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Students' Perceptions of Crossword Puzzles to Enhance Learning in Social Studies 10

Michael L. Bordeos^{1*}, Glen R. Mangana¹, Jarisk B. Lamadrid¹, Jimelyn E. Ligan²

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ABSTRACT

Extensive scholarly investigation in social studies education has led to a significant shift in the prevailing paradigm, moving away from conventional lecture-based teaching methods and towards adopting novel and student-centric instructional approaches. The utilization of crossword puzzles is a straightforward and innovative strategy for integrating active learning in the field of social studies. This subject area is an introduction for students to gain a fundamental comprehension of current circumstances, employing contemporary terminology and concepts that diverge significantly from their preexisting knowledge. This study aimed to evaluate students' perspectives on crossword puzzles as a viable strategy for reinforcing essential concepts related to contemporary subjects. The study was carried out at Bagong Nasyon II National High School. The study population comprised 60 tenth-grade students from the cohort of 2022-2023. After attending instructional lectures on the subject matter, the students were allocated 40 minutes to solve the puzzle using a freely available online puzzle generator. An eight-item survey instrument questionnaire was utilized to examine students' perceptions of crossword puzzles. Many learners perceived using the crossword puzzles as an innovative pedagogical strategy, as indicated by most of their positive evaluations. Using crossword puzzles as an active learning strategy offers a unique, creative, and straightforward approach to enhance the retrieval and preservation of information. Consequently, the study demonstrated that appropriately using crossword puzzles increased student involvement. This instructional tool can serve as a means of formative evaluation and offers a cost-effective alternative to the constraints of didactic teaching.

INTRODUCTION

Contemporary education in the 21st century entails equipping learners with the necessary competencies to thrive in the current milieu and facilitating the cultivation of self-assurance to apply these talents effectively. In light of the abundance of available information, contemporary skills in the 21st century encompass critical thinking, communication, cooperation, and creativity, emphasizing comprehending, disseminating, and judiciously utilizing this knowledge. As educators, it is imperative to reflect upon the methods by which we may develop and establish appropriate instructional resources that cater to the needs of learners in the twenty-first century. Utilizing instructional materials in the current competitive landscape catalyzes the advancement of knowledge and technology while concurrently aligning with national and educational objectives. Educators impart knowledge and skills on a particular subject matter, while students acquire this knowledge and develop proficiency through consistent engagement in everyday activities that gradually become ingrained habits. In the context of the learning process, it is evident that learners necessitate instructional materials that are both engaging and informative. Consequently, integrating innovative elements within learning materials becomes imperative to stimulate learners' motivation and facilitate their knowledge acquisition.

Utilizing innovative educational materials constitutes a strategy to foster enhanced academic progress among

learners. Teaching in the contemporary dynamic educational setting presents challenges, although it can provide gratifying outcomes when students actively engage in classroom activities. Educators must disseminate distinctive and efficacious active learning methodologies and instructional resources. Educators are accountable not only to the educational institutions they are affiliated with but also to their students and the communities in which they reside (Kroning, 2014). However, educators must adopt a more innovative approach, particularly in light of the limited financial resources available to many educational institutions.

Each year, it becomes evident that students struggle to maintain attentiveness throughout a full lecture without displaying signs of boredom. Bunce, Flens, and Neiles (2010) suggest that extant data indicates a limited attention span of students during classes, often ranging from 10 to 20 minutes. Daily, educators observe instances where students engage in activities such as daydreaming, engaging in side conversations, gazing into space, attending to other academic tasks, sleeping, and even using their mobile devices for messaging while in class. This behavior often leads teachers to interpret the students' lack of attention as a personal affront (Weimer, 2014). One potential approach for addressing these challenges involves engaging pupils in the educational setting through crossword puzzle worksheets.

The primary objective of the crossword puzzle is to

¹ Bagong Nasyon II National High School, SDO Antipolo City, Philippines

² Sagkahan National High School, CSDO Tacloban City, Philippines

* Corresponding author's e-mail: mimibordeos@gmail.com

enhance cognitive stimulation by engaging the brain's neural pathways. The brain's ability to engage in relaxed continuous learning significantly impacts memory and facilitates the restoration of the brain's optimal functioning. The task is achieved through successfully resolving the puzzle and the student's capacity to retain the information imparted to them (Bheke, Pritem, & Pujarih, 2021). According to Saran and Kumar (2015), Franklin, Peat, and Lewis (2003) have shown that crossword puzzles can effectively serve as instructional aids for enhancing understanding of terminology, definitions, spelling, and the association of fundamental concepts with corresponding terms. This pedagogical approach has been found to promote improved retention and memory of acquired knowledge.

However, the majority of research examining the efficacy of crossword puzzles as an instructional tool has primarily focused on their application in English subjects (Wiwat, 2013; Riyanto, 2017; Imoula, 2018; Omar & Said, 2019; Alda & Wati, 2021; Wijaksono S. & Siddik, 2022) and medical courses (Kolte, Jadhav, Deshmukh & Patil, 2017; Zamani, Biparva Haghighi, & Ravanbakhsh, 2021; Maheshwari, Javia & Sharma, 2021; Bawazeer *et al.*, 2022). In educational practices, the potential of crossword puzzles as a pedagogical instrument to foster active learning within the Social Studies domain remains unexplored.

Many students often require assistance in retaining and recalling several contemporary issues and concepts and understanding their significance and practicality. The provision of crossword puzzles on contemporary issues as a subject in Grade 10, centered on current subjects and concepts, has the potential to stimulate cognitive engagement among learners. This pedagogical approach can aid in identifying areas of comprehension and regions requiring further development while fostering an environment conducive to active learning. The justifications motivate researchers to investigate how crossword puzzles can enhance student learning in Social Studies 10 and foster proficiency in diverse concepts and perspectives on current societal matters. The researchers demonstrate a keen interest in investigating and instructing on current societal matters through a crossword puzzle. Hence, the objective of this study is to evaluate students' perspectives regarding the efficacy of crossword puzzle worksheets as an instructional tool for enhancing active learning in the context of Social Studies 10.

LITERATURE REVIEW

This section explores the pertinent scholarly literature on crossword puzzles, which forms the basis for the conceptual framework of this research paper.

In their study, Agarwal *et al.* (2020) employed a crossword puzzle as an innovative assessment tool to enhance learning outcomes in Forensic Medicine. The researchers evaluated 38 students using this technique. The puzzle generated curiosity among 92% of the 38 pupils. A significant majority of pupils, precisely 76.4%, found this problem beneficial for acquiring knowledge in forensic

medicine. According to the survey results, a significant majority of students, precisely 73%, expressed that the tool in question was beneficial in evaluating their level of understanding. Most students, precisely 81%, agreed on utilizing such a puzzle in competitive examinations. The puzzle positively influenced the subject recall of 84% of the pupils.

Consequently, engaging in crossword puzzles enhances students' cognitive abilities; including memory retention, academic achievement, and analytical reasoning, while providing an enjoyable experience. The study by Matreja *et al.* (2021) provides supporting evidence for using crossword puzzles as an assessment tool. Based on the research findings, crossword puzzles emerged as a viable and effective tool for assessment due to their ability to yield superior outcomes and enhance comprehension compared to conventional formative evaluation, as indicated by the feedback questionnaire. A significant proportion of the student population believed that engaging in crossword puzzles enhanced their understanding of pharmaceutical substances, fostered active participation in learning, and facilitated the retention of acquired knowledge.

The study by Alda and Wati (2021) aimed to examine the impact of crossword puzzle games on English vocabulary acquisition in Langsa, Aceh Province. The results indicated that using crossword puzzle games effectively enhanced the learners' vocabulary learning, as all participants achieved a score of at least 75, which is the Minimum Mastery Criterion (KKM). The research findings also revealed that introducing the crossword problem created a conducive atmosphere for language acquisition. The students actively participated in the learning process and voluntarily engaged. The participants' drive to complete the task was boosted, and their involvement in collaborative group work enhanced their self-efficacy in English language learning.

Additionally, it provided students with the opportunity to enhance their vocabulary and refine their pronunciation skills. Moreover, the research conducted by Meliyani and Kareviati (2021) concluded that using crossword puzzles as a method for teaching and learning vocabulary facilitated enhanced memorization of the vocabulary among students. Additionally, this approach fostered increased engagement and participation in the classroom. The findings also indicated positive student responses, with most expressing interest and enjoyment in learning vocabulary through descriptive texts accompanied by crossword puzzles.

In their study, Marlina *et al.* (2021) investigated the utilization of a multimedia tool in the form of a Science education crossword puzzle. The objective was to enhance the learning outcomes and process on the topic of the digestive system among students in junior high schools. The results indicated that implementing instructional crossword puzzle multimedia was effectively executed in all cycles, achieving a 100% success rate based on rigorous evaluation criteria. Based on the study's results, it was determined that the mean level of student activity

exhibited a score of 100%, meeting stringent standards. Based on an examination of student performance in Cycle I, where the mean score was 80.29, the mastery rate was 82.61%, and in Cycle II, the mean score was 83.48. The mastery rate was 91.30%; it can be inferred that integrating natural science educational crossword puzzle multimedia aids the learning process and enhances student academic achievements, particularly in the domain of the digestive system. The findings of Kruawong and Soontornwipast's (2021) research support the notion discussed. The study examined the Science Vocabulary Crossword Puzzle (SVCP) habits of 33 9th-grade students enrolled at a prominent secondary school in Bangkok. Based on the empirical evidence, it was observed that the adoption of SVCP practices resulted in a statistically significant increase of 0.05 in the mean score of students' science vocabulary knowledge. Furthermore, students exhibited favorable attitudes toward the activities associated with SVCP.

Researchers have pushed for incorporating crossword puzzles as interactive educational tools inside the classroom. The researcher posits that crossword puzzles are a viable method for augmenting students' comprehension, competency, and mastery of terminology, definitions, and spelling while facilitating the connection of vital concepts with associated terms engagingly. Nevertheless, the existing literature and research still need to address the utilization of crosswords to enhance students' learning in social studies. However, considering the arguments mentioned earlier, it is evident that there is a necessity for enhancements in social studies education at Bagong Nayon II National High School. Using the crossword puzzle technique can enhance student engagement and facilitate active participation in social studies learning within the classroom setting. Students' active engagement and motivation are enhanced when they experience a sense of delight. The abovementioned factor will impact students' academic performance in social studies courses.

Nevertheless, the inquiry regarding the potential utilization of a crossword puzzle activity inside modern content-based classrooms for students studying social studies still needs to be solved. Consequently, a recent investigation was conducted at Bagong Nayon II National High School to enhance the social studies proficiency of 10th-grade students. The study examined the impact of employing the crossword puzzle approach on students' engagement in active learning and motivation within the context of social studies courses.

MATERIALS AND METHODS

Research Design

The present study utilized a quantitative methodology. Burns and Grove (2001) define quantitative research as a rigorous and systematic approach that utilizes numerical data to objectively collect information about the world. As per the authors' assertions, this particular methodology is employed to characterize variables, examine the correlations between them, and uncover

cause-effect relationships among them. In the present investigation, a descriptive design was employed. Burns and Grove (2001) assert that descriptive designs play a crucial role in identifying issues within current practice, aiming to improve practice outcomes. The objective of descriptive study is to investigate and elucidate real-life phenomena while concurrently furnishing comprehensive details regarding their occurrence and various facets. Consequently, the study aimed to investigate students' perspectives on using crossword puzzles as an instructional method to enhance active learning in social studies.

The study project employed the descriptive survey design as its primary methodology. A survey was employed to obtain distinct data to describe a population that exceeds the capacity for direct observation (Mouton, 1996). Data collection in a survey is accomplished by obtaining responses from a selected group of individuals who provide self-reported information in response to a set of inquiries presented by the researcher (Polit & Hungler, 1993). The data for this study was gathered by disseminating electronic survey questionnaires to the participants using a messaging platform.

Population and Sampling

The study involved the participation of Grade 10 students from Bagong Nayon II National High School throughout the school year 2022-2023. A total of 60 learners were present. All learners were examined as subjects in this investigation.

The researchers, however, employed purposive sampling as a method for participant selection in this study. According to Burns and Grove (2001), purposive sampling can be defined as a form of judgmental sampling wherein researchers deliberately and consciously choose specific subjects or elements to be included in the study. Including participants in this study was deemed appropriate due to their intentional engagement in crossword puzzles as a component of classroom instruction

Research Instrument

The research was carried out at Bagong Nayon II National High School, focusing on Grade 10 students. The sample size for this study consisted of 60 participants. The crossword puzzle theme was selected by collaborating with the social studies teacher and the pupils. Based on the recommendations provided, a particular subject matter previously instructed in the classroom but was perceived as challenging for the students to comprehend and retain will be selected. The development of a crossword puzzle was facilitated by utilizing an available online resource, which was afterward subjected to rigorous scrutiny and validation by two experts affiliated with the Department of Social Studies.

The students were given hard copies of the crossword problem to solve. To cultivate a sense of collaborative learning, it is advised that individuals engage in-group conversations while working toward resolving the problem. The allotted duration for the completion of the

crossword puzzle is 40 minutes. The accurate solutions to the crossword problem will be provided at the culmination of the designated timeframe.

This study employed a pre-validated eight-item questionnaire to gather data on students' perspectives regarding the effectiveness of crossword puzzles as a pedagogical tool for enhancing active learning in social studies. The participants' replies to all eight topics were documented using a 4-point Likert Scale, where one represented "strongly disagree" and four represented "strongly agree." The percentages correspond to the responses provided by the students for items 1-8.

Ethical Considerations

During the inquiry, researchers duly considered ethical questions. The researchers delivered the informed consent message to the participants via social media. The researchers invited them to participate in the study, with due recognition of their entitlement to withdraw and decline. The study did not collect any data that could potentially disclose the personal identity of the participants, including information such as names, phone numbers, addresses, geographical locations, or national identification numbers.

Data Analysis

After data collection, the researchers systematically arranged and thoroughly examined the gathered information. The survey data was stored using the

Google Forms platform, and the responses provided by the students were compiled into an Excel spreadsheet. The data were analyzed using descriptive statistics. The researchers computed percentages and then presented them in tabular form. According to Kaur, Stoltzfus, and Yellapu (2018), descriptive statistics summarize data by elucidating the interrelationships among variables within a given sample or population.

RESULTS AND DISCUSSION

According to Table 1, a significant majority of the students, precisely 66.7%, expressed high agreement that engaging in crossword puzzles was an enjoyable activity that fostered active learning. The crossword puzzle activity improved the understanding of the issue for 60% of students. Most students, precisely 63.3%, expressed that the crossword puzzle exercise presented difficulty that required problem-solving skills. In addition, participants posited that the crossword puzzle clues adeptly underscored the salient facets of the matter under consideration. A substantial proportion of the student population, precisely 65%, demonstrated a high level of consensus about the effectiveness of the crossword puzzle exercise in promoting the memory of crucial terminology associated with the subject matter. Furthermore, these students reported a positive experience acquiring knowledge while engaging in recreational activities. Most students, precisely 76.7%, preferred using crossword puzzles in the social studies curricular materials.

Table 1: Student Perceptions of Crossword Puzzle as Learning Tool to Enhance Students' Learning in Social Studies 10 (Total N=60)

	Statements	Percentages (%)			
		Strongly Disagree	Disagree	Agree	Strongly Agree
1	Engaging in the completion of crossword puzzles is an enjoyable activity.		3.3	30	66.7
2	I have acquired a more comprehensive understanding of the subject matter.	3.3	3.3	33.3	60
3	The activities are characterized by their challenging nature and their emphasis on problem solving.	1.7	10	25	63.3
4	The central focus of the discussion was emphasized.	1.7	6.7	28.3	63.3
5	Assisted with the retention of essential terminology pertaining to the subject matter.	1.7	5	28.3	65
6	I derive pleasure from acquiring knowledge through recreational activities.	1.7	6.7	26.7	65
7	Promoted engagement in active learning	1.7	1.7	30	66.7
8	Inclusion in social studies curriculum materials to facilitate and encourage active learning.		1.7	21.7	76.7

Students frequently perceive contemporary issues as a challenging and dynamic subject that necessitates acquiring and retaining a substantial amount of material related to several topics within the field of Social Studies. Students frequently encounter challenges when attempting to remember and articulate knowledge in

the context of written or oral examinations. Hence, incorporating active learning methodologies, such as using crossword puzzles, within the realm of Social Studies has the potential to address these challenges. Aji and Khan (2019) underscored the significance of research in the field of learning, which has yielded compelling evidence

supporting the notion that active learning can produce favorable effects in terms of student learning. In a study conducted by Sinnayah *et al.* (2019), students discovered that using active learning strategies in a classroom environment resulted in enhanced academic performance among students, accompanied by a favorable perception of their overall learning experience.

Knowledge retention is often compromised when learning needs more meaningfulness, as the absence of comprehension hinders the ability to effectively use acquired information in future cognitive processes. In essence, instruction is necessary for acquiring knowledge, but this only sometimes happens solely due to an educator's pedagogical efforts. The understanding of learning significantly influences their instructional methods and the learning outcomes of their learners. This study examines students' perspectives regarding crossword puzzles as an educational instrument for promoting active learning and fostering a good learning encounter. A significant proportion of students expressed that engaging in crossword puzzles enhanced their comprehension of the subject matter, facilitated the retention of crucial terminology, and fostered an environment of active participation in the learning process. The findings mentioned above align with the outcomes of the research conducted by Illiyin (2023), Fitria (2023), and Tegu and Hadiwijaya (2022).

The students derived pleasure from engaging in the crossword puzzle exercise, facilitating interactive learning through recreational means. Crossword puzzles offered the learners a valuable respite from the repetitive lectures, rendering them more engaging and captivating than conventional pedagogical methods. In their respective studies, Shawahna and Jaber (2020) and Mshayisa (2020) observed comparable findings, indicating that the students perceived the incorporation of crossword puzzles as both pleasant and beneficial.

Most students evaluated the crossword puzzle activity as a challenging, problem-solving task. The students had to engage in cognitive processes to complete the crossword puzzle. These included carefully examining the provided clues, retrieving relevant information from their prior learning, and engaging in collaborative discussions with their peers. This intervention facilitated the establishment of a conducive atmosphere for active learning, resulting in enhanced understanding and retention of the educational content. Additionally, it played a role in fostering a favorable perception of the learning experience among the students. According to a recent study conducted by Bawazeer *et al.* (2022), empirical evidence supports the notion that crossword puzzles yield beneficial outcomes in the realm of learning. According to Torres, Williams, Kassahun-Yimer, and Gordy (2022), puzzles can serve as a means to enhance student motivation and foster greater interest in the subject matter. According to Nazeer *et al.* (2018), researchers have suggested crossword puzzles as an addition rather than a complete replacement for conventional study methods to enhance enjoyment

throughout the learning process.

CONCLUSIONS

The current investigation revealed that students usually held good attitudes regarding the value of crossword puzzles. In general, most students agreed on the educational benefits of crossword puzzles. These benefits include facilitating the acquisition of crucial knowledge, enhancing information retention, and serving as an effective tool for reviewing lecture content. Consistent with the findings of the above studies about the recreational and enjoyable nature of puzzles, most students expressed a cheerful disposition towards the classroom interactions that occurred during puzzle-solving activities. The participants perceived the puzzle as an interactive and enjoyable activity, fostering competition within the educational setting.

Integrating diverse teaching and learning tactics and methodologies in the educational setting improves learning outcomes. To be considered proficient teachers, they must possess diverse qualities encompassing pedagogical knowledge, subject matter competence, and effective classroom implementation (Altheyab, 2023). The teachers considered these skills crucial, particularly in augmenting the learning experience in the field of social studies. Crossword puzzles facilitate vocabulary augmentation, enhance cognitive abilities, bolster self-assurance, and expedite acquiring knowledge. Consequently, the integration of crossword puzzles as an instructional tool proved beneficial, as indicated by the majority of students, who positively influenced their learning disposition, subsequently leading to improved academic outcomes. Hence, the results of this study indicate that the utilization of crossword puzzles yielded positive outcomes in enhancing students' comprehension of contemporary issues and concepts. Educators ought to contemplate the utilization of crossword puzzles as dynamic instructional instruments to improve learners' comprehension of contemporary problems and concepts. Conversely, these findings bear noteworthy implications for incorporating interactive teaching methodologies in secondary educational establishments. Based on the results above, the researchers propose the incorporation of crossword puzzles as a pedagogical tool inside social studies courses, intending to enhance the overall appeal and interactivity of the classroom environment.

REFERENCES

- Agarwal, H. K., Singhal, A., & Yadav, A. K. (2020). Crossword puzzle: An innovative assessment tool to improve learning of students in Forensic Medicine. *Medico-Legal Update*, 20(1), 8-22. <https://doi.org/10.37506/V20/I1/2020/MLU/194286>
- Aji, C. A. & Khan, M. J. (2019) The impact of active learning on students' academic performance. *Open Journal of Social Sciences*, 7, 204-211. <https://doi.org/10.4236/jss.2019.73017>
- Alda, J. N., & Wati, S. (2021). Enhancing learners'

- vocabulary acquisition by crossword puzzle game. *JL3T (Journal of Linguistics, Literature and Language Teaching)*, 7(1), 25-40. <https://doi.org/10.32505/jl3t.v7i1.2820>
- Altheyab, A. H. (2023). Secondary School Teachers' Perceptions of the Qualities of Effective EFL Teachers in Saudi Arabia. *American Journal of Education and Technology*, 2(3), 28–39. <https://doi.org/10.54536/ajet.v2i3.1724>
- Bawazeer, G., Sales, I., Albogami, H., Aldemerdash, A., Mahmoud, M., Aljohani, M. A., & Alhammad, A. (2022). Crossword puzzle as a learning tool to enhance learning about anticoagulant therapeutics. *BMC Medical Education*, 22(1), 1-12. <https://doi.org/10.1186/s12909-022-03348-0>
- Bheke, E., Pritem, S., & Pujarih, S. (2021). The Effect of Application of Crossword Puzzle Learning Strategy on Student Learning Outcomes. *Journal La Edusci*, 2(3), 10-15 <https://doi.org/10.37899/journallaedusci.v2i3.398>
- Bunce, D. M., Flens, E. A., & Neiles, K. Y. (2010). How long can students pay attention in class? A study of student attention decline using clickers. *J. Chem. Educ.* 87(12), <https://doi.org/10.1021/ed100409p>.
- Fitria, T. N. (2023). The Effectiveness of Word Search Puzzles Game in Improving Student's Vocabulary. *Pioneer: Journal of Language and Literature*, 15(1), 50-67. <https://doi.org/10.36841/pioneer.v15i1.2766>.
- Franklin, S., Peat, M., & Lewis, A. (2003). Non-Traditional Interventions to Stimulate Discussion: The Use of Games and Puzzles. *Journal of Biological Education*. 37(2), 76-82. <https://doi.org/10.1080/00219266.2003.9655856>
- Illiyin, Z. (2023). The Effectiveness of Crossword Puzzle in Teaching Vocabulary of Fourth Grade Elementary Students. *Elite Journal*, 5(2), 417-424. <http://elitejournal.org/index.php/ELITE/article/view/152>
- Imoula, S. (2018). The use of crossword puzzles as a teaching technique to enhance learners' English vocabulary learning: The case of first-year private middle school pupils. *Ministere De L'enseignement Superieur Et De La Recherche Scientifique*, 64. <https://www.ummtto.dz/dspace/handle/ummtto/598>
- Kaur, P., Stoltzfus, J., & Yellapu, V. (2018). Descriptive statistics. *International Journal of Academic Medicine*, 4, 60-3. <https://doi.org/10.4103/IJAM.IJAM718>
- Kolte, S., Jadhav, P., Deshmukh, Y. A., & Patil, A. (2017). Effectiveness of crossword puzzle as an adjunct tool for active learning and critical thinking in Pharmacology. *International Journal of Basic & Clinical Pharmacology*, 6(6). <https://doi.org/10.18203/2319-2003.ijbcp20172236>
- Kroning, M. (2014). The importance of integrating active learning in education. *Nurse Education in Practice*, 14(5), 447–448. <https://doi.org/10.1016/j.nepr.2014.06.001>
- Kruawong, T., & Soontornwipast, K. (2021). The development of Thai EFL secondary school students' English Science vocabulary knowledge through Science Vocabulary Crossword Puzzle (SVCP) practices: Action research. *Shanlax International Journal of Education*, 9(4), 44–54. <https://doi.org/10.34293/education.v9i4.4054>
- Maheshwari, A. V., Javia, H. N., & Sharma, D. (2021). Crossword puzzles -An interesting teaching tool to facilitate teaching-learning process in undergraduate students of Biochemistry. *National Journal of Laboratory Medicine*, 10(3). <https://doi.org/10.7860/NJLM/2021/49256.2519>
- Marlina, R., Oktavianty, E., Silitonga, H. T., & Sandra, N. M. (2021). Application of Science education crossword puzzle multimedia to improve the outcomes and learning process at junior high schools in the digestive system. *Jurnal Pendidikan Indonesia*, 10(4). <https://doi.org/10.23887/jpi-undiksha.v10i4.25350>
- Matreja, P. S., Kaur, J., & Yadav, L. (2021). Acceptability of the use of crossword puzzles as an assessment method in Pharmacology. *Journal of Advances in Medical Education & Professionalism*, 9, 154-159. <https://doi.org/10.30476/jamp.2021.90517.1413>.
- Meliyani, Y., & Kareviati, E. (2021). The students' responses toward the implementation of crossword puzzle in teaching vocabulary to the seventh grade students in one of Junior High School in Cimahi. *PROJECT (Professional Journal of English Education)*. 4(3), 426-432. <https://doi.org/10.22460/project.v4i3.p426-432>
- Mshayisa, V. V. (2020). Students' perceptions of Plickers and crossword puzzles in undergraduate studies. *Journal of Food Science Education*, 19(2), 49-58. <https://doi.org/10.1111/1541-4329.12179>
- Nazeer, M., Sultana, R., Ahmed, M. M., Asad, M. R., Sami, W., Hattiwale, H. R., & Sreekanth, T. (2018). Crossword puzzles as an active learning mode for student-directed learning in anatomy teaching: Medical undergraduate perceptions. *International Journal of Medical Research & Health Sciences*, 7(10), 12-9. www.ijmrhs.com
- Omar, W. S., & Said, N. M. (2019). The effect of tarsia puzzle on vocabulary learning in a primary school setting. *International Journal of New Technology and Research (IJNTR)*, 5(7), 86-91. <https://doi.org/10.31871/IJNTR.5.7.21>
- Riyanto, N. P. (2017). The use of interesting crossword puzzles in improving students' mastery of vocabulary. *Semarang State University*, 9(7), 11-16. <https://nilamputrir.wordpress.com>
- Saran, R., & Kumar, S. (2015). Use of crossword puzzle as a teaching aid to facilitate active learning in dental materials. *Indian J Appl Res*, 5(4), 45-67. <https://www.researchgate.net/publication/320891742>
- Shawahna, R., & Jaber, M. (2020). Crossword puzzles improve learning of Palestinian nursing students about pharmacology of epilepsy: Results of a randomized controlled study. *Epilepsy & Behavior*, 10(6), 107024. <https://doi.org/10.1016/j.yebeh.2020.107024>
- Sinnayah, P., Rathner, J. A., Loton, D., Klein, R., & Hartley, P. (2019). A combination of active learning

- strategies improves student academic outcomes in first-year paramedic bioscience. *Advances in Physiology Education*, 43(2), 233-240. <https://doi.org/10.1152/advan.00199.2018>
- Tegu, Y., & Hadiwijaya, M. (2022). The Effectiveness of Crossword Puzzle Games toward the Students' Vocabulary Achievement at VII Grade in SMPN 1 Nangaroro. *Verbal Journal of Applied Linguistics*, 1(1), 11-15. <http://jurnal.anfa.co.id/index.php/verba/article/view/42>
- Torres, E. R., Williams, P. R., Kassahun-Yimer, W., & Gordy, X. Z. (2022). Crossword Puzzles and Knowledge Retention. *Journal of effective teaching in higher education*, 5(1), 18-29. <https://doi.org/10.36021/jethe.v5i1.244>
- Weimer, M., (2014). Students and attention: an interesting analysis. *Fac. Focus*, 26(10). <http://www.facultyfocus.com/articles>
- Wijaksono S. D. N. H., & Siddik, A. H. R. (2022). The effectiveness of using crossword puzzle games through student's vocabulary mastery. *Journal of English Ibrahimy*, 1(1), 1-10. <https://doi.org/10.35316/joey.2022.v1i1.1-10>
- Wiwat, O. (2013). Crossword puzzles as a learning tool for vocabulary development. *Electronic Journal of Research in Educational Psychology*, 11(2), 413-428. <https://eric.ed.gov/?id=EJ1017974>
- Zamani, P., Biparva, H. S., & Ravanbakhsh, M. (2021). The use of crossword puzzles as an educational tool. *J Adv Med Educ Prof*, 9(2), 102-108. <https://doi.org/10.30476/jamp.2021.87911.1330>