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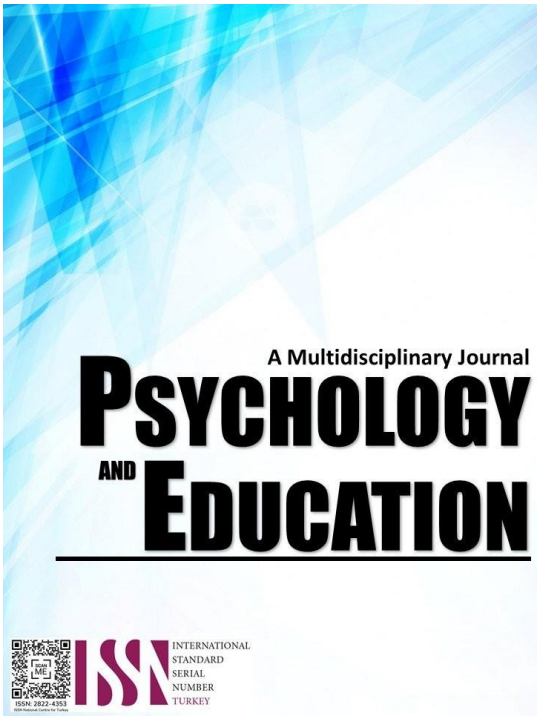

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Research Article

The Utilization of Computer Simulation in Discussing Verb-Pronoun (Pandiwa-Panghalip) Relationships: An Action Research

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Abstract

Computer Simulation is proven to maximize academic performance as it stimulates students' interest in the subject matter. Based on the literature, there are some topics considered as difficult, especially in grammatical differences in Filipino subject in the way of delivering their content that may need to use contemporary methods and strategies – one of these topics is verb-pronoun relationships. No study focuses on how effective computer simulation is in discussing verb-pronoun relationships in Filipino. This study used a Quasi-Experimental design. The data obtained were statistically treated using a Tailed t-test to determine the significant difference. The respondents are coming from first-year college of education students with 45 counts in each group – control and experimental. This study used a purposive sampling technique. All ethical considerations were practiced making sure that results could display the reality of how effective the intervention is. Results displayed a significant difference in the experimental group using the intervention with a p-value of 0.00. Computer simulation helps make boring subjects lively and engaging as it creates interactive discussions. This study can contribute to the body of knowledge, especially in teaching Filipino subject. It is empirical that the students' schema would be part of the study to check if it can affect their way of learning. Different strategies and methods can also be explored to test and see if these can make a significant increase in academic performance among learners of different levels.

Keywords: *academic performance, computer simulation, verb-pronoun relationships in Filipino, quasi-experimental*

Introduction

Every topic in an academic subject, no matter how simple or complicated it may be, should be delivered with appropriate methods and strategies (Beare et al., 2018; Riley-Tillman et al., 2020). The common adage that there's no best strategy inside the classroom underscores the fact that the teacher carries the responsibility and accountability for how the utilization of strategy is of its finest (DeBoer, 2020). Collings & Halverson (2018) elaborated that this responsibility becomes a primordial task for every effective teacher in delivering quality education inside the classroom. There is a range of different effective teaching strategies that can augment the challenges and difficulties that the students are experiencing especially when the subject matter is not their cup of tea (Billet, 2020; Pableo et al., 2022; Taneo et al., 2023). Hence, strategy can be a remedy for increased academic performance (May & Elder, 2018), longer attention span (Sari et al., 2017; Ugbamen et al., 2022), and improve critical analysis if it used at its best according to its strength (Blackmore et al., 2018), vertical alignment to its subject matter (Schindler et al., 2017), and on how this is expertly manipulated by the teacher inside the classroom (Bezanilla et al., 2019).

There are various topics in a Filipino subject. One of the introductory and basic topics in Filipino is the verb-pronoun (pandiwa-panghalip) relationship. This topic/lesson may encapsulate a simple understanding of how the verb and the pronoun words are being used in a sentence. Learners are having problems in using this especially since Filipino Language (Tagalog) is being used in discussing the topic. This is discussed usually in a simple discussion with a Filipino Instructor with examples for elaboration. Although, decades have passed and the discussion of this topic survived by just a plain or simple conversation inside the classroom, in today's era, not to mention the rise of educational reforms such as Education 4.0 (Hussin, 2018), it is expedient that the kind of teaching should be more on establishing congruence to the needs of the learners in this generation, thus, exemplifying the value of manipulation (Jolliffe et al., 2018), direct-purposeful learning experiences (Mariano, 2020), problem-solving, and discussions embedded, supplemented, and substantiated by technological advancements (Purnawan et al., 2019).

Computer Simulation affects learners' academic performance as proved by various research in the field of education (Vlachopoulos et al., 2017; Zheng, 2016). It was further concluded by the study of Monroe et al. (2019) and Stronge (2018) that the utilization of computer simulation within the scope of the teaching-learning process assists the students in dispelling confusion and ameliorating the comprehension of different academic contexts (Segarino et al., 2022). Simulation is a form of experiential learning where students learn from their experiences. Experiential Learning is also referred to as "learning through reflection on doing" (Hien, 2018). Discussing the verb-pronoun relationship in Filipino using computer simulation paves the way for better and more meaningful learning experiences (Lindgren et al., 2016; Fang & Hsu, 2017; Hsu et al., 2015).

In the study of Mills et al. (2019), the impact of discussing plate tectonics in a student-constructed animation was facilitated. The study highlighted the importance of instructional approaches that shed light on understanding some abstract geological concepts. The study resulted in a significant improvement in their GeoQuiz scores which was determined through a similar method used in this current study. Although, Mills et al. utilized a mixed method, the quantitative data provided a clear indication that the student-constructed animation in discussing plate tectonics was effective in increasing the academic performance of the respondents. This study also raised

the importance of representation-based activities such as slow-motion in teaching geological phenomena such as plate tectonics which are deemed effective. If computer simulation is effective in discussing geological concepts, the question remains if it can also be a significant strategy to assist learners who are having difficulty in understanding Filipino concepts. This literature is important in corroborating the possible results and findings of the current study, especially in using simulation.

Cavadas & Aboim (2020) emphasized the importance of the utilization of Digital Educational Resources (DERs) in science education which can also be in Filipino subject. Their study superseded the fact that these digital resources are necessary for promoting students' content knowledge of complex natural processes. This study specifically diagnosed the effectiveness of simulation in discussing verb-pronoun relationships. It was concluded that based on the results, the utilization of DERs contributed to the successful achievement in providing a clear understanding of the description of the continental and oceanic plate in terms of its thickness, temperature, density, composition, association with the plate movements, and geological consequences and structures. It was also highlighted that the simulation contributed a lot to the academic performance of the learners. This reference provides a clear understanding that simulation is a contributing factor that will increase learner's performance.

This study delves into the effectiveness of computer simulation in the verb-pronoun relationship. Moreover, this inquiry underscores the importance and the effectiveness of the utilization of technology inside the classroom which positively affects students' learning performance.

Research Questions

This study determined the effectiveness of computer simulation as a strategy for discussing verb-pronoun relationships among first-year college of education students. Further, this study elicited pertinent information in answering the following questions:

1. What is the pre-test result of the two groups of respondents?
    1.1. controlled group; and
    1.2. experimental group?
2. What is the post-test result of the two groups of respondents?
    2.1. controlled group; and
    2.2. experimental group?
3. Is there a significant difference between the pre-test and post-test scores of the controlled and experimental groups?
4. What recommendations can be forwarded based on the findings of the study?

Methodology

Research Design

This study utilizes the Quasi-Experimental Research – a type of quantitative research. Quasi-experimental research is a research design that resembles experimental research but is not true experimental research. Although the independent variable is manipulated, participants are not randomly assigned to conditions or orders of conditions (Cook & Campbell, 1979). Because the independent variable is manipulated before the dependent variable is measured, quasi-experimental research eliminates the directionality problem. However, because participants are not randomly assigned—making it likely that there are other differences between conditions—quasi-experimental research does not eliminate the problem of confounding variables.

Respondents

The study is set in the College of Education at Cebu Technological University – Moalboal Campus, Moalboa, Cebu, Philippines.

The total population is 90. The chosen respondents are the first year college of education students. The sampling technique in choosing the respondents is not randomized and therefore, assigned. There will be 90 students from the first-year college of education students. They will be divided into two – the control group (45 respondents) and the Experimental Group (45 respondents). The sampling will run for a week in discussing the topic – verb-pronoun relationship.

The sample size is determined by choosing 90 students for both control and experimental groups and is chosen according to their recent Filipino average grade obtained in the first quarter.

Instrument

The instrument is a researcher-made questionnaire containing 30 questions. All questions are in multiple-choice type. This instrument will go through the process of validation and reliability testing anchored from the book of Colton & Covert (2007).

Procedure

A letter of communication will be crafted and sent to the Office of the Campus Director and College of Education Dean for approval. After the approval of the letter, the researcher will inform the respondents that they will be part of the study. The invitation is set to be voluntary without coercion or any exchange of possible grade accommodation. The ethics of the study will be religiously followed. After receiving the confirmation of agreement from the respondents, the researcher will divide the respondents accordingly. There were

45 students or respondents per group. After that, the pre-test will be administered. The pre-test was designed and constructed by the researcher and went through face validity and content validity. The researcher followed Colton & Covert's (2007) Designing and Validating an Instrument in constructing the questionnaire (Cabello & Bonotan, 2021). The control group will have the traditional way of learning the topic which is a verb-pronoun (pandiwa-panghalip) relationship while the experimental group will have the computer simulation as a strategy in learning the lesson. After which, the administration of the post-test will commence. The post-test is also crafted and designed by the researcher and went through the same process as the pre-test as their content is just the same. The data gathered will be subjected to appropriate statistical tests set in this study.

Data Analysis

The study will use the Frequency and Percentage Distribution, Weighted Mean, and Two-tailed T-test using Minitab 16 or SPSS.

Frequency and Percentage of Distribution. The frequency and percentage distribution will be used to determine the scores of the respondents in their pre-test and post-test results.

Weighted Mean. The weighted mean will be used to describe the level of respondent's knowledge of verb-pronoun relationship.

Two-tailed T-test. The two-tailed t-test is widely used in establishing critical points of a distribution area whether a sample is greater than or less than a certain range of values. This is also used in proving the acceptance and rejection of the null hypothesis. This can also be used in different statistical analyses comparing two sets of values.

Ethical Considerations

The researcher observed ethical principles throughout the conduct of the study. The researcher maintained the highest level of objectivity in the discussions and analysis of findings throughout the study. Works of other authors utilized in this study in any part of the published articles and highly refereed journals with the use of the APA referencing system were acknowledged. Before the study, the researcher provided Informed Consent stating the purpose and objectives of the study to ensure that full consent from the respondents was obtained. As suggested by Bryman & Bell (2007), respondents have the right to withdraw from the study at any stage if they wish to do so. The researcher acknowledged the protection of privacy, anonymity, and dignity of respondents involved in the study as it is of paramount importance. The researcher also ensured that the gathered data from the respondents were given with the highest degree of confidentiality. The respondents were neither harmed.

Results and Discussion

After the analysis, the table below shows the data as presented in tables with discussion and corroboration of literature to comprehensively display the empirical findings of the study answering the research questions.

Table 1. *Pretest Results of the Control and Experimental Groups*

Respondents	*Pretest Scores (Control Group)*	*Pretest Scores (Experimental Group)*
1	22	6
2	21	10
3	16	15
4	9	22
5	14	31
6	11	35
7	24	11
8	22	10
9	20	30
10	21	17
11	22	18
12	16	11
13	14	12
14	11	18
15	10	21
16	6	22
17	19	20
18	15	21
19	22	21
20	31	14
21	35	15
22	11	15
23	10	15
24	4	13
25	17	11
26	18	10
27	11	12

28	12	12
29	18	11
30	21	14
31	22	22
32	20	21
33	21	16
34	21	9
35	14	14
36	15	11
37	15	24
38	15	22
39	13	20
40	11	21
41	10	22
42	12	16
43	12	14
44	11	10
45	14	10
Mean	16.20	16.56
Standard Deviation	6.09	6.23

Table 1 presents the Pretest Results of the control and experimental groups. It can be gleaned that the overall mean in the pretest scores is 16.20 and 16.56 in the posttest. This means that the scores of the respondents are below the standard passing score set by the Department standards. The need to have an intervention is necessary to augment this most pressing concern. Checking on the scores, in the control group, the highest score was garnered by respondent 21 which was 35. Meanwhile, the lowest score in the control group is 4 while 13 in the experimental group. As to compare this with the experimental group, it does not have a big difference because respondent 6 garnered the same score which is 35. They only have a small difference in their overall mean or 0.36. This implies that the learners have almost equal academic standing in Filipino.

Learning Filipino concepts and topics is not as easy as everyone thinks (Sasan & Rabillas, 2022). There are learners who are having difficulty in terms of understanding the concepts. With the results of the pretest, one can think of how to increase college students' academic performance. The majority of the learners failed in the pretest if the passing score is set to 50% of the total items. There were 30 items and 15 is the passing score. The overall mean presents a failing score. This is the reality of most of the learners in higher education wherein Filipino subject is treated as an ordinary subject or if it is their minor subject, they will just take it for granted (Trinidad, 2020). This is very alarming, and teachers should find the best remedies and strategies to address this concern.

Table 2 presents the post-test results of the control and experimental groups. It revealed the scores of the respondents which had increased from the pretest scores to the posttest in both groups. The overall mean of the control group is 19.51 while the overall mean of the experimental group is 39.69. The highest score in the control group is 37 while 49 in the experimental group. Meanwhile, the lowest score in the control group is 12 while 14 in the experimental group. Since the control group utilized the traditional way of teaching and the experimental group used the intervention, which is the computer simulation, their difference can be a significant reference to know if the strategy is effective. This implies that even in language subjects, computer simulation can be of great help in assisting learners who are being challenged with the subject.

Table 2. *Posttest Results of the Control and Experimental Groups*

Respondents	*Pretest Scores (Control Group)*	*Posttest Scores (Experimental Group)*
1	32	39
2	24	24
3	18	49
4	14	36
5	17	45
6	17	49
7	28	44
8	24	24
9	26	44
10	23	44
11	24	44
12	18	39
13	18	44
14	15	49
15	12	46
16	13	36
17	21	34
18	17	35

19	24	43
20	33	46
21	37	40
22	13	40
23	12	42
24	20	43
25	19	39
26	20	44
27	13	41
28	14	47
29	23	45
30	23	28
31	26	36
32	22	35
33	23	30
34	23	45
35	20	28
36	17	38
37	17	38
38	19	36
39	15	34
40	13	35
41	12	45
42	14	39
43	14	44
44	15	44
45	16	36
Mean	19.51	39.69
Standard Deviation	5.88	6.31

According to Liang and Fung (2021), acquiring knowledge in a language subject can be challenging when one is inclined to other subject matter. This is also relevant to those who are into language subjects. This reality is vivid in the classroom starting with pre-elementary education to Secondary up to the tertiary level even in the post-graduate courses. The scores in the post-test provide significant findings that when there is an intervention such as a strategy that is tested to help elevate the academic performance of the learners, it can be utilized and tested in different subjects to help learners increase their attention span and will have fun while learning (Tarng et al., 2022). When learners are given the chance to explore technological tools while learning, they would think critically.

Table 3. *Significant Difference Between the Pre-Test and Post-Test Scores of the Controlled and Experimental Groups*

Group	*n*	*df*	*alpha*	*p-value*	*Interpretation*	*Decision*
Control Group	45	44	0.05	0.00	Significant	Reject the Null Hypothesis
Experimental Group	45	44	0.05			

Table 3 presents the Significant Difference between the Pre-Test and Post-Test Scores of the Controlled and Experimental Groups. It can be gleaned that the p-value of 0.00 signifies that there is a significant difference between the control and experimental groups in both pre-test and post-test scores. This means that the hypothesis should be rejected. The result implies that both the traditional way of teaching and the utilization of computer simulation can impact the academic learning experiences of the learners. However, seeing the leap of difference in the scores, it can be gleaned that computer simulation has a greater difference in terms of the scores of the respondents in the experimental group compared to the traditional way of discussing the verb-pronoun (pandiwa-panghalip) relationship.

Computer simulation is usually utilized in science subjects where the movement of the earth's crust is displayed, the motion and velocity are presented, and the process of life is portrayed (Duran, 2018). However, computer simulation can also be used in language subjects (Gilbert & Doran, 2018). Teaching lessons with motions especially showing how grammatical differences are explained through technology can increase the level of attention and engagement time among learners (Aher et al., 2023). This can transform the classroom into a lively and absorbing one from a boring atmosphere (Yin & Tsai, 2021). When learners are also asked to manipulate things inside the classroom, it gives them a remarkable increase in learning experiences (Portela, 2020). In computer simulation, hands-on activities are guaranteed where learners can manipulate and explore the activities (Hannel & Cuevas, 2018). This is why the scores of the post-test significantly increased which concluded to have a significant difference compared to their pre-test scores. This exemplifies how quality education is forwarded when teachers discover the importance of testing strategy.

Conclusions

Computer Simulation is an intervention that science teachers utilize to bring life to the words from the book. This intervention should

not only be limited to science subjects but rather should be explored in different disciplines. This study proved that computer simulation can be used to improve the discussion of the verb-pronoun (pandiwa-panghalip) relationship. Having a significant difference in academic performance among college education students, this intervention is useful to break barriers in learning language subjects. This study contributed to the body of knowledge, especially in teaching Filipino subject.

This study highly recommends the exploration of the intervention – computer simulation to the different subjects such as English and other disciplines to determine if it will also have a significant increase in the academic performance of the learners. This intervention can be tested and tried in the different levels of learners such as elementary and secondary. Future studies can be initiated to test the same intervention and subject area in a different location to investigate if geographical location can also be a factor in utilizing computer simulation.

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