chapter presented the research method of the study. It addressed subjects such as research design, research environment, participants, sampling techniques, instrumentation, methods for gathering data, and statistical analysis. These are regarded as critical in pursuing significant answers to the research questions.

2.1 Research Design

This study employed a quantitative research design to develop e-learning modules in Science 8 for blended modality through Genyo e-learning during the new normal. It used the ADDIE (Analysis, Design, Development, Evaluation, and Implementation) model -a quantitative research design. It served as a solid basis for creating a practical course or program.

ADDIE model was designed for educational research. It is used in the development and validation of educational products. It is also concerned with advancing product-oriented research and enhancing academic quality, as it is linked to the education evaluation program. Furthermore, it is not simply to evaluate educational theories but to create effective products for special school programs, such as teaching and learning materials and media (Gustiani, 2019).

2.2 Research Environment

The research setting of this study will be at Saint Columban College – Junior High School Department, Pagadian City, Province of Zamboanga del Sur. The school has used Genyo e-learning as a Learning Management System for over a decade. This computer-assisted instruction has been instrumental in learning continuity during the pandemic. Genyo is a Learning Management System (LMS) customized to students' needs, with correlated K-12 ready-made resources. Different authoring tools are included with Genyo LMS, meaning that users can use external resources and add or create content in addition to the system's ready-made resources to promote self-directed and game-based learning through engaging activities. The said learning management system served as a great help in the school in implementing instructions, giving knowledge, concepts, and other things that cater to students' needs during distance learning, where face-to-face classes were prohibited.

2.3 Research Participants

The study participants were twenty (20) random grade eight students of Saint Columban College – Junior High School Department, coming from the four (4) different sections, and the four (4) content validators of the developed e-learning modules, including the expert teachers and the DIWA – Genyo Learning Integrated Specialist (LIS).

2.4 Sampling Technique

A Purposive random sampling technique was used in choosing the twenty-grade eight participants.

2.5 Research Instrument

The research instruments used in the study were the validation tool for the developed e-learning modules for teacher-experts, developed e-learning modules in Science 8 for blended modality through Genyo, and feedback forms to seek student-users' feedback. The teacher-experts and student-users validation and feedback forms in the study were used primarily to validate or evaluate the developed e-learning modules. The teacher-experts validation forms were using a four-point rating scale that was cited from the Guidelines and Processes for LRMDS Assessment & Evaluation – Evaluation Rating Sheet for Non-Print Materials (DepEd, 2009), while the students' feedback form using a five-point scale was cited from a study by Medina (2022) and adapted from Marasigan (2003), which generates the rating scale and descriptive interpretation.

The degree value of ratings by the teacher-experts validation was determined and interpreted as follows: Very Satisfactory (3.01 – 4.00); Satisfactory (2.01 – 3.00); Poor (1.01 – 2.00); and Not Satisfactory (0.01 – 1.00) for factors A-C, and factor D it is interpreted as follows: Not present (3.01 – 4.00); Present but very minor & must be fixed (2.01 – 3.00); Present & requires major redevelopment (1.01 – 2.00); and Do not evaluate further (0.01 – 1.00).

The degree value of ratings by the student-users evaluation was determined and interpreted as follows: Strongly Agree (4.01 – 5.00); Agree (3.01 – 4.00); Undecided (2.01 – 3.00); Disagree (1.01- 2.00), and Strongly Disagree (0.01 – 1.00).

The numerical rating scale and descriptive interpretations served as the basis for determining the acceptability of the developed e-learning modules in Science 8 for blended modality through Genyo in terms of the content quality, instructional quality, technical quality, and other findings for

the teacher-expert as research validators and the student-users evaluation of the format and content aspects of the developed tool by the researchers, the e-learning modules through Genyo e-learning for blended modality.

The pertaining items of the teacher-experts validation and student-users feedback forms were modified in accordance with the intent and essence of the research. The content of the modified forms will be presented by the following means: (1) Directions on how the learning materials will be validated; (2) The series of statements as the basis for the validation of the developed e-learning modules; (3) A section for general comments and suggestions for improvement of the developed e-learning modules; (4) The participant's name for both teacher-experts and student-users with their signatures, respectively.

2.6 Data Gathering Procedure

To ensure the integrity of the research process before generating data, the researchers personally sent a letter and asked for Permission and approval from the school president, the department unit head or school principal, and the students. Upon securing the necessary support, the researchers set the research schedule and gathered the participants in one place for an orientation on the nature of the study.

The orientation secured their full cooperation and support. After ensuring that the participants already have a perspective on the study, pilot testing of the developed e-learning modules is Science 8 for blended modality through Genyo was utilized by the chosen participants of the study. The data collection process included the following activities, which were completed correctly in the following order.

Analysis. In the analysis phase, the researchers identified the least learned concepts in electricity in Science Eight based on the results of the latest Philippine National Achievement Test (NAT) last 2018. Afterward, the researchers identified from the Curriculum Guide for Science 2016 the appropriate competencies based on the Department of Education, that aligned with the least learned concepts in Science eight and served as the foundation for the developed e-Learning modules. The researchers gathered learning tasks, chose essential assignments, and determined each necessary task in light of the chosen learning competencies.

Design. After identifying the least-learned concept in Science 8, the random selection of the participants, identifying the competencies used, collection of learning critical tasks, and analyzing each necessary task, the researchers designed appropriate learning objectives or targets, assessments, and content lessons to address the students' least-learned concepts in Science 8. The format was based on the school's learning plan format, Introduction-Interaction-Integration (3Is). The researchers identified the titles of two e-learning modules, Electricity and Circuits, and Series and Parallel Circuits, based on the least-learned Science 8 concepts. Table 1 shows the topics for developing the e-learning modules in Science 8 through Genyo.

Table 1

In this stage, the purposive-random selection of the four (4) teacher-experts as validators, and twenty (20) student-users as evaluators of the e-learning modules in Science 8 for blended modality were also identified.

First, the Introduction part includes Motivating Activity and a Linking Statement.

Motivating Activity. It could be an activity to review the student's previous lesson and connect it to the new one or a prior understanding evaluation activity.

Linking Statement. Includes the presentation of the learning targets, core values that need to be developed and integrated into the topic, and an overview.

Second, the Interaction part consists of Learning Activities and Assessment Techniques.

Learning Activities. It is where the concepts will be presented through a short discussion or in a discovery method. It also includes different individual and collaborative activities.

Assessment Techniques. It is where formative assessments are based on the concepts presented and learned.

Lastly, the Integration part contains different lifelong learning activities such as Transfer of Learning, Reflection, Closure, Resources, and Summary.

Transfer of Learning. A mini-performance task will be given as part of the scaffolding process.

Reflection. A reflecting statement will be given to help students develop the core values integrated into the topic.

Closure. The whole lesson will be summarized or generalized through a conceptual activity, or it could be the student's overall experience upon doing the module.

Resources. The collection of the list of resources and useful links in this developed e-learning module.

Summary. The summary report of the accomplished activities of the students upon doing the module.

Development. In this phase, the researchers designed and developed the e-learning modules using Genyo e-Learning in Blended modality using the learning plan format.

Implementation. The developed e-learning modules were presented to the four (4) teacher-experts to validate the tool. After the validation, recommendations, and revision, the researchers implemented the e-learning modules and instructions. The researchers concentrated on presenting and consulting with the thesis adviser and colleagues for corrections on the developed e-learning modules. Comments and suggestions were taken into account in order to refine the developed e-learning modules.

Evaluation. After completing the validation and evaluation forms for the teacher-expert and student user, the developed e-

Topic Outline of the E-Learning Modules in Science 8 for Blended Modality through Genyo

Least-Learned Science 8 Competencies	Module No.	E-Learning Module for Blended Modality Title
Infer Relationship Between Current and Charge	1	Electricity and Circuits
Explain the Advantages and	2	Series and Parallel Circuits

learning modules in blended modality through Genyo were enhanced in the final phase. In contrast, the thematic analysis will be employed appropriately to assess the logs of interviews in order to demonstrate student-user feedback on the developed self-learning packets. This will facilitate the examination of various student-user perspectives, highlighting similarities and differences and yielding unexpected insights. Most often, thematic analysis is employed to characterize a collection of writings, such as the recordings of interviews. The researchers carefully examined the data to identify common themes - topics, ideas, and recurring meaning patterns (Nowell, 2017).

2.7 Data Analysis

The data collected on the developed e-Learning modules through Genyo in blended modality were analyzed using descriptive statistics such as M.S. Excel is applied for the count of frequencies and a weighted average or mean to measure central tendencies of the experts' and students' validation of the developed e-learning modules in Grade 8 Science. The researchers provided a holistic analysis of the student-users' experiences in utilizing the developed discovery-based modules in Science 8. Thus, the student-users' feedback was analyzed using thematic analysis to extract the themes from familiarization with the interview transcripts, generated codes, searching for the themes, reviewing the themes, identifying the themes, and interpretations of the themes that emerged for the improvement of the learning resources in G8 Science.

Six (6) phases were followed: (1) familiarizing personally with the data collection records, (2) producing initial codes of the student-user, (3) looking for and looking at the patterns and commonalities that emerged, (4) going over the patterns and commonalities, and (5) establishing the names of the patterns and commonalities. Finally, (6) prepare a report on emerging themes (Medina, 2022).

The first step was understanding the information from the interview transcripts. After the student-users collected the data from the interviews, the researchers immersed themselves in the written materials by repeatedly reading and transcribing them. This was an excellent way for the researchers to become familiar with the data because it could have revealed patterns and ideas to the researchers (Medina, 2022).

The initial codes for the student users were generated in the second step. These codes were extracted from the transcribed data by highlighting sections or lines that might be pertinent to a topic or issue that was present in the transcribed data. Twenty (20) student-users were manually coded, and the researchers ensured that the initial codes were utilized only once.

The third step was the search for a theme. The pre-identified themes are considered significant in this step and can be extensively studied and classified into essential and meaningful themes. A few discovered codes were combined, improved, and eliminated.

The fourth step was reviewing the theme. The themes have been checked for additional modification after being pre-identified. To better reflect and capture the highlighted lines in the codes, the selected themes need to be rearranged and adjusted in this step. Some themes may also be eliminated. It was discovered that some themes needed to be divided into two significant themes.

The fifth step was defining and identifying the themes. In this stage, a debriefing on the themes was created to verify their validity and agreement with the lines of the transcribed material from which they were taken. The themes are now more clearly defined based on the salient features of each theme that call attention to the written passages in each line that best show how the themes have been identified and defined.

The sixth and final step involved writing a report on the themes. The topics were thoroughly developed in this stage. Writing up the findings and interpretation based on the thematic analysis was already underway at this stage. The themes' final report and the written transcripts that support it are reliable and valid. The researchers then quoted the corresponding student-user codes from the student's transcript. The literature then supports the position in the report.

2.8 Ethical Considerations

The researchers were accountable for protecting research participants from any adverse consequences or risks resulting from their involvement, conforming to ethical management practices, and conducting scientifically sound educational research. In the design phase, the researchers ensured that the study followed the school's ethical data collection, analysis, and dissemination protocol. During the research period, the following ethical guidelines will be the following:

Anonymity and Confidentiality. The researchers subsequently followed the rules imposed by Republic Act No. 10173, the Data Privacy Act of 2012. The researchers avoided disclosing any information obtained from research participants that could be used to identify them to unidentified third parties. When their data was transmitted, their identities were concealed by keeping their names and other recognized information.

Voluntary Participation. The participants' involvement was utterly voluntary; the researchers placed no pressure or force on them to take part in the study, and they were completely conscious that they could discontinue at any point during the study. Expert validators were compensated for validating the developed e-learning modules.

Informed Consent. The willingness on the part and freely agreed upon involvement in this study led to a written and signed consent letter. The expert and student validators gathered the information after they comprehended the intent of the research and what their participation entailed and freely agreed to participate.

3. RESULTS AND DISCUSSION

This chapter presents the results and discussion, which include the presentation, analysis, and interpretation of the validation, evaluation ratings, and feedback of the developed e-learning modules in Science 8 for blended modality through Genyo.

To determine the general acceptance of the generated e-learning modules in Science 8, as stated in the development process of the e-learning modules for blended modality using Genyo, two groups—four teacher-experts and twenty student users—rated the developed modules on the essential components. The following information shows and analyzes the precise results of the teacher-expert validation and student-user evaluation based on the two developed modules.

3.1 Validation Results of E-Learning Modules in Science 8 for Blended Modality by the Teacher-Experts

The findings presented here represent the validity ratings of the four (4) teacher-expert validators for the e-learning modules in Science 8 for blended modality through Genyo. Based on the four factors, the teacher-expert validators of the study validated the two (2) e-learning modules in Science 8 for blended modality through Genyo, which include (1) content quality, (2) instructional quality, and (3) technical quality as to the given value of 3.01 – 4.00 (Very Satisfactory); 2.01 – 3.00 (Satisfactory); 1.01 – 2.00 (Poor); and 0.01 – 1.00 (Not Satisfactory), and (5) other findings as to the given value of 3.01 – 4.00 (Not present); 2.01 – 3.00 (Present but very minor & must be fixed); 1.01 – 2.00 (Present & requires major development); and 0.01 – 1.00 (Do not evaluate further) as cited from the Guidelines and Processes for LRMDS Assessment & Evaluation – Evaluation Rating Sheet for Non-Print Materials (DepEd, 2009).

The result of the evaluations from the teacher-experts who validated the e-learning module 1 in Science 8 for blended modality through Genyo titled "Electricity and Circuits," based on the content quality, instructional quality, and technical quality gave it a very satisfactory rating (M = 3.91; SD = 0.15) for acceptability. The average validation ratings of the teacher-experts on the individual aspects of the e-learning module 1 for blended modality through Genyo as to the content quality (M = 3.98; SD = 0.05), instructional quality (M = 3.90; SD = 0.20), and technical quality (M = 3.85; SD = 0.20) of the developed material revealed similar remarks as a very satisfactory material. Also, based on their other findings it revealed that errors are mostly not present as a remark obtained by the teacher-experts of its acceptability (M = 3.94; SD = 0.13) based on their other findings of the developed material.

Comprehensively, all teacher experts revealed they were very satisfied with the developed e-learning module 1 in Science 8 for blended modality through Genyo based on its content, instructional, technical, and other findings. The validators were very satisfied that the contents were aligned with the DepEd Learning Competencies that are designed for the said grade level (1), it contributed to the enrichment, reinforcement, or mastery of the identified learning targets (2), it was accurate (3), up-to-date (4), free from cultural, gender, racial, or ethnic bias (5), it could stimulate and promote critical thinking, relevant to realistic situations (6), and it could promote positive values that support formative growth (7).

Concerning about developed e-learning module 1 in Science 8 for blended modality through Genyo based on its instructional quality, the teacher-experts were also very satisfied with the rationale of the material, which was well-defined and achieved (1); the learning objectives were clearly stated and measurable based on the appropriateness of the level of difficulty for the intended target user (2), its appropriate visuals and sounds were used that made the students enjoy the material. At the same time, it stimulated, challenged, and made them engaged and control the sequence of presentation and review (3); there was also feedback in every student-user's response to evaluate their learning phase (4).

On the other hand, the teacher-experts were also very satisfied in terms of the technical quality of the developed e-learning module 1 in Science 8 for blended modality through Genyo based on the visual representations of each part (1), the feature that allowed the users to navigate freely through the material (2), and the correct pacing of the self-made video of the researchers attached on the developed material. Furthermore, the teacher experts revealed that the developed e-learning module 1 was free from conceptual and factual errors (1), and mostly grammatical and typographical errors, computational errors, and others are not present (2).

In addition, Given that validation scores ranged from 3 to 4, inter-rater agreement by the teacher-expert was computed to identify and assess the degree of agreement between the teacher-expert on the level of performance scores on each component of the developed e-learning module 1 in Science 8 for blended modality using Genyo to have a more precise measurement of the teacher expert's coherence ratings. The average inter-rater agreement in terms of percentage ranged from 81% to 100% in the content, instructional, and technical quality, as well as their other findings as factors of the developed e-learning module 1 in Science 8 for blended modality using Genyo by the teacher-experts.

The result of the teacher-expert validation rating outcomes for the developed e-learning module 2 in Science 8 for blended modality through Genyo titled "Series and Parallel Circuits", obtained a very satisfactory remark by the teacher-experts (M = 3.92; SD = 0.12) of its acceptability. The average validation ratings of the teacher-experts on the individual aspects of the e-learning module 2 in Science 8 for blended modality through Genyo as to the content quality (M = 3.98; SD = 0.05), instructional quality (M = 3.90; SD = 0.16), and technical quality (M = 3.88; SD = 0.17), of the developed material revealed similar remarks as a very satisfactory material.

Based on the evaluations from the teacher-experts who validated the e-learning module 2 in Science 8 for blended modality titled "Series and Parallel Circuits," based on their other findings revealed that errors are typically not present, according to the teacher experts' assessment of its acceptability (M = 3.94; SD = 0.13) based on their other observations of the developed material.

Based on its content, instructional, technological qualities, and other factors, the second developed e-learning module in Science 8 for blended modality using Genyo received very satisfactory marks from all teacher experts. The content's alignment with the DepEd Learning Competencies for the corresponding grade level (1), accuracy (2), up-to-datedness

(3), lack of cultural, gender, racial, or ethnic bias (4), relevance to real-life situations (5), ability to stimulate and promote critical thinking, promotion of positive values (6), and contribution to the enrichment, reinforcement, or mastery of the discovered learning targets (7) all received very satisfactory marks from the validator.

Concerning about developed e-learning module 2 in Science 8 for blended modality through Genyo based on its instructional quality, the teacher-experts were also very satisfied with the purpose of the material, which was well defined and achieved (1), the learning objectives were clearly stated and measurable based on the appropriateness of the level of difficulty for the intended target user (2), its appropriate graphics and sounds were used that made the students enjoy the material (3), at the same time, it stimulated, challenged, and made them engaged and control the sequence of presentation and review (4); and there was also feedback in every user's response to evaluate their learning phase (5).

However, the teacher-experts were also very satisfied with the technical quality of the developed e-learning module 2 in Science 8 for the blended modality through Genyo based on the visual representations of each part (1), the feature that allowed users to navigate through the material freely (2), and the appropriate pacing of the researchers' self-made video that was attached to the developed material (3). According to the teacher experts, the developed e-learning module 2 also needed more conceptual and factual errors, grammatical and typographical errors, computational errors, and other problems (4).

Moreover, to have a more accurate measurement of the teacher expert's consistency ratings because the validation scores range from 3 to 4, the degree of agreement between the teacher-expert on the level of performance ratings on the various aspects of the developed e-learning module 2 was computed as well using inter-rater agreement. The mean inter-rater agreement in terms of percentage ranged from 88% to 100% in the content, instructional, and technical quality, as well as their other findings as factors of the developed e-learning module 2 in Science 8 for blended modality using Genyo by the teacher-experts, as shown in Tables 3.1 and 3.2.

3.2 *Comments and Suggestions from Teacher-Experts*

The researchers then addressed and incorporated all the necessary changes and improvements by the teacher-experts to be made to the two developed e-learning modules in Science 8 for blended modality through Genyo. This was done after the teacher-experts validated the two developed e-learning modules in Science 8 for blended modality through Genyo and provided some comments, suggestions, and recommendations on the two developed e-learning modules in Science 8 for blended modality through Genyo. The teacher-experts' comments and recommendations in the e-learning modules in Science 8 for blended modality through Genyo contained typographical and organizational errors. The developed materials needed minor revisions. Teacher-experts had different comments as they validated the developed tools. Specifically, Teacher-expert 1 commented on the developed e-

learning module 1 that it was complete, comprehensible, fun, technologically-wised, and synchronized in all parts. Teacher-expert 4 also commented that the e-learning module 1 was an innovative approach to transferring knowledge to our students. It is presented in such a way that it caters to the type of learner that we have today. All in all, teacher-experts 1 and 4 highly commended the quality of the content of the developed e-learning module 1 based on their positive comments.

Moreover, Teacher-expert 4 observed in the instructional quality that the objectives in the first e-learning module were clearly stated and defined. The teacher-expert also emphasized that the e-learning module allowed the teacher to engage the learners in different activities to ensure the learner's understanding of the topic. On the other hand, teacher-expert 1 noted that one part of the learning packet or learning package needs a strong/stable connection to be played, which was also related to the suggestion of teacher-expert 2 in which to try other resources for the motivation activity under the instructional quality of the developed e-learning module in blended modality through Genyo.

For the second developed e-learning module in Science 8 for blended modality through Genyo, teacher-expert 3 mentioned that the learning objectives' presentation was clear and measurable through different activities presented in the e-learning module under the content quality. Regarding the other findings of the two (2) developed e-learning modules in Science 8 for blended modality through Genyo, teacher-expert 1 commented that e-learning module 1 was well-prepared and crafted intelligently and patiently. This was also supported by the comments of teacher-expert 3 that the e-learning module was presented in a logical manner. The said teacher-expert loves the idea of correcting misconceptions before having a new topic and admires the technique catering to the different types of learners. While teacher-expert 2 also commented on the second e-learning module that it was comprehensively prepared. It was a fun-filled learning packet, and the students found the lesson exciting and participated actively. All in all, the four (4) teacher-expert recommended the approval of the developed e-learning modules in Science 8 for blended modality through Genyo to be utilized within public educational institutions if the development/revisions suggested in this analysis are implemented.

3.3 *Evaluation Results of e-Learning Modules for Blended Modality by Student-Users*

The evaluation and interview feedback to the student-users of the developed e-learning modules in Science 8 for blended modality through Genyo were carried out to validate the claims of the teacher-experts in the student-users' views and perceptions as they used the developed materials. This supported the claims and established the developed e-learning modules in blended modality acceptability and validity.

The evaluation ratings of the twenty (20) selected student-users of the developed e-learning modules in Science 8 for blended modality through Genyo are shown here. The student-users of the study evaluated the two (2) developed e-learning modules in Science 8 for blended modality through Genyo

based on the two aspects, solely on: (1) format and (2) content aspects as to the scale of 4.50 – 5.00 = Strongly Agree; 3.50 – 4.49 = Agree; 2.50 – 3.49 = Undecided; 1.50 – 2.49 = Disagree; 1:00-1.49 = Strongly Disagree as was cited from a study by Medina (2022) and adapted from Marasigan (2003), to evaluate the developed e-learning modules for blended modality through Genyo in Science 8.

In the evaluation results of the developed e-learning modules in Science 8 for blended modality through Genyo by student-users entitled "Electricity and Circuits", received an excellent evaluation from the student-user evaluator (M = 4.56; SD = 0.58). The student-users' evaluation ratings of the developed e-learning modules for blended modality in terms of format (M = 4.49; SD = 0.61) and content (M = 4.63; SD = 0.55) of the developed materials used by the students yielded the same finding remarks as excellent.

In particular, the student-users strongly agreed on the format aspect of the layout. The developed e-learning module 1 is logically and sequentially arranged (1), instructions and the details in the module are emphasized well (2), font size and style are readable (3), the formula and different symbols are readable (4), tables and diagrams are well presented and easy to understand (5). At the same time, the key points of the concept notes are well highlighted to focus attention while reading (6), illustrations, pictures, and captions were laid out for easy reference (7), and activity discussion and guide questions were arranged sequentially and easy to follow (8). Lastly, the developed e-learning module was formatted conveniently considering the paper size used (10) strongly agree.

Similarly, student-users strongly believed that they had easily understood the content of the developed e-learning module 1 based on the learning targets in each lesson (1), instructions in each lesson (2), ideas or concepts presented in each lesson (4), illustrations guided them quickly in following the instructions in the developed e-learning module (5), learning activities in the form of simulation activity to understand the lesson better (6), appreciate the styles of illustration and written expressions (7), they have enjoyed performing and answering the activities as presented in the form of online activities (8), and finally, they found it easier to understand the concepts of electricity using the developed e-learning module as they have strongly agreed on base on their responses. As gathered from Table 5, the student-users' rating responses varied very little.

On the other hand, the student-users' ratings of the developed e-learning modules for blended modality through Genyo in Science 8 titled "Series and Parallel Circuits", presented an excellent rating (M = 4.51; SD = 0.59). The evaluation ratings of the student-users on the aspects of the developed e-learning modules in Science 8 for blended modality through Genyo as to the format (M = 4.52; SD = 0.61) and content (M = 4.50; SD = 0.66) of the developed materials used by the students were the same as excellent.

In detail, the student-users strongly agreed on the format aspect of the layout. The developed e-learning module 1 is arranged in logical and sequential order (1), instructions in the

module are emphasized well (2), font size and style are readable (3), the formula and different symbols are readable (4), tables and diagrams are well presented and easy to understand (5). At the same time, the key points of the concept notes are well highlighted to focus attention while reading (6), illustrations, pictures, and captions were laid out for easy reference (7), and activity discussion and guide questions were arranged sequentially and easy to follow (8). Lastly, the developed e-learning module formatted conveniently considering the paper size used (10) strongly agree.

In the same way, student-users strongly believed that they had easily understood the content of the developed e-learning module 1 based on the learning targets in each lesson (1), instructions in each lesson (2), ideas or concepts presented in each lesson (4), illustrations guided them easily in following the instructions in the developed e-learning module (5), learning activities in the form of simulation activity to better understand the lesson (6), appreciate the styles of illustration and written expressions (7), they have enjoyed performing and answering the activities as presented in the form of online activities (8), and finally, they found it easier to understand the concepts of electricity using the developed e-learning module as they have strongly agreed on base on their responses. As gathered from Table 6, the student-users' rating responses varied very little.

3.4 *Feedback from Student-Users*

Along with the validity findings of the developed e-learning modules in Science 8 for blended modality validated by teacher-experts and evaluated by student-users, questions were asked to the student-users after they assessed the modules in order to gather feedback, comments, and suggestions in order to draw out the opinions and experiences of the student-users' responses after they had used the newly created resources. Based on their experiences using the developed e-learning modules in Science 8 for blended modality, four (4) themes emerged from the student-users' feedback. They were as follows: Well-Crafted, Engaging, Comprehensible, and Blended Learning.

In general, student-users described their experiences regarding the developed e-learning modules in Science 8 for blended modality through Genyo as entertaining and captivating in exploring the topics presented in the materials and detailed written responses from the transcript. The student-users responded positively when asked about their learning experiences when using the developed e-learning modules in Science 8 for blended modality. The transcript data revealed positive feedback from the student-users' experiences.

Well-Crafted. After the twenty (20) student-users, as part of the research participants, experienced the e-learning modules in Science 8 for blended modality, they shared their thoughts and insights, which revealed the first theme that emerged from the transcript, which is well-crafted. This theme speaks about how the developed e-learning modules' content is appropriately arranged sequentially and how the formats are designed to catch the learners' attention was caught and help them focus on what information is being presented. These factors were of great assistance in making learners build

concentration in all phases of the learning process, especially when they are starting.

When asked, "What are their learning experiences in using the developed e-learning modules in Science 8 for blended modality?" student-users bewailed about their experiences in the context of well-crafted e-learning modules. Student-Users explicitly highlighted how exquisitely developed e-learning modules in Science 8 for blended modality were regarding theme or background, content, format, and others.

Teachers' mastery and integration of learning technologies in designing the learning material is essential, especially in the digital era. One of these abilities is teachers' ability to package learning materials using various software (Delita, 2022) and different instructional materials that could promote effective and meaningful learning. One factor affecting students' mastery of concepts and skills is the manner in crafting the learning resource or materials (Delita, 2022). In this way, the developed e-learning modules in Science 8 for blended modality through Genyo utilizes effective and meaningful learning. E-modules serve as the primary teaching material in online learning and can also be used in face-to-face learning as teacher supports.

A well-crafted module is an independent, adequately arranged, structured learning experience with consistent and clear learning goals. An organized and complete strategy for the learning process is required when designing e-modules. The instructional procedure of designing an e-module emphasizes more than just the content and how the components are meant; the format and content provide an excellent presentation (Hamid, 2021).

Engaging. One more theme that emerged from the transcripts is engaging. The theme pointed out how the developed e-learning modules were interactive and excited the students to explore the next part of each module. The theme emphasized how the learners enjoyed the different activities that led to performing well in every phase of the learning process. Learners feel inspired, engaged, and focused when learning modules generate and boost comprehensive instructions and activities. Students provided positive feedback and exploration based on their experience with the specific aspect of the developed e-learning modules in Science 8 for blended modality that wedged their interest.

Discovering excellent educational materials that are capable of enhancing student comprehension associated with students in the solution of complex, real-world problems is a common problem for instructors.

Authentic, high-cognitive-demand tasks are one way to support students' learning. Tekkumru-Kisa (2015) defines high-cognitive demand tasks as requiring students to "make sense of the content and recognize how a scientific body of knowledge is developed. Students can check their understanding as they progress through the module and tackle complex real-life problems using online hands-on activities (Maggioni, 2020).

Comprehensible. Another theme emerged from the transcripts based on the student-users' experienced in exploring the developed e-learning modules in Science 8 for blended modality is comprehensible. This theme pointed out how the developed e-learning modules' contents are presented clearly, facts and concepts attached were very understandable. Even how the format of the modules aroused students' ability to grasp the things they need so that they can move on to the next part of the learning process. Comprehensibility of the modules greatly affected how students used their knowledge to solve problems and even apply it in real-life situations. The student-users mostly agreed that they quickly understood the topic presented because the modules' content was clearly and correctly arranged. Other student-users supported that the developed e-learning modules in Science 8 for blended modality are comprehensible because of the manner of the arrangement of the contents and even how the information is well-detailed.

In designing a learning material, one essential thing that needs to be considered is how the students' comprehension is affected. According to Deregözü (2021), learning comprehension is critical in the language classroom because it provides the learner with excessive inputs and determines how the learning targets are structured. So, what are the implications for those with limited comprehension? Furthermore, how does a student come to understand? What factors influence student learning compression? Developing learning materials through instructional strategies and combinations of methods that promote comprehensible meaning-focused input development is a mindset to bring to this piece. This instruction will create a different environment for students to work independently outside class (Misnawati, 2023).

Blended Learning. Finally, this theme is the viewpoint of the developed e-learning modules in Science 8 for blended modality through Genyo that appeared from the written transcripts. This theme revealed that the developed e-learning modules in Science 8 for blended modality through Genyo delivers blended learning. In which students learn about various aspects of the face-to-face and online learning processes. Furthermore, blended learning is evident in combining different instructional methods, pedagogical approaches, and technologies during the learners' learning phase (Hrastinksi, 2019).

Moreover, student-users were confident that they do more than just learn by simply giving the learning instructions in one method. According to them, this approach helped them to deeply understand the concepts in Science 8 by engaging in online simulation activities, and at the same time with the presence of the teacher's support and guidance in doing so, as present in their utilization of the developed e-learning modules in science 8 for blended modality through Genyo. This learning approach may develop students' independence in understanding the lesson. What were their observations and other findings in using the developed e-learning modules in Science 8 for blended modality through Genyo? Student-users also pointed out that the modules were thought-provoking and challenged them to explore more, even when they do the activities at home or in school. A student-user found the lesson in the module difficult as he began exploring it. However, by

understanding the given concepts and instructions and with the supported information given by the teacher, he claimed that he learned and even enjoyed it until the end.

Developing an effective blended learning strategy demands careful consideration of the best blend for various learning goals. Blended Learning is more than simply blending face-to-face and online learning instruction. The most challenging aspect is determining the best-blended learning methodologies for achieving different desired learning outcomes. (Sanders, 2023)

Blended learning prompts us to consider the characteristics of digital technology in general and information technology in particular (Dziuban, 2018) and communication technologies (ICTs) in particular.

One of the upsides of Blended Learning is that it can increase access to nontraditional and underserved students by providing a variety of educational resources and experiences to those who might lack access to on-campus resources. (Dziuban, 2018).

However, virtual conferences and face-to-face interactions can be incorporated into today's educational learning environment. Multiple research studies and instances were reviewed to prepare, implement, and evaluate blended Learning classes.

On the other hand, Blended Learning is thought to help learners construct the abilities they need to thrive in today's world, such as interpersonal relationships, knowledge literacy, innovative thinking, teamwork, and the ability to use technological resources for a wide variety of purposes. Blended Learning has many benefits, including increased learning skills, greater access to information, improved satisfaction and learning outcomes, and opportunities to learn from and teach others (Masadeh, 2021).

In summary, the efficacy of Blended Learning as a teaching approach for acquiring essential skills depends on learners being prepared to learn in a blended learning environment (Paudal, 2021). In addition, Blended Learning proves successful if it improves learners' learning performance and efficiency while interacting more easily with their classmates and teachers.

3.5 *The Content Quality of the Developed E-Learning Modules in Science 8 for Blended Modality*

One significant aspect of designing e-learning material is the quality of the content. The content quality's scope is based on consistency with the topics and skills anchored in the DepEd Learning Competencies for that specific level. The content quality adheres to the accuracy of the content, how logically developed it is, and that it can even stimulate and promote the students' critical thinking. Ensure that the language used is suitable for the prospective audience and drives positive traits that aid in developmental progress. It is an effort made by educators to help shape the character of their students. It is included in the lecturer's exemplary behavior when speaking or delivering the material (Rahma, 2022).

Based on the validation results of the teacher-experts of the developed e-learning modules in Science 8 for blended modality through Genyo, they have unanimously marked very

satisfactory with the two materials and have an overall rating of 3.98 for both developed e-learning modules in Science 8 for blended modality. This implies that the two developed e-learning materials' content quality is well-crafted, engaging, comprehensible, and caters to blended learning. This also highlights how the contents of the developed e-learning modules contribute to the upgrading, strengthening, and expertise of the previously determined targets for learning.

3.6 *The Instructional Quality of the Developed E-Learning Modules in Science 8 for Blended Modality*

A well-crafted e-learning module can be reflected based on its instructional quality. Making sure that the purpose is well-defined and it achieves its defined purpose. Additionally, it is significant to check if the difficulty level is appropriate. Students learn best when focused on the learning process (Masadeh, 2021). The preparation of the learning materials should be enjoyable, stimulating, challenging, and engaging based on the applied graphics, colors, and appropriate sounds. From the results of the validation of the teacher-experts to the instructional quality of the developed e-learning modules in Science 8 for blended modality, it was found that the two materials were noticeably very satisfactory and rated 3.90 for the overall instructional quality of the two developed e-learning modules.

Moreover, the blended learning activities in the form of online simulations helped them understand and achieve the learning materials' sole purpose.

3.7 *The Technical Quality of the Developed E-Learning Modules in Science 8 for Blended Modality*

The modules' technical quality can be evident reliant on how the audio enhanced understanding of the concept, the speech, and the narration on the video made is clear and easily understood. Quality in terms of its technicality must be complete in synchronizing the visuals with appropriate music and sound effects for instructional purposes. The visual representation must be straightforward and understandable for interpretation, sustaining excitement while not diverting the user's focus. The structure of the content permits the target user to navigate through the material and use it independently and freely, and the educational content must be considered meaningful and effective. Finally, the material should be free of technical flaws. Learning materials free from technical constraints are sufficient to lead to high learning rates (Seidel, 2023).

The different qualities of the learning material's technicality are reflected in the developed e-learning modules in Science 8 for blended modality. From the results of the validation of the teacher experts to the technical quality of the developed e-learning modules in Science 8 for blended modality, it was found that the two materials were marked very satisfactory that were rated 3.85 for module 1 and 3.88 for module2, as the overall instructional quality of the two developed e-learning modules.

3.8 *Other Findings of the Developed E-Learning Modules in Science 8 for Blended Modality*

The researchers believed that successful, meaningful, and effective e-learning materials depend not only on the content,

instructional, and technical quality but also on the other findings observed by the teacher-experts. It can be seen that the e-learning materials were free of theoretical errors, reality-based errors, grammar errors, and typography mistakes, along with various errors such as mistakes in computation, outdated information, and visual errors. The effectiveness of learning devices is determined by meticulously inspecting them for errors (Buhungo, 2023).

From the observation of the teacher-experts, the e-learning modules were appropriately checked to identify errors that could mislead students from learning the conceptual facts. From the results of the validation of the teacher-experts regarding toe the other observations of the developed e-learning modules in Science 8 for blended modality, it was found that the two materials were noticeable that errors were mostly not present and were rated 3.94 for module 1, and 4.00 for module 2, as to the overall result of the other findings of the two developed e-learning modules.

3.9 *Enhanced Developed E-Learning Modules in Science 8 for Blended Modality*

As the researchers acknowledged the results of the validation and evaluation forms and feedback from the teacher-experts and student-users, these were collected and used to improve the materials based on suggestions and recommendations. Feedback has proven that it is one of those that have the most significant impact on learning, and as a result, it will continue to be positively appreciated. It aims to change students' conceptualization or behavior toward better learning (Omeri, 2023). These were extremely useful in guiding the researchers on what areas for improvement to the developed materials, as they added to the general validity and acceptability of the materials.

Out of the four (4) teacher-experts, only one teacher-expert gave one recommendation to try other resources for motivation in the e-learning module 1, which is to try other resources for motivation in the e-learning module 1. In addition, out of the twenty (20) student-users, only two (2) suggested revisions to the developed modules based on the student-users evaluation results and feedback during their evaluation. The student-user recommends: (1) adding more pictures as examples and making the images big and (2) making the font from the important details bigger so they can study the notes more clearly, especially the students who do not know how to adjust the screen size.

4. SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

This chapter addresses the significant results and their implications, the researchers' conclusion, and the recommendations based on the study's findings.

4.1 *Summary of Findings*

Based on data analysis and interpretation, the following result findings are summarized:

1. What is the validity of the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning as evaluated by the teacher-experts based on the content, quality, instructional quality, technical quality, and other findings?

As reflected in Tables 2.1 and 2.2, the validation results of the developed e-learning module 1 in Science 8 for blended modality using Genyo entitled Electricity and Circuits obtained a very satisfactory remark by the teacher-experts (M = 3.91; SD = 0.15 for Factors A-C, and M = 3.94; SD = 0.13 for Factor D). The average validation ratings of the teacher-experts on the individual aspects of the first developed e-learning module as to the content quality (M = 3.98; SD = 0.05), instructional quality (M = 3.90; SD = 0.20), technical quality (M = 3.85; SD = 0.20), and other findings (M = 3.94; SD = 0.13) of the developed e-learning module revealed similar remarks as very satisfactory material.

Moreover, the second developed e-learning module in Science 8 for blended modality using Genyo entitled Series and Parallel Circuits obtained a very satisfactory remark by the teacher-experts (M = 3.92; SD = 0.12 for Factors A-C, and M = 4.00; SD = 0.00 for Factor D). Similar remarks as very satisfactory material was observed from the average validation ratings of the teacher-experts on the individual aspects of the first discovery-based module as to the content quality (M = 3.98; SD = 0.05), instructional quality (M = 3.90; SD = 0.16), technical quality (M = 3.88; SD = 0.17), and other findings (M = 4.00; SD = 0.00) of the developed e-learning module, as shown in Tables 3.1 and 3.2

2. What is the validity of the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning as evaluated by the student-users based on the format and content?

As reflected in Table 5, The student-user evaluators gave an excellent rating to the evaluation results of the student-users on the developed e-learning module 1 in Science 8 for blended modality through Genyo, titled Electricity and Circuits (M = 4.56; SD = 0.58). The evaluation ratings of the student-users on the aspects of the developed e-learning module 1 in Science 8 for blended modality through Genyo, as to the format (M = 4.49; SD = 0.61) and content (M = 4.63; SD = 0.55) of the developed materials used by the students, were the same as excellent.

Meanwhile, The student-user evaluation of the developed e-learning module 2 in Science 8 for blended modality through Genyo, entitled Series and Parallel Circuits, was excellent (M = 4.51; SD = 0.59). The evaluation ratings of the student-users on the aspects of the developed e-learning module 2 in Science 8 for blended modality through Genyo, as to the format (M = 4.52; SD = 0.61) and content (M = 4.50; SD = 0.66) of the developed materials used by the students, were the same as excellent, as shown in Table 6.

3. What are the comments and suggestions of the teacher-experts on the developed E-learning Modules in Science 8 for Blended Modality using Genyo e-learning?

As presented in Table 4, which were the overall comments and suggestions of the teacher-experts on the key parts of the newly created e-learning modules in Science 8 for blended modality. They commended the completeness and comprehensibility of the learning materials - making it fun, technologically wise, and synchronized in all parts. The e-learning modules promote an innovative way to transfer the

learning to the students and present it based on the learning needs. It was also clear and measurable concerning the contents and goals. Accordingly, it was also intelligently, patiently, and well-prepared. Thus, the modules were presented logically.

Additionally, they admire the technique of catering to the different types of learners. However, one part of the e-learning material needs a strong internet connection to be played. Therefore, they suggested trying other resources.

4.   What is the student-users' feedbacks on developed E-learning Modules in Science 8 for Blended Modality through Genyo e-learning?

Based on the student-users' written feedback in utilizing the developed e-learning modules in Science 8 for blended modality through Genyo, four (4) emerging themes emerged: well-crafted, engaging, comprehensible, and blended learning, as reflected in student-user feedback in Chapter 3.

5.   Based on the study's findings, how can the developed E-learning Modules in Science 8 for Blended Modality through Genyo e-learning be improved?

See the enhanced, developed e-learning modules in Science 8 for blended modality through Genyo in Chapter 3.

4.2 Conclusion

The developed e-learning modules in Science 8 for blended modality through Genyo are highly effective, functioning, excellent and very satisfactory, as validated by four (4) teacher-experts in terms of content quality, instructional quality, technical quality, and other findings, and evaluated by twenty (20) student-users in terms of format and content.

All items pertaining to the aspects for validation and evaluation were agreed upon by the teacher-experts and student-users, implying that the developed e-learning modules in Science 8 for blended modality through Genyo meet the relating factors, essential components and characteristics of added assistance learning material. Based on student-user feedback, the salient characteristics of the developed e-learning modules in Science 8 for blended modality through Genyo were well-crafted, engaging, comprehensible, and blended learning as emerging themes perceived by the student-users.

4.3 Recommendations

The following recommendations have been founded on the results and findings of the research:

1.   Science 8 teachers in higher education institutions may consider validating and utilizing the developed e-learning modules in Science 8 for blended modality through Genyo with their students to execute further its validity and effectiveness in the present learning modality.

2.   Junior High School students, private or public schools, may utilize and evaluate the revised developed e-learning modules in Science 8 for blended modality to determine other student-users' evaluation and feedback of the developed e-learning modules in Science 8.

3.   Future studies are suggested to basic education Science teachers to design and develop e-learning modules to undertake other least-learned Science 8 concepts to keep learners got involved in the educational process as they pursue their learning goals in the present educational setting.

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