

Effects of Visualization on Academic Performance of College Students

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Abstract—This study investigated the effects of visualization on college students' academic performance. One control group and two experimental groups were utilized. The participants were the first year Bachelor of Science in Psychology students of Batangas State University. Results obtained from the experiment showed that visualization has no significant effect on the academic performance of the two experimental groups. However, grade improvements were higher in these treatments compared to the control group. The students' performance before and after the visualization showed a computed p-value of 0.16 and 0.20 respectively, higher than 0.05 level of significance which failed to reject the null hypothesis. On the other hand, the control group showed significant effect which yielded a p-value of 0.009 lower than the 0.05 level of significance. The results also showed a chi-square value of 0.163 for experimental groups 1 and 2 which made the two approaches equally significant in improving academic performance.

Index Terms—Academic performance, college student, positive psychology, visualization.

I. INTRODUCTION

Visualization is a process of cognitive stimulation to direct things imagined to work. According to Jack Canfield (2005) in order to reach a goal, one has to visualize the goal "as already complete in vivid detail, and then allow yourself to feel that result of your goal (fuel the emotions)" [1].

Tal Ben-Shahar, an author and lecturer of Positive Psychology at Harvard University, mentioned during one of his lectures that a study by Shelley Taylor, Ph.D., a psychologist at University of California, Los Angeles (UCLA), conducted an experiment on how visualization affects individuals in achieving goals. This study became the basis and framework of the researchers' experimentation.

Science has indeed shown that visualization does work to some extent, primarily in the field of Sports Psychology. An experiment done by Australian psychologist Alan Richardson has revealed that athletes who visualized shooting free throws did just as well as those who actually practiced [2]. A study in Ohio by GuangYue, an exercise psychologist from Cleveland Clinic foundation, showed that by visualizing weightlifting, athletes gained muscle mass nearly as much as half the mass as those who actually trained; and prominent athletes who use visualization in sports are Tiger Woods, Jack Nicklaus, and Muhammad Ali [3].

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Thoughts generate the similar mental "instructions as actions" according to brain studies. Cognitive processes are affected by mental simulation. Doing mental exercises can improve one's effectiveness in performance and motivation. It can also increase confidence and chance for success in any endeavours in life [3].

Mental exercise can be practiced as one of the ways to attain success [3]. This notion of cognitive exercise aroused the researchers' interest to conduct the study to help students become more optimistic in their studies. Moreover, they wanted to determine how visualization can help improve students' performance by acquiring better study habits and positive behavior towards schooling.

In this generation of modern advancement, changes greatly affect students' mindset toward schooling. Some of them become very negative or unconcerned with their studies even during examinations and tend to get low grades. Lack of motivation and positive thinking is one of the factors that affect poor performance. This investigation aimed to know the effect of visualization in students' academic performance. To determine a more effective method of visualization was also the thrust of the study.

II. METHODOLOGY

A. Research Design

This study is a true experimental design. It specifically investigated the effects of visualization among first year BS Psychology students' academic performance to determine if this method can improve performance, study habits, and positivity. The statistical treatments used were mean, standard deviation, paired t-test, independent t-test, and chi-square.

B. Participants

The participants in this study were the first year BS Psychology students of Batangas State University. The samples were chosen using multistage sampling technique particularly stratified proportional sampling and simple random sampling. The researchers obtained the following number of participants for each treatment using the Slovin's formula. Both the control group and the experimental Group 1 had 24 out of 29 students. The experimental Group 2 had 23 out of 29 students.

C. Materials

- Results of the Semi-final examination (Science, Technology, and Society subject)
- Grades on the Midterm examination (Science, Technology, and Society subject)
- Mobile phones

- Daily Note Sheet
- After-experiment evaluation sheet (for personal evaluation)

D. Procedure

The researchers informed each class about the experiment. It was assumed that the participants were willing to be part of the experiment.

The participants were briefly informed about the methodology and the relevance of the study. However, the real purpose and nature of the study was not disclosed until the experiment was finished to avoid external and internal contaminations of results.

The participants in each section represented each of the different treatments. Section 1201 was the control group wherein basically no treatment was provided, but they were simply asked to take down notes of their study habits. Section 1202 served as the first experimental group wherein the participants were asked to visualize the goal of achieving a grade of 1.00 (98-100) and to evoke the emotion of happiness and pride upon achieving that goal on Science, Technology, and Society (STS) subject for their Semi-final examination. Lastly, Section 1203 stood as the second experimental group wherein the participants were told to visualize the goal of achieving a grade of 1.00 (98-100) and to evoke the emotion of happiness and pride upon achieving that goal as well as the journey or actions toward the goal like studying and reviewing lectures and notes, listening to the professor during classes, taking down notes, actively participating in class discussions, going to the library to study, doing group studies, and turning down friends who invite them to go out.

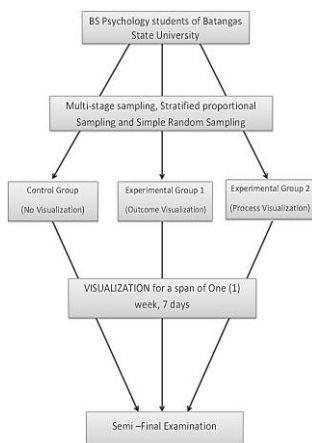
Each participant was to carry out the instructions for seven consecutive days each morning upon waking up for five minutes. They were reminded by the researchers every day for seven days through personal monitoring and SMS messaging. If they were not able to do so, then they were told to do it before they go to sleep.

The participants took the Semi-final examination on the scheduled day of the exam which was the date indicated in the university calendar.

The researchers took the results of the Semi-final examination as well as the Midterm examination from the Science, Technology, and Society (STS) professor for statistical evaluation.

After the experiment, the participants were debriefed (that is explaining the true nature and purpose of the study).

E. Research Matrix



III. RESULTS

TABLE I: MEAN AND STANDARD DEVIATION OF ACADEMIC PERFORMANCE OF PARTICIPANTS IN STS SUBJECT

Group	Midterm		Semi-final	
	Mean	s	Mean	s
Control	90.13	5.83	85.83	8.93
Experimental1	88.87	6.11	90.52	7.43
Experimental2	86.52	8.74	88.43	10.16

The mean shows where the data is centered. The table presents the mean scores for the Midterm examination of the control group of 90.13, the experimental Group 1 of 88.87, and the experimental Group 2 of 86.52. It can be noted that the control group got the highest mean score. On the other hand, the mean score for the Semi-final examination of the control group was 85.83, the experimental Group 1 was 90.52, and the experimental Group 2 was 88.43.

The standard deviation shows how spread the data is. The table shows that the standard deviation for the Midterm of the control group was 5.83, the experimental Group 1 was 6.11, and the experimental Group 2 was 8.74. On the contrary, the standard deviation for the Semi-final of the control group was 8.93, the experimental Group 1 was 7.43, and the experimental Group 2 was 10.16.

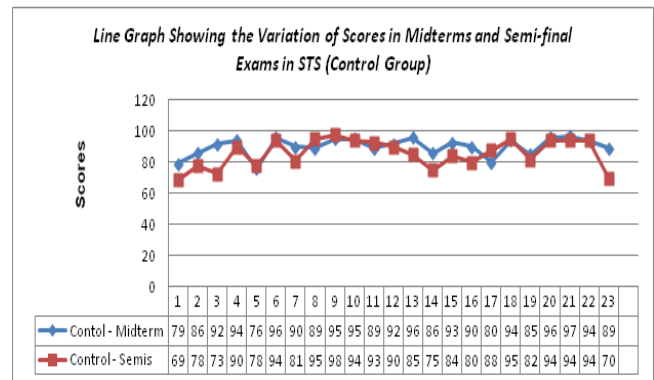


Fig. 1. Distribution of scores of respondents in the Control Group.

It can be noted that the result of the Midterm examination of the control group is higher compared to their Semi-final examination.

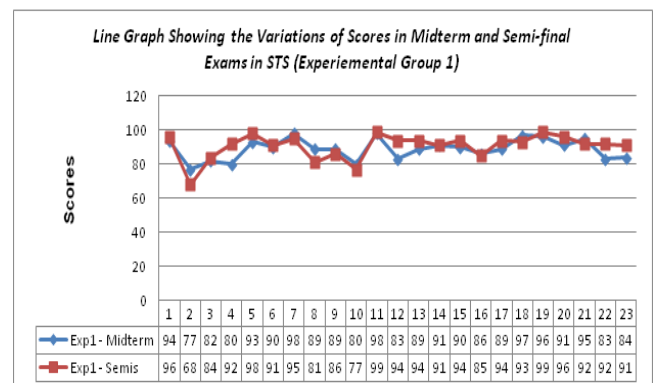


Fig. 2. Distribution of scores of the respondents in the Experimental Group 1.

Fig. 2 shows the variation of scores of Midterm and Semi-final of the experimental Group 1. It can be noted that the Semi-final exam improved a little in this treatment.

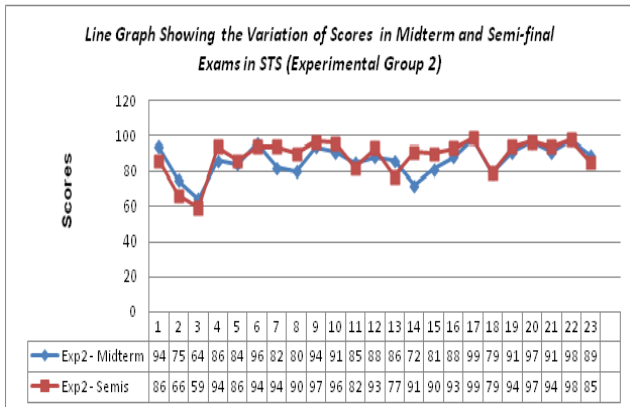


Fig. 3. Distribution of scores of respondents in the Experimental Group 2.

Fig. 3 shows the variation of scores of the Midterm and Semi-final examination of the experimental Group 2 which improved a little as well.

TABLE II: DIFFERENCE ON PARTICIPANTS’ ACADEMIC PERFORMANCE FOR MIDTERM AND SEMI-FINAL EXAMINATION

Group	p-values	Computed t-values	Decision on Ho	Verbal Interpretation
Control	0.009	2.87	Reject	Significant
Exp 1	0.16	-1.44	Failed to Reject	Not Significant
Exp 2	0.20	-1.33	Failed to Reject	Not Significant

Table II shows the representation of scores of respondents in their Midterm and Semi-final examination.

Since the p-value of 0.009 is lower than 0.05 level of significance, the computed t-value of 2.87 is found to be significant. This can also mean that the control group differs significantly in their academic performance compared to the experimental groups.

Specifically, it can be noted that majority of the participants in the control group shows lower grade results in their Semi-final examination compared to the Midterm examination. On the other hand, participants in the experimental groups gained higher test results compared to the control group but it is not high enough to be statistically significant.

TABLE III: DIFFERENCE ON THE PERFORMANCE OF PARTICIPANTS IN THEIR SEMI-FINAL EXAMINATION IN STS SUBJECT

Pairwise comparison	p-value	Computed t-value	Decision on Ho	Verbal Interpretation
Exp1 vs Exp2	0.43	0.80	Failed to Reject	Not Significant
Control vs Exp1	0.059	-1.938	Failed to Reject	Not Significant
Control vs Exp2	0.36	-0.93	Failed to Reject	Not Significant

Table III shows the pairwise comparison of each treatment conditions. The result shows no significant difference in any

of the following conditions being compared.

TABLE IV: COMPARISON OF ACADEMIC PERFORMANCE BETWEEN EXPERIMENTAL GROUP 1 AND EXPERIMENTAL GROUP 2

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	198.567 ^a	180	0.163
Likelihood Ratio	91.728	180	1.000
Linear-by-Linear Association	7.776	1	0.005
N of Valid Cases	23	-	-

208 cells (100.0%) have expected count less than 5. The minimum expected count is .04.

Table IV shows the comparison of scores between Experimental Group 1 (Outcome Visualization) and Experimental Group 2 (Process Visualization). The data shows that the results are not significant. Therefore, the two approaches have equal effects on the variable being measured.

IV. DISCUSSION

The experiment “Effects of Visualization on Academic Performance of College Students” was conducted in order to determine the effects of outcome visualization and process visualization as differentiated by Pham and Taylor (1999) [4], assigned to experimental Group 1 and experimental Group 2, respectively, on the academic performance of Psychology students at Batangas State University. It also determined the more effective method of visualization between the two means.

The study’s main goal about visualization was tested and interpreted after experimentation. The study done by Shelley Taylor and Lien Pham of UCLA showed that the process visualization group performed better than the outcome visualization group. There was also a control group, and the results showed that outcome visualization improved two points while process visualization increased by eight points, but Taylor also expressed doubts that the outcome visualization may not lead an individual to achieve one’s goal [5].

In the experiment done by the researchers, the two experimental groups represented the outcome visualization and process visualization groups wherein scores were tested and statistically analysed. Results indicated that the two approaches in visualization showed the same effect in improving academic performance. The comparison between two groups showed a p-value of 0.163 which was higher than 0.05 level of significance. The computed value of 198.567 was found to be not significant. This could also mean that the performance of experimental Group 1 exposed to outcome visualization approach does not vary with the performance of experimental Group 2 exposed to process visualization approach.

The experimenters gathered 24 participants for the control group and the experimental Group 1 while experimental Group 2 had 23 participants. One participant for both the control group and the experimental Group 1 was removed

because the researchers were informed later on that they were not enrolled in Science, Technology, and Society subject (STS).

Various studies were done to determine factors affecting students' academic performance. These factors are "communication, learning facilities, proper guidance, and family stress" [6]. According to Carol Jo Durr, a negative attitude toward a subject or course would demonstrate less effort than on an anticipated class, thus, considering motivation as one factor as well [7]. The best indicator contributing to high student performance is the higher level of socio-economic status according to Farooq, Chaudhry, Shafiq&Berhanu [8]. English competence and active class participation are the most important factors for a positive effect on students' performance. On the other hand, missing classes frequently and the less number of hours spent studying are most important factors for a negative effect on students' performance according to Harb& El-Shaarawi [9].

Results showed no significant difference on the effects of outcome visualization and process visualization to the academic performance of psychology students. The researchers believed that willingness to participate in the act of visualization contributed to its effectiveness. According to Walter J. Freeman, an act of perception "is a step in a trajectory by which brains grow, reorganize themselves and reach into their environment to change it to their own advantage" [10]. In general, participants who actively took part and were more focused on visualization got the benefit of closely achieving or achieving the target goal. Participants were asked to describe their experience and comments about the activity which ranged from being enjoyable to being boring, from being willing to simply following when reminded according to their own convenience. Since perception is affected by experience, motives, and emotions, the participants had varying degrees of involvement with regard to visualization [11].

V. CONCLUSION

Based on the findings, the researchers came up to the following conclusions:

- 1) Visualization is statistically insignificant in terms of academic performance.
- 2) Students who do process and outcome visualization score higher compared to the control group.
- 3) Based on the findings of the study, the two approaches on visualization, i.e. outcome visualization and process visualization are equally effective in improving academic performance.

Based on the results of the experimental study, the following recommendations can be considered for improvement:

- 1) Other variables may be studied by future researchers on visualization such as age or age group, gender, length of time, or perception.
- 2) Visualization should be closely monitored as much as possible and provide a more detailed means of proper visualization to obtain more accurate results.

- 3) Future researchers may consider using only participants who are willing and will actively participate in visualization or use a within-subject group design to precisely determine whether visualization is an effective means of achieving the goal.

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