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# UTILIZATION OF FREE VIRTUAL SIMULATION WEBSITES AS ENHANCING TOOLS TO IMPROVE LEARNERS' PERFORMANCE IN SCIENCE: BASIS FOR ENGAGEMENT STRATEGY RECOMMENDATION

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**ABSTRACT**

The narrative inquiry qualitative study utilized the free simulation websites as enhancing tools to improve learners' performance in science subject as bases for engagement strategy recommendation. It was found out that the learners assessed the utilization of free simulation websites in terms of presentation as good, fun, and variation in the difficulty. For teachers, they are interactive and catches attention. In terms of content, the learners assessed them as difficult content for PHET Colorado, understandable content but incomplete topics for PBS: Nova Labs, and detailed and understandable content for Concord Consortium. While for teachers, they all promote critical thinking. In terms of accessibility, the learners assessed them as easy to access, while for the teachers, they are accessible for everyone. In terms of complexity, the learners assessed them as easy to understand and manipulate and difficult to understand and manipulate for others. For teachers however, they are easy to understand and manipulate. In terms of quality, both the learners and teachers assessed them as good quality.

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**Keywords:** *Free Virtual Simulation Websites, Learners' Performance, Engagement Strategy, Recommendation*

## INTRODUCTION

Learning is considered as the most important goal of education. It is through learning that a success progress is attained resulting to producing globally competitive citizens and an improved and developed country that economically stable sufficiently sustainable. Thus, it is the focus of every educational institution all throughout the world.

Educators are expected to deliver quality instructions during the teaching-learning process to ensure that learning outcomes are achieved by the learners. Various strategies have been applied and used to aid instructions for effective learning. Nowadays, teachers have gone out of using the traditional ways of teaching and embrace the new trends to equip with the fast-changing society and fit in with the new learning styles of today's generation of learners and to cope with the learners' need especially during this post pandemic transition.

The Coronavirus (COVID-19) pandemic outbreak for the past two years caused the sudden disruptive changes in the educational system of many countries in the world including the Philippines. The transition in the delivery of education from the normal face-to-face classes to modular distance learning has inevitably resulted to learning loss and mental distress among

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learners (De Guzman, 2021). Therefore, teachers have crucial roles to bridge learning gaps and to mitigate problems related to learning loss during school closures. One of the readily accessible tools that can be used by teachers in presenting the lesson and help the learners gain deeper understanding of the concepts is through the use of technology.

In teaching and learning process, technology integration helps create a more engaging learning environment for learners. Using technology in the classroom can also help learners create some programs that they can use in their future endeavors, and provide opportunities to teachers to connect and relate with the new generation learners and build communities with them. Additionally, technology supports learning and helps learners collaborate and learn together (Lumen Learning, 2021).

Virtual simulation is one of types of computer aided instructions (CAI) or also known as computer – assisted instructions which uses partial immersion through digital learning environment like computer, tablet, phone, screen etc. to foster a perceived lived experience for an intended outcome (Foronda, 2021). Virtual simulation can enhance the traditional way of teaching and is effective when used as supplementary assisting tool in teaching and learning process. This can provide learners the framework to construct, interact, and learn (Edgar & Johnson, 2013 as cited in Qurat-ul-Ain et al., 2019).

Besides, virtual simulation can help learners be involved in the subject matter interactively, acquire knowledge and ideas, and engage with the realistic scenarios of the lesson without the

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intervention of a teacher. Furthermore, it increases learners' interest, enhances efficient learning, and develops self-efficacy (Thisgaard & Makransky, 2017). The experiences of learners in virtual simulation can help them to be more motivated and independent in learning. And most importantly, it will gauge them towards an effective learning process for the attainment of successful performance in learning. Thus, this provided the researcher the idea of the utilization of free virtual simulation websites as enhancing tool to improve the performance of learners which would be bases for engagement strategy recommendation.

## MATERIALS AND METHODS

In the study, qualitative research using narrative inquiry was employed. It was used to gain an insightful knowledge on the use of free simulation websites as enhancing tools to improve learners' performance in science that was used as bases for engagement strategy recommendation.

Qualitative research is a process of investigating and understanding the attributes of individuals or groups to a social human problem (Creswell & Creswell, 2018 as cited in Kong, 2019). It involves the interpretations of the researcher on the meaning of the data collected from the emerging questions and procedures on the account of the participant's setting and data analysis taken from particulars to general themes (Creswell & Creswell, 2018).

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Since this study focused on the experiences of the participants, qualitative narrative inquiry design is appropriate to use.

A narrative inquiry collects participants' responses and retells the participants' views by combining the researcher's experience with those of the participants to produce a collaborative narrative (Creswell, 2003).

The intent of this study was to elicit participants' responses by using narrative inquiry approach. A narrative inquiry was needed to provide in-depth information on the utilization of free simulation websites as enhancing tools to improve learners' performance in science that was used as bases for engagement strategy recommendation.

**Research Design**

The study used narrative inquiry using an in-depth interview guide that contains questions that were asked from the participants during the face-to-face interview. The purpose of the in-depth interview was to acquire detailed information from the participants. The interviewer allowed the participants to answer freely the questions to obtain the information needed (Showkat & Parveen, 2017).

**Participants of the Study**

The participants of the study were the eighteen (18) Grade 7 learners from the Special Program for Journalism (SPJ) and nine (9) science teachers who were teaching science subject in Junior High School (JHS) from Tigbauan National High School for the School Year 2022 – 2023.

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The learners' participants were chosen based on the idea that they belonged to a homogeneous group of learners and with available resources to be used which are important in the study.

For teacher participants, only science teachers were selected to be part of the study. They were also known to have been familiar with and were already using the simulation websites as part of their teaching instruction.

**Sampling Design**

The selection of the participants in the study was based on the strategy referred to as, "purposeful selection" (Maxwell, 2005). It is a selection strategy in which particular settings, persons or activities are selected deliberately in order to provide information that can't be gotten from other choices.

**Research Instrument**

The research instrument used in this study was an in-depth interview guide.

The interview guide questionnaire has two types with part one only. Type A is an in-depth interview schedule for learners with local dialect translation. Type B is an in-depth interview schedule for teachers stated in English language. The interview guide contained items about the utilization of free simulation websites as enhancing tools to improve learners' performance in science.

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The interview guide was used to gather the data from the participants during the one-on-one interview. The answers of the participants were recorded using a phone recorder and were analyzed and interpreted as well.

**Validity of the Research Instrument**

The validity of the interview guide refers to the extent to which an instrument measures what it purports to measure. The validity measures the accuracy of the instrument used and what it is meant to measure in the study (Middleton, 2022). The researcher-made interview guide was submitted to the adviser for review and revision. After the corrections were considered and acted upon, the prepared interview guide was then forwarded to the panel of experts for content and face validation. The guide was considered valid after it was checked by the panel of experts. Revisions were made after the validation of the panel of experts, and all their suggestions and corrections were incorporated. The final draft was submitted again to the panel for approval. The final interview guide was used during the one-on-one interview with the participants.

**Data Gathering Procedures**

After the interview guide had been found valid, it was used for the interview. The researcher asked permission from the school head and the participants through a letter addressed to them. For learner participants, a letter asking permission from their parents or guardian allowing their child to be interviewed was secured. Upon the consent of the teacher participants,

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learner participants and their parents or guardian, the researcher conducted a one-on-one interview.

**Data Analyses**

The data gathered were analyzed using the thematic approach. Emergent themes were identified and discussed comprehensively.

Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data (Braun & Clarke, 2006). The goal of a thematic analysis is to identify themes, i.e. patterns in the data that are important or interesting, and use these themes to address the research or say something about an issue. This is much more than simply summarizing the data; a good thematic analysis interprets and makes sense of it (Clarke & Braun, 2013).

## RESULTS AND DISCUSSION

**Summary**

This qualitative study was conducted to utilize the free simulation websites as enhancing tools to improve learners' performance in science subject which will serve as bases for engagement strategy recommendation for School Year 2022-2023 at Tigbauan National High School.

The study used a narrative inquiry approach under qualitative research design using an in-depth interview schedule. The interviewer allowed the participants to freely answer the series

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of questions about a certain issue which aimed at getting the main issue in a social context through their responses.

The participants in the study were eighteen (18) grade seven learners from SPJ program and nine (9) science teachers from Tigbauan National High School who were purposively chosen for this study. The participants were equipped to use simulations related to the science concepts and were accessed from various websites such as PhEt Colorado, PBS: Nova Labs, and The Concord Consortium.

Then, an interview guide was constructed by the researcher and was used in the study. This researcher-made guide was validated by a panel of experts determining its face and content validity using the 8- Point Criteria of Good and Scates. The data gathered were analyzed and interpreted using thematic analyses. In analyzing the data, it was categorized as assessed by the learners themselves and assessed by the teachers themselves given that their levels of understanding and perception are totally different.

The following are the findings of the study:

The utilization of free simulation websites as enhancing tools to improve learner's performance in science in terms of presentation as assessed by the learners themselves include: good, fun, and variation in the difficulty level of presentation. For teachers, however, their assessment of the websites includes the interactive and catches attention.

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The use of free simulation websites as enhancing tools to raise student achievement in science, as judged by the students themselves, includes difficult content for PHET Colorado, understandable content but incomplete topics for PBS: Nova Labs, and has detailed and understandable content for Concord Consortium. While for teachers, the content of the simulation websites promotes critical thinking generally.

In terms of accessibility, the utilization of free simulation websites as enhancing tools to improve learners' performance in science as assessed by the learners themselves includes easy access. Similarly, for teacher participants, their assessment of simulation websites is that they are accessible for everyone.

In addition, when the free simulation websites were utilized as enhancing tools to improve learners' performance in science in terms of complexity, it was assessed by the learners as easy to understand and manipulate for some learners and difficult to understand and manipulate for others. For teachers, however, it is easy to understand and manipulate.

Lastly, in terms of quality, the use of free simulation websites as enhancing tools to improve learners' performance in science, as judged by both learners and teachers themselves, includes good quality.

**Insights**

Based on the findings of the study, the following insights were gathered:

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The use of free virtual simulation websites in teaching - learning process is an effective way to provide learners with engaging learning experiences that can enhance learning performance. Virtual simulation websites as tools develop critical thinking skills among learners. They become clear, rational, and open minded when dealing with issues or problems.

In choosing simulation websites, it is vital also to consider websites characteristics such as presentation, content, accessibility, complexity, and quality.

A good website presentation can help learners retained the ideas presented. Enjoyable presentation and activities are crucial for learners to learn and understand the concepts presented. It provides them opportunity to explore different things and acquire new skills in a fun and enjoyable manner which leads to a successful cognitive understanding.

Learners also have different levels of knowledge. Therefore, giving them task that are too easy and too difficult might not produce successful learning outcomes. Teachers must carefully choose the type of activities to be given to them considering that they are heterogeneous in class. When using simulation in the classroom, it is also important that the learners have prior knowledge of the topic presented in the simulation.

Using simulations with understandable content in learning instructions can also create a stress-free experience for them and is effective to keep the learners motivated and eager to finish the task assigned to them. Also, it can help them acquire more skills and knowledge resulting to high academic performance. In addition, it also develops self-efficacy among learners.

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However, for simulations to be used in school, it requires internet connectivity and computers. Lacks of any of these, simulations cannot be used as tools to deliver quality instructions to enhance learners' performance in science.

The use of simulation websites in learning instructions has positive effects on both the leaners and teachers. Simulation websites used as tools can help the teachers achieve the desired outcomes in learning as well as it can improve learners' performance in science subject. However, as facilitators of learning, teachers should choose carefully simulations that are suitable to the type of learners handled and can cater their needs.

An engagement strategy recommendation is also made for the effective use of simulation websites as tools to improve the learners' performance.

## RECOMMENDATIONS

The following recommendations may be considered:

DepEd Officials shall consider establishing functional computer laboratory facilities with good internet connectivity which is opened to be used by all teachers and learners in school.

School heads should encourage science teachers to incorporate the use of digital technology like simulations in learning instructions especially that our education system is at stake due to the changes in educational system.

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Teachers who have the capacity to induce simulations in teaching can also use it as tools for learners to acquire skills and understanding that can improve their performance in science.

Learners may also be encouraged to access simulation websites to develop their scientific literacy skills provided they have capability to do so.

A similar study can also be conducted to other school or researcher but should focus on the best simulations that can be applied with specific topic and grade level.

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