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# AN EMPIRICAL STUDY ON THE USE OF WEB TUTORIAL SITES TO ENHANCE STUDENTS' PERFORMANCE IN WEB PROGRAMMING CLASS

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## Abstract:-

*In recent years, many of the students enrolled in the web programming classes found it difficult to learn the science and art of the course due to lack of exposure to similar courses in their previous semesters. Students fail to understand program dynamics with the use of common classroom materials such as projected presentations, diagrams, blackboard drawings, texts, and so on. Hence, this study investigated the use of web tutorial sites as supplemental learning resources to enhance students' performance. Findings showed that there were positive results in the post-test scores of both groups. Moreover, significant difference was evident favouring the treatment group. This would suggest that additional reading materials taken from the web tutorial sites which the students in the treatment group were able use provided them with better understanding of the concepts being presented and thus enhance their performance.*

**Keywords:-** *Blended learning, web tutorial sites, students' performance, mean gain*

## INTRODUCTION

Programming is the complex art of telling a computer what to do. It involves giving written instructions in a logical manner that the computer can understand. Essentially, the computer programmer gives the computer a series of instructions that the computer will have to execute. Programming, in essence, allows making of new software and have the computer do new things.

With the advent of the Internet, there came the need to create dynamic web applications that would facilitate online transaction. Hence, web programming came into existence. Web programming is the practice of writing applications that run on a web server and can be used by many different people (www.host-shopper.com, 2009). It allows web developers to turn a simple, static webpage into a dynamic system. It would then allow users to interact with web site and use the application on any computer that is connected to the Internet. Arguably, creating web system is often easier than creating software applications that run directly on the computer.

Most colleges and universities offering information technology-related academic programs would normally list web programming courses in their curricula. However, in past academic years, many of the students enrolled in the web programming classes found it difficult to learn the science and art of the course. As observed, many of them cannot immediately grasp the theories and the technology behind it due to lack of exposure to similar courses in their previous semesters. Their exposures were on different programming languages such that they were having problems in the comprehension of the topics being presented in regular classroom environment by way of lecture presentations. At some point, students that were enrolled in this type of course would tend to asked assistance from senior students, in a form of a tutorial, to be able to meet the competencies expected of them.

According to Rahmat et al. (2012), the programming subject itself is a main reason that makes the courses difficult because it is new to most of the students. Programming is a hierarchical skill where students acquire basic skills before going to advance levels. Foundation is the key. For example, students need to learn the basic syntax and then the semantic, structure, and style gradually (Jenkins, 2002). However, during the class, the lecturer will continue teaching without waiting the student to fully understand the topic. Otherwise, the course objectives will not be met.

Gomes & Mendes (2007) argued that teaching computer programming involves several dynamic concepts that many times are taught through static means (projected presentations, verbal explanations, diagrams, blackboard drawings, texts, and so on). For some students this is a problem, as they fail to understand program dynamics through this type of materials.

Several pedagogical techniques were employed to teach programming courses to students. One pedagogical technique employed is based on analogy. This technique is particularly useful when teaching programming fundamentals such as input/output, data types, sorting, searching, etc.; it uses illustrative examples of concepts that students have seen before, and relates the familiar concepts to new ones. In an analogy, the familiar concept is identified as the source and the new one as the target and, when an analogy is made, the source is mapped onto the target (Blanchette & Dunbar, 2000 in Miliszewska & Tan, 2007).

Another approach relies on the use of technology for teaching. Clancy et al. (2003) described their efforts to develop a laboratory-based model for computer science instruction. Their model included three components: an online course builder for the instructor, a Web-based learning environment for the delivery of all student activities, and a course portal that served as a learning management system. The evaluation of the system showed that student performance in the course had improved and that the students found the course enjoyable.

On the other hand, Simon (2015) took note that while textbooks are a great source of reliable information and ready-made activities, but the content they provide can be generic and not particularly engaging for students. By leveraging the instructional potential of web-based resources, student engagement can be increased, expose them to authentic content, and engage them in collaborative activities that trigger critical thinking and creativity.

Guy & Lownes-Jackson (2013) conducted a study that compares student performance using Web-based tutorials to that of the traditional face-to-face lectures. A casual-comparative design was used to examine the effects of instructional delivery on student performance in a business communications course with specific emphasis on the grammar and mechanics unit of study. The results of their study mirrored those of previous works reporting that Web-based tutorials are as effective as traditional face-to-face lecturing with regard to student performance.

It is in this context that this study assessed the impact of using web tutorial websites to enhance learning among students enrolled in Web Programming classes. The web tutorial sites were to augment the lectures presented in the class, particularly focusing in the construction of drills/hands-on exercises.

## METHODOLOGY

This section deals with the methodology employed in the study. Topics presented herein include the participants, data gathering methods, ethical issues and the tool for data analysis.

**Participants of the Study**
A complete enumeration of students enrolled in the subject WS101 (Web Systems and Technologies) offered in the 2nd Semester, School Year 2018-2019 with the BSIT 3rd Year Level at the IICS, NIPSC, Estancia, Iloilo. There were a total of 84 students; of whom 44 students or 52.38% of the population are in Section A and 40 students or 47.62% of the population are in Section B. The sectioning of students is heterogeneous in nature.

In order to determine which section would be the control group and which section would be the treatment group, a coin toss was made by the researcher. The "head" would become the control group while the "tail" would be the treatment group. Thus, after the tossing of the coin, the students in "Section A" belong to the treatment group while students in "Section B" were in the control group.

**Data Gathering Methods**
In this study, the Pretest-Posttest design was used. In a pretest-posttest design, the dependent variable is measured once before the treatment is implemented and once after it is implemented. If the average posttest score is better than the average pretest score, then it makes sense to conclude that the treatment might be responsible for the improvement (Price, Jhangiani & Chiang, 2015).

Pretests on a particular topic based on the syllabus were given to both groups to benchmarks the performance of each student. Following the giving of the pretest was the face-to-face lecturing coupled with multimedia demonstrations as the main pedagogical strategy which approximately lasted for ten (10) contact hours as prescribed in the course syllabus. The lectures were done for five (5) sessions with two (2) hours per session. At the end of each session, members of the treatment group were given URL addresses of the web tutorial website for further readings. It was also presumed that members of the treatment group would perform due diligence in reading the additional information found in the web tutorial sites.

At the end of the 10th-hour, posttests were administered to the two groups. Data were gathered, tabulated and 3nalysed for interpretation. To have a more reliable result, this was implemented for two (2) topics.

Moreover, the total number of items was 30. This was given in two (2) quizzes. Quiz one (Q1) which covered topics in the Hypertext Markup Language (HTML) was 15 points while quiz two (Q2) which covered topics surrounding Cascading Style Sheet (CSS) was also for 15 points. In order to produce a more reliable result, the scores of each student during the pre-test, post-test without intervention and post-test with intervention were kept secrets from them until the end of the experiments. Subsequently, the test questions were re-organized during the giving of the post-test evaluation to further avoid familiarity of its sequencing.

**RESULTS AND DISCUSSION**
The following section discusses the results from the investigation conducted:

**Pre-test Scores of Students Enrolled in the Web Programming Class**
Table 1 show the descriptive and inferential statistical results of the pre-test scores result of both the control group and the treatment groups of students enrolled in the web programming class. As presented, students that belong to the control group yielded a mean of 10.93 (SD=2.98) which is slightly lower than the obtained mean of the treatment group at 12.19 (SD=2.90). Moreover, the computed *t-value* was -1.464 with a *Sig. (2-tailed)* of .151 which is higher than the 0.05 level of significance. Thus, there was no significant difference in the pre-test scores between the control and treatment groups is accepted.

The pre-test scores of students in both control and treatment groups were at normal distribution as shown by their respective mean scores and standard deviation values. Moreover, the finding suggests that students in both the control group and the treatment group have more or less the same level of understanding with the concepts that would be presented before them.

**Table 1:-**Descriptive and Inferential Statistical Results of the Pre-test Scores of the Control and Treatment Groups Prior to the Intervention

| Groups | Mean | Standard Deviation | t | Sig. (2-tailed) |
|---|---|---|---|---|
| Control | 10.93 | 2.68 | -1.464 | .151 |
| Treatment | 12.19 | 2.90 | | |

Significant if p< .05

**Post-test Scores of Students Enrolled in the Web Programming Class when Group as Control and Treatment**
After the two interventions made with students enrolled in the web programming class, post-tests were given to assess the impact relative to their performance in quizzes. It was found out that the control group had a mean score of 17.95 (SD=3.17) while the treatment group came up with a mean score of 21.86 (SD=3.33). It could be noted that both method

were able to provide positive results in the performance of the students. The post-test scores showed that both groups were able to achieved better performance based from their pre-test scores. There were positive gains found on both groups in the post-test evaluation.

The result further shows that the computed *t-value* was at -3.888 with the *Sig. (2-tailed)* value of .000 which is obviously lower than the 0.05 level of significance. This meant that there exists a significant difference in the post-test scores between the control and treatment groups proving that the use of web tutorial sites as supplemental learning materials indeed was a factor in the performance of students. Table 2 shows the data.

**Table 2:-** Post-test Score Results of the Control and Treatment Groups Prior After the Intervention

| Groups | Mean | Standard Deviation | t | Sig. (2-tailed) |
|---|---|---|---|---|
| Control | 17.95 | 3.17 | -3.888 | .000* |
| Treatment | 21.86 | 3.33 | | |

* Significant if p< .05

**Gain Difference between the Mean Scores of the Two Groups of Students Enrolled in Web Programming Class**
The improvement (gain) from pre-test to post-test can be computed for each participant by subtracting each person's pre-test score from his or her post-test score. In this study, it was denoted using the formula:

*Mean Gain (MG) = Mean Post-test Score – Mean Pre-test Score*

As shown in Figure 1, both group of students were able to have positive gain in the mean scores with the treatment group (MG=9.67) outscoring the control group which only obtained a mean gain score of 7.02.

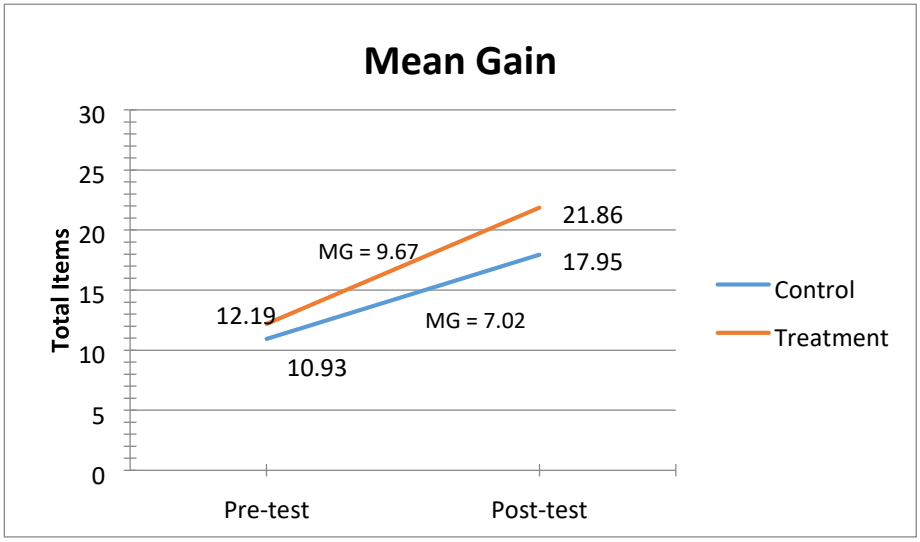


**Figure 1. Gain Difference between the Mean Scores of the Two Groups of Students Enrolled in Web Programming Class**

## CONCLUSION

This paper presents an empirical study on the use of web tutorial sites to evaluate its effect on the students' performance taking web programming classes. The findings of the study showed that the pre-test scores of both groups did not differ significantly. The level of knowledge and understanding of the students in both groups, in as far as the concepts to be presented before them are concerned, was at the same range. There was a positive gain in the students' performance, regardless of the method being employed.

The better positive results in the post-test scores of both groups were found to be significant favouring the treatment group. This would suggest that additional reading materials taken from the web tutorial sites which the students in the treatment group were able use provided them with better understanding of the concepts being presented.

## RECOMMENDATIONS

Based from the findings and the conclusions made, the following recommendations are provided:

1. Since the result of this study is plausible, a thorough investigation should be undertaken to include factors such as self-motivation, time and access to online materials and gender, among other things.

2. This research may be replicated with other groups of students (i.e. different subjects, teachers, batches) to test whether the same result will be produced.

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