Design, Development, and Validation of Kalinangan at Isipang Lokal Sa Asignaturang Pisika Interactive Video Vignettes (Kislap IVVs) as Learning Guides in Physics

Cathlea N. Tongco[1*]

[1]Graduate Program School of Teacher Education, National Teachers College, Manila, Philippines

Corresponding Author: Cathlea N. Tongco[1*]

[1]ORCID ID: 0009-0008-0694-181X

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ABSTRACT

This study aimed to design, develop, and validate Kalinangan at Isipang Lokal sa Asignaturang Pisika Interactive Video Vignettes (KISLAP IVVs) as contextualized learning guides for Grade 9 Physics. Grounded in constructivist and multimedia learning theories, KISLAP IVVs were created to enhance students' understanding of physics concepts by integrating local culture and interactive digital technology. The study followed Borg and Gall's research and development model, incorporating expert validations and iterative revisions. Eight IVVs were developed, each targeting a specific Most Essential Learning Competency (MELC) in Physics, such as projectile motion, momentum, mechanical energy, and heat engines. The contextualization of lessons using familiar local scenarios aimed to make abstract concepts more relatable and meaningful. Pre and post-tests were administered to assess student learning gains, while validation instruments evaluated the IVVs' content, context, interactivity, and applicability. Results revealed that KISLAP IVVs significantly improved students' conceptual understanding and were deemed effective, efficient, and usable by both experts and learners. This project contributes to the pool of localized instructional materials and offers a pedagogically sound and culturally responsive tool for teaching Physics, aligned with the Department of Education's goals for 21st-century, learner-centered education.

Keywords: *KISLAP IVVs, Interactive Video Vignettes, Contextualized Physics Instruction.*

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CHAPTER ONE
PROJECT IDEATION

In the Basic Education Development Plan (BEDP) 2030, the goal is to foster the holistic development of Filipino learners within the realm of basic education. This involves equipping them with 21st-century skills that empower them to self-manage, establish connections, inquire critically, innovate, remain adaptable, and contribute beyond themselves. Emphasizing a sense of pride in their Filipino national identity and commitment to nationhood, learners are encouraged to strive for personal flourishing and the acquisition of essential life skills, economic prosperity, socio-political stability, and unity in diversity. The vision extends to being responsive and competitive, while also promoting sustainable living, guided by the core values of *Maka-Diyos, Makatao, Makakalikasan, at Makabansa* (DepEd Order No.24, s. 2022)

A fundamental aspect of the K-12 curriculum in the Philippines is to enhance its relevance to learners through contextualization and integration. The lessons incorporate a variety of literary forms, such as stories, illustrations, poems, songs, paintings, and other mediums, to depict local culture, history, and reality and go beyond the subject boundaries.

However, due to a history shaped by diverse influences over centuries, Filipino learners often seem to overlook their cultural heritage (Agum, 2020). Within the educational process itself, there is a tendency to place more emphasis on Western and other cultures. For instance, in the previous curriculum, the study of science adopted a discipline-based approach heavily influenced by the concept-based and standards-based structure of the Western education system (Morales, 2014). Science was typically taught in a rational, logical, and analytical manner, assuming that learners could grasp scientific concepts and skills through standard and innovative teaching methods advocated by Western educators, such as the learner-centered paradigm, hands-on and minds-on experiences, and authentic and alternative assessments. Moreover, examples, scenarios, case studies, and presented problems are grounded in Western culture and norms.

However, as highlighted by Abayao in 2003 and emphasized by Morales in 2014, these Western methods and systems might not effectively capture the interest of students, let alone facilitate genuinely meaningful learning. Consequently, to address the challenge of instilling a sense of pride in being Filipino learners, the educational system needs a spark, or in Filipino, *kislap*, to shed light and prevent the rich cultural heritage of the country from fading into obscurity.

Today's world is one in which technology is advancing significantly. It has permeated the educational system, providing a wide range of opportunities for improvement, and fundamentally changing how education develops. Information and communication technology (ICT) has advanced to the point where teaching and learning procedures now provide interactive knowledge environments for abstract topics by utilizing animations and simulations. It thus encourages students to become active learners and allows them to construct and comprehend difficult concepts more easily, especially in science subjects. Students benefit from visual and auditory-rich learning environments, as well as easy access to information when technology is used in education. It has been demonstrated that employing technology in educational settings improves students'academic progress, promotes student-centered education, and is successful in engaging students' attention (Guntur, Setyaningrum, Retnawati, & Marsigit, 2020; Sumadio & Rambli, 2020).

Technology-based learning is gaining prominence in today's classrooms. Due to the fast-changing technological landscape, teachers make a lot of effort to incorporate technology into their lessons to connect students' interests to their learning. According to Haleem et al. (2022), digital technologies have had a significant impact on the educational system. They went on to say that learning landscapes have emerged as a form of instruction that combines several methodologies and allows different itineraries to be presented to each student. As a result, technology makes classroom instruction more engaging and significant.

Teachers have a remarkable opportunity to improve the 21st-century abilities of students in this technologically advanced world by integrating technology into the teaching-learning process. However, technology is not always accessible and cheap. To stay up with evolving educational trends, schools, particularly in the Philippines, struggle to finance software, computer programs, and other technology-related accessories. In addition, when the K-12 was implemented, various challenges including the availability of materials and resources surfaced. In the study by Soriano and Vargas in 2021 on the adequacy of instructional materials, including training of teachers, and the resources upon the implementation of the K-12 program in the Philippines, they found that the materials and training were only moderately adequate, while the facilities and equipment are only adequate. Hence, the need to produce more instructional materials to augment these inadequacies is needed. In that case, teachers are not only encouraged to use technology but also to produce educational materials in order to meet time demands.

To use in the teaching and learning process, the Department of Education (DepEd) encourages all teachers to create localized or contextualized learning resources. The department adheres that better academic success is the result of a learner's involvement with the learning materials. In contextualization, the lesson is intended to integrate basic skills and occupational material by focusing on real-life applications in a specific setting, which can be accomplished through localization or indigenization. In localization, the curriculum-based learning content is connected to local information and utilizes materials that are available in a specific community.

Indigenization, on the other hand, is a method for enhancing learning competencies in connection to the biogeographical, historical, and social setting of the curriculum (Nuqui, 2017 as cited in Lorbis, 2019).

The creation of contextualized learning resources also contributes to addressing the DepEd central office's textbook scarcity (Guidelines on Contextualized Learning Resource Development Processes and Workflow). To encourage teachers to create innovative resources that would improve the teaching-learning process, the Commission on Higher Education (CHED) through CHED Memorandum Order No. 76 series of 2017 (CMO No. 76 s. 2017) has funded a number of projects. However, this endeavor falls short of overcoming the current problems. It's critical to prepare in advance for a more flexible solution (Robles and Acedo, 2019).

In teaching physics, teachers use examples and situations stated in the book to make students understand the concept. Chances are, most of the examples and situations found in the book are not based locally or depict situations in which students do not have a grasp or idea since they are not familiar with them. More creative teachers use examples of certain contexts to help students understand how physics is applied in the real world or to allow the students to explore the concept by participating in activities. In those cases, the teacher either allows students to relate the material through a contextualized exercise or uses an ideal example to sidestep the complexities of the real world. For example, letting the students play marbles or billiards to demonstrate momentum, or alternatively, letting them observe what happens during the game. These may not be practical, yet they are quite successful in conveying fundamental physics principles (Sing, 2011 as stated by Dumanjog in 2019). However, mere observations would lessen student engagement and do not promote active learning.

Through the use of technology, contextualized instructional resources or supplementary learning materials help learners to pave the road to mastery of many abilities that are critical for education and learning (E. C. Jimenez et al, 2020), not to mention that these will avoid the complexities of real-life applications. In addition, technology- enhanced physics learning settings provide chances to promote students' engagement, motivation, and positive attitudes toward science in the digital age (Kapici et al., 2020). Moreover, if these materials promote interactive learning, students will be given due consideration of their abilities and learning pace, giving them immediate feedback, and promoting independent learning (Djamas, et.al., 2021).

One of the most effective interactive learning tools is interactive video vignettes (IVVs). The fundamental idea underpinning IVVs revolves around the development of ungraded web-based assignments, merging the accessibility of internet video with video analysis and personalized interaction similar to a tutorial. Drawing inspiration from successful techniques employed in online learning tools, as evidenced by studies conducted by Cardinale (2020), Arif (2017), and Wright (2016), IVVs represent a cutting-edge approach to instructional design. The use of IVVs in the Philippine educational scene as instructional tools is not new. Several local studies have been done to determine their effectiveness in imparting lessons to Filipino students and teachers as well.

Guiao and Caballes (2023) conducted a study that delved into the perspectives of educators regarding the incorporation of historical vignettes into the teaching of science concepts. Employing a mixed-method approach involving structured interviews and surveys with Likert scale assessments, the researchers gathered valuable insights from 15 science teachers in public schools. The findings of the study unveiled two prominent categories encapsulating the teaching philosophies manifested by educators: a practical, real-life orientation and an experimental, experiential approach. The infusion of historical vignettes into science instruction proved to be instrumental in enhancing students' scientific literacy, critical thinking abilities, learning aptitude, conceptual comprehension, and life skills. Notably, the outcomes indicated a positive impact on the pedagogical strategies employed by the teachers. Furthermore, the approach sparked a keen interest among students to actively engage in societal issues and cultivate a scientific mindset capable of addressing real-world problems. Overall, teachers expressed a high level of satisfaction with this innovative approach, acknowledging its efficacy in facilitating effective science education. However, the study is limited to the perceptions of teachers on the use of IVVs and did not discuss their usability and effect on students as tools of instruction.

In the senior high school education, Del Carmen (2018) innovatively crafted Historical Physics Vignettes (HPV) as an instructional tool tailored for imparting the Nature of Science (NOS) concepts to Grade 12 STEM students in their General Physics 2 classes. Rigorous validation ensued, involving experts who meticulously assessed historical narratives, NOS-relevant elements, guiding questions, linguistic nuances, overall presentation, illustrations, and supplementary activities. The evaluation utilized a researcher-developed criterion-based reference tool to ensure the material's comprehensiveness and effectiveness. In the administered pre-test and post-test evaluations, the results demonstrated a noteworthy disparity in students' Views on Nature of Science (VNOS) before and after the General Physics 2 course, showcasing the positive impact of the HPV intervention. The compelling findings made the researcher conclude that imparting NOS to students not only cultivates a deeper understanding of science content but also influences academic performance. Though, Del Carmen’s study is only focused on historical interactive video vignettes and the respondents are senior high school students, one cannot discount that these IVVs may or may not also be effective in discussing Physics lessons at the junior high school level.

Similarly, a study conducted by Sarmiento (2018) looked into the impact of using Interactive Historical Video Vignettes (IHV) as instructional tools, but this time, in discussing key concepts of matter, atoms, measurement, molecules, and ions in the General Chemistry 1 subject in the Senior High School STEM track of Grade 11 students. Aside from the incorporation of IHVs in the lesson, the researcher also crafted comprehensive lesson plans for teachers' use. Then again, these IVVs are historical in nature and are limited to being used by senior high school students.

In 2022, Cruz spearheaded a transformative initiative at Espiritu Santo Parochial School of Manila, Inc., by introducing the innovative incorporation of historical vignettes.

Employing a qualitative approach, the research focused on the integration of historical vignettes into the teaching of Genetics for grade 9 students. The students were given the flexibility to choose from three formats of historical vignettes: textual, comic strips, and digital storybooks adapted for YouTube. According to the results of the study, the historical vignettes served as a valuable tool in reigniting students' interest in science, particularly in the subject of Genetics. Although the study's respondents catered to junior high school students, particularly Grade 9 students, it should be noted that the vignettes used in the study are historical and are not interactive. It is duly noted that in any instructional material developed, immediate feedbacking and assessment of learning of students are crucial, in which, historical vignettes are not capable of.

Colegio de San Juan de Letran (CSJL) is a private institution situated in Intramuros, Manila, Philippines. It emerged from the fusion of two institutions, Colegio de Niños Huerfanos de San Juan de Letran and Colegio de Huerfanos de San Pedro y San Pablo, with a similar purpose to educate and mold orphans into good Christian citizens. Since its foundation in 1620, CSJL has faithfully lived up to its mission of Dominican preaching through education towards the integral formation of its students anchored on its core values of *Deus, Patria, Letran*. Significantly, in 2018 the Elementary and Junior High School Department (EJHSD) of CSJL was given the Innovations in Quality Education – Learning Methodologies and Delivery Systems for Learning Effectiveness Award in the 6th Excellence in Educational Transformation Awards (EETA) and is currently granted a Level III accreditation by the Philippine Accrediting Association of Schools, Colleges, and Universities (PAASCU). To continuously uphold the quality of the educational programs of the department and check and monitor student proficiency in major subjects such as Science, Mathematics, and English, several assessments were given yearly to the EJHSD students. For the past years, the EJHSD has subscribed to various organizations such as the Asian Psychological Services and Assessment (APSA) for its Standards-Based Assessment (SBA) and in Center for Learning and Assessment Development – Asia (CLAD-Asia) for its K to 12 Learning Assessment. These assessments, along with the formative and summative classroom assessments, are utilized in evaluating the school's curriculum and instructions, assessment, identification, and classification.

In the school year 2021-2022, during the COVID-19 pandemic when classes are held remotely, the EJHSD continued to assess and check student proficiency by administering a test in all subjects that focus on the Most Essential Learning Competencies (MELCs) identified by the Department of Education (DepEd). The teacher-made assessment test was done before the end of the school year to determine student learning outcomes. In Grade 9 science, the teacher gave a forty-item test that covered the concepts that assess these MELCs. Out of these forty items, ten items covered concepts that assess the MELCs that need to be acquired by the Grade 9 students in Physics. Table 1 shows the mean percentage score of each item and the extent of mastery of the seventy-one (71) Grade 9 students who took the test.

Table 1 Extent of Mastery of Students in Grade 9 Physics

Most Essential Learning Competency	**Mean Percentage Score**	**Extent of Mastery**
Describe the horizontal and vertical motions of a projectile.	56.33	Average near mastery
Observe that the total momentum before and after collision is equal.	70.42	Moving towards mastery
Trace and explain the energy transformation in various activities.	59.15	Average near mastery
Perform activities to demonstrate conservation of Mechanical Energy.	64.79	Average near mastery
Ascertain that the total mechanical energy remains the same during any process.	9.86	Very low mastery
Infer that doing work can release heat.	76.06	Moving towards mastery
Demonstrate that heat can be turned to work	23.94	Low mastery
Explain how heat transfer energy	73.23	Moving towards mastery
Describe the energy transmission and distribution from a power station to the community.	80.28	Moving towards mastery
Describe energy transformation in electrical power plants.	61.97	Average near mastery

It can be noted in the table that Grade 9 students of the EJHSD of Letran have not achieved mastery of the MELCs, particularly on the Physics topics. Furthermore, Grade 9 students have low to very low mastery of the concepts of heat and total mechanical energy, respectively. It can also be noted from the overall results of the test, that only the Physics component has attained a very low mastery in the MELCs identified for Grade 9 Science.

During the school year 2022-2023, the EJHSD with the coordination of the Guidance and Counseling Department of CSJL, tapped CLAD-Asia to administer the standardized K to 12 Learning Assessment to students. In Grade 9, eighty-nine (89) students took the assessment in English, Math, and Science that determines a set of standard competencies based on the national curriculum.

Out of these 89 students, 52 or 58.43% of them are identified as beginners according to their proficiency level in Physics which means that they did not master the competencies and need thorough instructional support to learn the lessons on force and motion. Table 2 shows the percentage of correct answers of Grade 9 students in the Physics Learning Competencies based on the report of CLAD-Asia.

Table 2 Percentage of Correct Answers of Students about Force and Motion in Grade 9 Science K to 12 Learning Assessment by CLAD-Asia

	Force and Motion (Grade 9)	
Test Item #	**Learning Competency**	**Percent Correct for the Level**
42	Describe the horizontal and vertical motions of a projectile	28.09 %
43	Describe the horizontal and vertical motions of a projectile	38.20 %
44	Investigate the relationship between the angle of release and the height and range of the projectile	23.60 %
45	Investigate the relationship between the angle of release and the height and range of the projectile	40.45 %
46	Relate the impulse and momentum to collision of object	31.46 %
47	Relate the impulse and momentum to collision of object	44.94 %
48	Infer that the total momentum before and after collision is equal	21.35 %
49	Infer that the total momentum before and after collision is equal	39.33 %
50	Examine effects and predict causes of collision-related damages/injuries	32.58 %
51	Explain energy transformation in various activities/events	51.69 %
52	Perform activities to demonstrate conservation of mechanical energy	31.46 %
53	Perform activities to demonstrate conservation of mechanical energy	24.72 %
54	Infer that the total mechanical energy remains the same during any process	44.94 %
55	Infer that the total mechanical energy remains the same during any process	6.74 %
56	Construct a model to demonstrate that heat can do work	25.84 %
57	Construct a model to demonstrate that heat can do work	38.20 %
58	Infer that heat transfer can be used to do work, and that work involves the release of heat	23.60 %
59	Infer that heat transfer can be used to do work, and that work involves the release of heat	29.21 %
60	Explain how heat transfer and energy transformation make heat engines like geothermal plants work.	30.43 %

Similar to the results of the teacher-made test in 2022, the Grade 9 students have low mastery of concepts in force and motion as per the results of the K to 12 Learning Assessment by CLAD-Asia. This affirms that the Grade 9 students of EJHSD of Letran need thorough instructional support to attain mastery of the learning competencies.

In this light, this project aims to design, develop, and validate instructional materials, particularly interactive video vignettes, that can be used as tools to assist Grade 9 students of the EJHSD of Letran in achieving the MELCs to achieve the content and performance standards in Grade 9 Physics. The *Kalinangan at Isipang Lokal sa Asignaturang Pisika* interactive video vignettes (KISLAP IVVs) will focus primarily on the most essential learning competencies in Grade 9 Physics in the local context serving as learning guides for teaching and learning physics concepts.

- *Alternatives and Solutions*

Students can control how they use interactive multimedia learning materials, which incorporate multiple media such as text, image, voice, video, animation, and simulation (Asysyura, 2023). They can also provide feedback to students, encouraging them to become involved actively in their studies. Although physics principles are abstract, animation and simulation of numerous situations and scenarios that are relevant to students' daily lives might help students understand them. Furthermore, videos in interactive multimedia learning materials can explain physics ideas that students do not understand, allowing them to study independently. Hence, they encourage students' independent learning and critical thinking (Djamas, et al., 2021).

With these in mind, the following learning theories and pedagogies will be considered in the design, development, and validation of KISLAP IVVs.

- *Integrative Approach in the K to 12 Curriculum*

Section 5. E of the Enhanced Basic Education Act of 2013 (RA 10533) serves as the cornerstone for the K to 10 Instructional Design Framework within the K to 12 curriculum. This provision mandates the incorporation of pedagogical methodologies characterized by constructivism, inquiry-based learning, reflection, collaboration, and integration. The MATATAG Curriculum is dedicated to upholding these principles, ensuring the continuation of constructivist, inquiry-based, reflective, collaborative, and integrative teaching approaches as specified in RA 10533 and DepEd Order No. 21, issued in 2019.

Embedded within the K to 12 curriculum's instructional principles, the concept of integration stands out as one of the four essential "4Is" or the four instructional principles. In essence, integrative education entails fusing diverse components into a cohesive whole, leveraging learners' existing knowledge, incorporating real-world scenarios, and fostering connections between various concepts and ideas. This principle serves as a catalyst for students to relate academic content to their daily lives, facilitating a profound understanding of the subject matter. The integrative approach not only encourages connections within a specific curriculum but also extends to other areas of learning, prioritizing interconnectedness over the mere dissemination of isolated facts.

Integrated studies go beyond traditional subject boundaries, allowing students to gain a more genuine and comprehensive grasp of the material. The primary objectives of integration pedagogy are to guide students in making sense of the learning process, discerning the relevance of information, applying acquired knowledge to practical situations, and establishing associations between learned elements. This approach places emphasis on the contextualization of information, enabling learners to navigate the complexities of the world with a more holistic understanding.

➢ *Contextualization in the K to 12 Curriculum*

Within the MATATAG curriculum, a diverse array of pedagogical approaches is strategically employed across various grade levels and learning areas. These encompass differentiated instruction, the explicit teaching (direct instruction) approach, experiential learning, culture-based instruction, and technology-enhanced instruction. Teachers are encouraged to utilize these pedagogies independently or in combination with other teaching methods to ensure the holistic development of learners' 21st-century skills.

Moreover, the MATATAG curriculum emphasizes two pivotal aspects of instructional design: context and connection. These elements significantly influence the planning, delivery, and assessment of the teaching and learning process. Context pertains to the backdrop or setting that shapes how learners grasp information. By anchoring teaching materials in the realm of learners' everyday experiences, context serves to heighten motivation, fostering active participation in learning activities, making learning more relevant to them.

Connection, on the other hand, is dedicated to cultivating understanding and the formulation of transferable knowledge. The objective is for students to construct resilient, adaptable knowledge that can be applied to novel problems and diverse contexts. This approach strives to transcend rote memorization, promoting a deeper comprehension of subject matter and enabling learners to employ their knowledge effectively in real-world scenarios.

In essence, the MATATAG curriculum not only integrates a spectrum of effective pedagogical approaches but also places a strategic focus on contextualizing learning materials and fostering connections to ensure a well-rounded and meaningful educational experience for students.

➢ *Constructivism and Contextual Learning*

Constructivism places a strong emphasis on creating new knowledge through the combination of old knowledge and new knowledge gained through experience or interaction with the world (Kretchmar, 2019). According to Vygotsky (1978), students build their own knowledge through their own experiences and the process of learning, for which they need scaffolding—assistance from peers and adults. According to Topolovcan and Matijevic (2017), acculturation on constructivism can help students develop their critical thinking abilities. Suryawati and Osman (2018) assert that context-based instruction and learning place a strong focus on higher-order thinking, interdisciplinary knowledge transfer, and the gathering, analyzing, and synthesizing of data from many sources. This was also stated in Orozco and Pasia's (2021) study on enhancing the higher-order thing skills of students through contextualization in mathematics.

Contextual learning is built around the constructivist paradigm of teaching and learning. In this method, learning happens when teachers present content in a way that enables students to draw meaning from their own experiences (Hull, 1995). In addition, he stressed that learning only happens when students digest new knowledge or information in a way that makes sense to them. He further claims that this approach to teaching and learning is predicated on the idea that the mind instinctively seeks meaning in context by looking for connections that make sense and seem beneficial. This method acknowledges that the brain searches for the relevance of specific connections with our environment (Imad, 2022; Bath, 2017). On this premise, contextualized learning activities can be carried out not just in the classroom but also in laboratories and, in the future, in the workplace. To create learning environments that are easily applicable to real life, educators must be smart. Students can make connections between unrealistic concepts and regular assignments in authentic contexts in this type of setting. Teachers utilize this technique to connect concepts and lessons with something that their students are already familiar with: relating to or learning in the context of life experience, or association (Sharma, 2020). This helps students in connecting prior knowledge to new information resulting to meaningful learning (Andrews, 2023). At this point, the curriculum should make an effort to support learning in a real-world context. As it will inspire students to connect the concepts they learn to the everyday occurrences that they observe, and experience. In the end, this learning will benefit students, as they will be able to resolve issues or problems that they experience or might experience (Wang, 2023).

➢ *Cognitive Constructivism and Situated Cognition*

Another paradigm of education arose in the 1950s as a result of a change in the theory around the nature of knowledge. With Jean Piaget and John Dewey as key theorists, the constructivist paradigm saw knowledge as something that is created by individuals rather than as something that already exists and can be transferred to learners. According to cognitive constructivism, learning is the process by which meaning is created; it is the way in which people interpret their experiences. This represented a significant departure from the behaviorist and cognitivist paradigms' objectivist presumptions. Although cognitive constructivists continue to be concerned with students' mental models, the overarching goal of education is for students to be able to develop new information by building on prior knowledge from earlier experiences. Because knowledge is actively constructed, learning is depicted as an active discovery process. In order to help students make this discovery, teachers must provide them with the resources they require, support them as they try to combine new knowledge with prior knowledge, and modify the former to make room for the latter. When selecting how to create a curriculum and how to present, sequence, and arrange new information, teachers must consider the knowledge that the learner currently holds, their ability to think and reason, their cultural and socio-economic background, and their personal history.

John Seely Brown is the most well-known proponent of situated cognition, which emphasizes how knowledge is ingrained in the activity, place, and culture in which it was acquired (Renga, 2022; Lave, 2015). Learning is an interactive social process. Instead, as they converse, exchange knowledge, and solve problems with one another during these tasks, people learn through language while interacting with each other through shared activities (a form of socio-cultural learning). However, situated cognition emphasizes the integrative nature of the setting in which the learning activity takes place, where the situation itself co-produces information through activity. This concept is in line with experiential learning in science (Ng, 2019). Situated cognition emphasizes the importance of actual contexts and activities that simulate how the information will be applied in daily life. To give the purpose and motivation for learning, as well as a sustained and complex learning environment that can be extensively explored, this context must be all-encompassing.

- *Sensory Theory and Multi-Sensory Learning*

The fundamental tenet of the sensory stimulation theory is that successful learning happens when the senses are stimulated (Laird, 1985). Laird cites data indicating that humans gain 75% of their information from observation. The second most efficient sense is hearing (about 13%), while the remaining senses—touch, smell, and taste—account for 12% of what we know. Learning can be improved by activating the senses, particularly the visual sense. However, according to this theory, learning is increased when many senses are stimulated. More colors, louder noise, powerful assertions, data presented visually, and the use of a range of techniques and media all contribute to the stimulation of the senses.

The idea behind multisensory learning is that people learn more effectively if they are exposed to different senses while being taught (modality). Visual, auditory, kinesthetic, and tactile - VAKT (i.e., seeing, hearing, doing, and touching) senses are typically used in multisensory learning. Other senses may include balance, taste, and scent. Students engage multiple senses simultaneously during multisensory instruction. Multisensory training gives students more than one approach to creating connections and learning concepts. It is advantageous for all students since they are more likely to retain information as they learn concepts through many senses. Hence, better skill memory is the end outcome (Rostan, et.al., 2020; Alenizi, 2019). For students who have varied learning styles, multisensory learning can be especially beneficial. Students who have trouble with visual or auditory processing, for instance, may find it difficult to acquire new things by only reading or listening. All students have additional ways to connect to what they are studying when using several senses. With multisensory learning, students can more easily gather information, establish links between newly learned information and what is already known, comprehend and resolve issues or problems, and employ nonverbal problem-solving techniques (Morin, n.d.).

Teachers are always looking for technology tools that can improve their students' learning. Though there are several drawbacks, the use of technology in the classroom has been hailed as a terrific tool that has improved student learning. Carstens, et al (2021) mentioned in their study that though there are many positive and negative aspects of the use of technology in the classroom, the teachers found more positive impacts of technology than negative as their students' motivation and engagement were higher with the use of technology. New information technology has made schooling more flexible in terms of time and location (Santiago, Jr. et al., 2021; Kokoç, 2019).

There is evidence that an online lecture that is more interactive than a non- interactive online lecture or a face-to-face lecture may be more effective. Digital education has injected enthusiasm and interactivity into traditional classroom teaching. Students are growing more aware of this shift, actively engaging with both verbal and visual components. This fosters visual learning, particularly beneficial for children. The use of interactive online presentations enhances the depth of understanding during practical sessions in digital classrooms, encouraging students to focus on details. Technological progress in the educational environment grants students increased autonomy and a broader array of choices in shaping their learning journeys (Haleem et al., 2022b). In the study of Magulod (2017), elementary students who are exposed to multi-sensory environments, such as graphics, animation, and video, have substantially more accurate memory than those who only hear or read information . According to the author, mental connections are significantly stronger if the brain can create two mental representations of an explanation, such as "verbal and visual."

- *Cognitive Load Theory and Chunk Theory of Learning*

Cognitive Load Theory (CLT) is a framework for understanding how the human mind processes information and how cognitive load influences learning. It was created in the late 1980s by John Sweller. According to the theory, the quantity of information the human brain can process at any given time is limited. The overall amount of mental effort expended in working memory is referred to as cognitive load. CLT distinguishes three types of cognitive load:

- Intrinsic Cognitive Load: The difficulty of the learning materials or tasks themselves. Some topics or tasks are inherently more complicated, necessitating greater cognitive resources.
- Extraneous Cognitive Load: This is the cognitive load imposed by the instructional design or the manner in which information is presented. Excessive cognitive load can be exacerbated by poorly designed educational materials or superfluous knowledge.
- Germane Cognitive Load: This is the cognitive load related to the actual learning and comprehension process. The mental work necessary to construct a mental model or schema enhances comprehension and retention.

According to CLT, the purpose of instructional design is to efficiently regulate cognitive load. This entails minimizing unnecessary load, maximizing intrinsic load, and encouraging germane load. Using clear and well-organized teaching materials, for example, can help reduce extraneous load, whilst scaffolding and guiding can encourage the formation of a solid mental model, hence increasing germane load.

In practice, educators and instructional designers use CLT principles to develop learning experiences that correspond with learners' cognitive capacity, facilitating effective learning and information retention. In making multimedia presentations, for example, the following are considered given the three types of cognitive load:

- Intrinsic Load: Multimedia presentations often involve a combination of visual and auditory information. The intrinsic cognitive load is influenced by the complexity of the multimedia elements, such as graphics, animations, or narration. If the content is too complex or presented too quickly, it can overload the learner's working memory.
- Extraneous Load: Poorly designed multimedia presentations, with distracting visuals, irrelevant information, or confusing navigation, can contribute to extraneous cognitive load. This can hinder learning by diverting cognitive resources away from the core content.
- Germane Load: Well-designed multimedia can contribute to germane cognitive load by facilitating the construction of mental models. When learners can effectively organize and relate information presented in multimedia, it enhances their understanding and retention.

In the context of Cognitive Load Theory (CLT), "chunking" refers to the strategy of grouping individual pieces of information into larger, more meaningful units or "chunks." The idea is to organize information in a way that reduces the cognitive load on working memory, making it easier for individuals to process and retain information. Working memory has limited capacity, and chunking helps overcome this limitation by allowing individuals to focus on a smaller number of meaningful chunks rather than a larger number of individual elements. When information is organized into meaningful chunks, it becomes easier to encode and retrieve (Angga, et.al., 2022).

In educational settings, instructors often use chunking as a technique to present information. Breaking down complex concepts into smaller, manageable chunks helps students process and understand the material more effectively. Additionally, providing clear structure and organization in learning materials can facilitate chunking and enhance the overall learning experience. The following are examples of how chunking is applied in multimedia presentations:

- Reducing Cognitive Load: Chunking is a technique used to reduce cognitive load by organizing information into meaningful chunks. In multimedia presentations, this might involve breaking down complex concepts into smaller, more digestible segments. For example, presenting information through slides, sections, or modules can help learners process and retain information more effectively.
- Enhancing Learning: Meaningful chunking in multimedia presentations aligns with the principles of CLT. By presenting information in well-organized, coherent chunks, learners can better manage their cognitive load. For instance, breaking down a complex process into a series of steps with visual aids can make the information more accessible and easier to comprehend.
- Visual and Auditory Chunking: Multimedia presentations can leverage both visual and auditory elements for chunking. Visual aids, diagrams, and animations can represent chunks of information, while narration or spoken explanations can complement the visual elements. This multimodal approach helps distribute cognitive load across different channels.

In light of this, multimedia and interactive instructional materials like video vignettes that utilize pertinent visuals. texts, and activities to enhance the ordinary narrative videos may be effective and efficient learning guides in Physics. In addition, presenting the concept in the local context which features the everyday life, scenarios, traditions, beliefs, and literature of the Filipinos would make these materials more relevant and meaningful to learners. Hence, the *Kalinangan at Isipang Lokal sa Asignaturang Pisika* interactive video vignettes (KISLAP IVVs) is a promising supplementary learning guides for Grade 9 students that will cater to the Most Essential Learning Competencies (MELCs) in Physics in the context of local culture. Making these interactive video vignettes meaningful, significant, and relatable to students.

➢ *Design Opportunity*

The concept behind IVVs is to create ungraded web-based assignments that combine the accessibility of internet video with video analysis and the interaction of a personalized tutorial. IVVs use techniques that have been proven successful in using online learning tools (Cardinale, 2020; Arif, 2017; Wright, 2016;). A crucial element of IVVs is user interaction. While there is potential for current online tools to improve learning, none of them are interactive and none provide the same combination of real-world problems, scaffolding, reflection, and feedback that IVVs have. Each online vignette, which will be created using *Vignette Studio*, a free-to-download user-friendly application for making IVVs, addresses a recognized learning competency in physics with required interactive elements, such as analysis, graphing, multiple-choice questions, or question-based branching. These IVVs will take the students 10 minutes or less to finish.

The KISLAP IVVs would cater to the MELCs in Junior High School Grade 9 Physics in the context of local culture. Three considerations will be considered to maximize this project: *Content, Context, and Interactivity.*

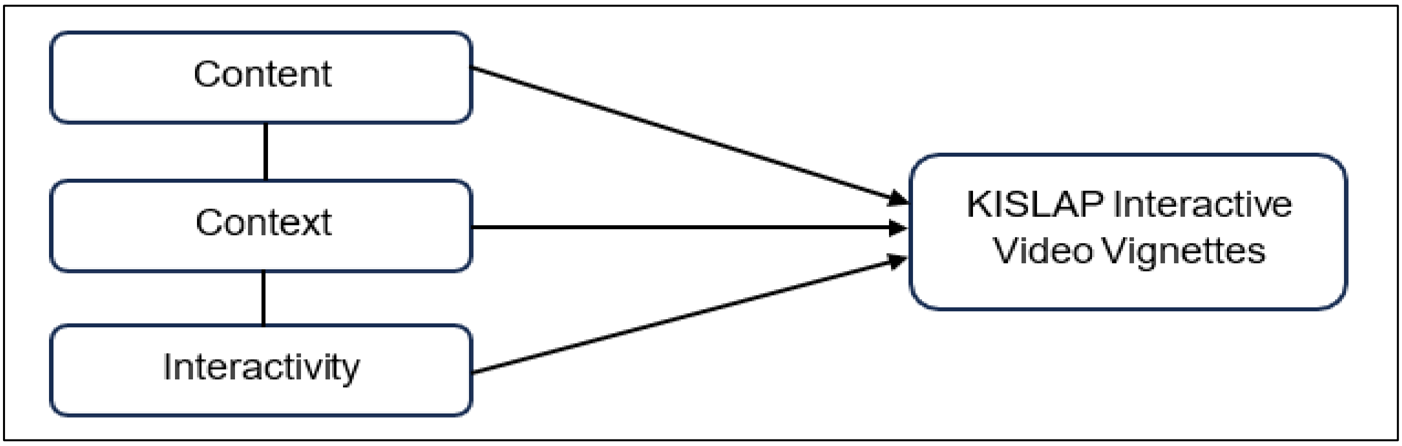

Fig 1 KISLAP Interactive Video Vignettes Conceptual Framework

➢ *Content*

Technology must be thoroughly integrated with subject-matter content, firmly rooted in curriculum objectives, and a part of effective instructional practices (Zulkifli et.al., 2022; Murad et al., 2019;). Likewise, in the study of Zou (2023), it was clearly evident that the fusion of constructivism and technology might revolutionize education, specifically in teaching English.

The KISLAP IVVs will cater to the identified Most Essential Learning Competencies (MELCs) in Physics of Grade 9 junior high school students based on the K- 12 curriculum of the Department of Education. The topics of the learning competencies are projectile motion, impulse and momentum, conservation of linear momentum, conservation of mechanical energy, the relationship among heat, work, and efficiency, and the generation, transmission, and distribution of electrical energy from power plants. In addition, the KISLAP IVVs will address common misconceptions on the topics as presented in various studies. The following table shows the topics in Grade 9 Physics, their corresponding MELCs, and the common students' misconceptions:

Table 3 Topics, the MELCs, and Common Misconceptions in Grade 9 Physics

Topic	Most Essential Learning Competency	Common Misconceptions
Projectile Motion	Describe the horizontal and vertical motions of a projectile Investigate the relationship between the angle of release and the height and range of the projectile	• An object released from constant horizontal velocity follows a linear path. An object falls back from the position where it was released with horizontal constant initial velocity. • From the same height, a released object
		falls before the object at a horizontal
		constant velocity. • The final velocity of an object which is
		released into free fall depends on the
		force of gravity. • An object with greater mass will have a
		greater velocity when released into free
		fall. • The higher the object is released, the
		acceleration is greater because it moves
		more. (Aslan & Büyük, 2021)

Impulse and Momentum	Relate impulse and momentum to collision of objects (e.g. vehicular collision)	• Momentum is only influenced by velocity and mass is not important. • If an object has a bigger mass then the object has a bigger momentum and velocity is not important. • Momentum is not a vector. • The velocity of an object affects the magnitude of the impulse. • Impulse is momentum. (Triyani et al., 2019)
Conservation of Linear Momentum	Infer that the total momentum before and after collision is equal	• If soft objects collide with other objects then momentum doesn't converse. • In momentum conservation, objects must experience perfectly elastic collision. • When two objects with the same mass collide there will be a perfectly elastic collision. • The difference in mass of two objects when colliding is an inelastic collision without regard to the collision. • If two objects where one of the objects has velocity and the other is static after colliding, then the collision is perfectly inelastic collision. (Triyani et al., 2019)
Conservation of Mechanical Energy	Perform activities to demonstrate conservation of mechanical energy	• Energy always conserves on a frictionless surface. • Energy conserves when momentum conserves. When an object is released to fall, gravitational potential energy immediately becomes kinetic energy. Energy can be destroyed when transferred from one object to another. (Liu & Fang, 2017)
The relationship among heat, work, and efficiency	Construct a model to demonstrate that heat can do work Explain how heat transfer and energy transformation make heat engines work	• Heat and temperature are equivalent. • Temperature determines how "cool" or "warm" a body feels. • Heat is a substance transferred between bodies. • Addition of energy as heat always increases the temperature in a body. • Temperature should change in a phase transition (e.g. boiling) since energy is being added or removed. (Self et al., 2008)
Generation, transmission, and distribution of electrical energy from power plants	Explain how electrical energy is generated, transmitted, and distributed.	The electricity made in power plants is just as strong, or the same strength, as electricity that reaches homes. All the electricity that is made in a power plant makes it to our homes. • Stuff or materials that are necessary for life are energy sources. (Salinas, n.d.)

Considering the content and performance standards of each topic, the researcher will design, develop, and validate KISLAP IVVs that will comprehensively and contextually discuss the Grade 9 Physics topics toward the achievement of the MELCs. The researcher will make one (1) KISLAP IVV for each MELC. Hence, the researcher will make a total of eight (8) KISLAP IVVs that will cater to the discussion of the concepts toward the achievement of the identified MELCs in Grade 9 Physics.*Context*

In order to have a substantial impact on sustainability, education should be localized while maintaining a global perspective, as the United Nations Educational, Scientific, and Cultural Organization (UNESCO) emphasized. The promotion of sustainability and the preservation of indigenous knowledge could be facilitated by learning according to the cultural background (Morales, 2014). According to Aikenhead (2001), cross-cultural approaches or cultural integration give students the chance to study science concepts that are taught in the context of the customs of the local culture. While cultural background influences motivation and cognitive style, students' cultural perspectives influence knowledge construction (Morales, 2014). Understanding the cultural context of education and cultural background helps explain how and why students respond in a certain manner to the milieu or learning materials

(Briška & Siliņa-Jasjukeviča, 2020; Mankutty, et al. 2007). The Philippines' rich culture can be advantageous for both students and teachers as it can be integrated into instruction.

For each KISLAP IVV, a specific local scenario featuring the local culture and heritage will be showcased that also shows the identified most essential learning competency. Hence, contextualizing the content and performance standard for each lesson will make the students appreciate more the local culture more, make the learning meaningful, and value the application of physics principles in their everyday life.

➢ *Interactivity*

The cognitive-affective theory of multimedia learning (CTML) (Mayer 1999, 2003, and 2005) integrates cognitive learning theory (CLT) with a number of additional assumptions that have been supported by studies in educational science. First, CTML is predicated on the notion that a learner's working memory has a finite capacity while their long-term memory has an almost infinite capacity. Additionally, it proposes that verbal (texts, explanations) and visual-pictorial (pictures, videos) channels independently express the transmission and processing of information in working memory and that information is processed using verbal and nonverbal as the two primary representation codes (dual coding theory by Clark & Paivio, 1991). Another crucial premise behind CTML is that for learning to be meaningful, the learner must actively engage in the cognitive process.

Ramlatchan (2019) mentioned about a number of key concepts for developing an effective multimedia-learning environment from the empirical research on CTLM from the study of Mayer and Moreno (2003), such as:

- *The multimedia principle:* When both words and visuals are present in an explanation, pupils have the opportunity to develop two different mental representations, a verbal model and a visual model, and as a result, they can build links between them.
- *The temporal contiguity principle*, states that when presenting a multimedia explanation, words and corresponding pictures should be presented concurrently in time rather than separately. When the verbal and visual channels are solicited simultaneously, the mental representations of both channels are maintained concurrently in working memory and, as a result, mental connections between the verbal and visual representations are favored.
- *The principle of spatial contiguity*, which states that similar information, such as representations of the same motion in mechanics, should be spatially adjacent to one another in order to avoid students from losing focus in visual search processes that raise the extraneous cognitive load;
- *The split-attention principle*, which states that words should be presented orally rather than visually to avoid overtaxing the visual information processing system. Instead, the narration should be processed in the verbal information processing system and the animation in the visual information processing system.
- *The coherence principle:* any extraneous material should be excluded as any superfluous information for cognitive resources in working memory competes with the information important for learning, while a shorter presentation leads the learner to select relevant information and organize it productively. This principle connects with the multimedia principle in its recommendation to optimally exploit both the processing channels; The learning environment ought to "promote creative thought, manage essential processing, and reduce extraneous processing."
- *The interactivity principle* states that rather than simply receiving instructions passively, students should be given the chance to actively engage in their education by engaging with the educational materials. By involving the learner in the active pursuit of meaningful learning, interaction promotes the processing of new knowledge.

➢ *Statement of the Problem*

This project aims to answer the question, "*Are locally contextualized KISLAP IVVs applicable and effective as learning guides in Physics?"*. Specifically, it aims to answer the following questions:

- *How were the Following Principles and Theories used in the Design and Development of the KISLAP IVVs?*

✓ Integrative Approach and Contextualization in the K to 12 Curriculum
✓ Constructivism and Contextual Learning
✓ Cognitive Constructivism and Situated Cognition
✓ Sensory Theory and Multi-Sensory Learning
✓ Cognitive Load Theory and Chunk Theory of Learning

- *How did the Experts Evaluate and Validate the KISLAP IVVs in Terms of:*

✓ Content?
✓ Context?
✓ Interactivity?
✓ Applicability?

- *How Suitable are KISLAP IVVs in Terms of:*

  - ✓ Content?
  - ✓ Context?
  - ✓ Interactivity?

- *What is the Extent of the Applicability of the KISLAP IVVs in Terms of:*

  - ✓ Usability?
  - ✓ Effectiveness?
  - ✓ Efficiency?

- *What are the pre-test scores of the Grade 9 students in the physics test before using KISLAP IVVs?*
- *What are the posttest scores of the Grade 9 students in the physics test after using KISLAP IVVs?*
- *Is there a significant difference in the academic achievement in physics of Grade 9 students upon using KISLAP IVVs?*
- *What are the learning gains that are the desired outcomes of each KISLAP IVV?*

- *In light of the findings, what instructional plan or lesson exemplar can be proposed on the effective and efficient use of KISLAP interactive video vignettes as learning guides in Physics?*

➢ *Objectives of the Project*

The project aims to design and develop interactive video vignettes of the most essential learning competencies in Physics in the context of local culture. Hence, it also aims to validate the created KISLAP IVVs' applicability and effectiveness as learning guides for Grade 9 students in Physics. Thus, the validated KISLAP IVVs will add robust contextualized learning resources for students to use in physics lessons. More importantly, this study can be seen as an important undertaking since using such resources can enhance independent learning, allowing students to become self-directed learners who are eager to increase the information or skill acquisition they need to master in the Physics subject.

IVVs as learning tools allow users to privately experience interactivity and "active engagement" in the comfort of personal space, which may be beneficial for students who need remediation and tutorials in a self-paced mode. Hence, using local culture as context/scenario/issue/example in each KISLAP IVV that is related to the learning competency that is being focused on, students will be able to relate, understand, give value, and appreciate how physics concepts are used or evident in the culture of the local community.

Junior high school students will benefit from the vignettes that will be created and validated in this project, both directly (by giving them resources to encourage self-directed learning) and indirectly (by providing physics education researchers with new sources of data that will be used to improve education). Since the vignettes' quality and efficacy are maximized by using research-based development techniques, the study of students' thinking is presenting new directions for future study.

➢ *Scope and Limitation*

This project will focus on the design and development of interactive video vignettes of the Most Essential Learning Competencies in Grade 9 Physics in the context of local culture. As well as on the validation of these created interactive video vignettes' applicability and effectiveness as learning guides for Grade 9 students in Physics. The study does not cover the comparison of KISLAP IVVs versus other video vignettes. Hence, the study will not determine the level of effectiveness of these KISLAP interactive video vignettes on the academic performance and attitude of students in Physics.

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CHAPTER TWO
PROJECT DESIGN AND METHODOLOGY

- *Design Principles*

The KISLAP IVVs will be designed for Grade 9 students for their Physics lessons. Each vignette will be set up in the local context and integrated with the identified Most Essential Learning Competencies in Physics. Interactive video vignettes (IVVs) are based on educational research and incorporate findings from studies on constructivist learning theory and cognitivism. High-quality IVVs are created to encourage learning while doing, involve students in real-world problems, offer scaffolding support, encourage self- reflection on the learning process, change student conceptions, and provide feedback and direction as students progress in the science subject (Teese, 2020; Engelman & Koenig, 2018; Laws, 2015).

To aid in the deep learning of concepts, IVVs employ constructivism and elicit- confront-resolve theories of cognitive learning. Contrary to many instructional videos, IVVs feature live action, demand user engagement, and present a real-world scenario in which a problem needs to be solved. The vignettes' significant and distinctive aspect is that they ask students to make predictions before contrasting those predictions with actual results from experiments. This method may help in generating the cognitive dissonance needed to overcome false information, particularly if experimental findings contradict the original prediction. This study will attempt to engage students in a constructivist model- building activity, acquiring information flow of physics concepts that will prepare them for the future (Wright & Newman, 2011).

Interactive video vignettes are web-based applications created using JavaScript and HTML5. Tablets, laptops, and desktop computers are just a few of the gadgets that can use these technologies. Smartphones can play IVVs, however because of their small screens, it is not advised to do so. IVVs will be produced using *Vignette Studio,* a program or application that can be downloaded for free from Compadre (http://www.compadre.org/IVV/studio.cfm). Users can quickly add images, videos, and multiple-choice questions to certain pages of the vignette using the application package's drop-and-drag interface. Because a user sees a different page based on which of the multiple-choice options they select, the program also enables developers to include branching multiple-choice questions. IVVs will undergo several weeks of postproduction after they are shot. This includes making the final web application and editing videos. Closed captioning can be added to IVVs to make them functional and accessible to users who have hearing impairments. Each IVV begins with an instruction page where users can input their names and concludes with a summary page that shows the user's name, date, the length of time it took them to complete the IVV, and the responses they provided for their final reflections. As evidence that students finished the task, teachers can print or take a snapshot of the final page. IVVs will then be uploaded to the school's internal server. Hence, the IVVs can be uploaded to free websites that run in HTML5.

IVVs are created for online delivery as priming exercises outside of the classroom to get students ready for discussion and problem-solving during class. As with other IVVs, the user must respond to the question before the page will advance. Throughout this IVV, the user is asked for feedback multiple times, and as the user advances through the IVV, the characters also advance in their comprehension of how to construct valid representations of data. The teacher may use the reflection as formative feedback to ascertain which topics the class has grasped, and which still need more explanation. All questions posed to the user are addressed during IVVs, which is another element of IVVs. Additionally, prediction-related questions that involve experiments will be presented on IVVs. The user is prompted to determine whether their initial prediction is validated by the data after they have witnessed the experiment and examined the IVV data. The user must reconcile their original concept with the real evidence when using this method, which leads to cognitive dissonance. The conversation and wrap-up scenes that end each IVV also assist the user in coming to this realization. The user is prompted to consider what they have learned and any remaining questions regarding the subject at the conclusion of each IVV. Constructivist teaching places a high value on reflection because it is seen to reinforce learning. In an IVV, the user has the opportunity to return to any page, allowing students to review or rewatch it as many times as necessary to become familiar with the topic. There is no restriction on how many times a single user may take part in an IVV, therefore students are free to replay the full IVV if they so prefer. They may therefore be useful physics self-learning guides.

IVVs as learning tools allow users to privately experience interactivity and “active engagement” in the comfort of personal space, which may be beneficial for students who need remediation and tutorials in a self-paced mode. Hence, using local culture as context/scenario/issue/example in each KISLAP IVV that is related to the learning competency that is being focused on, students will be able to relate, understand, give value, and appreciate how physics concepts are used or evident in the culture of the local community.

- *Incubation Framework*

This study will use the research and development (R and D) design. The R & D method steps by Borg and Gall in 1983 are shown in Figure 2.

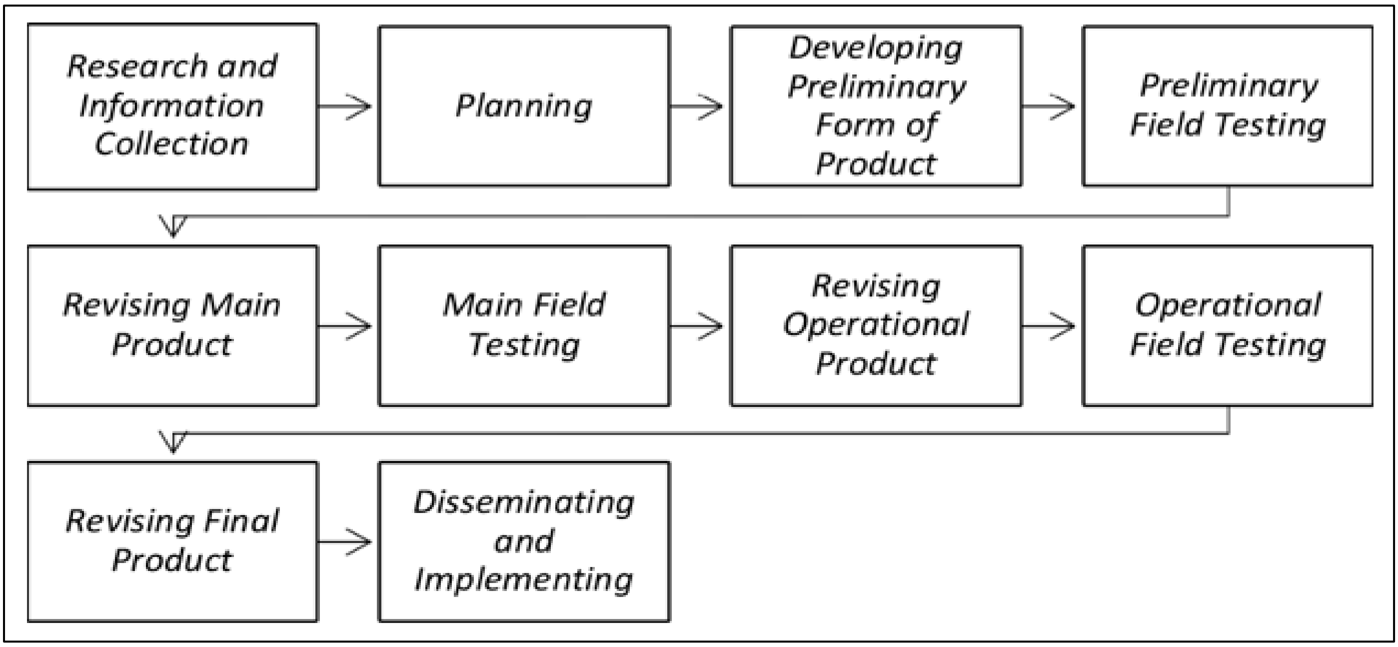

Fig 2 R&D Method Steps (Borg & Gall, 1983)

The Research and Development (R&D) method by Borg & Gall (1983) is among the best model designs. To create and validate their educational products, experts in the field of education used Borg and Gall's (1983) research and development (R&D) methodology. The improvement of educational quality as it relates to the assessment program in the education domain (Gall, Gall & Borg, 2007) and the development of product-oriented research employed in education are also of significance. Gay (1992) further suggested that R&D is primarily used to create effective products for specific school programs including teaching and learning materials and media rather than just evaluating educational theories.

Borg & Gall (1983) suggested 10 steps for using the R&D Method. The steps are arranged in the manner listed below.

- *Research and Information Collection.* The research is initiated by reviewing pertinent literature, analyzing the need, and developing the framework.
- *Planning.* This entails developing knowledge and experience pertaining to the research problem, creating stage-specific objectives, and designing the research stages and necessary feasibility studies.
- *Developing a Preliminary Form of Product.* This process involves preparing and assessing the supporting materials, along with its guidelines and manuals, to create the initial educational product, often known as a "trial product."
- *Preliminary Field Testing.* In order to gather and analyze the data for the next phase, the preliminary product is tested on a small scale with a chosen group of people (3–4) using interviews, questionnaires, or observation.
- *Revising Main Product.* Using the information gathered in step four, the preliminary/trial product is revised. Depending on the outcomes of the trial product, the change may need to be done more than once. Wider testing of the revision is now possible.
- *Main Field Testing.* This process, which is also known as major testing, involves numerous people testing the redesigned educational product on a larger scale (5-15). The qualitative method is frequently used to gather data. For some items, an experimental research design is required in order to obtain exact feedback and data for the following stage.
- *Revising Operational Product.* On the basis of the information gathered in step six, the redesigned product in this phase is revised once more. After that, the product is created as an operational model design that will be tested.
- *Operational Field Testing.* With large groups (30–40), either by questionnaires, observations, or interviews, the operational model is validated. The data serve as the foundation for the final step of product revision. It aims to determine if the model is fully prepared for deployment in educational settings without researchers serving as counselors.
- *Revising Final Product.* The final instructional product is released after being entirely changed using the information obtained in step eight.
- *Disseminating and Implementing.* Through seminars, publications, or presentations to relevant stakeholders, the product is disseminated to the general public, particularly in the education sector.

➢ *Iteration Framework*

The KISLAP IVVs for Grade 9 students in Physics will be the project's outputs. The DepEd's K12 Curriculum Guide's inclusion of the Most Essential Learning Competencies in Grade 9 physics will serve as the study's input variables placed in the context of local culture. Using the R & D design, the researcher would follow the flow and procedures in Figure 3.

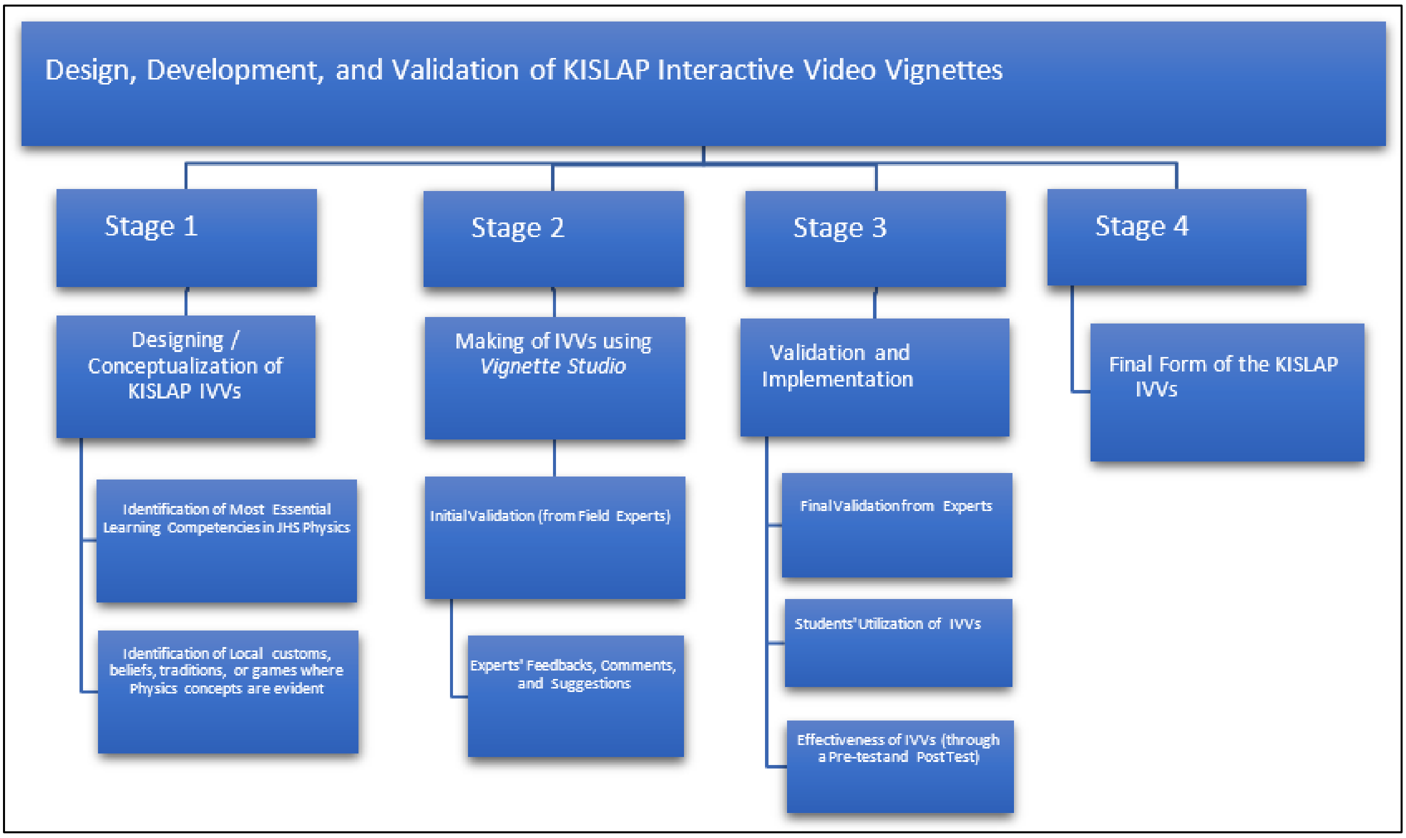

Fig 3 Research Design (Adapted from Robles and Acedo, 2019)

The diagram shows the entire stages of designing KISLAP IVVs to the final form of the vignettes. The design and development of the vignettes will be initiated by the researcher with the help of initial validation from field experts. As the IVVs are being created, field experts' feedback, comments, and suggestions from the initial validation will be considered. After production, the vignettes will be reviewed by field experts for final validation. Likewise, students' feedback and experience in using the IVVs will be noted for the creation of the final form of KISLAP IVVs.

➢ *Implementation Framework*

The KISLAP IVVs will be designed, developed, and validated systematically to ensure their effectiveness and educational value. The following is a general flow of the KISLAP IVVs' design, development, and validation:

- *Needs Analysis:*

✓ Determine the topics in Grade 9 Physics and the corresponding Most Essential Learning Competencies (MELCs) to be covered.
✓ Identify scenarios, events, and culture in the local context that exhibit the identified Physics concepts and are relevant to students.

- *Learning Outcomes Definition:*

✓ Clearly define the desired learning outcomes or objectives for each lesson.
✓ Align outcomes with specific knowledge, skills, or attitudes that the students should gain as determined in the MELCs.

- *Interactive Element Planning:*

✓ Identify where interactive elements can enhance the students' learning experience.
✓ Choose appropriate interactions such as quizzes, simulations, or decision-making scenarios that will target the learning competencies.

- *Storyboarding and Scriptwriting:*

✓ Create a storyboard outlining the flow of information, interactive elements, and assessments. Consider the total length of each KISLAP IVV to be between 6-10 minutes only in creating the storyboard.
✓ From the storyboard, develop a script that aligns with educational objectives and promotes engagement. Ensure that common

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misconceptions or learning difficulties are addressed in the discussion or assessment.
- ✓ Have the storyboard and script validated by experts to ensure comprehensiveness, completeness, and accuracy of information on the Physics concepts.

- *Content Creation:*

- ✓ Using a camera, develop high-quality video content featuring local scenarios, events, or culture that discusses or highlights the Physics concepts toward the achievement of the MELCs.
- ✓ Create supplementary visuals, graphics, or animations to reinforce concepts using Canva or Powtoon.

- *User Interface (UI) Design:*

- ✓ Design a user-friendly interface that guides students through the educational content.
- ✓ Ensure the UI supports a positive learning experience and accessibility to cater to diverse learners.

- *Development of KISLAP IVVs:*

- ✓ Using Vignette Studio, a program or application that can be downloaded for free from the Compadre website (http://www.compadre.org/IVV/studio.cfm), develop the KISLAP IVVs incorporating all the interactive elements and the created videos ensuring alignment with the storyboard and script.

- *Assessment Integration:*

- ✓ Integrate formative and summative assessments within each KISLAP IVV.
- ✓ Ensure assessments align with learning objectives, target the achievement of MELCs, and provide learners with guidance, reinforcement, and meaningful feedback.

- *Developer Testing:*

- ✓ Perform extensive testing to discover any problems with the content, interactions, or assessments.
- ✓ Check that the interactive features are functioning properly.

- *KISLAP IVV Content Refinement:*

- ✓ Incorporate feedback from pilot testing to refine the content and interactive elements.
- ✓ Ensure that the educational content is clear, concise, free from potential barriers to learning, and engaging.

- *Validation of Experts:*

- ✓ Validate the educational effectiveness of the KISLAP IVVs by seeking feedback from subject matter experts, educators, or instructional designers.
- ✓ Let the experts use the KISLAP Interactive Video Vignette Validation Instrument to validate the KISLAP IVVs.

- *Consent and Ethical Considerations Process:*

- ✓ Write a letter of request for study to the Principal of the Elementary and Junior High School Department of Colegio de San Juan de Letran Manila.
- ✓ Request for consent of parents and students to be included in the study through Parent and Student Consent Forms. The Parent and Student Consent Forms state the guidelines for informing the participants on the purpose and output of the study, the plan on how the participants will be informed on their inclusion in the study, the privacy and security of sensitive data, their voluntary participation, confidentiality and anonymity of the participants and addressing ethical and legal dimensions of the process in the collection, analysis, and storage of data.

- *Publishing KISLAP IVVs:*

- ✓ Identify an e-learning platform or hosting solution for the KISLAP IVVs that run HTML5.
- ✓ Ensure compatibility with learning management systems (LMS) if applicable.

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- *Validation Testing:*

- ✓ Conduct validation testing with the Grade 9 students of EJHSD.
- ✓ Evaluate the effectiveness of the educational content in meeting the learning objectives by administering a pretest and a post-test on the lessons covered by the KISLAP IVV.
- ✓ Collect students' feedback by letting them accomplish the KISLAP IVV Instrument.

- *Evaluation and Iteration:*

- ✓ Analyze feedback from the experts, educators, and students about KISLAP IVVs to make iterative improvements.

- *Documentation:*

- ✓ Create documentation for educators and learners, including instructions on using the interactive video and any additional resources for future reference or updates.
- ✓ Disseminate lesson exemplars on how to effectively integrate KISLAP IVVs in lessons, homework, or asynchronous tasks for independent learning.

By following this flow, the KISLAP IVVs will not only be engaging but also effective in delivering educational content of Physics lessons and in achieving the MELCs for Grade 9 students.

In the study, a pretest serves as an evaluative tool to be administered to Grade 9 students prior to their utilization of KISLAP IVVs, while a posttest will be employed after the treatment has been administered. The quasi-experimental pretest-posttest research methodology necessitates equipping participants with identical assessment instruments before and after treatment to ascertain whether any observed changes can be ascribed to the treatment. The test, which will be crafted by the researcher, is designed to gauge the learning progress of the respondents based on their comprehension of the lessons conveyed through KISLAP IVVs. Prior to constructing the test, the content and performance standards of the lesson, along with the pivotal learning competencies, will be clearly defined. The development phase will include the creation of a table of specifications. Following the deployment of the instrument, a *t-test* will be employed to determine the learning gains of students from the KISLAP IVVs.

The researcher intends to adapt the instruments of Acedo and Robles (2019), and Adelana, et. al., (2021), and the themes that are identified in the study of Reyes, et al. in 2019, will be used as a validation tool with minor revisions. Since contextualization and interactivity are the major features of the KISLAP IVVs, the researcher would be including relevance and active engagement as parameters. The adopted instrument's validity and reliability will be determined using Cronbach alpha (formula below), which measures the internal consistency and scale reliability.

Formula

$$\rho_T = \frac{k^2 \overline{\sigma_{ij}}}{\sigma_X^2}$$

ρ_T = tau-equivalent reliability

k = number of items

σ_{ij} = covariance between Xi and Xj

σ_X^2 = item variances and inter-item covariances

After establishing the validity and reliability of the instrument, it will be fielded. From the experts' ratings, the level of the content's validity, acceptability, relevance, and active engagement will be measured. The experts' comments and suggestions regarding the content and extent of applicability of KISLAP IVVs will also be determined. Hence, the effectiveness of the KISLAP IVVs as self-learning guides will be determined through a pre-test and post-test that will be given to the students who will initially utilize the vignettes.

Detailed analyses of the results would allow the refinement of the vignettes, create appropriate assessments of learning, and inform teachers of the common areas of students' misconceptions that can be followed up through additional activities and discussions. These will be disseminated as lesson exemplars on how to effectively integrate KISLAP IVVs in lessons, homework, or asynchronous tasks for independent learning.

➢ *Design Thinking Process*

Responding to the challenge to create contextualized learning resources for students, teachers are looking for tools that they can use in the science classroom. As technology is advancing significantly, and studies have shown that integrating it can develop and enhance the 21st-century skills of students, teachers can use it to develop these contextualized learning resources. Though there are many instructional materials that are available, contextualization is not evident. Hence, these materials do not promote interactivity and relevance to students.

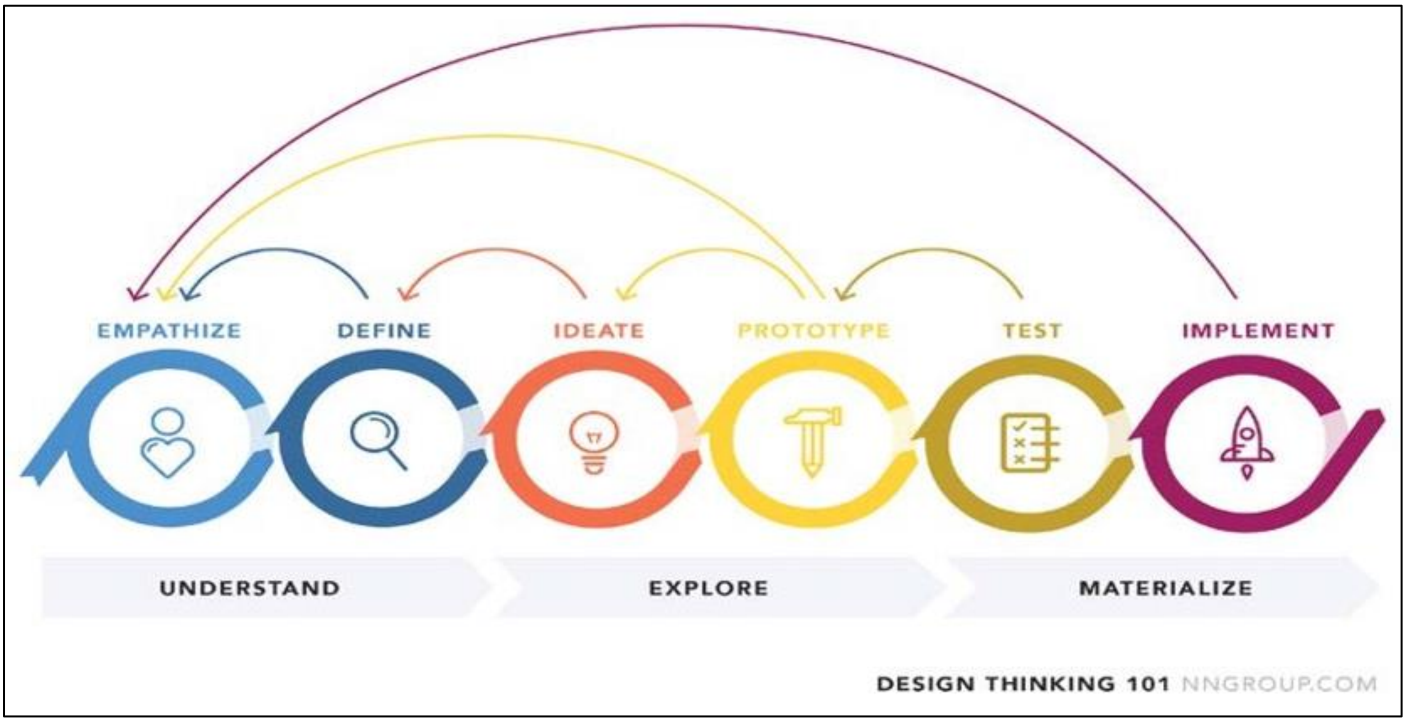

Fig 4 Design Thinking Process (Gibbons, 2016)

In the context of this study, the design thinking process can be applied to various aspects, such as the research questions, methodology, data collection tools, or even the communication of findings.

- Empathize: Responding to the challenge to create contextualized learning resources for students, teachers are looking for tools that they can use in the science classroom.
- Define: Though there are many instructional materials that are available, contextualization is not evident. Hence, these materials do not promote interactivity and relevance to students.
- Ideate: Comes up with the idea to design, develop, and validate Kalinangan at Isipang Lokal sa Asignaturang Pisika interactive video vignettes (KISLAP IVVs).
- Prototype: Creates KISLAP IVVs prototypes that are set in the local context and feature the most essential learning competency in Physics for field experts' and students' testing and feedback.
- Test: Test the KISLAP IVVs to Grade 9 students and empathize with users to gain real insight into their needs
- Implement: Publish the KISLAP IVVs in a website. Let the students access and learn from the interactive video vignettes.

Applying design thinking to the research process helps researchers to be more user- focused, creative, and iterative, ultimately leading to more innovative and effective research outcomes.

For these reasons, the researcher came up with the idea to design, develop, and validate Kalinangan at Isipang Lokal sa Asignaturang Pisika interactive video vignettes (KISLAP IVVs) for Grade 9 students in Physics. These KISLAP IVVs are set in the local context and feature the most essential learning competency in Physics for field experts' and students' testing and feedback. The users' comments and suggestions and the results of validation will be used to revise the KISLAP IVVs before posting on a website.

➢ *Consent and Ethical Considerations Process*

To protect participant rights, guarantee data security, and preserve the integrity of the research, the study will adhere to strict ethical guidelines and procedures. Compliance with institutional and legal frameworks, including the Data Privacy Act of 2012 (Republic Act No. 10173) in the Philippines and the ethical standards for quantitative and qualitative research, will be upheld and prioritized. Important ethical aspects include obtaining informed consent, ensuring voluntary participation, maintaining confidentiality, protecting data, being culturally sensitive, and using technology and AI tools responsibly.

➢ *Informed Consent and Voluntary Participation*

All participants will be asked for informed consent, which will include students' assent and consent from their parents or guardians. The Parent and Student Consent Forms will explicitly state and clearly explain the study's objectives, research methods, duration, potential risks and benefits to the participants, the voluntary nature of participation, and confidentiality measures. Furthermore, the forms will include contact details for both the researcher and the adviser for any questions. To ensure that participants fully understand the study's objectives and expectations, an orientation session will be held prior to data collection. Participants will be made aware that their decision to participate or not will not impact their grades, class standing, or evaluations from their teacher. They will have the option to withdraw at any time without facing any penalties. Those who choose not to take part in the research component involving Interactive Video Vignettes (IVVs) will be offered an alternative educational activity that meets the learning objectives without requiring participation in the research.

➢ *Data Privacy, Security, and Retention*

Strict confidentiality and security protocols will be implemented in this study to handle sensitive and private data in compliance with the Data Privacy Act of 2012. By making sure that all data collecting, processing, and storage procedures adhere to data protection laws, the researcher is dedicated to upholding participants' right to privacy. To avoid identification, all data will be anonymized or pseudonymized, and no personally identifying information will be gathered. Private data will be protected using a built-in encryption tool for Windows that offers full-disk encryption to safeguard sensitive research data. It ensures that all survey responses, interview transcripts, and recorded IVV encounters are secure from unauthorized access. Data will be stored on a secure server with controlled access and multifactor authentication (MFA) in place. MFA is a security measure that requires multiple forms of verification (like a password and a temporary code sent to a registered device) to allow access, providing an additional layer of security against unauthorized entry.

Moreover, password protection will be implemented using complex, randomly generated passwords that are securely stored in an encrypted password manager. Participants will be fully informed about their data rights, including the option to request deletion or correction of their information, as detailed in the study's informed consent process. Any such requests will be documented and addressed promptly, with all necessary updates or deletions performed securely.

Physical recordings, such as handwritten notes or backup storage devices, will be stored in a locked, fireproof filing cabinet with restricted access. Digital recordings and files will be kept on encrypted hard drives or cloud storage with an end-to-end encryption, ensuring that data remains secure during both transmission and storage. Access to all digital data will be strictly limited to the researcher and adviser, and, if necessary, authorized panel members. Any data transmission will utilize secure channels such as Virtual Private Networks (VPNs) or encrypted email services.

At the end of the study, all digital data will be permanently erased using industry-standard data-wiping techniques, which guarantee that deleted data cannot be recovered. Physical documents and storage devices will be securely shredded or disposed of. Data will be kept for a year before being securely erased and shredded using document-shredding techniques. Participants will be given pseudonyms, and the connection between their real names and pseudonyms will be kept in a separate, extremely secure file that will be encrypted and is only accessible by a select group of people with permission.

➢ *Ethical Considerations for Multimedia and AI Usage*

Strict ethical requirements will be followed because the study includes audio and video recordings and to protect participant privacy and confidentiality. Every video file will be encrypted and stored on a secure, restricted-access website. These resources will only be accessible to the researcher and those who have been given permission, and recordings will only be used for research. Participants will be asked for their full written agreement before any recordings are used or shared. Those who choose not to participate in videos will not face any consequences, and their work will not be published. All video data will be completely deleted using encryption-based deletion software after a year of storage.

Using the American Psychological Association's (APA) referencing guidelines, the study will also uphold academic integrity by correctly citing sources, quotations, and literature. To guarantee originality, plagiarism detection software like Grammarly or Turnitin will be utilized. All sources will be appropriately credited, and direct quotes will be correctly referenced and enclosed in quotation marks.

KISLAP IVVs, which incorporate third-party photos, videos, or audio, will comply with fair use guidelines and copyright regulations. Proper licenses or licensing agreements will be obtained before their use, and open-source materials will be appropriately credited. Any AI-generated or software-assisted content, such as simulations or animations, will be transparently disclosed. The research methodology will explicitly recognize the use of AI tools for writing, editing, or data analysis, including Grammarly, Turnitin, and SPSS.

➢ *Participant Well-Being and Cultural Sensitivity*

Though the study does not present any known risks, steps will be taken to reduce potential psychological discomfort from the participants. Clear instructions and guidance will be given to avoid misunderstandings or anxiety from the participants. They will also have the option to take breaks and skip any questions that make them uncomfortable. Furthermore, the researcher will monitor participants during the KISLAP IVVs implementation to detect any signs of distress or discomfort. If any participant needs support, the study will adhere to established intervention practices, such as referring students to school guidance counselors and providing access to mental health resources.

To promote inclusivity, the KISLAP IVVs will showcase a variety of personalities and scenarios that reflect Filipino culture. Care will be taken to avoid stereotypes in language, imagery, and content. Experts will review and validate the KISLAP IVV materials to ensure they are accurate, sensitive, and representative of Filipino culture.

➢ *Addressing the Digital Divide and Technology Access*

Recognizing that some students may have limited access to technology, the KISLAP IVVs will be designed to function on low-bandwidth connections and various devices, including smartphones, tablets, and computers. Students without personal devices will be given alternative access through the school computer laboratory. Any challenges faced by students with varying levels of access will be documented to allow for unbiased analysis.

➢ *Teacher Training and Support*

During the study, a teacher training and support program will be given to teachers who will implement the KISLAP IVVs. This will cover the ethical use of the material, the confidentiality and privacy of data, cultural sensitivity, and the psychological welfare of the students. A pre-implementation training, technical knowledge, and pedagogical workshop hands-on experience are part of the training. Mentorship support will also be provided, and continuous feedback mechanisms will be accessible to teachers. Teachers' autonomy will be respected, ensuring the adaptability of KISLAP IVVs without excessive workload. A post-implementation review will enable reflection and program improvement. Lesson exemplars, which are outputs from the feedback of students and evaluation of experts, will be shared with teachers and future users of the KISLAP IVVs. This project encourages an inclusive, ethical, and sustainable way to integrate KISLAP IVV in science education.

➢ *Transparency and Debriefing*

To maintain transparency and uphold the integrity of this study, a full disclosure of any potential conflicts of interest will be stated in the paper and in the informed consent. This covers any financial, professional, or personal relationships that might affect the research findings or the implementation of KISLAP IVVs. To minimize any influence, the researcher will establish objective oversight to safeguard research participants and to ensure that research is conducted ethically, and all participants will be made aware of any relevant affiliations. The researcher will follow strict ethical guidelines to avoid biases and ensure academic integrity, thereby keeping the study impartial and credible.

At the conclusion of the study, a debriefing session will take place, during which participants will be given instructional materials, a summary of the research findings, and important insights. They will also have the opportunity to provide feedback and ask questions, promoting transparency and the sharing of knowledge.

By putting these thorough ethical safeguards in place, this study guarantees the protection of participants, the security of data, academic integrity, cultural inclusivity, and compliance with ethical standards in research and technology.

CHAPTER THREE
PROJECT OUTCOMES

A. Presentation of Findings

This section presents the results of the impact project titled "Design, Development, and Validation of KISLAP Interactive Video Vignettes (KISLAP IVVs) as Learning Guides in Physics." The findings are categorized according to the three developmental phases of the project: Incubation, Iteration, and Implementation. This structure aligns with the progressive model of impact-based research and development. Each phase presents quantitative data from content validation, student feedback, and academic performance assessments, followed by corresponding analysis interpreted through relevant educational theories and previous research to provide a broader context and implications of results.

➢ *Analysis of Incubation*

The incubation phase marks the beginning of the impact project. At this stage, the content of the KISLAP Interactive Video Vignettes (KISLAP IVVs) was conceptualized, aligned with the Most Essential Learning Competencies (MELCs) in Grade 9 Physics, and drafted into scripts and storyboards. To ensure quality and pedagogical soundness, the initial versions of the IVVs—including their embedded assessment tools—were subjected to expert validation.

The reliability of the KISLAP IVV instrument used in this phase was confirmed through Cronbach's alpha values across five domains: validity, acceptability, relevance, active engagement, and contextualization. Table 4 shows the instrument's strong internal consistency, with all alpha coefficients rated as "acceptable" to "very good." Likewise, the extent of applicability validation of KISLAP IVVs appeared to be "very good" concerning their usability and appropriateness indicators.

Table 4 KISLAP IVV Instrument's Content Validation by Experts

Table Number	Indicators	Cronbach's Alpha	Number of Items	Interpretation
I. Content Validation of KISLAP Interactive Video Vignettes	Validity Indicators	0.867	9	Very Good
	Acceptability Indicators	0.760	5	Acceptable
	Relevance Indicators	0.778	5	Acceptable
	Active Engagement	0.787	6	Acceptable
	Contextualization	0.753	4	Acceptable
II. Extent of Applicability Validation of KISLAP Interactive Video Vignettes	Usability Indicators	0.803	5	Very Good
	Appropriateness Indicators	0.829	5	Very Good

Table 4 shows the validity and reliability analysis of the instrument used to validate the KISLAP Interactive Video Vignettes (KISLAP IVVs). The instrument was composed of structured indicators grouped under six validation areas: validity, acceptability, relevance, active engagement, contextualization usability, and appropriateness. The goal of this analysis was to determine whether the tool was internally consistent and therefore dependable for use in both experts' and students' evaluations of the KISLAP IVVs. Reliability was measured using Cronbach's alpha, a statistical tool that evaluates how closely related a set of items is as a group. The values resulting from the analysis indicate that the tool is a reliable and internally consistent instrument. Specifically, the validity indicators suggest a strong consistency among the nine items used to assess how well the KISLAP IVVs met instructional standards. The other categories, acceptability, relevance, active engagement, and contextualization, received alpha values that indicate acceptable reliability.

These results confirm that the tool is appropriate for evaluating key instructional qualities of digital learning materials. According to Devellis (2016), an alpha of 0.70 or higher is considered acceptable in early stages of research instrument development, and higher values represent increased reliability and consistency of the measurement tool. As for the extent of usability, both sets of indicators yielded alpha values above 0.80, indicating very good internal consistency. This suggests that the items designed to measure the usability and appropriateness of the KISLAP IVVs are consistently understood and responded. The reliability of these indicator groups enhances the credibility of student feedback in the study. This suggests that the tool was well-constructed and appropriate for use in evaluating the effectiveness and applicability of the KISLAP IVVs from the learners' perspective. By confirming the internal consistency of the tool, the study adheres to the standards of rigorous educational research. As Fraenkel and Wallen (2009) emphasize, it is important to establish instrument validity and reliability before data collection in developmental research. Hence, the reliability and validity of the tool ensure that insights drawn from student feedback, specifically their experiences in using KISLAP IVVs, are trustworthy, reproducible, and suitable as guides in the development of instructional materials.

The next step in the incubation phase includes the experts' validation of the KISLAP IVVs' format flow, the KISLAP IVVs' validity, acceptability, relevance, active engagement, contextualization, extent of applicability based on usability and

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appropriateness, and the validation of the pretest and the post-test by the experts.

Table 5 Experts' Validation of the Format Flow of KISLAP IVVs

Format Flow of the Vignette	Mean	Standard Deviation	Verbal Interpretation
Structure and Organization	4	1	Good
Flow and Transitions	4.67	0.58	Very Good
Engagement and Relevance	4.67	0.58	Very Good
OVERALL	4.45	0.3	Very Good

The above table (Table 5) shows the validators' assessment of the format flow of the KISLAP Interactive Video Vignettes (KISLAP IVVs). Both clarity of the flow and transitions and engagement and relevance garnered a mean of 4.67 with a standard deviation of 0.58, which was conferred as very good. On the other hand, the structure and organization got a mean of 4 with a standard deviation of 1, which is verbally interpreted as good. Consequently, the format flow of the KISLAP IVV is acceptable based on the experts' validation ratings. Furthermore, the format and flow of the IVVs were evaluated by experts and rated 4.45 (SD = 0.30), interpreted as *Very Good*, indicating that the design and transitions were smooth and engaging.

These results indicate that the KISLAP IVVs are well-structured, pedagogically coherent, progress logically, sustain learner attention, and maintain content relevance throughout. Although structure and organization received a slightly lower mean, it still falls under the "good" category, suggesting room for minor improvements in visual and sequencing elements. These affirm Clark and Mayer (2011) principles on multimedia learning design, particularly user interface, navigation, and logical sequencing. These factors reduce cognitive overload, making the learners focused on the lesson. Similarly, Mayer (2009) emphasizes that effective flow enhances learner comprehension by supporting dual-channel processing, ensuring visual and verbal elements are presented in a cohesive and timely manner.

As the format flow of the KISLAP Interactive Video Vignettes is deemed acceptable by the experts, the researcher proceeded with creating the scripts and the KISLAP IVVs using the Vignette Studio, which is downloaded for free from the Compadre website. There were eight KISLAP IVVs that covered the MELCs in Grade 9 Physics. The created KISLAP IVVs were then subjected to content validation using the five domains, namely validity, acceptability, relevance, active engagement, and contextualization.

Table 6 Experts' Validation on the Validity of KISLAP IVVs

A. Validity	Mean	Standard Deviation	Verbal Interpretation
1. The KISLAP interactive video vignette covers the most essential learning competencies in Physics in junior high school.	4.67	0.58	Strongly Agree
2. The KISLAP interactive video vignette meets the current objectives of the lesson.	5	0	Strongly Agree
3. The KISLAP interactive video vignette is appropriate for students.	5	0	Strongly Agree
4. The KISLAP interactive video vignette is accurate and detailed.	4.67	0.58	Strongly Agree
5. The content of the KISLAP interactive video vignette is adequate for communicating physics concepts effectively to students in less time.	4.67	0.58	Strongly Agree
6. The KISLAP interactive video vignette is adequate in terms of instructional delivery.	4.33	1.15	Strongly Agree
7. Students can rely on the KISLAP interactive video vignette to learn physics concepts effectively.	4.33	0.58	Strongly Agree
8. The KISLAP interactive video vignette promotes higher-level thinking.	4.33	1.15	Strongly Agree
9. The assessments and activities in the KISLAP interactive video vignette are appropriate for students.	4.67	0.58	Strongly Agree
OVERALL	4.63	0.55	Strongly Agree

Table 6 shows the validity assessment of the validators of the KISLAP interactive video vignette (KISLAP IVVs) using nine key indicators. The KISLAP IVVs received an overall mean score of 4,63 and a standard deviation of 0.55, interpreted as "strongly agree", indicating a high level of agreement among experts on the instructional soundness and curriculum alignment of the vignettes. Notably, three items achieved a perfect mean score of 5.00: the IVVs meet current lesson objectives, are appropriate for students, and align with the Most Essential Learning Competencies (MELCS). These top ratings affirm that the KISLAP IVVs' instructional relevance and content accuracy, ensuring they address core competencies in Grade 9 Physics as prescribed by the Department of Education. Though slightly lower, the indicators on higher-order thinking skills and instructional delivery still fall within the "strongly agree" range, suggesting that the KISLAP IVVs also support cognitive engagement and conceptual understanding. According to Lardizabal et.al. (1991), valid instructional materials must be aligned with objectives, developmentally appropriate, and conceptually accurate. The findings here echo this, confirming that KISLAP IVVs are suitable not just for content delivery but also for fostering deeper understanding. Furthermore, Bruner's (1996) theory of constructivist learning highlights the importance of well-designed materials in scaffolding knowledge construction, another function the KISLAP IVVs effectively fulfill.

The high validity ratings establish that the KISLAP IVVs are curriculum-aligned, learner-appropriate, and pedagogically robust. This supports the study's goal of creating contextualized video-based resources that are both efficient and effective in delivering Physics content. Since validity directly affects the credibility of instructional materials, these results confirm that KISLAP IVVs can be confidently adopted in classroom settings and are poised to contribute meaningfully to improve student academic performance.

Table 7 Experts' Validation on the Acceptability of KISLAP IVVs

B. Acceptability	Mean	Standard Deviation	Verbal Interpretation
1. The contents of the KISLAP interactive video vignette are suitable since they provide systematic explanations that are aligned with the curriculum guide.	4.33	0.58	Strongly Agree
2. The explanations in the KISLAP interactive video vignette are acceptable and suitable to students' level of understanding as they enhance their skills.	4.33	0.58	Strongly Agree
3. The concepts in the KISLAP interactive video vignette are appropriately and accurately explained. They are free from grammatical errors.	4.33	0.58	Strongly Agree
4. The overall KISLAP interactive video vignette captures the main objective and is acceptable to students with different learning styles.	4.67	0.58	Strongly Agree
5. Overall, the KISLAP interactive video vignette is a creative approach that allows the viewer to understand vital concepts worth remembering.	4.67	0.58	Strongly Agree
OVERALL	4.47	0.46	Strongly Agree

Table 7 shows the acceptability assessment of the validators for the KISLAP interactive video vignette (KISLAP IVVs). The validators greatly agreed that it captures the main objective and is acceptable to students with different learning styles, and overall, it is a creative approach that allows the viewer to understand vital concepts worth remembering, garnering the highest mean of 4.67 with a standard deviation of 0.58, which is verbally interpreted as strongly agree. This confirms that the materials are widely acceptable for use in classroom settings across varying student needs. The results affirm that the KISLAP IVVs are engaging and pedagogically inclusive, qualities that are important in modern, learner-centered instruction. Validators agreed that its contents are suitable since they provide systematic explanations that are aligned with the curriculum guide, the explanations are acceptable and suitable to students' level of understanding as they enhance their skills, and the concepts in it are appropriately and accurately explained. They are free from grammatical errors with the lowest mean of 4.33 and a standard deviation of 0.58, which is still verbally interpreted as strongly agree. This indicates consistent agreement on the systematic presentation of concepts, appropriateness of explanations for student understanding, and the accuracy and grammatical quality of the content. These results suggest that the KISLAP IVVs meet professional expectations for language, structure, and instructional clarity. As Clark and Mayer (2011) points out, instructional materials are considered acceptable when they are not only accurate and complete but also accessible to learning according to varying learning styles or preferences. The findings also agree with Lardizabal et al. (1991), who emphasized that materials should be creative, organized, and tailored to learners' comprehension levels to be considered as instructionally acceptable.

These findings establish that the KISLAP IVVs are not only valid in terms of content but also highly acceptable in terms of presentation and learner adaptability. Acceptability is a crucial metric because it determines the extent to which instructional materials can be confidently adopted and sustained in real classroom environments. The strong expert consensus affirms that KISLAP IVVs are ready for practical use and are well-suited to the diverse cognitive and cultural needs of the Filipino learners.

Table 8 Experts' Validation on the Relevance of KISLAP IVVs

C. Relevance	Mean	Standard Deviation	Verbal Interpretation
1. The contents of the KISLAP interactive video vignette are essential to students since they provide relevant discussions on the subject matter.	4.67	0.58	Strongly Agree
2. The KISLAP interactive video vignette can be considered an essential tool to achieve better retention of students' learning.	4.67	0.58	Strongly Agree
3. The KISLAP interactive video vignette is relevant because it reinforces or supplements concepts necessary for mastery.	4.67	0.58	Strongly Agree
4. The overall discussion in the KISLAP interactive video vignette provides a substantial explanation and gives an explicit discussion of the subject matter.	4.33	1.15	Strongly Agree
5. In general, the objective/s of the KISLAP interactive video vignette is/are relevant and aligned with the skills and competencies in the curriculum guide.	4.67	0.58	Strongly Agree
OVERALL	4.6	0.69	Strongly Agree

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The previous table shows the relevance assessment of the validators to the KISLAP interactive video vignette (KISLAP IVVs), assessing whether the materials contribute meaningfully to content mastery, curriculum alignment, and learning retention. The validators greatly agreed that its contents are essential to students since they provide relevant discussions on the subject matter, it can be considered an essential tool to achieve better retention of their learning, and it is relevant because it reinforces or supplements concepts necessary for mastery, garnering the highest mean of 4.67 with a standard deviation of 0.58 which is verbally interpreted as strongly agree. On the other hand, the validators least agreed that the overall discussion provides a substantial explanation and gives an explicit discussion of the subject matter, with the lowest mean of 4.33 and a standard deviation of 1.15, which is still verbally interpreted as strongly agree. In general, the KISLAP IVVs got a mean score of 4.6 and a standard deviation of 0.69, which means that the experts affirmed the KISLAP IVVs as highly relevant to the intended Grade 9 Physics curriculum. These findings align with Morales (2014), who emphasized that contextualized materials must remain grounded in curriculum standards and be directly relevant to learners' conceptual needs. The high ratings on reinforcement and retention also support Suryawati and Osman's (2018) claim that learning resources with strong contextual and conceptual alignment significantly improve student understanding and engagement. Moreover, relevance in instructional design ensures that materials do not just deliver information, but do so in a way that is timely, applicable, and useful to learners, qualities that are deemed present in the KISLAP IVVs as reflected in the high expert ratings.

The results confirm that the KISLAP IVVs are not only accurate and engaging but also educationally significant in the way they support concept mastery and curriculum goals. High relevance is critical to instructional impact, as it ensures that learning materials address what students need to know and can apply in real-life or academic settings. These findings strengthen the KISLAP IVVs' role as a curriculum-aligned and outcomes-driven resource, validating their use as effective support tools in Physics education.

Table 9 Experts' Validation on the Active Engagement of KISLAP IVVs

D. Active Engagement	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. The lessons, activities, content, and procedures in the KISLAP interactive video are effective in motivating students to acquire physics knowledge.	4.33	0.58	Strongly Agree
2. There is a balanced use of graphics, text, and sound which are appealing to the sense of sight in the KISLAP interactive videos.	4.33	1.15	Strongly Agree
3. The multimedia used is clear, simple to understand, and effective in communicating the concepts of physics.	4.67	0.58	Strongly Agree
4. The colors, background, and font styles are appealing and captivating.	4.33	1.15	Strongly Agree
5. The use of animations/videos is well-positioned and appropriate.	4.67	0.58	Strongly Agree
6. The KISLAP interactive video is easy to navigate, and the directions given on the opening screens are easy to follow.	4.67	0.58	Strongly Agree
OVERALL	4.5	0.6	Strongly Agree

Table 9 shows the active engagement assessment of the validators to the KISLAP interactive video vignette (KISLAP IVVs). The validators greatly agreed that the multimedia used is clear, simple to understand, and effective in communicating the concepts of physics, the use of animations/videos is well-positioned and appropriate, and it is easy to navigate, and the directions given in the opening screens are easy to follow, garnering the highest mean of 4.67 with a standard deviation of 0.58 which is verbally interpreted as strongly agree. On the other hand, the validators least agreed that the lessons, activities, content, and procedures in the KISLAP interactive video are effective in motivating students to acquire physics knowledge, There is a balanced use of graphics, text, and sound which are appealing to the sense of sight in the KISLAP interactive videos, and the colors, background, and font styles are appealing and captivating with the lowest mean of 4.33 and a standard deviation of 1.15 which is still verbally interpreted as strongly agree. At large, with a mean score of 4.5 and a SD of 0.6, the validators strongly agree that the KISLAP IVVs promote active engagement with their users. These results align with Mayer's (2009) Cognitive Theory of Multimedia Learning, particularly the modality, redundancy, and multimedia principles, which emphasize that combining visuals and narration, if done well, enhances engagement and understanding. Similarly, Clark and Mayer (2011) argue that learners stay focused and comprehend better when visual and verbal elements are designed for interaction and emotional engagement.

Active engagement is a keystone of effective digital instruction. The high expert ratings confirm that the KISLAP IVVs are not only pedagogically sound but also visually and cognitively stimulating, making them suitable for today's multimedia-savvy learners. These findings support the goal of the study to develop learning materials that go beyond information delivery to actively motivate, involve, and sustain student attention, which are key components of the 21st-century teaching and learning.

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Table 10 Experts' Validation on the Contextualization of KISLAP IVVs

E. Contextualization	Mean	Standard Deviation	Verbal Interpretation
1. Students can relate to the real-life situations in the KISLAP interactive video vignettes.	5	0	Strongly Agree
2. The KISLAP interactive video vignettes are based on students' experiences or experiences of the community.	5	0	Strongly Agree
3. The KISLAP interactive video vignettes showcase materials that are found in the surroundings or in the community that students are familiar with.	5	0	Strongly Agree
4. The KISLAP interactive video vignettes use local information, and present local culture, beliefs, and/or traditions.	5	0	Strongly Agree
OVERALL	5	0	Strongly Agree

The above table shows the contextualization assessment of the validators of the KISLAP interactive video vignette (KISLAP IVVs). The validators strongly agreed on all indicators, garnering a mean of 5.0 with a standard deviation of 0, which is verbally interpreted as strongly agree. This indicates that the KISLAP IVVs are contextualized to real-life situations and present local culture and experiences of the community. The consistency of responses (shown by no variation in standard deviation) reinforces the validity of this rating and reflects a strong consensus on the KISLAP IVVs' alignment with students' lived experiences This result aligns with Vygotsky's (1978) sociocultural theory, which emphasizes that learners make meaning more effectively when concepts are mediated through culturally relevant and socially embedded contexts. Similarly, Morales (2014) argues that contextualization strengthens both motivation and comprehension because students see their identity and reality reflected in the content. Furthermore, Suryawati and Osman (2018) affirm that contextualized science instruction significantly improves the transfer of learning by connecting abstract scientific ideas to community-based and daily experiences. The KISLAP IVVs embody this principle, making Physics more relatable, understandable, and meaningful to Filipino learners.

Overall, the experts agree that the KISLAP IVVs are valid, acceptable, relevant, promote active engagement, and are contextualized on local culture. The experts' rating on contextualization confirms that the KISLAP IVVs are not only academically valid and engaging but also culturally responsive. This is highly relevant to the study's goal of developing localized instructional materials under the Department of Education's mandate for contextualized learning. By embedding Filipino locale, traditions, and relatable scenarios into the videos. The KISLAP IVVs help bridge the gap between curriculum content and the students' everyday realities, thereby enhancing relevance, inclusivity, and learner identity in science education.

The KISLAP IVVs are also validated by experts in terms of the extent of their applicability, considering their usability and appropriateness. The following tables show the validation results of the experts with regard to KISLAP IVVs' usability and appropriateness.

Table 11 Experts' Validation on the Usability of KISLAP IVVs

A. Usability	Mean	Standard Deviation	Verbal Interpretation
1. The KISLAP interactive video is an innovative material used to reinforce students' learning.	5	0	To a Very Large Extent
2. The KISLAP interactive video may be used to maximize students' learning, beneficial in enhancing their 21st-century skills.	4.67	0.58	To a Very Large Extent
3. The content of the KISLAP interactive video may be used as a tool in helping the viewers understand a series of concepts worth remembering.	4.67	0.58	To a Very Large Extent
4. The message of the KISLAP interactive video is comprehensive and is useful to enhance students' learning.	4.67	0.58	To a Very Large Extent
5. The KISLAP interactive video is suitable for students' learning styles and preferences. Hence, it is helpful to both students and teachers.	5	0	To a Very Large Extent
OVERALL	4.8	0.35	To a Very Large Extent

Table 11 shows the contextualization assessment of the validators of the KISLAP interactive video vignette (KISLAP IVVs), measuring how functional, adaptable, and supportive the materials are for learners and teachers. The validators assessed to a great extent that it is an innovative material used to reinforce students' learning, garnering the highest mean of 5 with a standard deviation of 0, which is verbally interpreted as a very large extent. On the other hand, the validators assessed the least extent that it may be used to maximize students' learning, beneficial in enhancing their 21st-century skills, its content may be used as a tool in helping the viewers understand a series of concepts worth remembering, and its message is comprehensive and is useful to enhance students' learning with the lowest mean of 4.67 and a standard deviation of 0.58 which is still verbally interpreted as a very large extent. Overall, having a mean score of 4.8 and a SD of 0.35, the KISLAP IVVs are deemed to be usable to a very large extent by the validators. This indicates strong and consistent consensus among validators that the KISLAP IVVs are highly usable educational tools, and adaptable to varied instructional needs and learner styles which are key qualities in inclusive and differentiated instruction. These findings are strongly supported by Clark and Mayer (2011), who stress that usability in e-learning materials encompasses ease of access, instructional clarity, and cognitive engagement. Furthermore, Carstens et al. (2021) emphasize the importance of digital learning tools being user-centered, learner-friendly, and versatile across diverse contexts—principles that the KISLAP IVVs clearly satisfy based on expert judgment.

High usability is critical in determining the practical effectiveness and classroom readiness of instructional resources. The validation results affirm that the KISLAP IVVs can be seamlessly integrated into real-world teaching and learning environments, enhancing both student comprehension and instructional delivery. This is especially important given the shift toward flexible, technology-enhanced education models under the MATATAG curriculum and post-pandemic learning reforms. The findings further validate that KISLAP IVVs are not only pedagogically sound but also highly implementable, making them valuable tools for both teachers and learners.

Table 12 Experts' Validation on the Appropriateness of KISLAP IVVs

B. Appropriateness	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video will help students understand better their current lesson.	4.67	0.58	To a Very Large Extent
2. The KISLAP interactive video is appropriate that aid the students in developing their critical thinking skills.	5	0	To a Very Large Extent
3. The KISLAP interactive video is a useful supplementary material for reinforcement and application of new learning.	4.67	0.58	To a Very Large Extent
4. The overall quality of the KISLAP interactive video presented is effective and free from grammatical errors.	4.67	0.58	To a Very Large Extent
5. As a whole, the KISLAP interactive video is considered valid, effective, relevant, and useful to both students and teachers.	4.33	0.58	To a Very Large Extent
OVERALL	4.67	0.31	To a Very Large Extent

Table 12 outlines expert evaluations on the appropriateness of the KISLAP interactive video vignette (KISLAP IVVs) in relation to content suitability, instructional effectiveness, and alignment with cognitive and pedagogical goals. The validators assessed to a great extent that, as a whole, it is appropriate that aid the students in developing their critical thinking skills, garnering the highest mean of 5 with a standard deviation of 0, which is verbally interpreted as a very large extent. On the other hand, the validators assessed the least extent that, as a whole, it is considered valid, effective, relevant, and useful to both students and teachers, with the lowest mean of 4.33 and a standard deviation of 0.58, which is still verbally interpreted as a very large extent. In general, having a mean of 4.67 and a standard deviation of 0.31, the KISLAP IVVs are deemed to be appropriate for use to a very large extent.

These findings are supported by Bruner's (1996) view that instruction should be developmentally appropriate and intellectually engaging to be effective. Moreover, Wright and Newman (2011) stress that well-designed digital learning resources should not only deliver knowledge but also stimulate independent and critical thinking. The strong ratings on appropriateness show that the KISLAP IVVs fulfill both roles effectively. Additionally, Lardizabal et al. (1991) emphasize that for learning materials to be considered appropriate, they must match learners' cognitive levels, reflect classroom realities, and support lesson continuity—criteria met according to expert judgment.

The high appropriateness ratings confirm that the KISLAP IVVs are pedagogically sound and instructionally aligned, making them well-suited for classroom integration. Appropriateness is a key criterion for instructional impact because it ensures that learners can connect with, comprehend, and benefit from the material in ways that reinforce core competencies. The validation supports the study's overarching aim: to develop contextualized, learner-responsive materials that are both technologically innovative and instructionally practical for Filipino junior high school science education.

The last phase in the incubation stage is the experts' validation of the pretest and the posttest. The tests were constructed covering the Most Essential Learning Competencies (MELCs) of Grade 9 Physics. A table of specifications was created to make sure that the tests cover all skills required by the DepEd for Grade 9 Physics. The following table shows the results of the experts' validation of the pretest and the posttest.

Table 13 Experts' Validation of the Assessment Tools (Pretest and Posttest)

A. Tests	Mean	Standard Deviation	Verbal Interpretation
Clarity of Directions and Questions	4.67	0.58	Very Good
Test Items	5	0	Very Good
Objectivity	5	0	Very Good
OVERALL	4.89	0.19	Very Good

Table 13 shows the validators' assessment of the pre- and post-tests of the KISLAP Interactive Video Vignettes (KISLAP IVVs). All clarity of directions and questions, test items, and objectivity were conferred as very good. The overall mean is 4.89, and the standard deviation of 0.19 suggests that the pre- and post-tests are very good. These findings established the foundational reliability of the KISLAP IVVs, including the quality of instructional content and the robustness and validity of the tools to be used in the succeeding implementation phase.

These results align with DeVellis (2016) and Fraenkel and Wallen (2009), who emphasize that for an assessment to be considered reliable and valid, it must exhibit clarity, fairness, and alignment with the instructional goals. The expert consensus suggests that the pretest and posttest tools used in this study meet these essential criteria. Moreover, clear and objective test items are central to collecting credible and actionable data, especially in pre-experimental designs such as pretest-posttest setups. According to Tavakol and Dennick (2011), reliability in testing instruments is crucial to ensure that any observed learning gains are due to the intervention (KISLAP IVVs) and not a result of flawed or ambiguous questions.

The validation results confirm that the pretest and posttest tools used in the implementation phase are both technically sound and instructionally appropriate. This is highly relevant to the study, as these tools served as the primary instruments for measuring the cognitive impact of the KISLAP IVVs. The strong expert endorsement adds credibility to the findings that showed significant improvement in student performance and post-intervention. Therefore, the validated assessment tools reinforce the study's claim that the KISLAP IVVs are effective in enhancing conceptual understanding and can be reliably evaluated through well-constructed instruments.

➢ *Analysis of Iteration*

In the iteration phase, the refined versions of the KISLAP IVVs were introduced to a sample group of Grade 9 students. This phase aimed to evaluate the content validity, usability, appropriateness, and reliability of the materials from the learners' perspective.

For the content validation, the students score the KISLAP IVVs using the expert-validated KISLAP IVV tool based on the indicators covering the five domains of validity, acceptability, relevance, active engagement, and contextualization. The following tables show the results of the validation.

Table 14 Students' Validation on the Validity of the KISLAP IVVs

A. Validity	Mean	Standard Deviation	Verbal Interpretation
1. The KISLAP interactive video vignette covers the most essential learning competencies in Physics in junior high school.	4.22	0.78	Strongly Agree
2. The KISLAP interactive video vignette meets the current objectives of the lesson.	4.27	0.77	Strongly Agree
3. The KISLAP interactive video vignette is appropriate for me.	4.27	0.75	Strongly Agree
4. The KISLAP interactive video vignette is accurate and detailed.	4.15	0.77	Agree
5. The content of the KISLAP interactive video vignette is adequate for communicating physics concepts effectively to me in less time.	4.07	0.97	Agree
6. The KISLAP interactive video vignette is adequate in terms of instructional delivery.	4.09	0.87	Agree
7. I can rely on the KISLAP interactive video vignette to learn physics concepts effectively.	4.3	0.74	Strongly Agree
8. The KISLAP interactive video vignette promotes higher-level thinking.	3.79	1.02	Agree
9. The assessments and activities in the KISLAP interactive video vignette are appropriate for me.	4.27	0.73	Strongly Agree
OVERALL	4.16	0.58	Agree

Table 14 presents the students' evaluation of the validity of the KISLAP Interactive Video Vignettes (IVVs), focusing on content alignment, instructional delivery, and appropriateness. The KISLAP IVVs received an overall mean score of 4.16 with a standard deviation of 0.58, interpreted as "Agree." While this is slightly lower than expert evaluations (Table 6, M = 4.63), it still reflects a generally positive perception of the KISLAP IVVs' instructional validity.

Students gave high ratings (M = 4.22 to 4.30) on items related to lesson objectives, content coverage, and personal appropriateness. However, lower scores were observed in instructional delivery (M = 4.09) and promotion of higher-level thinking (M = 3.79)—suggesting that while students found the materials accurate and relevant, some felt they could be further improved in depth and complexity.

This gap between expert and student ratings highlights differences in evaluative focus: experts emphasized alignment and technical validity, while students focused on usability and engagement. As Mayer (2009) and Bruner (1996) suggest, learning materials must not only be accurate but also cognitively stimulating for learners. The students' lower score on higher-order thinking aligns with this idea and provides direction for future revisions of the KISLAP IVVs.

These findings are crucial in validating that KISLAP IVVs are perceived as instructionally sound by learners, especially in terms of lesson alignment and comprehension. While expert validation confirms theoretical validity, student feedback provides authentic insight into the actual learner experience. Together, they affirm that the KISLAP IVVs are valid tools for learning, with opportunities for enhancement in promoting deeper cognitive engagement.

Table 15 Students' Validation on the Acceptability of the KISLAP IVVs

B. Acceptability	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video vignette are suitable since they provide systematic explanations that are aligned with the curriculum guide.	4.07	0.8	Agree
2. The explanations in the KISLAP interactive video vignette are acceptable and suitable to my level of understanding as they enhance my skills.	4.1	0.76	Agree
3. The concepts in the KISLAP interactive video vignette are appropriately and accurately explained. They are free from grammatical errors.	4.18	0.94	Agree
4. The overall KISLAP interactive video vignette captures the main objective and is acceptable to us students with different learning styles.	4.09	1.04	Agree
5. Overall, the KISLAP interactive video vignette is a creative approach that allows the viewer to understand vital concepts worth remembering.	4.32	0.81	Strongly Agree
OVERALL	4.15	0.62	Agree

This table shows the acceptability assessment of the respondents to the KISLAP interactive video vignette (KISLAP IVVs). The respondents greatly agreed that it is a creative approach that allows the viewer to understand vital concepts worth remembering, garnering the highest mean of 4.32 with a standard deviation of 0.81 which is verbally interpreted as strongly agree. On the other hand, the respondents least agreed that its contents are suitable since they provide systematic explanations that are aligned with the curriculum guide, with the lowest mean of 4.07 and a standard deviation of 0.8 which is verbally interpreted as agree. Accordingly, the students agree that the KISLAP IVVs are acceptable, as shown by the mean score of 4.15 and a standard deviation of 0.62.

Compared to expert evaluations (Table 7, M = 4.47), student ratings were slightly lower across all indicators. While experts emphasized structure, curriculum fit, and instructional design, students focused more on how well the materials matched their comprehension level and learning preferences. This aligns with Clark and Mayer (2011), who emphasize that acceptability from the learner's point of view depends on how intuitively content is delivered and how well it supports individual learning styles. The variability in scores, especially in how the KISLAP IVVs accommodate different learning styles (SD = 1.04), suggests that while many students found the videos effective, others may benefit from additional differentiation or scaffolding.

The student validation confirms that the KISLAP IVVs are generally acceptable and well-received by learners, particularly in terms of clarity, creativity, and instructional support. Acceptability is critical to instructional effectiveness because it influences how students perceive and engage with learning materials. The findings support the IVVs' practical application in the classroom while also pointing to areas for enhancement in differentiated instruction and learner accommodation.

The next table shows the relevance assessment of the respondents to the KISLAP interactive video vignette (KISLAP IVVs). The respondents greatly agreed that it is essential to them since they provide relevant discussions on the subject matter, garnering the highest mean of 4.27 with a standard deviation of 0.77 which is verbally interpreted as strongly agree. On the other hand, the respondents least agreed that it can be considered an essential tool to achieve better retention of learning, with the lowest mean of 3.94 and a standard deviation of 0.87, which is verbally interpreted as agree. Overall, the respondents agree that the KISLAP IVVs are relevant to their learning as reflected by the mean score of 4.07 and a standard deviation of 0.65.

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Table 16 Students' Validation of the Relevance of the KISLAP IVVs

C. Relevance	Mean	Standard Deviation	Verbal Interpretation
1. The contents of the KISLAP interactive video vignette are essential to me since they provide relevant discussions on the subject matter.	4.27	0.77	Strongly Agree
2. The KISLAP interactive video vignette can be considered an essential tool to achieve better retention of my learning.	3.94	0.87	Agree
3. The KISLAP interactive video vignette is relevant because it reinforces or supplements concepts necessary for mastery.	3.97	0.88	Agree
4. The overall discussion in the KISLAP interactive video vignette provides a substantial explanation and gives an explicit discussion of the subject matter.	4.04	0.99	Agree
5. In general, the objective/s of the KISLAP interactive video vignette is/are relevant and aligned with the skills and competencies in the curriculum guide.	4.11	0.95	Agree
OVERALL	4.07	0.65	Agree

These scores contrast with the expert validation on relevance (Table 8), where the overall mean was higher at 4.60, with unanimous "Strongly Agree" ratings across most indicators. This gap implies that while experts viewed the IVVs as highly aligned and instructionally robust, some students may have experienced difficulty linking the videos to their personal learning needs or outcomes.

This highlights the principle emphasized by Morales (2014) and Suryawati & Osman (2018): contextualization and relevance are most effective when learners can connect instructional content to their own experiences and cognitive level. While the KISLAP IVVs clearly integrate real-world examples, the variation in student ratings suggests the need for stronger scaffolding or follow-up activities that help bridge concepts to learners' lived realities and prior knowledge.

The findings affirm that the KISLAP IVVs are generally relevant and instructionally useful from the learners' perspective, especially in aligning with subject matter and classroom objectives. However, the moderate scores in retention and mastery suggest an opportunity to enhance post-video activities or reflection tasks to maximize conceptual reinforcement. These insights are valuable for improving future KISLAP IVV iterations and confirm the importance of learner-centered validation in educational material design.

Table 17 Students' Validation of the Active Engagement of KISLAP IVVs

D. Active Engagement	Mean	Standard Deviation	Verbal Interpretation
1. The lessons, activities, content, and procedures in the KISLAP interactive video are effective in motivating me to acquire physics knowledge.	4.18	0.95	Agree
2. There is a balanced use of graphics, text, and sound which are appealing to the sense of sight in the KISLAP interactive videos.	4.24	0.74	Strongly Agree
3. The multimedia used is clear, simple to understand, and effective in communicating the concepts of physics.	4.31	0.8	Strongly Agree
4. The colors, background, and font styles are appealing and captivating.	4.24	0.76	Strongly Agree
5. The use of animations/videos is well-positioned and appropriate.	4.25	0.86	Strongly Agree
6. The KISLAP interactive video is easy to navigate, and the directions given on the opening screens are easy to follow.	4.12	0.95	Agree
OVERALL	4.23	0.59	Strongly Agree

Table 17 shows the active engagement assessment of the respondents to the KISLAP interactive video vignette (KISLAP IVVs). The respondents greatly agreed that the multimedia used is clear, simple to understand, and effective in communicating the concepts of physics, garnering the highest mean of 4.31 with a standard deviation of 0.8, which is verbally interpreted as strongly agree. On the other hand, the respondents least agreed that it is easy to navigate, and the directions given on the opening screens are easy to follow, with the lowest mean of 4.12 and a standard deviation of 0.95, which is verbally interpreted as agree. Overall, with a mean of 4.23 and a SD of 0.59, the respondents strongly agree that the KISLAP IVVs promote active engagement.

When compared with expert evaluations (Table 9, M = 4.50), student responses were slightly more varied but still affirmed that the IVVs are visually engaging and cognitively stimulating. This suggests that the design effectively captures learner attention and supports active engagement, key elements of effective video-based instruction.

The strong student ratings on engagement confirm that the KISLAP IVVs are not only instructionally effective but also visually and emotionally engaging, which supports sustained learning and deeper conceptual involvement. In line with the study's goal to produce contextualized and meaningful Physics learning tools, this validation confirms that the IVVs hold strong appeal for digitalnative learners and are effective in stimulating motivation and interest in science.

Table 18 Students' Validation of the Contextualization of the KISLAP IVVs

E. Contextualization	Mean	Standard Deviation	Verbal Interpretation
1. I can relate to the real-life situations in the KISLAP interactive video vignettes.	3.91	1	Agree
2. The KISLAP interactive video vignettes are based on our experiences or experiences of the community.	3.97	0.97	Agree
3. The KISLAP interactive video vignettes showcase materials that are found in the surroundings or in the community that I am familiar with.	4.1	0.84	Agree
4. The KISLAP interactive video vignettes use local information, and present local culture, beliefs, and/or traditions.	4.09	0.92	Agree
OVERALL	4.02	0.71	Agree

Table 18 presents student ratings on the contextualization of the KISLAP Interactive Video Vignettes (IVVs), particularly how well the content reflects local realities, experiences, and culture. The IVVs received an overall mean score of 4.02 with a standard deviation of 0.71, interpreted as "Agree." This indicates that students generally recognized the relevance of the videos to their community and experiences, though with some variation.

Students gave the highest score to the item indicating familiarity with community-based materials (M = 4.10), and to the use of local information, culture, and traditions (M = 4.09), suggesting they noticed and appreciated the efforts to embed cultural elements. However, the slightly lower ratings for personal relatability (M = 3.91) and perceived alignment with community experiences (M = 3.97) may suggest that some learners struggled to fully identify with certain examples or contexts used in the videos.

These results contrast slightly with expert evaluations (Table 10), which yielded a perfect mean of 5.00, showing complete agreement that the videos were deeply contextualized. The difference highlights a valuable insight: while experts saw strong alignment with curriculum-based notions of localization, students' perception of contextual relevance can vary depending on personal background, exposure, and environment.

This supports Vygotsky's (1978) sociocultural theory, which asserts that meaning-making is deeply tied to learners' own cultural and experiential frames of reference. Morales (2014) also emphasizes that while contextualization enhances relevance, its impact depends on how well the materials resonate with students' actual lived realities.

The student validation confirms that the KISLAP IVVs are generally contextualized and relatable, although perceptions vary across the learner population. This affirms the project's direction while also suggesting a need for broader representation in future KISLAP IVVs to ensure greater inclusivity and personal connection. Contextualization is central to the study's goal of making Physics meaningful and accessible, and these findings validate that the materials are on the right track, while offering direction for continuous refinement.

Table 19 Students' Validation of the Usability of KISLAP IVVs

A. Usability	Mean	Standard Deviation	Verbal Interpretation
1. The KISLAP interactive video is an innovative material used to reinforce students' learning.	4.39	0.76	To a Very Large Extent
2. The KISLAP interactive video may be used to maximize students' learning, beneficial in enhancing their 21st-century skills.	4.15	0.91	To a Large Extent
3. The content of the KISLAP interactive video may be used as a tool in helping the viewers understand a series of concepts worth remembering.	4.27	0.91	To a Very Large Extent
4. The message of the KISLAP interactive video is comprehensive and is useful to enhance students' learning.	4.25	0.72	To a Very Large Extent
5. The KISLAP interactive video is suitable for students' learning styles and preferences. Hence, it is helpful to both students and teachers.	4.34	0.72	To a Very Large Extent
OVERALL	4.28	0.61	To a Very Large Extent

Table 19 presents student ratings on the usability of the KISLAP Interactive Video Vignettes (IVVs), specifically regarding their practicality, adaptability, and effectiveness in facilitating learning. The IVVs received an overall mean score of 4.28 with a standard deviation of 0.61, interpreted as "To a Very Large Extent." This indicates that students found the IVVs highly usable and beneficial for their learning experience.

The highest-rated indicator was the innovation of the material in reinforcing learning (M = 4.39), followed closely by its alignment with various learning styles and preferences (M = 4.34) and its conceptual clarity and usefulness (M = 4.25–4.27). These results suggest that students appreciated how the IVVs helped simplify complex Physics topics and presented them in an engaging, digestible format.

Although still within a high range, the lowest score (M = 4.15) was associated with enhancing 21st-century skills. This suggests that while students found the IVVs helpful for understanding content, fewer directly associated them with broader skills like collaboration, digital literacy, or problem-solving—perhaps due to the individual, video-based nature of the tool.

These findings are consistent with Clark and Mayer (2011), who argue that usability in multimedia instruction requires not only clarity of content and navigation, but also learner-centered flexibility and relevance. When compared with expert ratings on usability (Table 11, M = 4.80), students' scores are slightly lower but still confirm that the KISLAP IVVs are effective, easy to use, and instructionally valuable.

The high usability rating from students reinforces the KISLAP IVVs' potential for widespread classroom application. Usability ensures that the tool is not only theoretically effective but also accessible, intuitive, and supportive of independent learning—all critical attributes in digital learning environments. These results affirm the study's goal of producing student-friendly, technology-enhanced Physics materials that can improve learning outcomes while being seamlessly integrated into diverse classroom settings.

Table 20 Students' Validation of the Appropriateness of the KISLAP IVVs

B. Appropriateness	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video will help students understand better their current lesson.	4.25	0.93	To a Very Large Extent
2. The KISLAP interactive video is appropriate that aid the students in developing their critical thinking skills.	4.16	0.93	To a Large Extent
3. The KISLAP interactive video is a useful supplementary material for reinforcement and application of new learning.	4.27	0.85	To a Very Large Extent
4. The overall quality of the KISLAP interactive video presented is effective and free from grammatical errors.	4.28	0.73	To a Very Large Extent
5. As a whole, the KISLAP interactive video is considered valid, effective, relevant, and useful to both students and teachers.	4.36	0.81	To a Very Large Extent
OVERALL	4.27	0.66	To a Very Large Extent

The above table shows the appropriateness validation of the respondents to the KISLAP interactive video vignettes (KISLAP IVVs). The respondents assessed to a great extent that, as a whole, it is considered valid, effective, relevant, and useful to both students and teachers, garnering the highest mean of 4.36 with a standard deviation of 0.81, which is verbally interpreted as a very large extent. On the other hand, the respondents assessed the least extent that it is appropriate that aid the students in developing their critical thinking skills, with the lowest mean of 4.16 and a standard deviation of 0.93, which is still verbally interpreted as a very large extent.

Students affirmed that the KISLAP IVVs aid lesson comprehension, develop critical thinking, and serve as effective reinforcement tools, indicating that the materials meet educational and cognitive demands.

These results confirm that KISLAP IVVs are not only contextually aligned but also pedagogically appropriate for Grade 9 learners. The positive validation supports their use as supplementary instructional tools that address diverse learning needs and promote mastery of complex Physics concepts, aligning with the K to 12 curriculum's emphasis on contextualization and 21st-century skills. The findings reflect Djamas et al. (2021), who argued that interactive and contextualized materials promote independent learning and critical thinking. Similarly, Mayer's (2005) Cognitive Theory of Multimedia Learning supports that well-designed multimedia enhances comprehension by integrating verbal and visual elements. The strong appropriateness rating also aligns with Kapici et al. (2020), who found that technology-based tools foster engagement and improve learning outcomes in science.

Students were also asked to evaluate the pretest and posttest instruments, both as learners and as participants in the learning cycle. Their responses confirmed the clarity and fairness of the assessments. While they were not given numerical scoring rubrics to validate the tests as the experts did, their validation scores on the clarity and alignment of the KISLAP IVV assessments with the videos' learning goals support their usability in measuring cognitive gains.

Students rated the IVVs positively, they strongly agreed that the IVVs were appropriate and aligned with lesson objectives, although they suggested that the vignettes could be further improved to encourage more critical thinking.

For usability and appropriateness, students assigned an overall usability rating of 4.28 (SD = 0.61) and appropriateness rating of 4.27 (SD = 0.66), both interpreted as “to a very large extent”. These results suggest that the KISLAP IVVs met their expectations as effective tools for understanding and retaining the MELCS of Grade 9 Physics.

These results affirm that the KISLAP IVVs were not only effective and relevant from a pedagogical standpoint but also acceptable and practical in real classroom settings. Both experts’ and students’ validation data, particularly those involving the assessments, support the overall reliability and instructional validity of the KISLAP IVV materials prior to implementation.

➢ *Analysis of Implementation*

The implementation phase marks the culmination of the KISLAP IVVs development cycle, including measuring their impact on student academic performance. After the incubation and iteration phases, the KISLAP IVVs were further developed based on the experts’ and students’ validations. The implementation phase also answers the core question of whether the KISLAP interactive video vignettes significantly improved learners' understanding of Grade 9 Physics topics covering the MELCs. To do this, a pretest-posttest design was employed, where forty-four (44) Grade 9 students were assessed before and after using the KISLAP IVVs. These 44 respondents were given parents’ consent and voluntarily assented to participate in the study.

Table 21 Content Validation of KISLAP Interactive Video Vignettes

A. Validity	**Mean**	**SD**	**Verbal Interpretation**
1. The KISLAP interactive video vignette covers the most essential learning competencies in Physics in junior high school.	4.55	0.63	Strongly Agree
2. The KISLAP interactive video vignette meets the current objectives of the lesson.	4.43	0.76	Strongly Agree
3. The KISLAP interactive video vignette is appropriate for me.	4.39	0.69	Strongly Agree
4. The KISLAP interactive video vignette is accurate and detailed.	4.16	0.81	Agree
5. The content of the KISLAP interactive video vignette is adequate for communicating physics concepts effectively to me in less time.	4.16	0.86	Agree
6. The KISLAP interactive video vignette is adequate in terms of instructional delivery.	4.3	0.77	Strongly Agree
7. I can rely on the KISLAP interactive video vignette to learn physics concepts effectively.	4.41	0.76	Strongly Agree
8. The KISLAP interactive video vignette promotes higher-level thinking.	4.02	0.95	Agree
9. The assessments and activities in the KISLAP interactive video vignette are appropriate for me.	4.2	0.76	Agree
OVERALL	**4.29**	**0.54**	**Strongly Agree**
B. Acceptability	**Mean**	**SD**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video vignette are suitable since they provide systematic explanations that are aligned with the curriculum guide.	4.3	0.88	Strongly Agree
2. The explanations in the KISLAP interactive video vignette are acceptable and suitable to my level of understanding as they enhance my skills.	4.2	0.82	Agree
3. The concepts in the KISLAP interactive video vignette are appropriately and accurately explained. They are free from grammatical errors.	4.39	0.81	Strongly Agree
4. The overall KISLAP interactive video vignette captures the main objective and is acceptable to us students with different learning styles.	4.39	0.84	Strongly Agree
5. Overall, the KISLAP interactive video vignette is a creative approach that allows the viewer to understand vital concepts worth remembering.	4.63	0.7	Strongly Agree
OVERALL	**4.38**	**0.61**	**Strongly Agree**
C. Relevance	**Mean**	**SD**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video vignette are essential to me since they provide relevant discussions on the subject matter.	4.48	0.73	Strongly Agree
2. The KISLAP interactive video vignette can be considered an essential tool to achieve better retention of my learning.	4.09	0.86	Agree
3. The KISLAP interactive video vignette is relevant because it reinforces or supplements concepts necessary for mastery.	4.26	0.82	Strongly Agree

4. The overall discussion in the KISLAP interactive video vignette provides a substantial explanation and gives an explicit discussion of the subject matter.	4.23	1.01	Strongly Agree
5. In general, the objective/s of the KISLAP interactive video vignette is/are relevant and aligned with the skills and competencies in the curriculum guide.	4.25	0.89	Strongly Agree
OVERALL	**4.26**	**0.63**	**Strongly Agree**
D. Active Engagement	**Mean**	**SD**	**Verbal Interpretation**
1. The lessons, activities, content, and procedures in the KISLAP interactive video are effective in motivating me to acquire physics knowledge.	4.36	0.81	Strongly Agree
2. There is a balanced use of graphics, text, and sound which are appealing to the sense of sight in the KISLAP interactive videos.	4.18	0.95	Agree
3. The multimedia used is clear, simple to understand, and effective in communicating the concepts of physics.	4.41	0.82	Strongly Agree
4. The colors, background, and font styles are appealing and captivating.	4.39	0.69	Strongly Agree
5. The use of animations/videos is well-positioned and appropriate.	4.57	0.55	Strongly Agree
6. The KISLAP interactive video is easy to navigate, and the directions given on the opening screens are easy to follow.	4.32	0.88	Strongly Agree
OVERALL	**4.37**	**0.52**	**Strongly Agree**
E. Contextualization	**Mean**	**SD**	**Verbal Interpretation**
1. I can relate to the real-life situations in the KISLAP interactive video vignettes.	4.18	1.04	Agree
2. The KISLAP interactive video vignettes are based on our experiences or experiences of the community.	4.14	0.77	Agree
3. The KISLAP interactive video vignettes showcase materials that are found in the surroundings or in the community that I am familiar with.	4.34	0.83	Strongly Agree
4. The KISLAP interactive video vignettes use local information, and present local culture, beliefs, and/or traditions.	4.16	0.95	Agree
OVERALL	**4.2**	**0.67**	**Agree**

Table 21 presents the students' validation of the KISLAP Interactive Video Vignettes (IVVs) across five domains—Validity, Acceptability, Relevance, Active Engagement, and Contextualization. The results show consistently high mean scores, with all domains receiving an overall interpretation of "Strongly Agree" except for Contextualization, which still earned a favorable "Agree" rating. The Validity category (M = 4.29) indicates that the KISLAP IVVs are well-aligned with the Most Essential Learning Competencies (MELCs) in Physics and successfully meet the current lesson objectives. Students perceived the videos as accurate, detailed, and effective in facilitating quick yet meaningful learning of physics concepts. In terms of Acceptability (M = 4.38), learners affirmed that the content was developmentally appropriate, free from grammatical errors, and suitable for diverse learning styles. Most commendable is the highest rating given to this item in the present domain for its emphasis on the creativity of KISLAP IVVs in conveying memorable and key concepts.

The Relevance domain (M = 4.26) targeted the KISLAP IVVs input in enhancing retention and stressing key ideas. Students said the material helped deepen their understanding and were aligned with their curriculum standards. Active Engagement (M = 4.37) has a statement along the lines that the KISLAP IVVs were entertaining eyecaptivators due to a good mix of text, graphics, animations, and clear navigation. All of which correspond to Mayer's (2005) Cognitive Theory of Multimedia Learning, which postulates that content which engages both visual and verbal channels fosters student understanding and retention. And while Contextualization (M = 4.20) was rated lower than other domains, it still received a respectable mark whose implications suggest that students relate with scenarios in videos that are real, based on community concerns. This underlines the importance of local culture and experience in instruction-a notion largely supported by Vygotsky's (1978) theory of social constructivism, which holds that learning occurs most effectively when it is contextualized within cultures that are familiar to the learners.

The KISLAP IVVs have therefore been regarded as valid, relevant, and interesting teaching tools. Their design for interactivity and cultural responsiveness promotes critical thinking and independent learning as substantiated by Djamas et al. (2021). Moreover, studies by Kapici et al. (2020) and Morin (n.d.) emphasize the positive impact of multisensory and interactive learning environments on science engagement and knowledge retention. Overall, the table validates the KISLAP IVVs as pedagogically sound and student-approved resources for enhancing physics education in junior high school.

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Table 22 Extent of Applicability Validation of KISLAP Interactive Video Vignettes

A. Usability	**Mean**	**SD**	**Verbal Interpretation**
1. The KISLAP interactive video is an innovative material used to reinforce students' learning.	4.66	0.64	Strongly Agree
2. The KISLAP interactive video may be used to maximize students' learning, beneficial in enhancing their 21st-century skills.	4.25	1.01	Strongly Agree
3. The content of the KISLAP interactive video may be used as a tool in helping the viewers understand a series of concepts worth remembering.	4.39	0.89	Strongly Agree
4. The message of the KISLAP interactive video is comprehensive and is useful to enhance students' learning.	4.34	0.64	Strongly Agree
5. The KISLAP interactive video is suitable for students' learning styles and preferences. Hence, it is helpful to both students and teachers.	4.48	0.67	Strongly Agree
OVERALL	**4.42**	**0.54**	**Strongly Agree**
B. Appropriateness	**Mean**	**SD**	**Verbal Interpretation**
1. The contents of the KISLAP interactive video will help students understand better their current lesson.	4.39	0.97	Strongly Agree
2. The KISLAP interactive video is appropriate that aid the students in developing their critical thinking skills.	4.18	0.9	Agree
3. The KISLAP interactive video is a useful supplementary material for reinforcement and application of new learning.	4.23	0.94	Strongly Agree
4. The overall quality of the KISLAP interactive video presented is effective and free from grammatical errors.	4.43	0.7	Strongly Agree
5. As a whole, the KISLAP interactive video is considered valid, effective, relevant, and useful to both students and teachers.	4.52	0.76	Strongly Agree
OVERALL	**4.35**	**0.7**	**Strongly Agree**

Table 22 reflects the high level of student agreement regarding the applicability of the KISLAP Interactive Video Vignettes (IVVs), specifically in the areas of Usability and Appropriateness. Under Usability (M = 4.42, SD = 0.54), all items received a "Strongly Agree" interpretation. Students recognized the IVVs as innovative tools that reinforce learning and cater to various learning styles. They found the videos not only comprehensive in messaging but also highly beneficial in enhancing understanding and retention of physics concepts—an important consideration for effective multimedia design. The integration of such tools aligns with studies by Morin (n.d.) and Mayer (2005), which emphasize that multimodal and multisensory approaches (visual, auditory, kinesthetic) significantly support learner engagement and information retention.

In terms of Appropriateness (M = 4.35, SD = 0.70), the IVVs were seen as highly effective in improving lesson comprehension and critical thinking, although one item rated slightly lower ("development of critical thinking skills" at M = 4.18, interpreted as "Agree"). Nevertheless, the majority of responses affirmed that the videos are relevant, error-free, and applicable as supplementary materials that support both student learning and teaching practice. These results are consistent with the findings of Djamas et al. (2021), who emphasized the value of interactive video content in fostering independent learning and higher-order thinking, and with Kapici et al. (2020), who showed how technology-rich instructional environments positively impact science education.

Taken together, the strong usability and appropriateness ratings validate the KISLAP IVVs as highly applicable tools for the 21st-century classroom. Their effective design, pedagogical alignment, and learner-centered features make them particularly suited for reinforcing scientific understanding in diverse and technology-integrated learning environments.

- *Descriptive Analysis of Pretest and Posttest Scores*

The descriptive statistics for the pretest and posttest results are shown in Table 23. Table 23 presents the descriptive statistics for students' pretest and posttest scores after using the KISLAP Interactive Video Vignettes (KISLAP IVVs). The mean score increased from 24.84 (SD = 7.35) in the pretest to 31.05 (SD = 4.98) in the posttest, indicating a substantial improvement in students' performance after the intervention. This increase reflects the effectiveness of the KISLAP IVVs in enhancing students' understanding of physics concepts. Additionally, the reduction in standard deviation suggests a more consistent level of performance among students in the posttest.

The results of the Shapiro-Wilk test indicate that both distributions deviate significantly from normality, with p-values of 0.023 (pretest) and 0.000 (posttest), leading to the interpretation of "Not Normal." Despite non-normality, the negative skewness in both assessments, more pronounced in the posttest (skewness = -1.580), suggests that more students scored toward the higher end of the scale after the intervention. The increase in kurtosis (3.402 in the posttest) indicates a more peaked distribution, reflecting that a larger number of students scored near the mean.

These findings support the literature on the effectiveness of interactive multimedia tools in improving academic performance. Mayer (2005) posits that multimedia learning environments, when designed effectively, facilitate cognitive processing and comprehension. Similarly, Djamas et al. (2021) emphasize that interactive videos help bridge conceptual gaps and support mastery learning through engagement and scaffolding. The results in Table 23, therefore, reinforce that the KISLAP IVVs significantly contributed to improved learning outcomes and consistent performance across the student population.

Table 23 Descriptive Statistics of Pretest and Posttest Scores

Assessment	Mean	SD	Skewness	Kurtosis	Shapiro-Wilk			Interpretation
					Statistic	df	p	
Pretest	24.841	7.345	-0.233	-1.147	0.940	44	0.023	Not Normal
Posttest	31.045	4.979	-1.580	3.402	0.870	44	0.000	Not Normal

The Shapiro-Wilk test revealed that both the pretest and posttest distributions were not normally distributed, with p-values below 0.05. This result required the use of a non-parametric test, specifically the Wilcoxon Signed-Rank Test, to assess the statistical significance of score differences.

- *Wilcoxon Signed-Rank Test Results*

The results of the Wilcoxon Signed-Rank Test are summarized in Table 23. Out of the 44 student participants, 34 students showed improvement in their posttest scores (positive ranks), 6 students scored the same (ties), and only 4 students scored lower (negative ranks) after using the KISLAP IVVs. The test yielded a Z-value of -4.841 and a p-value of 0.000, indicating that the difference between the pretest and posttest scores is statistically significant at the 0.001 level.

Table 24 Wilcoxon Signed-Rank Test Results for Pretest and Posttest

Assessment	M	SD	Ranks (pre → post)			Z	P
			Negative Ranks (pre > post)	Positive Ranks (pre < post)	Ties (pre = post)		
Pretest	24.841	7.345	4	34	6	-4.841	0.000
Posttest	31.045	4.979					

These findings affirm that the implementation of the KISLAP IVVs had a significant positive impact on student learning. The improved scores reflect the learners' better understanding of Physics concepts, which may be attributed to the KISLAP IVVs' effective integration of narrative elements, localized examples, and multimedia design. This outcome supports constructivist learning theory, particularly the idea that meaningful engagement with content in a familiar context enhances comprehension and retention (Bruner, 1996; Vygotsky, 1978).

Further, in agreement with the significant improvements noted, these high ratings of KISLAP IVVs during the period of validation, when it was validated by students and experts in terms of clarity, appropriateness, and reliability of pretest and posttest. Referencing the validation tables above, experts rated tests high at 4.89 out of 5 on the basis of objectivity and clarity, while students validated that the tests aligned with the video content, and assessed understanding accordingly.

These findings also support those by Guntur et al. (2020) and Sumadio & Rambli (2020), which further verified online learning environments' role in ensuring science achievement through increased interactions and understanding. The differentiated learning elements of KISLAP IVVs are consilient with the many pathways recorded by Haleem et al. (2022) to facilitate flexible-suited learning experiences. Cardinale (2020), Arif (2017), and Wright (2016) added evidence that the combination of narrative and interactivity within KISLAP IVV promotes understanding concepts-an effect reflected in this study by a major increase in class scores. The contextualization present in KISLAP IVVs adds learning, as mentioned by Jimenez et al. (2020), who emphasized contextualized materials for broader mastery in content.

The considerable standardized achievement gains and evidence from criterion-referenced instruments suggest strong instructional validity for KISLAP Interactive Video Vignettes, which can produce significant academic gains. This appears to be furthered by the contextualized, pictorial narratives and systematic learning methodology, which may lead to deeper cognitive processing and transfer in an abstract and numerical subject such as Physics that tends to trouble students.

CHAPTER FOUR
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

A. Summary

This Impact Project was a work pursued with the purpose of designing, developing, and validating KISLAP Interactive Video Vignettes (IVVs) as contextualized learning guides for Grade 9 Physics, and evaluating the impact on student performance. Grounded in the perspectives of contextualized instruction, multimedia learning, and constructivist pedagogy, the study followed the three main phases of an Impact Project: incubation, iteration, and implementation.

During the incubation process, the KISLAP IVV scripts and content were created in alignment with the Most Essential Learning Competencies (MELCs) identified by the Department of Education. The content was validated by learning experts who critiqued the vignettes for five important dimensions: validity, acceptability, relevance, active engagement, and contextualization. The materials were well-rated, certifying that the KISLAP IVVs were pedagogically sound and culturally appropriate. In addition, the pretest and posttest instruments were expert-checked and scored "Very Good" in terms of clarity, objectivity, and item quality.

The iteration phase involved piloting the KISLAP IVVs with Grade 9 students who evaluated the materials in content validity and level of acceptability. The students described the IVVs as valid, very usable, and suitable, testifying that vignettes were well-matched with their learning needs, interests, and levels of understanding. Student feedback also testified that the video vignettes were interesting, easy to use, and supportive of learning retention, critical thinking, and independent learning.

The implementation phase aimed to further validate the content validity and applicability of the KISLAP IVVs, including evaluating the effectiveness of the KISLAP IVVs utilizing a pretest-posttest approach. Forty-four Grade 9 students took part in this phase. The results showed that academic performance improved markedly following the use of KISLAP IVVs. The Wilcoxon Signed-Rank Test showed that there was a statistically significant difference in the pretest and posttest scores, confirming that the use of IVVs had a significant and positive impact on student learning.

B. Conclusion

Therefore, as shown by the results, the KISLAP IVVs are valid, effective, and sound instructional materials suitable for Grade 9 students in achieving the skills and knowledge based on the Most Essential Learning Competencies (MELCs). Storytelling, animation, and contextualization are characteristics of Mayer's (2009) Cognitive Theory of Multimedia Learning, wherein dual-channel processing and learner engagement are addressed through images and sound.

The vignettes were effectively created based on local context scenarios and actual applications, which increased student interest and understanding of abstract Physics concepts. The relevance of the vignettes to context is in support of Vygotsky's (1978) Sociocultural Theory that learning occurs best when new ideas are rooted in known social and cultural contexts. This concurs with Morales (2014), who stated that contextualized learning materials enhance understanding and long-term memorization.

The iterative improvement and expert verification of the KISLAP IVVs correspond to Lardizabal et al. (1991), who highlighted clarity, organization, and pedagogical correctness as major signs of proper teaching materials. The constructivist underpinning of the KISLAP IVVs resonates with Bruner's (1996) view that students actively build meaning through contextual interaction.

The strong ratings by expert validators and students validate that KISLAP IVVs are aligned with academic standards and learning outcomes and are also responsive to the Filipino learners' cultural context. The incorporation of multimedia aspects and local items enhanced student motivation, facilitated retention, and enabled differentiated instruction.

The considerable posttest score gain following implementation of the KISLAP IVVs clearly shows their ability to enhance performance. This establishes the educational benefit of contextualized electronic learning resources and supports the effectiveness of interactive video-based teaching in science instruction.

All in all, KISLAP IVVs effectively support the purposes of the MATATAG curriculum and the greater objectives of the Philippine basic education reforms, which include fostering science teaching that is innovative, accessible, and contextually relevant.

C. Recommendations

In light of the findings, the following recommendations are proposed:

- *For Science Teachers:*

Teachers are encouraged to adopt and integrate KISLAP IVVs into their instructional practices, particularly for complex Physics topics. These vignettes can serve as tools for introducing concepts, reinforcing lessons, or providing enrichment and remediation.

- *For Curriculum Developers and Administrators:*

The Department of Education and school curriculum planners should consider supporting the widespread use of contextualized video vignettes like KISLAP in various subject areas. Providing training on how to effectively utilize such materials will also help maximize their instructional potential.

- *For Educational Technologists and Designers:*

Further development of KISLAP-like IVVs across different science disciplines (e.g., Biology, Chemistry, Earth Science) is recommended. The use of culturally rooted, interactive, and story-based video materials can serve as an effective model for content development under the MATATAG curriculum.

- *For Future Researchers:*

Longitudinal studies may be conducted to examine the lasting impact of IVVs on conceptual retention and science attitudes. Comparative studies may also be undertaken to assess the effectiveness of IVVs versus traditional methods or other forms of technology-enhanced instruction.

- *For Policy Makers:*

Education policymakers are encouraged to support the production, validation, and dissemination of localized learning resources that are accessible to public schools, especially in underserved communities. Policies that incentivize research-based innovation in teaching should be expanded.

- *For Students:*

Students are encouraged to use the IVVs for self-paced learning and review. With teacher guidance, these tools can help promote independent learning and improve confidence in dealing with challenging science content.

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