Games: A Supplemental Strategy in Teaching Science

BY

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Abstract

This study was undertaken to determine the use of games as a supplementary strategy in teaching science, with the end goal of developing games for teaching science. Specifically, this study looked into the extent of utilization of games in teaching science, the usefulness of games in teaching topics in science, and the constraints met in using games in teaching science. The researcher used a descriptive design with the questionnaire as the main instrument for gathering appropriate data from public high school science teachers as respondents. To interpret the data, a weighted mean was utilized. This study revealed that games were used to a great extent in teaching science. The top three games utilized were science mind games, science riddles, and science bingo. The games are significant in teaching science, especially in enhancing student learning, increasing students' abilities to apply principles to motivate learners, developing their analytical skills, and allowing students to enjoy learning science. Games seem to be useful in teaching science, yet there are constraints encountered in their use. Including insufficient time for the use of games, no instructional guide for using games, and no immediately available games. As a result of the study, it is recommended that games be developed for teaching science. Teachers in science can explore the use of alternative strategies to lessen the anxiety among students in science. An experimental study may be conducted to test the effectiveness of games in teaching science.

Keywords: Games, Utilization, Usefulness, Constraints, Science

1.INTRODUCTION

Education is the key to a better future; it trains every individual provides knowledge and learning, develops skills, and builds attitudes and values that play a vital role in the total development of a human being (Candido, 2020). It is the means of achieving the national goal of the country. With the help of the teacher, students become more capable, productive, and flexible in facing problems. As a result, better individuals will become key players in the future of society (Glynn et al., 2016).

The main objective of any educational institution is to provide the basic tools for learning to its students (Burleson & Olimpo, 2016). Exposing the learners to different activities will enable them to learn more and make them self-sufficient individuals. Education empowers individuals by contributing to the development of cognitive content and mastering intellectual processes by teaching people actual things, providing them with skills for learning, developing confidence, and instilling rightful ways and values (Carandang, 2016).

Educators aim to develop a total individual in an environment that is informative yet nurturing, an atmosphere that ensures learning yet encourages self-expression, through a process that is educational yet entertaining. These bring forth the challenge for a teacher to employ different techniques that may make the teaching and learning process more lively and interactive without compromising the achievement of the objectives for every learning task (Corpuz & Lucido, 2018). As a result, different motivational approaches to teaching have been tried and exploited. One of these is through the use of games.

As cited by Candido (2020), games provide maximum student participation with goals, rules, and rewards that are believed to stimulate student interests and thus increase motivation. Games develop social and intellectual skills among students. The use of games in the teaching and learning process has become popular among teachers (Barclay, et al., 2019). Through the incorporation of games in the delivery of instruction, the student's learning experience becomes livelier and more dynamic. It only implies that the benefit of using games in teaching cannot be taken for granted (Allery, 2014;

Fazlioglu et al., 2016). The inherent motivation among learners to participate in games should be taken as an advantage. This participation, which can be hard to obtain from students, can be easily achieved through games.

Aside from the above-mentioned gains from using games in teaching, Corpus et al. (2018) stated that simulation and games can help develop changes in attitudes, prepare participants for assuming new roles in the future, increase student's ability to apply principles, motivate learners, and develop their analytical skills. Moreover, they stated that games can be used for many purposes, like practicing and refining knowledge and skills already acquired. Identifying weaknesses through evaluation and serving as a simulation or review to develop new relationships among concepts and principles

One of the subject areas that plays a vital role in the progress and development of the world is science. Teaching science incorporates instructional strategies that balance procedural proficiency and conceptual understanding (Bayir, 2018). A science teacher is tasked to tackle the science vertebra of their job to develop student's capacity for critical thinking and logical reasoning, which are the principal tools of science appreciation (Bhaskar, 2020).

Science, like English and mathematics, is a difficult and disliked subject. This expression demonstrates hard work on how to teach science effectively and profitably. Each science topic consists of a specific set of standards that determine the course content and a performance standard that delineates what students should be able to do after completing the topic or the subject.

If the teacher utilizes a game to illustrate a particular concept, the game is capable of going in many directions as a good game (Gutierrez, 2020). Teachers may have to be very manipulative to meet the goals. Games can cultivate the outlook that there are rewards for carefully examining student behavior and participating in such exercises (Carew, 2018). Instructional games can be viewed as a tool for promoting behaviors that minimize the tendency to think (Beylefeld & Struwig, 2017).

To make the teaching of science enjoyable and meaningful among students, science teachers adopt games, techniques, and approaches in the teaching of the subject (Cavalho et al., 2018). It is believed that the active participation of students lies in how teachers present the lessons. Different simulation games should be implemented as teaching methods to improve students' performance in all science subjects (Franco et al., 2016).

As observed, most teachers are good at teaching, but some of their students become bored because of the strategies being used. It is for this reason that the researcher came up with this research to assess the use of games as a supplemental strategy in teaching science at selected Senior High Schools in the Division of Quirino particularly the Districts of Maddela and Nagtipunan.

Specifically, this study aims to answer the following questions:

1. To what extent do teachers utilize games in teaching science?
2. How useful are the games implemented in teaching topics in science?
3. What are the constraints met in the use of games for the teaching and learning process? and
4. What games may be developed for teaching science?

2. RESEARCH METHODOLOGY

This research used the descriptive survey design, making use of a questionnaire checklist to gather data. The questionnaire was given to the teacher-respondents. It consists of statements describing the extent of utilization of games in teaching science, the usefulness of games in the subject, and the constraints met by the teachers in the use of games in their teaching process. A weighted mean was used to analyze the results, thus assessing the effectiveness of games in improving their teaching process.

3. RESULTS AND DISCUSSION

Extent of Utilization of Games in Teaching Science

Table 1 presents the extent of the utilization of games in teaching science. It is shown in the table that topping the list of activities the teachers utilize are mind games and puzzles in teaching science. Both games fall within the weighted mean of 3.00. Through the use of these games, it was perceived to create a conducive learning environment with the end goal of enriching the students' performance as well as their attitudes. This is supported by Olimpo et al. (2019) study, which found that using games and puzzles in classes made teaching and learning effective and helped develop the positive attitudes of students towards the subject.

Generalizing the result of the table, the respondents evaluated that games were utilized to a great extent, with a composite mean of 2.76. To make learning fun and engaging, games were implemented for better learning. Games were used not just for learning but also for enjoyment.

Table 1: Extent of Utilization of Games in Teaching Science

Games	W. Mean	V. Interpretation
1. Mind Games	3.00	GE
2. Riddles	3.00	GE
3. Bingo	2.98	GE
4. Domino	2.85	GE
5. Jeopardy	2.78	GE
6. Tangram Picture	2.78	GE
7. The Comparison Game	2.78	GE

	W. Mean	V. Interpretation
8. Magic Triangle	2.69	GE
9. Tic Tac Toe	2.69	GE
10. Wally Test Quest	2.54	GE
11. The Game of 50	2.36	ME
Composite Mean	**2.76**	**GE**

Legend: GE – Great Extent   ME – Moderate Extent

1. Usefulness of Games in Teaching Topics in Science

The study looked at the usefulness of games in teaching science. Games are a means of arousing and holding the interest of students in learning the subject. Table 2 presents the usefulness of games in teaching topics in science.

Table 2: Usefulness of Games in Teaching Topics in Science

Items	W. Mean	V. Interpretation
1. Enhance students' learning	3.56	VU
2. Increase students' ability to apply principles, motivate learners, and develop their analytical skills	3.56	VU
3. Allow students to enjoy learning science	3.55	VU
4. Grab students' attention and actively engage in the lesson	3.53	VU
5. Enhance the social environment of the classroom	3.51	VU
6. Give students opportunities to apply scientific ideas to problem-solving situations	3.48	VU
7. Effective enrichment of remedial lessons	3.45	VU
8. Generate a reasonable amount of practice to build strong mental skills and fast performance	3.43	VU
9. Make drills enjoyable for students rather than being tedious in the	3.41	VU
traditional practice		
10. Create a context for using critical reasoning	3.38	VU
11. Develop the communication skills of students	3.38	VU
12. Lead students to work above their normal level	3.35	VU
13. Eliminate pressure on students' mental work	3.34	VU
Composite Mean	**3.45**	**VU**

Legend: VU – Very Useful

The table shows the games are useful in enhancing students learning, increasing their ability to apply learned concepts and principles, motivating them, and developing their analytical skills. Both the statements above got a weighted mean of 3.56, which is verbally interpreted as very useful. This implies that teachers use games to create a classroom environment that enhances learning so that students can apply the principles of learning and acquire knowledge. It can be said that teaching science is emotionally and intellectually challenging, requiring an environment that caters to students' differences, particularly their concerns, motivations, learning experiences, and levels of comprehension.

Generalizing the result, the respondents evaluated the games used in teaching science topics as very useful, with a composite mean of 3.45. All items included on the usefulness of games in teaching were rated as very useful. This implies that using games in teaching science is a strategy that enhances the learning and attitudes of students. This is supported by the statement of Bayir (2018) in his study that a great factor in helping students learn is giving them proper motivation.

2. Constraints Met in the Use of Games in Teaching Science

The study looked into the constraints met by the teacher-respondents in using games. Table 3 presents the negative sides of using games in the teaching process.

Table 3: Constraints Met in the Use of Games in Teaching Science

Items	W. Mean	V. Interpretation
1. Insufficient time in the use of games	2.90	OM
2. No instructional guide for using	2.70	OM

	games		
3.	No immediate availability of games on different topics in science	2.70	OM
4.	Unfamiliarity with the different games	2.66	OM
5.	Problem behavior in conducting games	2.66	OM
6.	Classroom management difficulty in using games	2.59	OM
7.	Misalignment of games to the intended learning outcomes	2.56	OM
8.	Difficulty in giving directions and procedure in the conduct of games	2.43	SM
9.	Inappropriateness of games to student knowledge	2.36	SM
10.	Negative perception of teacher in using games	2.26	SM
	Composite Mean	**2.58**	**OM**

Legend: OM – Often Met   SM – Sometimes Met

The table shows that among the mentioned constraints met by the teachers in using games in their teaching process, the majority made mention of the insufficient time for the use of games with a weighted mean of 2.90, verbally interpreted as often met. Teachers thought the time intended for the activity was insufficient because once the student enjoyed the game, the teacher could not just stop and finish it (Glynn et al., 2015). Conducting games in classes, though useful, may be time-consuming (Selby et al., 2017). Games to be implemented in the classroom to facilitate

Generalizing the result, respondents evaluated that constraints in the use of games in teaching science are often met with a composite mean of 2.58. This implies that no matter how useful the games are in facilitating learning for the students, negative aspects still arise (Persky et al., 2017). Teachers may consider preparing suitable games intended for the topic that will be discussed. Further, the time intended for the game may be shortened to give space for other activities in the classroom (Liu & Chen, 2020).

4. CONCLUSIONS AND FUTURE WORKS

Based on the findings of the study, it can be concluded that teachers use games to a great extent in teaching science. Furthermore, the games used by the teachers in their teaching process are very useful. With the advantages of games in the classroom, especially in teaching science, constraints on the use of games are often met by the teachers.

As to recommendations, the researcher recommends the development of games to be used in the classroom for better learning. Teachers may also explore the use of alternative strategies to lessen the anxiety and triteness of science among students. An experimental study may also be conducted to test the effectiveness of games on the academic performance of the students.

5. LITERATURE CITED

1. Allery, L. (2014). Make use of educational games. Education for Primary Care, 25(1), 65-66.
2. Barclay, S. M., Jeffries, M. N., & Bhakta, R. (2019). Educational card games to teach pharmacotherapeutics in an advanced pharmacy practice experience. American Journal of Pharmaceutical Education, 75(2), 33.
3. Bayir, E. (2018). Developing and playing chemistry games to learn about elements, compounds, and the periodic table: Elemental Periodica, Compoundica, and Groupica. Journal of Chemical Education, 91(4), 531-535.
4. Beylefeld, A. A., & Struwig, M. C. (2017). A gaming approach to learning medical microbiology: students' experiences of flow. Medical Teacher, 29(9-10), 933-940.
5. Bhaskar, A. (2020). Playing games during a lecture hour: experience with an online blood grouping game. Advances in Physiology Education, 38(3), 277-278.
6. Burleson, K. M., & Olimpo, J. T. (2016). Clue Connect is a word array game to promote student comprehension of key terminology in an introductory anatomy and physiology course. Advances in Physiology Education, 40(2), 223-228. Kazım Karabekir Eğitim Fakültesi Dergisi, 35, 14-30.
7. Carew, M. (2018). Using a word game to test physiology comprehension. Advances in Physiology Education, 42(3), 464-465.
8. Cavalho, J. C. Q. D., Beltramini, L. M., & Bossolan, N. R. S. (2018). Using a board game to teach protein synthesis to high school students. Journal of Biological Education, 52, 1-12.
9. Fazlioglu, Y., Bayir, E., & Günşen, G. (2016). Teaching Preschoolers Science through Play. In E. Atasoy, R. Efe, I. Jażdżewska & H. Yaldır (eds.), Current Advances in Education, (603-616). Sofia: St. Kliment Ohridski University Press.

10. Franco-Mariscal, A. J., Oliva-Martínez, J. M., Blanco-López, Á., & España-Ramos, E. (2016). A game-based approach to learning the idea of chemical

11. elements and their periodic classification. Journal of Chemical Education, 93(7), 1173-1190.

12. Glynn, S. M., Aultman, L. P., & Owens, A. M. (2015). Motivation to learn in general education programs. The Journal of General Education, 54(2), 150-170.

13. Gutierrez, A. F. (2020). Development and effectiveness of an educational card game as supplementary material for understanding selected topics in biology. CBE-Life Sciences Education, 13(1), 76-82.

14. Jones, J. S., Tincher, L., Odeng-Otu, E., & Herdman, M. (2018). An educational board game to assist PharmD students in learning autonomic nervous system pharmacology. American Journal of Pharmaceutical Education, 79(8), 114.

15. Lewis, A., Peat, M., & Franklin, S. (2015). Understanding protein synthesis: an interactive card game discussion. Journal of Biological Education, 39(3), 125-130.

16. Liu, E. Z. F., & Chen, P. K. (2020). The effect of Game-based Learning on students' Learning performance in science learning–A case of "Conveyance Go". Procedia-Social and Behavioral Sciences, 103, 1044-1051.

17. Lujan, H. L., & DiCarlo, S. E. (2016). Too much teaching, not enough learning: what is the solution? Advances in Physiology Education, 30(1), 17-22.

18. Olimpo, J. T., Davis, S., Lagman, S., Parekh, R., & Shields, P. (2019). Learning can be all fun and games: Constructing and utilizing a biology taboo wiktionary to enhance student learning in an introductory biology course. Journal of Microbiology & Biology Education, 11(2), 164–165.

19. Persky, A. M., Stegall-Zanation, J., & Dupuis, R. E. (2017). Students' perceptions of the incorporation of games into classroom instruction for basic and clinical pharmacokinetics. American Journal of Pharmaceutical Education, 71(2), 21.

20. Selby, G., Walker, V., & Diwakar, V. (2017). A comparison of teaching methods: interactive lecture versus game playing. Medical Teacher, 29(9-10), 972-974.