International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

Enhancing the conceptual skills of Grade 7 students in measurements and calculations through a teacher-made module

Renante Q. Bista Jr., MATLE
Ilocos Sur National High School
Corresponding Author e-mail: *renante.bista@deped.gov.ph*

Received: 01 January 2026 **Revised**: 02 February 2026 **Accepted**: 05 February 2026

Available Online: 06 February 2026

Volume I (2026), Issue 1, P-ISSN – 3116-3769; E-ISSN - 3116-3777

https://doi.org/10.63498/injelps1

Abstract

Aim: This study aimed to determine the effectiveness of a teacher-made instructional module in enhancing the conceptual skills of Grade 7 students in measurements and calculations.

Methodology: A true experimental pretest–posttest equivalent group design was employed. Seventy-four Grade 7 students were assigned to either an experimental group exposed to the teacher-made module or a control group taught using the traditional method. A validated 30-item achievement test was administered before and after the intervention. Data were analyzed using descriptive statistics and t-tests.

Results: Both groups demonstrated improvement from a nearly proficient level in the pretest to a proficient level in the posttest. However, statistically significant differences were found between the pretest and posttest scores of both groups and between the posttest scores of the experimental and control groups, favoring students who used the teacher-made module.

Conclusion: The findings indicate that the teacher-made module was an effective instructional intervention for improving students' conceptual understanding of measurements and calculations. The results support the use of teacher-developed instructional materials as a strategy for enhancing learning outcomes in junior high school mathematics.

Keywords: *teacher-made module, conceptual understanding, measurements and calculations, mathematics education, experimental design*

INTRODUCTION

Enhancing students' conceptual understanding of foundational mathematics competencies continued to be a persistent concern in basic education worldwide. Conceptual understanding in measurements and calculations is essential for problem-solving, scientific reasoning, and real-life decision-making; however, international large-scale assessments consistently showed that many learners struggled to apply mathematical concepts meaningfully rather than procedurally (OECD, 2023; Mullis et al., 2020). At the junior high school level, this challenge became more evident as learners transitioned from concrete operations to formal reasoning, a stage that required deeper conceptual processing rather than rote memorization.

Recent empirical studies underscored that students' difficulties in mathematics were largely attributed to weak conceptual foundations, particularly in measurement-related competencies (Kilpatrick et al., 2021; Rittle-Johnson et al., 2022). Research further demonstrated that instructional approaches emphasizing active engagement, structured learning sequences, and conceptual scaffolding were more effective in supporting mathematical understanding than traditional lecture-based methods (Hiebert & Grouws, 2021). Modular and self-paced instructional materials, when carefully designed, were found to support independent learning, reduce cognitive overload, and improve learning outcomes across mathematics-related disciplines (Mayer, 2020; Schunk, 2022).

In the Philippine basic education context, persistent learning gaps in mathematics had been documented in national and international assessments. Results from large-scale assessments such as the National Achievement Test and the Programme for International Student Assessment (PISA) consistently indicated low proficiency levels among Filipino learners in mathematics, particularly in tasks requiring conceptual understanding and application (Department

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

of Education, 2022; OECD, 2023). In response, the Department of Education promoted the development and utilization of contextualized instructional materials to address least mastered competencies and accommodate diverse learner needs.

Despite the availability of prescribed learning resources, assessment results from public secondary schools revealed that many Grade 7 students continued to demonstrate weak conceptual understanding in measurements and calculations, suggesting that existing materials did not sufficiently address misconceptions or support deep learning. Previous studies reported that teacher-made instructional modules positively influenced students' achievement and engagement (Alelaimat & Ghoneem, 2021; Igbo & Omeje, 2014). However, most prior research focused on general achievement outcomes or other subject areas, with limited experimental studies specifically examining conceptual skills in measurements and calculations at the junior high school level, particularly within Philippine public secondary schools.

Moreover, few studies employed true experimental designs to directly compare the effectiveness of teacher-made modules with traditional teaching methods in developing conceptual understanding. This gap indicated the need for rigorous empirical investigation that focused not only on performance gains but also on conceptual skill development in specific mathematical domains.

Thus, this study investigated the effectiveness of a teacher-made instructional module in enhancing the conceptual skills of Grade 7 students in measurements and calculations using a true experimental design. The study provided empirical evidence contributing to mathematics education and instructional design research and offered practical implications for classroom instruction, curriculum development, and teacher professional practice in basic education.

Review of Related Literature and Studies

Conceptual Understanding in Measurements and Calculations

Conceptual understanding is a critical component of mathematical proficiency and problem-solving ability. Research consistently demonstrated that students' difficulties in measurements and calculations stemmed more from conceptual weaknesses than procedural errors (Rittle-Johnson et al., 2022). Learners who relied primarily on memorization often failed to transfer knowledge to unfamiliar contexts, resulting in persistent misconceptions and poor application skills (Kilpatrick et al., 2021).

In secondary education, measurements and calculations served as prerequisite competencies for advanced mathematical and scientific concepts. Studies revealed that students frequently struggled to apply measurement concepts to real-world situations, indicating a disconnect between classroom instruction and authentic application (Hiebert & Grouws, 2021). These findings emphasized the need for instructional interventions that promoted meaning-making, conceptual coherence, and contextualized learning experiences.

Teacher-Made Instructional Modules as Instructional Interventions

Teacher-made instructional modules gained increasing recognition as effective tools for addressing specific learning gaps. Modular instruction allowed learners to progress at their own pace while providing structured content, guided activities, and formative assessments (Schunk, 2022). Recent studies reported that teacher-developed modules improved learner engagement, independent learning, and academic performance, particularly when aligned with learners' needs and curricular objectives (Alelaimat & Ghoneem, 2021).

Unlike commercially produced materials, teacher-made modules were typically contextualized to learners' language, environment, and prior knowledge. Contextualization was identified as a key factor in improving comprehension and motivation (Igbo & Omeje, 2014). Empirical evidence further showed that students exposed to teacher-designed modules outperformed those taught using purely lecture-based or textbook-centered approaches, especially in concept-intensive subjects.

Effectiveness of Modular Instruction in Basic Education

Recent literature documented positive outcomes associated with modular and self-directed learning in basic education. Studies conducted between 2021 and 2024 indicated that modular instruction supported differentiated learning by allowing students to revisit concepts, engage in guided practice, and receive feedback at their own pace (Mayer, 2020; Schunk, 2022). In mathematics-related subjects, modular learning reduced anxiety and enhanced conceptual understanding by breaking complex topics into manageable units.

ETCOR's Website : https://etcor.org
Facebook Page : https://www.facebook.com/EmbracingTheCultureOfResearch
Twitter Account : https://twitter.com/ETCOR_research
YouTube Channel : https://tinyurl.com/YouTubeETCOR
E-mail Address : embracingthecultureofresearch@etcor.org
Mobile Number : 0939-202-9035

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

Experimental and quasi-experimental studies further demonstrated that modular instruction resulted in significantly higher posttest performance compared to traditional teaching methods (Alelaimat & Ghoneem, 2021). These gains were attributed to the structured sequencing of content, integration of explanations and examples, and opportunities for independent practice.

Synthesis and Research Gap

Collectively, the reviewed literature indicated that conceptual difficulties in measurements and calculations remained prevalent in junior high school education. While modular instruction and teacher-made materials showed promise, scant experimental research focused explicitly on conceptual skills in measurements and calculations within Philippine public secondary schools, and fewer studies utilized true experimental designs to establish causal relationships. This gap justified the conduct of the present study.

Theoretical Framework

This study was anchored on Constructivist Learning Theory, Cognitive Learning Theory, and Instructional Materials Theory, which collectively explained how learners develop conceptual understanding and how instructional resources influence learning outcomes.

Constructivist Learning Theory, grounded in the works of Piaget (1977) and Vygotsky (1978), posited that learners actively construct knowledge through interaction with learning tasks, prior experiences, and social engagement. Learning occurred as students integrated new information into existing cognitive structures. The teacher-made module supported constructivist learning by incorporating guided activities, reflective tasks, and independent practice that encouraged active engagement with measurement and calculation concepts.

Cognitive Learning Theory emphasized internal mental processes such as comprehension, reasoning, memory, and problem-solving (Bruner, 1996; Mayer, 2020). This theory asserted that instruction should be logically sequenced and designed to facilitate information processing. The teacher-made module reflected cognitive principles through its organized presentation, worked examples, and reinforcement exercises, which supported conceptual processing and minimized misconceptions.

Instructional Materials Theory highlighted the role of well-designed instructional resources in improving learning effectiveness (Dick et al., 2015). According to this theory, instructional materials must align with learner needs, learning objectives, and contextual realities. The teacher-made module was developed to address least mastered competencies identified through assessment data, making it contextually relevant and instructionally effective.

Conceptual Framework

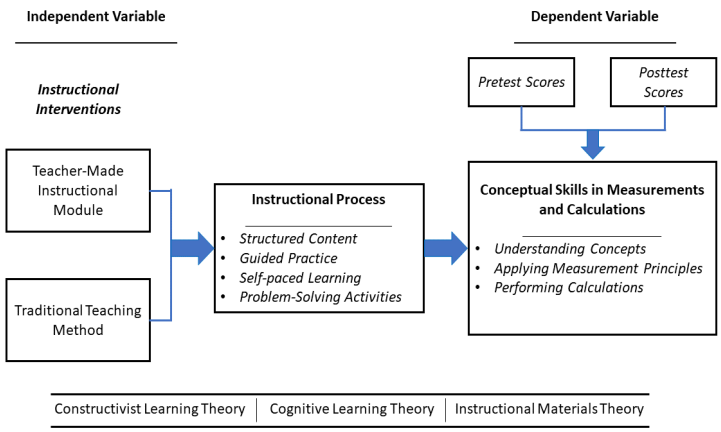

Figure 1. Research Paradigm

The conceptual framework guided the design of the instructional module, the development of the achievement test, and the implementation of the instructional intervention. It identified the teacher-made instructional module as

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

the independent variable, the instructional processes as mediating mechanisms, and students' conceptual skills in measurements and calculations as the dependent variable. The framework also informed the construction of research instruments, instructional planning, and data analysis.

The instructional intervention influenced student learning through specific instructional processes embedded in the module, namely: content presentation, guided practice, self-paced learning, and independent problem-solving tasks. These instructional processes facilitated student engagement, supported cognitive processing, and promoted the active construction of knowledge.

Students' conceptual skills in measurements and calculations served as the dependent variable of the study. This variable was operationalized in terms of students' ability to understand concepts, apply measurement principles, and perform accurate calculations. Learning outcomes were measured using pretest and posttest scores obtained from a validated achievement test.

The framework assumed that a well-designed and contextualized teacher-made instructional module grounded in constructivist and cognitive learning principles would lead to better conceptual understanding than traditional instruction. This theoretical assumption guided the formulation of research objectives, the selection of the research design, and the analysis and interpretation of research findings.

Statement of the Problem

Conceptual understanding in measurements and calculations plays a vital role in students' performance in mathematics, science, and technology-related subjects, as these competencies underpin problem-solving, analytical reasoning, and real-life application skills. However, many junior high school students demonstrate weak conceptual understanding in these areas, as reflected in classroom assessments and school achievement data. Learners often memorize procedures in measurements and calculations without fully understanding the underlying concepts, resulting in recurring misconceptions and low academic performance.

This concern is evident in Philippine basic education, where measurements and computations are among the least mastered competencies in mathematics. Despite the availability of prescribed learning materials and the use of conventional teaching approaches, many Grade 7 students continue to show limited conceptual skills. This situation indicates the need for instructional strategies that directly address conceptual gaps and promote meaningful learning.

Teacher-made instructional modules have been recognized as potential tools for contextualized and learner-centered instruction that can support independent learning and systematic concept development. However, limited experimental research has examined the effectiveness of teacher-developed modules in improving conceptual skills in measurements and calculations among junior high school students, particularly in the Philippine secondary school context. Moreover, few studies have used rigorous experimental designs to compare teacher-made modules with traditional teaching methods.

Given these gaps, it was necessary to investigate whether a teacher-made instructional module could significantly enhance the conceptual skills of Grade 7 students in measurements and calculations. Addressing this issue provided evidence that could guide instructional practices, encourage teacher-led innovations, and contribute to improved learning outcomes in secondary school mathematics.

General Objective

To determine the effectiveness of a teacher-made instructional module in enhancing the conceptual skills of Grade 7 students in measurements and calculations.

Specific Objectives

The study aimed to:

1. Determine the level of conceptual skills of Grade 7 students in measurements and calculations before and after exposure to the instructional interventions.
2. Examine whether a significant difference existed between the pretest and posttest mean scores of Grade 7 students in measurements and calculations.
3. Determine whether a significant difference existed between the posttest mean scores of students taught using a teacher-made instructional module and those taught using the traditional teaching method.

Research Questions

1. What was the level of conceptual skills of Grade 7 students in measurements and calculations before and after the instructional interventions?

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

2. Was there a significant difference between the pretest and posttest mean scores of Grade 7 students in measurements and calculations?
3. Was there a significant difference between the posttest mean scores of students exposed to the teacher-made instructional module and those taught using the traditional teaching method?

H_{o1}: There was no significant difference between the pretest and posttest mean scores of Grade 7 students in measurements and calculations.
H_{o2}: There was no significant difference between the posttest mean scores of students taught using the teacher-made instructional module and those taught using the traditional teaching method.

Methodology

Research Design

The study employed a true experimental research design, specifically the pretest–posttest equivalent groups design, to determine the effectiveness of a teacher-made instructional module in enhancing the conceptual skills of Grade 7 students in measurements and calculations. This design involved the comparison of learning outcomes between an experimental group, which utilized the teacher-made module, and a control group, which received instruction through the traditional teaching method.

Group equivalence was established through pretesting, which ensured that both groups had comparable baseline levels of conceptual skills prior to the intervention. Two intact classes were used to maintain the natural classroom setting; however, random assignment of the intact classes to experimental and control conditions was implemented to minimize selection bias. The design was appropriate for the study as it allowed the establishment of causal relationships between the instructional intervention and students' learning outcomes while controlling for initial differences.

Population and Sampling

The participants of the study consisted of 74 Grade 7 students enrolled at Ilocos Sur National High School during School Year 2024–2025. Two intact classes were involved in the study. One class was randomly assigned as the experimental group (n = 37), while the other class served as the control group (n = 37).

An intact group random assignment technique was employed, which is appropriate for true experimental studies conducted in school settings where individual randomization is not feasible. The use of intact classes ensured minimal disruption to regular instructional schedules while maintaining experimental rigor. The equal group sizes ensured balanced comparison and statistical validity.

The table shows the distribution of respondents. It further shows that the two groups, experimental and control groups, were similar in number.

Section	Group	Number
Armstrong	Controlled	37
Aristotle	Experimental	37
	Total	**74**

Research Instruments

The primary data-gathering instrument was a researcher-made 30-item achievement test designed to measure students' conceptual skills in measurements and calculations. The test was developed based on a Table of Specifications (TOS) to ensure alignment with the targeted learning competencies and cognitive levels.

Content Validation

The instrument underwent content validation by three subject-matter experts, consisting of:

- a Head Teacher (Mathematics),
- a Master Teacher (Mathematics), and
- an Education Program Supervisor (Mathematics).

Each validator possessed at least a master's degree and extensive experience in mathematics instruction and curriculum evaluation. A 5-point Likert-type scale was used for validation, where 5 indicated *very highly valid* and 1 indicated

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

poorly valid. The instrument obtained a mean validity rating of 4.62, interpreted as Very Highly Valid, indicating excellent content adequacy and relevance.

Reliability Testing

Reliability testing was conducted through a pilot administration involving 30 Grade 7 students who were not part of the actual study sample. Using Cronbach's alpha, the instrument yielded a reliability coefficient of 0.85, which indicated high internal consistency and suitability for research use.

Data Collection Procedure

Data collection was conducted during the third grading period of School Year 2024–2025 in the regular classroom setting during scheduled Information and Communications Technology periods. Initially, a pretest was administered simultaneously to both the experimental and control groups to determine baseline conceptual skills.

Following the pretest, the experimental group was exposed to the teacher-made instructional module over the designated intervention period, while the control group received instruction using the traditional teaching method. At the end of the intervention, a posttest, using the same validated achievement test, was administered to both groups to determine changes in students' conceptual understanding.

Treatment of Data

Appropriate statistical tools were employed to analyze the data in relation to the research objectives. The mean score was used to determine the level of students' conceptual skills in measurements and calculations before and after the intervention. This measure was appropriate since all test items were equally weighted and contributed uniformly to the total score.

To address the second research objective, the *t*-test for dependent samples was used to determine whether a significant difference existed between the pretest and posttest mean scores within each group. To address the third research objective, the *t*-test for independent samples was used to determine whether a significant difference existed between the posttest mean scores of the experimental and control groups. All statistical tests were conducted at the 0.05 level of significance.

The following scale was used to interpret students' levels of conceptual skills:

Range of Scores	Descriptive Interpretation
25-30	Highly Proficient (HP)
19-24	Proficient(P)
13-18	Nearly Proficient (NP)
7-12	Low Proficient (LP)
0-6	Beginning (B)

Ethical Considerations

Ethical standards were strictly observed throughout the conduct of the study. Approval to conduct the research was obtained from the Schools Division Office and the school administration. Since the participants were minors, written informed consent was secured from both the students and their parents or legal guardians prior to data collection.

Participation in the study was voluntary, and participants were informed of their right to withdraw at any time without penalty. Confidentiality of respondents' identities and data was maintained, and all information collected was used solely for academic and research purposes.

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

RESULTS and DISCUSSION

This section presents and discusses the results of the study based on the research questions. Findings are interpreted in relation to learning theory and relevant empirical studies to explain observed outcomes.

Table 1. Level of students' conceptual understanding before and after the intervention

Groups	N	Pretest		Posttest		
		$\bar{x}$	Descriptive Rating	$\bar{x}$	Descriptive Rating	Mean Difference
Experimental (Aristotle)	37	13.92	Nearly Proficient	24.00	Proficient	10.08
Control (Armstrong)	37	15.29	Nearly Proficient	20.79	Proficient	5.50

The pretest results showed that the experimental group obtained a mean score of 13.92, while the control group recorded a mean score of 15.29. Both groups were interpreted as Nearly Proficient, indicating limited conceptual understanding of measurements and calculations prior to the intervention. The similarity in descriptive ratings suggests that students in both groups had comparable baseline knowledge, confirming the presence of conceptual gaps among Grade 7 learners.

These findings are consistent with previous studies reporting that students often struggle with measurement concepts due to an overreliance on procedural knowledge rather than conceptual understanding (Rittle-Johnson et al., 2022; Kilpatrick et al., 2021). From the perspective of Constructivist Learning Theory, learners enter the classroom with pre-existing misconceptions that must be actively addressed through meaningful learning experiences (Piaget, 1977; Vygotsky, 1978). The pretest results highlight the need for instructional approaches that allow students to actively construct knowledge rather than passively receive information.

After the intervention, both groups improved to a Proficient level in the posttest. However, the experimental group achieved a higher mean score (24.00) than the control group (20.79). The substantially higher mean gain of the experimental group (10.08) compared to the control group (5.50) indicates that the teacher-made instructional module was more effective in enhancing students' conceptual understanding.

This improvement may be explained using Cognitive Learning Theory, which emphasizes structured content, guided practice, and reinforcement as critical factors in concept formation (Bruner, 1996; Mayer, 2020). The teacher-made module provided logically sequenced lessons, worked examples, and opportunities for independent practice, which supported deeper cognitive processing and reduced misconceptions in measurements and calculations.

Table 2. Significant difference on pretest and posttest mean scores of the students in the experimental and control groups

	Paired Differences		t	df	*p*-value (two-tailed)	Decision
	Mean	Sd				
Pre-Post	-7.76000	4.15198	-16.186	74	<.001	Significant

The results of the t-test for dependent samples revealed a statistically significant difference between the pretest and posttest mean scores ($p < .001$). This finding confirms that students' conceptual understanding significantly improved following instruction. The greater improvement observed in the experimental group suggests that the teacher-made module enhanced learning beyond the gains achieved through traditional teaching methods.

According to Constructivist Learning Theory, learning occurs when students actively engage with content and reflect on their understanding (Vygotsky, 1978). The instructional activities embedded in the module required students to analyze problems, apply concepts, and practice independently, thereby facilitating active knowledge construction.

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

Similar findings were reported by Alelaimat and Ghoneem (2021), who found that students exposed to modular instruction demonstrated significantly higher achievement gains compared to those taught using conventional methods.

Furthermore, the module's self-paced design aligns with Cognitive Load Theory, which posits that reducing extraneous cognitive load allows learners to focus on essential information, thereby improving comprehension and retention (Mayer, 2020). By allowing students to revisit explanations and exercises, the module supported sustained conceptual development.

Table 3. Significant difference of the two groups' post test mean scores

	Test Used	Mean	Mean Difference	t-stat	*p*-value (two-tailed)	Significance α=0.05
Pretest	Control Group	15.29	1.37	-1.71	0.08	Not Significant
	Experimental Group	13.92				
Posttest	Control Group	20.79	3.21	-6.47	<.001	Significant

The t-test for independent samples showed no significant difference between the experimental and control groups during the pretest phase ($p > 0.05$), confirming group equivalence prior to the intervention. However, a statistically significant difference was observed in the posttest mean scores ($p < .001$), favoring the experimental group.

This result indicates that the teacher-made instructional module was more effective than the traditional teaching method in improving students' conceptual understanding of measurements and calculations. The effectiveness of the module may be attributed to its contextualized content and learner-centered structure, which enabled students to connect abstract measurement concepts to real-life situations.

These findings support earlier studies that demonstrated the effectiveness of teacher-made instructional materials in improving academic performance and conceptual understanding (Igbo & Omeje, 2014; Schunk, 2022). Unlike commercially produced materials, teacher-made modules are often tailored to learners' specific needs, language level, and learning context, which enhances comprehension and motivation.

Conclusions

Based on the analysis and interpretation of the data, the following conclusions were drawn.

1. Grade 7 students demonstrated limited conceptual understanding of measurements and calculations prior to the intervention, as reflected in their nearly proficient performance in the pretest. This finding indicates persistent conceptual gaps in foundational mathematics competencies and underscores the need for instructional approaches that explicitly address conceptual understanding.
2. Both the teacher-made instructional module and the traditional teaching method resulted in significant improvement in students' conceptual skills, as evidenced by the posttest results. However, students who were exposed to the teacher-made module achieved substantially higher learning gains than those taught using the traditional approach. This result indicates that the module provided more effective instructional support for enhancing conceptual understanding.
3. The significant difference in posttest performance between the experimental and control groups confirms the effectiveness of the teacher-made instructional module as an instructional intervention. The module's contextualized, structured, and learner-centered design facilitated deeper engagement with content and supported improved conceptual learning outcomes.
4. Overall, the study concludes that teacher-made instructional modules are effective tools for enhancing students' conceptual skills in measurements and calculations and may serve as viable alternatives or instructional supplements to conventional teaching methods in junior high schools.

International Journal of Education, Learning, and Pedagogical Sciences (INJELPS)
P - ISSN 3116-3769; E - ISSN 3116-3777
National Book Development Board (NBDB) Registration as Book Publisher (Print & Digital): 6312
PRC-CPD Accredited Provider: PTR-2025-749

Recommendations

Based on the conclusions of the study, the following recommendations are offered.

1. Mathematics and technology teachers may integrate teacher-made instructional modules into classroom instruction, particularly for competencies that require strong conceptual understanding. These modules may be used either as primary instructional materials or as supplementary learning resources.
2. Instructional leaders and school administrators may support the development and utilization of teacher-created instructional modules through professional development programs, collaborative lesson planning, and Learning Action Cell sessions. Such institutional support may enhance teachers' capacity to design effective and learner-centered instructional materials.
3. Future researchers may conduct similar studies using larger samples, different grade levels, or other subject areas to further validate the effectiveness of teacher-made instructional modules. Longitudinal studies may also be undertaken to examine the sustained effects of modular instruction on students' conceptual understanding.
4. Further investigations may explore the integration of teacher-made instructional modules within digital or blended learning environments to determine their effectiveness across diverse instructional settings. Such studies may contribute to the continuous improvement of instructional practices in basic education.

REFERENCES

Alelaimat, A. R., & Ghoneem, K. A. A. (2021). The effect of educational modules strategy on the direct and postponed study's achievement of seventh primary grade students in science, in comparison with the conventional approach. *Higher Education Studies, 2*(2), 40–54. https://doi.org/10.5539/hes.v2n2p40

Bruner, J. S. (1996). *The culture of education*. Harvard University Press.

Department of Education. (2022). On the Philippines' participation in the Programme for International Student Assessment (PISA) 2022. Department of Education, Philippines. https://www.deped.gov.ph/2022/03/11/on-philippines-participation-in-pisa-2022/

Dick, W., Carey, L., & Carey, J. O. (2015). *The systematic design of instruction* (8th ed.). Pearson Education.

Hiebert, J., & Grouws, D. A. (2021). The effects of classroom mathematics teaching on students' learning. *Journal for Research in Mathematics Education, 52*(3), 267–298. https://doi.org/10.5951/jresematheduc-2021-0023

Igbo, J. N., & Omeje, J. C. (2014). Perceived efficacy of teacher-made instructional materials in promoting learning among mathematics-disabled children. *SAGE Open, 4*(2), 2158244014538431. https://doi.org/10.1177/2158244014538431

Kilpatrick, J., Swafford, J., & Findell, B. (2021). *Adding it up: Helping children learn mathematics*. National Academies Press. https://doi.org/10.17226/9822

Mayer, R. E. (2020). *Multimedia learning* (3rd ed.). Cambridge University Press. https://doi.org/10.1017/9781316941355

Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). *TIMSS 2019 international results in mathematics and science*. TIMSS & PIRLS International Study Center. https://timssandpirls.bc.edu/timss2019

Organization for Economic Co-operation and Development (OECD). (2023). PISA 2022 results (Volume I and II): Philippines country note. https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/philippines_a0882a2d-en.html

Piaget, J. (1977). *The development of thought: Equilibration of cognitive structures*. Viking Press.

Rittle-Johnson, B., Fyfe, E. R., McLean, L. E., & McEldoon, K. L. (2022). Emerging understanding of conceptual and procedural knowledge in mathematics. *Journal of Educational Psychology, 114*(4), 754–770. https://doi.org/10.1037/edu0000674

Schunk, D. H. (2022). *Learning theories: An educational perspective* (8th ed.). Pearson Education.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.