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Effectiveness of Using Jigsaw Puzzle in Enhancing Language Learning Amidst Post-COVID-19 Educational Crisis in the Philippines

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Abstract

Background: The COVID-19 pandemic has hurt the educational system, specifically in terms of literacy among students. Studies have shown that it is imperative to continue learning regardless of the educational crisis. Therefore, different treatment modalities may be used. One of these is the online learning modality, which contributes to educational disparities due to students' socioeconomic backgrounds. Consequently, learning was not met holistically, and the educational crisis was evident in the learning gaps when face-to-face classes returned.
Objective: This study aims to assess the effectiveness of the Jigsaw Puzzle as an intervention during face-to-face classes to enhance language learning amidst the educational crisis in the Philippines.
Methodology: This study utilised the Jigsaw Puzzle intervention, a collaborative learning strategy wherein students are assigned to be experts on specific topics, thoroughly study the subject matter, and instruct their peers. The pre-test and post-test were administered to identify the least mastered competencies, which then became the focus of the intervention, and to evaluate the overall effectiveness of the intervention. A z-test was utilised to analyse the data. The potential implications to the students while having the intervention were gathered through focus group discussions and it was analysed using thematic analysis.
Results: The intervention showed a statistically significant effect and effectively addressed the learning gaps during the educational crisis, indicating improvements in the target competencies and encouraging collaboration in face-to-face classes. It is an engaging and effective learning method that differs from traditional lecture-based instruction. This fostered critical thinking, improved comprehension, and enhanced understanding. The method also promoted leadership skills, teamwork, and socialisation, helping students build stronger relationships and create a more cohesive classroom environment.
Conclusion: The pandemic has caused substantial disruptions, hindering authentic and holistic learning, especially literacy in language education, resulting in a learning gap or shortage among affected students. This is evident from the pre-test assessment, which reveals that the least mastered competencies are also affected by the lack of prior knowledge. Significant results were observed for each sample when the Jigsaw Puzzle was used. It is imperative to use an intervention during an educational crisis, and the Jigsaw Puzzle proved effective. Learning domains for inclusive, holistic, and cooperative learning approaches were evident when the intervention was used.
Unique Contribution: This research has contributed to the Sustainable Development Goals of the United Nations under SGD no.4-Education in promoting inclusive and equitable education and life-long learning opportunities during educational crises.

Recommendations: In order to effectively address the challenge of learning gaps amidst educational crises, it is crucial to conduct assessments before class and implement interventions that will aid in their development. These activities will be particularly beneficial for students who have experienced learning gaps.
Keywords: Jigsaw Puzzle, Learning Continuity, Learning Recovery, Language Education, Educational Crisis

Introduction

In recent years, the world has faced a pandemic crisis in the form of COVID-19, in which the education system has drastically changed worldwide, affecting the teaching-learning process. Consequently, the Department of Education (DepEd) in the Philippines has taken action to ensure continuity of learning with quality education. The DepEd addressed this through a department order no. 12 in 2020, also known as "Adoption of the Basic Education Learning Continuity Plan for School Year 2020-2021 in light of Public Health Emergency." According to DepEd (2020), this will continue to create holistic Filipino students with 21st-century skills. The department ensured the continuity of education in the Philippines with different programs and interventions as a response to the challenges faced by the educational system.

In accordance with the objectives of the DepEd, the Schools Division Office (SDO) of Mandaluyong carried out the initiatives outlined in Division Memorandum no. 729 s. 2022, titled "Activities for the School Learning and Continuity and Recovery Plan (LCRP) School Year 2022-2023," to address the educational requirements of the city's educational institutions. Continuing to teach and learn is critical for fostering "holistic Filipino learners with 21st-century skills" (Deped, 2020) while also addressing the learning gap, specifically in literacy in language education. This imperative is driven by the evolving demands of the workforce, which necessitate individuals to maintain up-to-date knowledge and skills throughout their lifetime. Lifelong learning is crucial for adapting to technological, economic, and social changes (Alario-Hoyos, 2022). Thus, it cannot be hampered by the educational crisis brought by the pandemic.

Dickerman and Told (2021) emphasise that the academic community has come to acknowledge the importance of ongoing learning, focusing on innovative educational approaches and integrating contextualised teaching strategies. However, despite the recognition of the need for lifelong learning, there are disparities in educational outcomes that must be addressed during the educational crisis. These disparities persist among students from socioeconomic backgrounds (Bacharach et al., 2023; Bailey et al., 2021; Moreu & Brauer, 2021; Rowley et al., 2020) who cannot afford different learning modalities during the pandemic. Consequently, learning was not met holistically, and the educational crisis was evident in the learning gaps when face-to-face classes returned. To address this issue, implementing inclusive teaching methods and interventions, such as Jigsaw Puzzle, can help bridge these learning gaps and promote success for students from underrepresented groups (Clark, 2023; Moreu & Brauer, 2021).

In light of the circumstances, this research venture seeks to tackle the necessity of implementing Learning Continuity and Recovery measures to bridge the learning gaps in language subjects (Filipino and English) among students in Senior High School at Mataas na Paaralang Neptali A. Gonzales by employing the Jigsaw Puzzle technique. This study also aims to assess the

effectiveness of the Jigsaw Puzzle as an intervention to enhance language learning amidst the educational crisis in the Philippines.

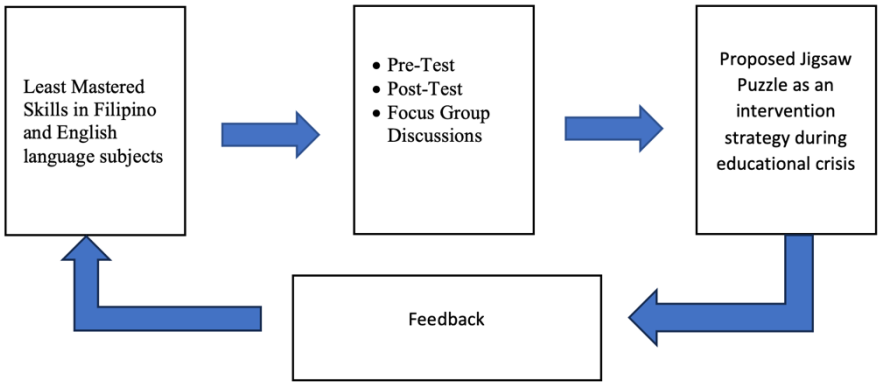
Students participated in collaborative activities by utilising the Jigsaw Puzzle as an intervention. As per Dhull and Verma (2019), this activity assigned each student as an expert on a particular subject matter, compelling them to study the topics thoroughly along with their associated skills and subsequently teach/share them with other groups. Meanwhile, the teacher will be the facilitator of learning. This approach indicates that collaborative activities promote student learning (Dhull & Verma, 2019), fostering responsibility and accountability in their education. Villegas and Abarro (2022) stressed the importance of collaborative activities in preparing students to interact, make group decisions, and collaborate for the greater good. With the aid of the Jigsaw Puzzle, it aims to address the educational crisis by transforming language education, catering to learning continuity and recovery, thereby reducing learning gaps and consistently producing proficient students in various skills in language subjects.

Research Questions

This study aims to assess the effectiveness of the Jigsaw Puzzle as an intervention during face-to-face classes to enhance language learning amidst the educational crisis in the Philippines with the following questions:

1. What are the skills that are least mastered in language subjects that need to be addressed to enhance language learning amidst the post-COVID-19 educational crisis?
2. Is there a significant difference between students' pre-test and post-test scores after using the Jigsaw Puzzle?
3. What are the experiences of students in using Jigsaw Puzzles and their potential implications for language learning?

Figure 1. *Paradigm of Jigsaw Puzzle*



Alt Text for Graphical Figure
This shows the flow of the paradigm using the Input, Process, and Output. It entails the process of a Jigsaw Puzzle as the intervention for the least mastered skills.

Figure 1 shows IPO (Input, Process, Output) as the paradigm of Jigsaw Puzzle. In the input, the skills that were least mastered in language subjects were the basis for intervention using the pre-

test. The post-test was the basis for the effectiveness of the intervention. Focus group discussions were used to gather the implications of using the intervention on the students. The output is the proposed Jigsaw Puzzle as an intervention strategy during the educational crisis. Feedback was given in manifestation of the inputs.

Methodology

Research Design

This research used mixed methods, both quantitative and qualitative research designs. The quantitative design was suitable for quantifying the significant difference of the pre-test and post-test using the Jigsaw Puzzle intervention and the qualitative design was used to gather and analyze the experiences of students using the Jigsaw Puzzle intervention and its implications to language learning.

Participants

The General Academic Strand (GAS) served as the sample participants for the study. The GAS was divided into three sections: GAS 1 with 51 students, GAS 2 with 56 students, and GAS 3 with 47 students. For the Jigsaw Puzzle, which employed collaborative work, each section was divided into five groups. The language teachers' pre-test assessment revealed a lack of proficiency in skills and learning gaps, which led to the selection of the GAS as the sample participants. A random sampling technique was used for participants in focus group discussions within the three sections.

Data Gathering Procedure

The researcher administered a pre-test to assess students' language subjects' competencies and identify the skills that need improvement, which was then utilised in the Jigsaw Puzzle intervention. The pre-test was crafted using the table of specifications aligned with the competencies provided in the language subjects curriculum. The Jigsaw Puzzle was implemented following the identification of these least mastered competencies based on the result of a pre-test. After the completion of the Jigsaw Puzzle intervention, a post-test was conducted to evaluate and determine whether any improvements resulted from the intervention. Additionally, the researcher employed focus group discussions to gather the experiences faced by the participants and their implications for language learning in using the Jigsaw Puzzle.

Data Analysis

The error frequency was used to identify the least mastered competencies in the pre-test. This determined the students with learning gaps and who led the Jigsaw Puzzle intervention. The collected data was assessed using Mean Score, Percentage Score, and Standard Deviation to evaluate the impact of the intervention. To assess whether there is a statistically significant discrepancy between the pre-test and post-test scores of the sample participants, a paired z-test was utilised as the sample comprises more than 30 respondents. The results of the focus group discussions were analysed through thematic analysis.

Research Instrument

The pre-test and post-test assessments were the instruments used in this study's quantitative method. Furthermore, a set of questions for the focus group discussions was the instrument of the qualitative method, which explored attitudes, perceptions, and opinions based on the participants' experiences during the intervention.

Intervention and Strategy

The Jigsaw Puzzle intervention was conducted among students during their face-to-face classes. This teaching strategy involves collaborative work or grouping of students and is different from the usual group work done in class. In the Jigsaw Puzzle, students engaged in independent learning towards collaborative/peer teaching, resulting in each one's learning. This requires cooperation among each group and with other groups considering their learning styles, and different topics, including skills, are assigned to one who knows the subject in each group for discussion. Li et al. (2019) considered applying learning styles in teaching strategies to support an approach to students' learning performance. Subsequently, they shared their learnings with other groups, and the group they shared with also shared what they had learned from their respective topics. Therefore, each one's learning depends on each group's teaching, and the teacher guides the class. The least mastered skills were identified after the pre-test and were given to each group that was utilised during the Jigsaw Puzzle intervention.

Ethical Considerations

The researcher has forwarded the pre-test and post-test to the Master Teacher for review and endorsement. The selection of participants was contingent upon the outcomes of the preliminary assessment. The inquiries posed during the focus group discussions were also scrutinised. The researcher was solely responsible for all the resources and financing utilised in the study, from the conception, composition of the research, and execution of the intervention to the editing phase. A statistician independently verified the validity of the z-test results. The transcripts from the focus group discussions were recorded precisely to facilitate thematic analysis. An AI was solely used to correct the grammar of this research.

Results and Discussion

The least mastered competencies in Language Subjects

The researcher devised a table of specifications that served as the foundation for a pre-test, which was evaluated by a Master Teacher and subsequently used to create the test. The pre-test was conducted before delving into the subject matter. By examining the frequency of errors in each item, the researcher was able to pinpoint the competencies that required improvement for the Jigsaw Puzzle intervention. The researcher utilised the 60% portion of the frequency of errors in each item for each class as a reference point (Abdullah et. al, 2019).

Table 1. **Least mastered competencies in English subject Reading and Writing Skills**

Topics	Least mastered competencies	Subject Code
Text as Connected Discourse	Distinguishes between and among patterns of depevolpment in writing across disciplines	EN11/12RWS-IIIbf-3
Properties of a well-written Text	Identifies properties of a well-written text	EN11/12RWS-IIIgh-4
Critical reading as looking for ways of thinking	Explains critical reading as looking for ways of thinking	EN11/12RWS-IIIij-5
	Explains critical reading as reasoning	EN11/22RWS-IVac-8

	Critical reading as reasoning

Alt text for Table 1 [18 words]:
Four competencies were found to be the least mastered in the English subject from thirteen competencies after the pre-test.

Table 2. **Least mastered competencies in Filipino subject Pagbasa at Pagsusuri sa Iba't Ibang Teksto Tungo sa** Pananaliksik

Topics	Least mastered competencies	Competency Code
Impormatibo Deskriptibo Persuweysib Naratibo Argumentatibo Prosidyural	Naibabahagi ang katangian at kalikasan ng iba't ibang tekstong binasa	F11PS-IIIb-91 F11WG-IIIc-90
	Nagagamit ang cohesive device sa pagsulat ng sariling halimbawang teksto	F11EP-IIId-36
	Nakakukuha ng angkop na datos upang mapaunlad ang sariling tekstong isinulat	F11PB-IIId-99
	Naiuugnay ang mga kaisipang nakapaloob sa binasang teksto sa sarili, pamilya, komunidad, bansa at daigdig	F11PS-IIIf-92
	Naipaliliwanag ang mga kaisipang nakapaloob sa tekstong binasa	

Five competencies were identified as the least mastered skills from the ten competencies in Filpino subject after the pre-test.

The competencies that are least mastered and need to be addressed to respond to the learning gap can be identified through various studies. Dmitrenko (2021) underscores the significance of cultivating abilities for self-directed communication learning. This is because students may not possess the ability to establish objectives, devise educational plans, and regulate their own learning processes. Conversely, certain studies concentrate on specific subject areas, while others, such as Kovtunets and Polishchuk (2021) and Dolezel et al. (2021), discuss competencies more broadly. For example, Kovtunets and Polishchuk (2021) differentiate between learning outcomes and competencies, emphasising the need for a more elegant assessment of skills, whereas Dolezel et al. (2021) identify a set of core evidence-based practice competencies for students, including cognitive, affective, and skills domains.

These competencies and skills require improvement depending on the context of the subject area. Dmitrenko (2021) said that self-learning demands attention. Additionally, Kovtunets and Polishchuk (2021) and Dolezel et al. (2021) argued that a more comprehensive approach to competencies and learning outcomes can provide strategies to address the learning gaps. In addressing these gaps effectively, an intervention should be tailored to a specific area of a particular subject with the least mastered competencies.

The Pre-test and Post-Test Results

After the pre-test and the Jigsaw Puzzle intervention were conducted, it was found that they were effective in addressing the learning gaps during educational crises. Tables 3 and 4 show the significant results of the intervention using the Z-test in the language subjects.

Table 3. **The Pre-test and Post-test Results in English Subject**

Participants	Pre-test Mean	Post-test Mean	Z-Value	P-Value	Remarks
Section 1 (n=51)	26.75	41.31	15.66	0.05	Significant
Section 2 (n=56)	23.32	34.89	13.27	0.05	Significant
Section 3 (n=47)	23.59	37.65	12.22	0.05	Significant

The value of Z for section 1 is 15.661588. The value of p was < .00001. The result was considered significant at p < .05.
The value of Z for section 2 is 13.269587. The value of p was < .00001. The result was considered significant at p < .05.
The value of Z for section 3 is 12.218716. The value of p was < .00001. The result was considered significant at p < .05.

Alt text for Table 3 [32 words]:
The value of p for three sections was less than .00001. All of the results for the pre-test and post-test in English Subject were at P less than .05 or considered significant.

Table 4. **The Pre-test and Post-test Results in Filipino Subject**

Participants	Pre-test Mean	Post-test Mean	Z-Value	P-Value	Remarks
Section 1 (n=51)	22.73	37.12	14.05	0.05	Significant
Section 2 (n=56)	23.27	34.55	11.32	0.05	Significant
Section 3 (n=47)	23.79	36.89	19.76	0.05	Significant

The value of Z for section 1 is 14.054084. The value of p was < .00001. The result was considered significant at p < .05.
The value of Z for section 2 is 11.316198. The value of p was < .00001. The result was considered significant at p < .05.
The value of Z for section 3 is 19.746289. The value of p was < .00001. The result was considered significant at p < .05.

The value of p for three sections was less than .00001. All of the results for the pre-test and post-test in Filipino Subject were at P less than .05 or considered significant.

The various research studies indicate that the Jigsaw Puzzle intervention presented a significant difference from the pre-test to post-test scores of the students (Halimah et al., 2019; & Lalit and Piplani, 2021). Specifically, the correlation between the intervention during the learning process

and the student's learning continuity and recovery in the learning outcome (Cheng, 2014) was significant. Gumbao (2021) proved in a report that there are statistically significant improvements in the post-test score with the use of a Jigsaw Puzzle. These findings were supported by Halimah et al. (2019), Lalit & Piplani (2021), Puppalwar and Jambhulkar (2019), and Malavar (2020) in their studies showing and suggesting that the Jigsaw Puzzle intervention can effectively enhance student's learning outcomes. However, Sengül and Katranci (2014) argued that this intervention may vary depending on the specific learning outcomes being measured.

This summarises the Jigsaw Puzzle as an intervention that is effective, as provided by the majority of the studies that showed shreds of evidence supporting the efficacy of this intervention in improving students' learning outcomes as measured by pre-test and post-test. It also emphasises that the Jigsaw Puzzle intervention may vary according to the subject matter and the learning outcomes assessed (Sengül and Katranci, 2014). But the overall trend suggests that this intervention can be an effective tool in addressing learning continuity and recovery (Abed, 2019; Gumbao, 2021; Halimah et al., 2019; Lalit & Piplani, 2021; Malavar, 2020; and Puppalwar & Jambhulkar, 2019;) in the times of educational crisis brought by the pandemic.

The experiences of individuals who have utilised the Jigsaw Puzzle intervention for enhancing the least mastered competencies of students.

To identify the potential implications of the Jigsaw Puzzle for the students, the research conducted focus group discussions on selected students and shared their experiences while having the intervention.

Student A:
I have enjoyed the Jigsaw Puzzle because it is a very interactive experience. This brought us to a different experience of learning from the traditional lecture instruction in English and Filipino Subjects and it helped us understand well the lessons.
Student B:
I find Jigsaw Puzzle very helpful as it fosters critical thinking to me and to my classmates. Being the leader who studied the lectures and discussed them with my groupmates made me empowered to my capabilities. I have learned so much by being a teacher to my classmates. I understood well the topic discussion.
Student C:
This intervention has an advantage for Filipino and English subjects, particularly in extensive memorization and comprehension of intricate ideas. This also helped us build harmonious relationships with our classmates. And I noticed that some of my classmates who were struggling with the competencies were able to cope with the help of this intervention.
Student D:
It is new to me and some of my classmates. It made the subject more interesting. It also helped us be critical in comprehending the subject matter specifically this subject will fall in research writing. Somehow, this builds a foundation for us in reading and writing critically.
Student E:
Working on jigsaw puzzles as a group can be an excellent way to strengthen our teamwork abilities. Collaborating on tasks in peer teaching enables us to rely on one another, provide assistance, and appreciate each individual's input, fostering a more unified atmosphere in the

class. This cooperative approach can enhance our social skills and improve our overall cohesion as a class.
Student F:
Peer assistance would be a great opportunity for those who are in academic challenge. It helped me socialize to my classmates while learning. This is so much fun. We learn while having fun. And I have noticed that my comprehension skills have improved.

The Jigsaw Puzzle intervention has several implications for students' learning. Designed to foster cooperative learning between students, this will be a great avenue for harmonious social interaction while learning and an inclusive learning atmosphere in the class (Wattanawongwan et al., 2021). This will enable all students to participate in the given tasks (Wattanawongwan et al., 2021) and eventually enhance their comprehension and communication skills in the target competencies. Different studies have shown that various teaching and learning approaches will motivate students, help them achieve more, give social relations, and boost their self-esteem in connection to their academic achievement (Drouet et al., 2023; Mubayinah, 2023). Drouet et al. (2023) emphasise that different factors may affect and contribute to the result of using this intervention, leading to a context-dependent nature of every subject matter. Thus, in language subjects, this shows effectiveness in using the intervention to address the learning gaps during educational crises.

Conclusion

Using the pre-test, the researcher assessed to identify the least mastered competencies that still need to be improved in language education subjects. Four (4) competencies were found to be the least mastered competencies in English , out of thirteen (13), and five (5) competencies were identified as the least mastered skills from the ten (10) competencies in Filpino. From here, the Jigsaw Puzzle was implemented as an intervention for the learning gaps amidst the educational crisis. Significant results were observed in each section when the Jigsaw Puzzle was used. Each section obtained the same p-value of $< .00001$, and the results were all significant at $p < .05$. Students found this intervention very useful and helpful in achieving the learning competencies of this subject.

The acquisition of skills in various subjects from elementary to Senior High School depends on prior knowledge, which students must possess to comprehend and acquire these skills fully. However, the pandemic has caused substantial disruptions, hindering authentic and holistic learning, especially in literacy and language education, which has resulted in a learning gap or shortage among affected students. This is evident from the pre-test assessment, which reveals that the least mastered competencies are also affected by the lack of prior knowledge.

To resolve this problem, the Jigsaw Puzzle intervention was introduced, demonstrating its potency in bridging the educational deficits experienced by students giving them holistic learning. The conducted activity yielded substantial improvements in the skills that required enhancement, and the outcomes were substantial as a result of the activity's effectiveness in further developing these competencies. Despite learning gaps, the intervention was found to be effective, as demonstrated by the data collected. Engaging in such activities is a valuable method for bridging learning gaps and enhancing educational outcomes.

This intervention will also be an avenue for each learner to gain other social learning domains aside from cognitive domain. Results have shown that the affective and psychomotor domains are prominently included in the iceberg of learning curricula manifesting a holistic learning approach using the intervention. Seemingly, interventions like Jigsaw Puzzle would create a learning experience for the students that does not focus only on the cognitive aspect of literacy but also creates a social environment for an inclusive, holistic, and cooperative learning approach.

In order to effectively address the challenge of learning gaps amidst educational crises, it is crucial to conduct assessments before class and implement interventions that will aid in their development. These activities will be particularly beneficial for students who have experienced learning gaps. Although face-to-face classes have resumed as a mode of instruction, it is imperative that teachers continue to evaluate the skills that require attention in order to ensure that all students are able to keep pace and follow one another's learning progress. Thus, it is essential to persevere and see the activity through to its completion in order to fully achieve its intended purpose and address the learning gaps that exist among students.

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