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Consumer Physics-Enhanced Lesson Exemplars (CoPLE) for Junior High Schools

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Abstract

Using the descriptive research design employing the Research and Development (R&D) methodology, this study developed Consumer Physics-enhanced Lesson Exemplars (CoPLE) for Junior High School based on a survey on the level of knowledge on Consumer Physics of 58 purposively chosen Science teachers in Schools Division of Ilocos Norte (SDOIN) using an expert-validated questionnaire on the level of knowledge on Consumer Physics administered via Google form. An adapted validation tool was also used for the evaluation of CoPLE by Physics and Instructional Material development experts.Results of the survey show that the teachers are knowledgeable on Consumer Physics along the following topics which obtained the lowest ratings: Interference and Diffraction; Refraction; Effect of Temperature on Speed of Sound; Charging processes; and Work, Power, and Energy. Hence, they were considered in the development of the CoPLE. The CoPLE is a teaching resource material that highlights the integration of consumer context in Physics education to encourage meaningful learning, a holistic education perspective, and self-motivation. It contains a Teaching Plan (TP) and Learner's Material (LM). Results of the experts' evaluation show that the CoPLE's content quality is valid in terms of content and design. Hence, CoPLE is recommended to be used and adapted for instruction in teaching Junior High School Physics to enhance students' scientific literacy, lessen the layer of abstraction of Physics concepts, accelerate the academic development of students, and improve students' engagement in Science classes.

Keywords: *Consumer Physics, Instructional Material, Lesson Exemplars, Physics.*

INTRODUCTION

The promotion of scientific literacy is a primary goal of science education. Scientific literacy means knowledge and understanding of the essential scientific concepts and processes. There is a complex discussion on the definition of scientific literacy, but Justi, Almeida, and Santos (2019) identified essential elements that constitute it. According to them, for an individual to become scientifically literate, it is important to become aware of a point or an issue that needs to be discussed, engage in discussion, think critically, and make decisions. Yacoubian (2015) presented a critical thinking-nature of Science (CT-NOS) framework for guiding future citizens. The framework explains that critical thinking is the foundational pillar for socio-scientific decision-making. Thus, critical thinking and decision-making are conditions for scientific literacy.

The Program for International Student Assessment (PISA) has studied students' scientific literacy in many developing countries because it is regarded as a critical success factor in learning science. The PISA 2018 results showed that Filipino students' scientific literacy achievement was unsatisfactory. The Philippines ranked second-lowest in both Mathematics and Science (OECD, 2019). This situation should reflect the fact that our education quality still needs to be improved in all areas, particularly the Science learning process. Science teachers must change their habits to not only transfer knowledge but also empower scientific literacy. Teachers face a challenge when it comes to developing scientific literacy (Balguna, 2020), especially in junior high schools.

The K to 12 Curriculum emphasizes contextualization and focuses on organizing the curriculum around situations and problems that challenge and arouse learners' curiosity and motivate them in the learning process. Contextualization has been embraced in Science education and studies have generated evidence that it facilitates learning and improves students' understanding and interest (Picardal & Sanchez, 2022). However, Fortus and Krajcik (2020) pointed out that contextualized learning environments must be appropriately designed to avoid misalignment, which can cause confusion and activate irrelevant knowledge.

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Teaching Science is closely linked to hands-on experiments and lab work. Using equipment, materials, and exploring natural phenomena are essential parts of learning Science. Since Science relies on Mathematics, it involves formulas, equations, numbers, and analysis (Antonio, 2018). Calzada and Antonio (2023) also noted that students learn best when they have various activities. To make learning meaningful, it's important to connect scientific ideas to real-life situations. Additionally, good teachers adapt their methods and materials to fit each child's needs and development level, helping them understand and apply what they learn.

However, teachers face significant challenges in teaching Science, particularly with assessments. The main issues they encounter include the time required for checking and preparing tests, students guessing their answers and performing poorly, and ensuring the quality of tests through reliability and validity measures. Teachers have expressed the need for training in general assessment techniques, current assessment trends, and alternative assessment methods. The low level of competency in assessment among teachers affects the types of assessment methods they use and exacerbates the difficulties they face in evaluating their students' performance (Antonio et al., 2024).

Physics is a particular science subject in high school where students' interest is profoundly low due to its complex and abstract nature (Casinillo & Yunzal, 2020). Physics is distinguished from other subjects by its high level of abstraction and idealization. Moreover, the predominant role of equations in the field makes it more complex for students. Though it is complex, Physics is important because it can be applied to explain natural phenomena, calculate quantities, explain and design devices, and solve societal issues. This makes Physics a fundamental science subject that is critical for scientific progress. However, students could not easily comprehend concepts when they are confronted with modules, textbooks, or boards covered with Physics prose. Many teachers actually encountered students questioning the relevance of what they learn inside the classrooms (Lamb, Hsu & Lemanski, 2019). According to Pio (2021), teachers must then stress the importance of putting relevant context in teaching Physics content and processes. One of which is by integrating consumer-related context into the lessons.

Students are now regarded as young consumers because of the change in the economy, particularly the rise of e-commerce and online shopping. They look into a diverse array of providers to fulfill their needs and wants. They compare and evaluate products, which means that they have the ability to decide on products to buy based on their knowledge and capabilities. They are connected directly or indirectly to other consumers and can affect others' purchasing decisions by sharing information or by making recommendations about a product through social interactions or verbal communication (Wang & Yu, 2017). Hence, there is a need to raise awareness on consumer education to guide students-consumers in selecting goods and services more wisely (Mojica, Sy, Geges, et al.,2016).

To support consumers in making decisions and establishing their rights, Republic Act No. 7394 calls for the development and adoption of a consumer education program in both public and private schools. For students to have the chance to participate in and shape society, consumer education must be a part of educational institutions and curricula at all grade levels. The consumer education goals include using independent consumer information; exercising consumer rights; acting competently in daily life; developing an understanding of the interactions between consumption, environment, and society; taking into account consumption as a means of identifying oneself and integrating into society; and participating in the development of the framework of consumption and production patterns (Penning & Muller, 2021). In line with this, the Department of Education (DepEd) conducted pilot testing (started in the school year 2010-2011) of Consumer Education Exemplars wherein the lessons on consumerism were integrated into English, Filipino, Science, Mathematics, Social Studies, Values Education, Music, Arts, Physical Education and Health (MAPEH), and Technology and Livelihood Education (TLE). However, materials on the incorporation of consumerism specifically in Physics education are not yet available.

Bringing students into the role of consumers can put teaching and learning process out of the traditional orientation. It builds new perspectives by using essential Physics concepts and processes. Teachers should bring more opportunities to engage the students to become smart consumers by means of discussion and investigation. Scientific investigation should be able to connect scientific concepts to potential consumer

concerns. Students' comprehension of Physics can be made more comprehensive and expanded by using consumer context in their learning.

Consumer Physics is a strategy of incorporating consumer-related context into Physics concepts. It has the potential to enhance students' scientific literacy, lessen the layer of abstraction of Physics concepts, accelerate the academic development of students, and improve students' engagement in science classes (Saglam and Cetin, 2020). Consumer Physics is a new strategy and is barely mentioned in Junior High School learning materials, textbooks, and even materials available online. Therefore, it was seen imperative by the researchers to make instructional materials that help teachers to promote scientific literacy by bringing Physics concepts out of the classroom and into the field, specifically by integrating consumer context.

It is in the above context that this study is conceived. This study aimed to develop Consumer Physics-enhanced Lesson Exemplars (CoPLE) for Junior High School. The lesson exemplars elaborate on the potential of consumer context integrated into Physics lessons.

The study was performed to develop and validate the CoPLE. Specifically, this research was geared to investigate the level of knowledge of Physics teachers on Consumer Physics; the lesson exemplars that can be developed based on the knowledge of teachers on Consumer Physics; and the validity of the developed lesson exemplars in terms of content (objectives, content, context, instructional characteristics, and evaluation characteristics) and design (design characteristics and adaptability).

The success of this study in coming up with valid instructional materials could hopefully encourage the school administrators to plan for webinars and seminar workshops for teachers' professional development with an emphasis on the improvement of teachers' proficiency in contextualization. The findings of this research could also stimulate other educational researchers to conduct further research investigating the effectiveness of Consumer Physics lesson exemplars in teaching and develop more effective and efficient instructional materials in various disciplines.

METHODOLOGY

This study was anchored on Integrated Learning (IL) and Contextual Teaching and Learning (CTL). IL emphasizes the notion that students learn more effectively when there is a strong and valid connection across the entire curriculum. Students have the chance to see the interconnectedness and interrelationships in the various parts of the curriculum through integrative learning. Likewise, CTL is a term that refers to an instructional strategy that is designed to make it easier for students to connect the learning of foundation skills with academic or occupational content by focusing teaching and learning on concrete applications in a context that is relevant to them (Kalchik & Ortle, 2010). When designing educational content, it is vital to consider the social realities of people in order to engage the students in the learning process.

The research employed the descriptive research design and the Research and Development (R&D) methodology. It was conducted in public secondary schools within the Schools Division of Ilocos Norte (SDOIN). The Schools Division supervises fifty-four (54) public secondary schools across 21 municipalities in the Province of Ilocos Norte. The research was conducted among two sets of respondents: the first set was composed of 58 teachers who are Junior High School Science teachers of SDOIN teaching Physics for at least two years; and the second set was the panel of experts for validation composed of two (2) university professors and three (3) DepEd Master teachers. Purposive sampling technique was used in the two sets of respondents. Two (2) instruments were used in gathering the needed data: the level of knowledge on Consumer Physics survey questionnaire, which was subjected to validation and considered very highly valid as revealed by its mean average of 4.75; and the Validation toolkit patterned after the validation tool of Ventura (2020) and Pio (2021).

The level of knowledge on Consumer Physics survey was administered to Physics teachers in the SDOIN via Google form. The survey results served as basis for developing Consumer Physics-enhanced lesson exemplars. This was followed by designing and writing of the lesson plans, preliminary evaluation of the research adviser, and preliminary revision of the lesson exemplars. After these, the CoPLE were subjected to validation. The panel of experts was given time to review the instructional material using the provided Validation Toolkit which

was given personally by the researchers. Comments and suggestions of the experts were incorporated in the revisions of the developed teaching resource material.

The researchers used descriptive statistics, particularly mean, in order to interpret the data that led to the identification of the top five Consumer Physics topics with the lowest rating considered in developing the CoPLE, and also the ratings given by the panel of experts in the validation of CoPLE for Junior High School.

RESULTS AND DISCUSSIONS

Level of Knowledge of Teachers on Consumer Physics

Table 1 shows the mean ratings on the level of knowledge of 58 teachers on Consumer Physics. It can be gleaned from Table 1 that teachers are knowledgeable about Consumer Physics under the Physics topics of Interference and Diffraction (2.88), Refraction (2.95), Effect of Temperature on Speed of Sound (3.07), Charging processes (3.12), Work, Power, and Energy (3.14), Reflection (3.16), Polarization (3.24), and Type of Lens and Image Formation on Lens (3.24).

The above topics were cited by the respondents because they have knowledge but are not highly aware that these can be contextualized with consumer-related contexts. Generally, based on the comments of the teachers, Consumer Physics can be interesting and engaging to the students. The stated application of Physics would definitely aid students and teachers in relating abstract concepts to reality, thereby making sense of the actions behind everything.

Furthermore, the results show that teachers are *Very Knowledgeable* about the rest of the Consumer Physics listed such as in Law of Inertia (3.67), Light, Color and Intensity (3.64), Characteristics of Sound (3.53), Series and Parallel Connection (3.53), and Law of Acceleration (3.52). These topics were cited by the teacher respondents because they are already highly aware of the consumer-related contexts. Physics concepts and principles are included in all facets of people's lives and all natural phenomena are based on it. Thus, Physics lessons are actually applied to various areas including consumerism.

The topics that were considered in the development of CoPLE are the following: Interference and Diffraction (2.88), Refraction (2.95), Effect of Temperature on Speed of Sound (3.07), Charging processes (3.12), Work, Power, and Energy (3.14). Since teachers are less familiar with these, most likely, they do not integrate these into their teaching; hence, these topics need to be included in the developed material to further guide teachers on how these can be integrated into the relevant physics lessons, and to enhance teachers' awareness on Consumer Physics. These topics can be further elaborated by specific examples and engaging activities that are consumer-related which allow learners to connect to these topics despite the fact that they are theoretical in nature.

Table 1. Mean ratings on the level of knowledge on Consumer Physics survey (n=58).

CONSUMER PHYSICS TOPICS	Mean	DI	Rank
Grade 7			
Descriptors of Motion Passengers consider the speed, velocity, and/or acceleration of a transport vehicle in choosing their rides.	3.45	VK	7
Characteristics of Sound Consumers must identify to the characteristics of sound (Pitch, Loudness, and Quality) in buying quality speakers, headsets/ earphones, microphone, etc.	3.53	VK	3
Production of Sound Buying interesting musical instruments (i.e. brass, woodwind, and percussion instruments) includes awareness and understanding of how sound is produced.	3.26	VK	17
Light Color and Intensity In buying LED strip lights and K-pop light/ light sticks, consumers must be aware of the relationship between light color and intensity.	3.64	VK	2

Heat Transfer In buying insulated bottles or vacuum flask (*ThermoFlask / Hydro Flask*), consumers must apply the concept of heat transfer—that for a vacuum flask conduction, convection, & radiation are important.	3.52	VK	5
Electric Charges Whenever consumer touch a metal surface inside the mall (which has a positive charge with few electrons), they feel a tiny shock. The tiny shock is a result of the quick movement of these electrons.	3.28	VK	15
Charging Processes The consumers must be aware of the idea that cutting the rounded third prong on a plug, usually used for grounding, is a "*short-term solution that could cost them more than they think".*	3.12	K	22
Grade 8			
Law of Inertia Consumers who are buying and wearing protective equipment such as helmets, knee pads, seat belts, airbags, car seats, etc. understand the law of inertia, and considers individuals safety against the potential impacts of physical and vehicular accidents.	3.67	VK	1
Law of Acceleration Passengers examine how mass of an object and/or force applied to the object affects its acceleration of a transport vehicle in choosing their rides (i.e. bus, jeep or tricycles).	3.52	VK	5
Law of Interaction Newton's law of interaction serves as reminder to consumers that in buying more and more of wants than needs, there will be opposition from forces outside of control. These forces can range from unexpected expense to huge debt.	3.34	VK	13
Work, Power, and Energy Riders must determine the amount of potential energy that can be stored in a device (i.e. Kinetic energy recovery system) before buying it as a energy converter for bicycle/motorcycle.	3.14	K	21
Effect of Temperature to Speed of Sound Students must know their responsibilities as consumer to be environmentally friendly and reduce the use of plastics as packaging in various products that contribute to the warming effect in the environment as temperature affects the speed of sound.	3.07	K	23
Reflection Students, as consumers, must be economic and use less expensive reflective material in making a periscope or kaleidoscope.	3.16	K	20
Refraction Choosing and buying of transparent substance/ material through investigating refraction and calculating the angle of refracted ray. The knowledge on refraction and calculating the angle of refracted ray provides basis for selecting and buying quality but cheaper transparent substances for consumption.	2.95	K	24
Interference & Diffraction Students, as consumers, must be economic and understand the idea that "low price is good value" in building holograms. Using low-priced materials that could give the same result as the high-priced materials.	2.88	K	25
Polarization Understanding on the concept of polarization leads to the consumers' awareness in buying quality polarized glasses.	3.24	K	18

Characteristics of Visible Light The concept of the relationship of light energy and color provides a basis on when to replace the gas tank. The flame of the stove indicates high/ low energy as well as the fullness/ emptiness of the gas tank	3.38	VK	11
Grade 9			
Ohm's Law In buying home appliances (electric fans, electric kettles, etc.), consumers can use Ohm's law to consider the electrical efficiency and consumption by taking a look at its resistance, voltage input, and amount of current needed to power up the appliance.	3.45	VK	7
Series & Parallel Connection Consumers consider the advantage and disadvantage of series and parallel connections in buying Christmas lights and identifying the connection of their home appliances.	3.53	VK	3
Power plants generation As consumers are becoming more central actors in the energy markets, it is important to discuss the different power plants. Energy consumers could think of their energy consumption and advocate renewable energy sources.	3.40	VK	9
Electrical energy transmission and distribution The students, as electrical energy consumers, must know how to read and compute of their electrical energy consumption and explain how electrical energy is generated, transmitted, and distributed.	3.36	VK	12
Grade 10			
Electromagnetic Waves and its Applications Patients must understand the relative wavelength and practical applications of EM waves to know how often an individual get non-intrusive imaging such as x-ray, MRI imaging, and ultrasound.	3.28	VK	15
Effects of EM Radiation Consumers must be cautious in buying antiradiation glasses and antiradiation screen protector and understand as well as explain the effects of EM radiation on living things.	3.40	VK	9
Types of Mirror & Image formation on Mirrors When deciding to buy a mirror, the consumers must have knowledge about the different types of mirrors such as concave, convex, and plane mirrors, as well as how images formed on each type.	3.31	VK	14
Types of Lens & Image formation on Lenses When deciding to buy eye glasses with lens, the consumers must have knowledge about the different types of lens such as concave and convex lenses, as well as how images formed on each as well as the knowledge on the type of lens applicable for their eye disorders/ defects.	3.24	K	18

Legend:	Range of Means	Descriptive Interpretation
	3.26-4.00	Very Knowledgeable (VK)
	2.51-3.25	Knowledgeable (K)
	1.76- 2.50	Aware but Don't Know Much (A)
	1.00-1.75	Not Aware (NA)

Consumer Physics-enhanced Lesson Exemplars (CoPLE) for Junior High School

Consumer Physics-enhanced Lesson Exemplar (CoPLE) is a teaching resource material that highlights the integration of consumer context in Physics education to encourage meaningful learning, a holistic education perspective, and self-motivation. The main objective of this teaching material is to provide exemplar lessons or guides for classroom Physics teachers. Hopefully, this facilitates the teaching and learning of JHS students by providing a guide in developing and designing materials integrating Consumer Physics.

The creation of CoPLE involved review of the Most Essential Learning Competencies (MELCs), systematic planning of the content and design, and production of contextualized activities, examples, and discussions.

The CoPLE contains a Teaching Plan (TP) and Learner's Material (LM). These materials could improve students' understanding of how Physics connects to the world and could provide them with a better position to make well-informed decisions about Physics-related issues that affect their consumer behavior and skills.

The Teaching Plan (TP) consists of the content standard and learning competency aligned with the K to 12 Curriculum, description of the lesson, learning objectives, key points/ concepts, time allotment, materials/ resources, and lesson proper. The lesson proper adopts the 7E learning cycle which consists of the following: Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend. According to Peralta (2022), using teaching materials that adhere to the 7E learning cycle can help the students understand the problems and phenomena they encounter in the environment, explore ideas and be motivated to build new knowledge, and will be able to reason, think critically, and be more creative.

The Learner's Material (LM) contains a description of the lesson, learning objectives, information relevant to the lesson, and Activity Sheet/s aligned also with the 7E learning cycle. The CoPLE was designed to give students opportunities to learn, apply, and engage themselves in real-time decision-making as consumers using Physics concepts. Moreover, the activities and discussions are designed to ensure that concepts and ideas are correctly accumulated in order to better prepare students for the next level of education. The 7E learning cycle includes Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend.

The advantages of the 7E learning cycle are: (1) teachers can choose more effective learning strategies based on the results of student's initial knowledge disclosure; (2) students are moved to recall the subject matter they have learned previously; (3) students become more active and aroused by their curiosity; (4) students will experience discovery learning processes, so the concepts learned will become more meaningful and durable; (5) higher-level thinking skills (critical thinking and creative thinking) students will be accommodated in the learning process; (6) students will have better scientific communication skills; and (7) students' understanding and mastery of concepts will be very strong and the knowledge more useful (Hartini, Abyati, & Salam, 2020).

At the end of the teaching plan are the references, possible answers to questions in the activities; answers in the evaluation and assignment; and scoring guides included.

Validity of Consumer Physics-enhanced Lesson Exemplars (CoPLE)

Objectives. Table 2 shows the mean rating of the panel of experts on the objectives of CoPLE. The objectives of CoPLE were rated as *Very Highly Valid* with an overall mean of 4.72, this means that the objectives are attainable, measurable, observable, specific, and testable.

Table 2. Mean rating of experts on the objectives of CoPLE.

Criteria	Mean	Descriptive Interpretation
The objectives of the lessons are		
a. Attainable	4.80	VHV
b. measurable.	4.60	VHV
c. observable.	4.80	VHV
d. specific.	5.00	VHV
e. testable.	4.40	VHV
Overall Mean	**4.72**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

The result of the study is supported by the study of Kapur (2019) that developing teaching resource materials involves formulating learning objectives that provide a focused mindset for the students to acquire an efficient understanding of the content. Moreover, the compass that guides instruction is the set of objectives that are stated in clear terms expected for learners to encounter in the learning activities (Edinyang, 2016). Hence, the result is important as it affirms that the purpose of CoPLE is geared towards the prescribed direction of the teaching and learning process in Physics. Moreover, the students are also led to find out what to achieve in each lesson.

Content. Table 3 shows the mean rating of the panel of experts on the content of CoPLE. The content of the exemplars was rated as *Very Highly Valid* with an overall mean of 4.76. This means that the evaluators agreed that the contextualized lesson exemplars can develop skills relevant to the objectives, provide accurate and relevant information, focus on important Physics concepts and specific skills, provides a logical arrangement of the subject matter, and exhibit unity and coherence of the presentation of the subject matters.

The *Very Highly Valid* rating of the CoPLE with respect to its content is noteworthy. Mazgon and Stefanc (2012) stated that the characteristics of educational content is one of the factors that should be taken into account when developing educational materials. The content

Table 3. Mean ratings of experts on the content of CoPLE.

Criteria	Mean	Descriptive Interpretation
The consumer context used in the lesson exemplars are:		
a. relevant to the lesson.	4.80	VHV
b. able to clearly illustrate or demonstrate the Physics concept.	4.80	VHV
c. common, familiar & encountered frequently.	4.60	VHV
d. helpful in understanding Physics concept.	5.00	VHV
Overall Mean	**4.80**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

should be suitable for the student's level and relevant to the skills that the teacher wants to develop (Tumamao 2016). Undoubtedly, the *Very Highly Valid* rating on the content of the CoPLE support its validity as teaching resource material.

Context. In other studies where instructional material was developed and validated, context does not appear as a parameter in examining the validity of the material. However, in this study, the key development is centered on the integration of consumer-related context into Physics lessons.

It is evident from the results in Table 4 that the developed CoPLE is *Very Highly Valid* as indicated by the overall rating of 4.80. This means that the experts believe that the consumer contexts used in the lesson exemplars are relevant to the lesson, able to clearly illustrate or demonstrate the Physics concept, frequently encountered, common and familiar, and helpful in understanding Physics concepts.

Crawford (2002) argued that materials must be contextual and realistic. With the above result and remarks, the CoPLE, as a teaching resource guide, achieved its purpose which is to incorporate consumer-related context that can be directly experienced and used by the students during and after the instructional process. The presence of contextualized examples, situations, and activities in the materials makes it possible for students to remember the concepts and apply it to their daily lives.

Table 4. Mean ratings of experts on the context of CoPLE.

Criteria	Mean	Descriptive Interpretation
The consumer context used in the lesson exemplars are:		
a. relevant to the lesson.	4.80	VHV
b. able to clearly illustrate or demonstrate the Physics concept.	4.80	VHV
c. common, familiar & encountered frequently.	4.60	VHV
d. helpful in understanding Physics concept.	5.00	VHV
Composite Mean	**4.80**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

Instructional Characteristics. It can be seen in Table 5 that the developed CoPLE is *Very Highly Valid* in terms of instructional characteristics as indicated by the overall rating of 4.84. This means that the lesson exemplars hit the core purpose which is to engage the students in scientifically oriented questions, allow them to gather evidence that are used to formulate explanations, require them to connect explanations to scientific knowledge, and let learners communicate and justify explanations.

The characteristics and level of inquiry of the activities in the Science learner's material were evaluated using the same criteria as Meneses (2023). Moreover, his study highlights the importance of providing students with opportunities to engage in high-level inquiry instruction to enrich their learning experiences. With this, the *Very Highly Valid* rating of CoPLE in terms of instructional characteristics asserts that it has the potential to enhance students' scientific literacy and accelerate their academic development.

Table 5. Mean ratings of experts on the instructional characteristics of CoPLE.

Criteria	Mean	Descriptive Interpretation
The examples, illustrations, and activities in the contextualized lesson exemplar:		
a. engages learners in scientifically oriented questions.	5.00	VHV
b. allows learners to gather evidences that are used in responding to questions.	4.80	VHV
c. makes learners formulate explanations from evidences.	4.60	VHV
d. requires learners to connect explanations to scientific knowledge.	4.80	VHV
e. let learners communicate and justify explanations.	5.00	VHV
Composite Mean	**4.84**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

Evaluation Characteristics. It evident from the results in Table 6 that the evaluation characteristics of developed CoPLE is *Very Highly Valid* as indicated by the overall rating of 4.64. This means that the experts believe that the evaluation activities in the contextualized lesson exemplars match the objective of each lesson, measure students' mastery of the lesson, develop critical thinking, and use various types of testing.

Table 6. Mean ratings of experts on the evaluation characteristics of CoPLE.

Criteria	Mean	Descriptive Interpretation
The evaluations activities in the contextualized lesson exemplar:		
a. match with the objectives of the lesson.	4.80	VHV
b. measures mastery of the lesson.	4.80	VHV
c. develop critical thinking.	4.60	VHV
d. use varied types of test	4.40	VHV
Composite Mean	**4.80**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

Summary of evaluation of the content quality. It can be noted in Table 7 that the CoPLE have earned a Very Highly Valid rating in all indicators. All of the composite means fall within the range of 4.51-5.00. The content quality of CoPLE received an overall mean rating of 4.85 which translates to a very highly valid descriptive interpretation. These ratings indicate that the CoPLE is a valid teaching resource material in Physics education.

The study of Picardal and Sanchez (2022), which states that bridging the gap between Physics concepts and real-life experiences supports the results below. This study embraced contextualization. Based on content validity, the CoPLE maximizes the achievement of learning objectives through various assessment tools, activities, and teaching techniques with the integration of familiar context.

Table 7. Mean ratings of experts on the content quality of CoPLE.

Criteria	Mean	Descriptive Interpretation
a. Objectives	4.72	VHV
b. Content	4.76	VHV
c. Context	4.80	VHV
d. Instructional Characteristics	4.84	VHV
e. Evaluation Characteristics	4.64	VHV
Overall Mean	**4.75**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

Design Quality

Design characteristics. Table 8 shows the mean rating given by experts on the design of CoPLE. It is revealed that the design characteristics of CoPLE is *Very Highly Valid* with an overall mean of 4.80. This means that the contextualized lesson exemplars present clear instructions, are readable, are consistent with the 7E learning cycle, are compatible with the allotted time frame, and include appropriate educational strategies.

The results of the study are in common with the findings of Manurong (2017) which stated that it is important to consider the language in writing materials so that learners could understand the lessons properly. For example, the writing of instructions using simple language enables the students to understand what to do in the activities. Also, Manurong (2017) argued that effective materials need a model so that teaching/ learning strategies and processes are systematically and scientifically designed to fulfill the needs of the students.

Table 8. Mean ratings of experts on the design characteristics of CoPLE.

Criteria	Mean	Descriptive Interpretation
The design of the contextualized lesson exemplars:		
a. present clarity of instruction.	5.00	VHV
b. are readable.	5.00	VHV
c. Present consistency of the 7E learning cycle	5.00	VHV
d. provide compatibility of the lessons to the allotted time frame.	4.20	VHV
e. include appropriate teaching/ learning strategies.	4.80	VHV
Overall Mean	**4.80**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

Adaptability. Table 9 shows the mean rating of experts on the adaptability of CoPLE. It is revealed that the CoPLE is *Very Highly Valid* with an overall mean of 4.67 in terms of adaptability. This means that the contextualized lesson exemplars are adaptable to any learning group size, compatible to the capabilities of both teachers and students and adaptable to their experiences and interests.

Table 9. Mean ratings of experts on the adaptability of CoPLE .

Criteria	Mean	Descriptive Interpretation
The contextualized lesson exemplars are:		
a. adaptable to any learning group size.	4.40	VHV
b. compatible to the capabilities of teachers and students.	4.60	VHV
c. adaptable to experience and interest of the teacher and students	4.60	VHV
Composite Mean	**4.53**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)

1.00-1.50	Not Valid (NV)

The results suggest that the CoPLE could help attain the contextualization, espoused in RA 10533, for teachers to design or adapt instructional materials that connect teaching and learning to various experiences and interests and are compatible to diverse group of students.

Summary Of Evaluation of The Design Quality. Table 10 presents the summary of the evaluation of the panel of experts on the design aspects of CoPLE.

It can be noted in Table 10 that the Consumer Physics-Enhanced Lesson Exemplars are Very Highly Valid rating in all indicators. All of the composite means fall within the range of 4.51-5.00. Overall, the design quality of CoPLE received an overall mean rating of 4.67 which translates to a very highly valid descriptive interpretation. These ratings indicate that the CoPLE is a valid teaching resource material in Physics education.

Table 10. Mean ratings of experts on the design quality of CoPLE (N=5).

Criteria	Mean	Descriptive Interpretation
a. Design characteristics	4.80	VHV
b. Adaptability	4.53	VHV
Overall Mean	**4.67**	**VHV**

Legend:	**Range of Means**	**Descriptive Interpretation**
	4.51-5.00	Very Highly Valid (VHV)
	3.51-4.51	Highly Valid (HV)
	2.51-3.50	Moderately Valid (MV)
	1.51-2.50	Slightly Valid (SV)
	1.00-1.50	Not Valid (NV)

CONCLUSIONS

Based f the results of data gathered, the researchers concluded that the developed Consumer Physics-enhanced Lesson Exemplars (CoPLE) for Junior High School is a valid teaching resource material as perceived by the panel of experts or validators.

The CoPLE is very highly valid in terms of its content and design qualities. The CoPLE was found to offer a guide or direction in teaching Physics with the integration of consumer-related contexts which are present in the discussion, activities, and assessments.

The CoPLE features adhere with Integrative Learning which highlights that students are active participants in the creation of valuable skills and knowledge through recognizing the connection of concepts or theories and practice.

The CoPLE also agrees with Contextual Teaching and Learning (CTL), which links the learning of essential skills with academic content by focusing teaching and learning materials on concrete applications in a context that is relevant to the students.

In this study, consumer-related situations and activities were adapted as students' context as they are considered to be young consumers and the contexts are familiar and helpful to them. The CoPLE, as learning material, empowers the students to become smart consumers who could create and radiate influence in the global community.

Recommendations

Based on the conclusions, several recommendations are proposed for the Consumer Physics-enhanced Lesson Exemplars (CoPLE) for Junior High School. Schools should adopt CoPLE as a standard teaching resource due to its high validity. Comprehensive training should be provided for teachers on integrating consumer-related contexts and using the exemplars effectively. Continuous evaluation and feedback systems should be established to refine the materials. CoPLE should be integrated into the broader curriculum, with necessary resources allocated for successful implementation. Engaging students through real-life consumer-related activities will help them see the relevance of Physics and empower them as informed consumers. Ongoing

research should be supported to assess the long-term impact of CoPLE on student learning and development. These steps will enhance Physics education and equip students with valuable skills for their future.

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