

Development and Validation of Modified Pechakucha E – Instructional Material Through Storytelling

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Abstract— This study examined the effectiveness of using modified PechaKucha storytelling-based instruction to enhance student performance and address least-learned competencies among Grade 10 students at Sto. Niño National High School, San Agustin, Surigao del Sur, during the third quarter of the 2024-2025 academic year. PechaKucha, characterized by 20 slides displayed for 20 seconds each, emphasizes visual storytelling and concise narratives to engage learners. Results showed a significant improvement in students' performance between pre-test and post-test assessments. The instructional material, validated by Technology and Livelihood Education (TLE) experts, teachers, a master teacher, and the school head, received an outstanding overall rating of 4.909 for content, format, organization, accuracy, and relevance. Despite its effectiveness, challenges emerged, including limited learner-teacher interaction, reduced peer discussions, and the risk of information overload. To mitigate these issues, the study proposed incorporating interactive forums through platforms like Facebook Messenger for real-time Q&A, adding quizzes for immediate feedback, introducing gamified elements, and encouraging collaborative projects and peer reviews. Additionally, reflective journaling and case studies were recommended to promote critical thinking. The findings demonstrate the potential of modified PechaKucha storytelling as an innovative instructional tool, with suggested enhancements to further optimize its impact on competency-based education.

Keywords— Instructional Design; Nursery Ponds; Least - learned Competencies; Pechakucha; Storytelling; Technology and Livelihood Education (TLE)

I. INTRODUCTION

Understanding least learned competencies (LLCs) is essential for addressing educational disparities. These competencies, identified through assessments such as the National Assessment of Educational Progress [1], represent persistent challenges that hinder students' achievement in a variety of subject areas. This highlights that LLCs contribute to achievement gaps, particularly for students at risk of academic failure. Typically, LLCs are identified through formative and summative assessments, which reveal gaps in student learning that require targeted interventions [2]. In the domain of Technology and Livelihood Education (TLE), many studies have documented significant gaps in learning, particularly in practical skills and technical knowledge. It ties these deficiencies to limited hands-on skills and inadequate access to resources, which significantly hinder students' ability to develop practical skills [3]. The COVID-19 pandemic further exacerbated these gaps, as remote and hybrid learning environments reduced engagement and retention of essential skills [4]. Addressing these challenges requires innovative instructional approaches that enhance student engagement and

facilitate skill acquisition. One promising strategy for mitigating LLCs is the integration of digital and multimedia tools in instruction. Research suggests that technologyenhanced learning can increase student engagement, improve retention, and foster critical thinking skills [5]. Multimedia instructional tools such as video-based lessons, e-learning platforms, and interactive presentations have been particularly effective in reinforcing learning outcomes [6]. Emphasizing the role of multimedia as a key intervention for addressing learning gaps, offering personalized and interactive learning experiences [7] A notable multimedia-based pedagogical tool gaining traction in education is PechaKucha. Originally developed by Mark Dytham and Astrid Klein in 2003, PechaKuchaemploys a structured presentation format of 20 slides, each displayed for 20 seconds, fostering concise and visually engaging content delivery [8]. Recent studies suggest that PechaKucha enhances student engagement and retention by combining visual and auditory stimuli [9]. The integrating modified PechaKucha presentations in a flipped classroom model allowed students to engage with learning materials before class, maximizing in-class discussions and problemsolving activities [10].

The effectiveness of PechaKucha in addressing LLCs stems from its ability to support cognitive processing and memory retention [11]. It suggests that the dual-channel processing of visual and auditory information enhances comprehension and recall. Additionally, PechaKucha presentations can be adapted to include embedded quizzes, polls, and prompts, fostering interactive learning and immediate feedback [12]. This adaptability enables students to revisit instructional materials at their own pace, reinforcing mastery of challenging competencies [13]. Empirical evidence supports the efficacy of modified PechaKucha e-instructional materials in improving student learning outcomes. For instance, [14] demonstrated that PechaKucha presentations in high school mathematics improved conceptual understanding, particularly in areas where traditional instruction was ineffective. Similarly, reported significant gains in conceptual and practical applications of scientific principles among students using PechaKucha-based learning materials [15]. Furthermore, found that university students studying history exhibited higher engagement and content retention when exposed to PechaKucha-enhanced instruction [16]. The adaptability of modified PechaKucha presentations further strengthens their potential as a pedagogical tool for addressing LLCs. It notes that PechaKucha-style lessons can cater to different learning styles, making them accessible to both visual and auditory learners [17]. Additionally, advancements



in educational technology enable AI-driven platforms to personalize PechaKucha lessons based on student performance and learning needs [18]. Emerging research indicates that combining PechaKucha with interactive elements such as 3D models, virtual field trips, and augmented reality can create immersive learning experiences, particularly in science, engineering, and mathematics [19].

II. MATERIALS AND METHOD

A 50-item multiple-choice pre-test with four options, designed by the researcher, was utilized in this study. The test was constructed using a table of specifications to ensure content validity, aligning with the least-learned competencies of TLE 10 for the third quarter. The pre-test was administered before the implementation of the developed and validated modified PechaKucha e-instructional material. Learners answered the pre-test based solely on their prior knowledge and understanding of the subject matter [24]. Following the pre-test, the researcher introduced the developed and validated modified PechaKucha e-instructional material to the students. This instructional material adhered to a customized format of time-bounded advancing PowerPoint slides, designed to enhance student engagement and comprehension. The material consisted of the following components: Learning Competencies, Pre-Test, Discussion, Illustrative Examples, Post-Test, and Answer Key. The inclusion of these structured elements aimed to facilitate an effective learning experience [20].

After exposure to the instructional material, a post-test, identical in structure to the pre-test, was administered to the learners. The objective of the post-test was to assess the knowledge acquired by the students after engaging with the modified PechaKucha e-instructional material. The results of both the pre-test and post-test were analyzed to determine the instructional material's effectiveness in enhancing student learning outcomes [21]. To ensure content validity and reliability, the instructional material was subjected to expert validation. TLE teachers and a master teacher in TLE evaluated the material using a rubric adapted from the Department of Education's "A Tool to Assess the Quality of Self-learning Modules (SLMs) for TLE." This evaluation framework assessed the quality of the instructional material based on its structure, content relevance, and instructional effectiveness [22]. The feedback from the evaluators was incorporated to enhance the instructional material before implementation.

Furthermore, the study investigated the learners' perceptions and challenges encountered in the implementation of the modified PechaKucha e-instructional material. Qualitative data were gathered through student feedback and teacher observations to gain insights into the usability and effectiveness of the instructional approach [23. These findings provided valuable information for future improvements in instructional material design and pedagogy.

III. RESULTS AND DISCUSSION

The data reveals in Table 1 that the competencies "Prepare Nursery Pond" and "Stock Fish in Nursery Pond" are among

the least learned topics, with correct response rates ranging from 48.41% to 69.05%. The lowest performance (48.41%) suggests significant challenges in understanding nursery pond preparation, which aligns with [24] findings that aquaculture practices require hands-on experience and structured instructional support. Similarly, fish stocking involves species selection, density management, and acclimatization, which students may struggle with due to limited practical exposure [25]. The slightly higher scores in fish stocking suggest some conceptual grasp, but the overall results indicate a need for enhanced teaching strategies. [26] It emphasizes that integrating multimedia learning, such as PechaKucha-based instruction, can improve knowledge retention and engagement in technical subjects. Therefore, revising instructional approaches to incorporate interactive and digital learning tools may enhance student comprehension and competency acquisition in aquaculture-related topics [27].

TABLE 1. Least – learned Competencies for the Third Quarter, S.Y. 2024 -

Total No. of Correct Responses	% of Correct Responses	Competency/Topic	Remarks
75	59.52	Prepare nursery pond	LeastLearned
82	65.08	Prepare nursery pond	Least Learned
61	48.41	Prepare nursery pond	Least Learned
74	58.73	Prepare nursery pond	Least Learned
64	50.79	Prepare nursery pond	Least Learned
74	58.73	Stock Fish in Nursery Pond	Least Learned
76	60.32	Stock Fish in Nursery Pond	Least Learned
77	61.11	Prepare nursery pond	Least Learned
76	60.32	Stock Fish in Nursery Pond	Least Learned
74	58.73	Stock Fish in Nursery Pond	Least Learned
71	56.35	Stock Fish in Nursery Pond	Least Learned
87	69.05	Stock Fish in Nursery Pond	Least Learned
65	51.59	Stock Fish in Nursery Pond	Least Learned
71	56.35	Stock Fish in Nursery Pond	Least Learned

TABLE 2. Pre - test and Post - test Results based on the Field Try - out

Crown	Pre	etest	Posttest		
Group	Mean	Sd	Mean	Sd	
Field Try - out	23.69	4.42	30.10	7.75	

Table 2 presents the pre – test and post test scores of the students during the field try-out. Before implementing the modified pechakucha storytelling - based instruction, the mean pretest score is 23.69 with a standard deviation of 4.42. After implementing the material, the mean pretest score increases to 30.10 with a standard deviation of 7.75. This means that the utilization of modified pechakucha storytelling - based instructions helps the students understand the least learned competencies

 TABLE 3. Significant Difference between the Pre-test and Post-test Scores of

the Students								
Sources of	Computed	D voluo	Decision	Conclusion				
Variation	t	r-value	Decision	Conclusion				
Pretest &			Reject the	Highly				
Post -test	7.43	0.000	Null	Fight				
Score			hypothesis	Significant				



Table 3 shows the significant difference between the pre – test and post test scores of the students during the field try-out. At the significance level of 0.05, the table above has a computed t value of 7.43 and has a p-value of 0.000, which is less than 0.05 and the decision is to reject the null hypothesis. It shows a significant difference between the pre - test and post - test scores of the students during the field try-out of the modified pechakucha storytelling – based instruction.

Table 4 shows the test of normality of the pre – test and post - test scores of the students using Shapiro-Wilk. In the pretest, the Shapiro-Wilk statistics is 0.975 and the degrees of freedom is 42. Since the p-value 0.673 is greater than the significance level of 0.05, we fail to reject the null hypothesis. It suggests that the pretest scores are likely normally distributed. In the post - test, the Shapiro-Wilk statistics is 0.962 and the degree of freedom is 42. Since the p-value 0.343 is greater than the significance level of 0.05, we fail to reject the null hypothesis. This suggests that the post - test scores are also normally distributed. In summary, the pre – test and post - test scores of the students during the field try-out of modified pechakucha e – instructional material through storytelling is normally distributed.

TABLE 4. Tests of N	formality
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Teata	Shapiro-Wilk					
Tests	Statistics	Df	Sig.			
Pre - test	0.975	42	0.673			
Post - test	0.962	42	0.343			

Indicators		Teachers		Experts		SH/MT	
Indicators	Yes	No	Yes	No	Yes	No	
IPR Compliance							
No copyrighted violations.	100%		100%		100%		
Copyrighted texts and visuals are cited.	100%		100%		100%		
References are properly cited in Bibliography.	100%		100%		100%		
Learning Competencies							
Content is consistent with the targeted DepEd Learning	100%		100%		100%		
Competencies (LCs) intended for the learning area and grade level	100%		100%		100%		
Instructional Design and Organization							
The LR contributes to the achievement of specific objectives	100%		100%		100%		
Sequencing of contents and activities facilitates goal achievement	100%		100%		100%		
Content is suitable to the level f development, needs and experience	100%		100%		100%		
Content reinforces the mastery learning areas and grade level	100%		100%		50%	50%	
Content is logically developed and organized	100%		60%	40%	50%	50%	
The LR contains useful introduction, reviews that facilitates progression	50%	50%	80%	20%	50%	50%	
Development of lesson allows for review, comparison and integration with previous lessons	50%	50%	40%	60%	50%	50%	
Motivation strategies	100%		100%		50%	50%	
LR uses various teaching and learning strategies to meet individual differences	50%	50%	100%		50%	50%	
LR develops higher cognitive skills	50%	50%	100%		50%	50%	
Instructional Quality							
Content and information are accurate.	100%		100%		100%		
Content and information are up-to-date.	100%		100%		100%		
LR is free from any social content violations.	100%		100%		100%		
LR is free from factual errors.	100%		100%		100%		
LR Is free from computational errors.	100%		100%		100%		
LR is free from grammatical errors.	100%		100%		100%		
Assessment							
LR provides useful measurements and information.	100%		100%		100%		
Assessments are aligned with the specific objectives and content			100%		100%		
LR provides "self-checks", ready-made assessments types.	50%	50%	100%		50%	50%	
LR provides variety of assessments types.	50%	50%	100%		50%	50%	
Assessments have clear demonstrations/examples, instructions.	25%	75%	100%		100%		
Variety of activities within LR are utilized to ensure active engagement.	100%		100%		100%		
Readability							
Vocabulary level is adapted to user's experience and understanding	100%		100%		50%	50%	
Length of sentences is suited to the comprehension level of users	100%		80%	20%	100%		
Sentences and paragraph structures are varied and appropriate	100%		100%		100%		
There is logical and smooth flow of ideas in a lesson	100%		100%		100%		
There is consistency and good use of transition devices	100%		100%		100%		
Lessons, instructions, exercises, questions and activities are clear.	50%	50%	80%	20%	100%		

Table 5 shows the result of the content validation as experienced by the three groups of respondents for the modified pechakucha e – instructional material through storytelling. The tool evaluates specific indicators including "Intellectual Property Rights (IPR Compliance), Learning Competencies, Instructional Design and Organization, Instructional Quality, Assessment, and Readability. The evaluation is based on the indicators, with ratings provided by the teachers, experts, and master teachers/school heads. The ratings are presented in percentages indicating compliance in every indicator.



Overall, the result suggests that almost all of the indicators received excellent ratings in the three groups of respondents receiving 100% ratings. However, the indicator instructional design and organization particularly in its "content reinforcement factor" received a rating of 50% from the school head and master teacher. Also, the factor "content development and organization" received 60% and 50% from the experts and school head/master teacher, respectively. As to LR progression, this factor received 50%, 80% and 50% from teachers, experts and school head/ master teacher, respectively. The factor "development of lessons" received 50%, 40% and 50% from teachers, experts and school head/master teacher, respectively. The factor "motivation strategies" received 50% from school head/ master teacher. As to the factor "LR uses various teaching and learning strategies to meet individual differences/learning style", it received 50% from teachers and school head and master teacher. The factor

"LR develops higher cognitive skills" received 50% from school/master teacher.

The indicator assessment particularly in the factor "LR provides self – checks; ready – made assessment" received 50% from teachers and school head/master teacher. The factor "LR provides variety of assessment types" received 50% from school head/master teacher. As to the factor "Assessments have clear demonstrations/examples, instructions" received 25% from the teachers. The factor "Variety of activities within LR are utilized to ensure active engagement" received 50% from school head/master teacher. As to the readability indicator particularly the factor "Length of sentences is suited to the comprehension level of users", it received 80% from experts. The factor "Lessons, instructions, exercises, questions and activities are clear" received 50% and 60% from teachers and experts, respectively.

TABLE 6. Perceptions of the Three Groups of Respondents on the Developed Modified Pechakucha E - instructional Material Through Storytelling

Indicators	Teachers	Experts	School Head/MT	Grand Mean	Over-all Adj. Rating
Indicators	Mean	Mean	Mean	Mean	Adj.Rating
Content	5.000	4.840	5.000	4.947	Outstanding
Language & Style	5.000	4.960	5.000	4.987	Outstanding
Presentation and Organization	4.875	4.700	4.750	4.775	Outstanding
Accuracy and Up-to-datedness	4.937	4.850	5.000	4.929	Outstanding
Over-all Mean	4.953	4.837	4.937	4.909	Outstanding

TABLE 7. Significant Different	ence of the Evalua	tion rating a	s Perceived by t	he Three Groups of	of Respondents

Sources of Variation	Computed F	P-Value	Decision	Conclusion
Content	8.730	0.010	Reject null hypothesis	Significant
Languange & Style	0.550	0.600	Failed to reject null hypothesis	Not significant
Presentation & Organization	5.000	0.390	Reject null hypothesis	Significant
Accuracy & Up-to-datedness	1.220	0.344	Failed to reject null hypothesis	Not significant

Table 6 above presents the perceptions of the three groups of respondents on the developed modified pechakucha e instructional material through storytelling based on the following indicators: content, language and style, presentation and organization, and accuracy and up - to - datedness The result of the evaluation shows high ratings across all indicators. In the first indicator "content" the three groups of respondents rated with a grand mean of 4.947 which suggest that the material is outstanding. This means that the content validity as a whole is very much valid and the content is suitable to the students' level of development. In language and style, the indicator has a grand mean of 4.987, which has an adjective rating of outstanding. This means that the directions give clear information about the topic and the language used is simple, easy to understand and suitable to the ability of the students. In presentation and organization, and accuracy and up - to - datedness of information, the three group of respondents rated with a grand mean of 4.775 and 4.929, respectively which also suggest that the material is outstanding in quality. This means no that the material has illustrations, examples, figures and exercises that serve as instrument to attain the learning process and there were no grammatical errors found. However, there were comments and suggestions of the validators that leads to the improvement of the modified pechakucha e – instructional material through storytelling. The over - all grand mean is 4.909 which

suggests that the developed modified pechakucha e – instructional material through storytelling is outstanding in quality and very much valid.

The table presents the analysis of variance (ANOVA) of the evaluation ratings as perceived by the three groups of respondents. In the content, this indicator has a computed F of 8.730 with a P - Value of 0.010 and it rejected the null hypothesis. In language and style, the computed F is 0.550 with a P – value of 0.600 and it failed to reject null hypothesis. Also, in presentation and organization, the computed F is 5.000 with a with a P – value of 0.390 and it rejected the null hypothesis. Lastly, in accuracy and up - to - datedness of information, it has a computed F of 1.220 with a P - value of 0.344 where it failed to reject the null hypothesis. As to the content and presentation and organization indicators, the ANOVA suggests that there is a significant difference in the perception of the three groups of respondents. On the other hand, ANOVA suggest that there is no significant difference in the perception of the three groups of respondents as to language and style and accuracy and up - to - datedness. These results implies that the modified pechakucha e instructional material differs across indicators.

IV. CONCLUSION

The findings of this study reveal a significant improvement in student performance between the pre-test and post-test,



indicating the effectiveness of the Modified PechaKucha E-Instructional Material in enhancing learning outcomes in Technology and Livelihood Education (TLE). The material received positive evaluations from educational stakeholders, including TLE experts, classroom teachers, a master teacher, and the school head, who all affirmed its relevance, clarity, presentation, organization, and up-to-datedness. The overall grand mean rating of 4.909 supports the conclusion that the material is both outstanding and highly valid.

Although ANOVA results reflected both significant and non-significant differences across the responses of the three groups of evaluators, these variations do not detract from the overarching outcome: the instructional material contributed to better student understanding of the least learned competencies. Its development was timely and addressed the instructional needs of the target learners.

However, several challenges were identified in the material's implementation. The inherently fast-paced and concise format of the Modified PechaKucha approach may limit opportunities for meaningful teacher–student and peer-to-peer interactions, potentially resulting in cognitive overload for some learners. To address these limitations, future iterations of the material should incorporate enhancements such as interactive discussion platforms (e.g., through Facebook Messenger), embedded formative assessments, gamified learning elements (e.g., badges or leaderboards), and structured peer collaboration activities. Strategies promoting active learning, such as reflective journaling, think-pair-share exercises, and case-based applications, are also recommended to strengthen student engagement and deepen critical thinking.

Overall, while the Modified PechaKucha E-Instructional Material presents a promising and innovative approach to digital instruction in TLE, its pedagogical effectiveness can be further optimized through strategic design enhancements aimed at fostering interactivity, collaboration, and deeper learning.

RECOMMENDATIONS

The conclusions drawn from this study highlight the need for training and support to understand pechakucha format and how it could be integrated into teaching practices. As an instructional design, teachers must be adept to use engaging visuals and incorporating interactive elements to enhance learner engagement and understanding. And there must be continuous improvement to regularly review and update the modified pechakucha e – instructional material to ensure it remains relevant and effective. To promote collaboration and improvement, modified pechakucha e – instructional material must be shared as one of the best practices educators could utilize.

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