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A comparative study of academic achievement between teaching by concept learning and normal learning in the project

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Abstract

This study was aimed to conduct experimental research to compare the learning achievement between two approaches of instruction: conventional and principle teaching approaches on the topic of a digital gate. This study hypothesized that the principle teaching approach will yield higher learning achievement than the conventional teaching approach. The tools used in this study contained conventional and principle teaching approaches, a learning achievement test with 4 choices for 30 items, a behavior observation form, and a teaching plan with 3 worksheets. These will be a basis for their understanding of the 3 types of digital gate. The learning achievement and material were evaluated by experts in content and experts in the assessment. The sampling group consisted of 40 second-year vocational education diploma students, third year. They were split into 2 groups of 20 people: control and experimental groups. They were chosen in a purposive sampling manner. Before the treatment, the sampling group was given a test about previous knowledge and they had to reach the requirement of 80%. The experimental group was given a principle teaching approach. The control group was given a conventional teaching approach. Then, learning achievement was measured and analyzed using a T-test. The research results were that the principle teaching approach could help the experimental group achieve learning achievement in the area of memory and the learning achievement of the experimental group was higher than that of the control group at the statistical significance of 0.05 level. The behavior about the understanding of the experimental group was also higher than the control group at the statistical significance of 0.01 level. In terms of application and other aspects, there was no difference.

1. Introduction

At present, instruction in educational institutes under the supervision of the Office of the Vocational Education Commission is usually based on one textbook or many textbooks with the same title. The instructors usually give lecture to students or solve problems in front of the classroom so that students can learn how to imitate and do exercises at the end of each chapter. This kind of teaching aims at giving more knowledge to students so that they have to learn a lot and they are forced to remember. However, to gain higher understanding and idea and to solve problems require the application of various teaching methods so that learners can use brains to tackle with the contents and develop understanding inside the learners. Therefore, the researchers would like to conduct a comparative study of academic achievement between conceptualization teaching approach and conventional teaching approach on the topic of the design of the pneumatic control in a programmable logic controller to develop the knowledge and understanding of students.

In this study on the comparative study of academic achievement between conceptualization and conventional teaching approaches on the topic of the design of the pneumatic control in a programmable logic controller, students were divided into 2 groups: Group 1 was the experimental group while Group 2 the control group. Their academic achievement would be compared.

This article will present the results from the comparative study of academic achievement between conceptualization and conventional teaching approaches on the topic of the design of the pneumatic control in a programmable logic controller. The students were divided into 2 groups: Group 1 was the experimental group while Group 2 the control group. Their academic achievement would be compared.



2. Experimental

2.1 The test about previous knowledge about logic gate was given to students until both experimental and control groups reached the requirement of 80%.

2.2 The pretest of 30 items with 4 multiple choices was given to both experimental and control groups.

2.3 The experimental group was given principle teaching approach while the control group was given conventional one.

2.4 The posttest was given as a learning achievement and this was the same pretest but the items and choices were rearranged for both experimental and control groups.

2.5 The data were analyzed and the score from both groups was compared with previous knowledge, learning achievement, and behavior through t-test statistical technique. Both groups were independent. Previous knowledge and learning achievement were compared using one-way t-test technique.

3. Results

The research on the learning achievement of both experimental and control groups through learning achievement test containing 30 items of 4 multiple choices. Their scores were compared through t-test statistical technique. It was found that the experimental group and the control group showed significantly different learning achievement at the statistical level of 0.01. This means that the experimental group showed higher learning achievement than the control group. Principle teaching approach could help the experimental group achieve better scores than the group with conventional teaching approach.

Table 1: Comparison of learning achievement between the experimental and control groups

Sampling group	N	\bar{X}	S.D.	t-value
Experimental group	20	16.25	1.78	-3.12
Control group	20	18.35	2.43	

According to the analysis of the data from Table 1, it was found that the value was statistically significant (0.01, df = 38). The t value from the table was 2.457 and the t value from calculation was -3.12. This means that the experimental group and the control group had statistically significant difference for their learning achievement.

Table 2: shows the mean, standard deviation and t-test value for the learning achievement pretest of the experimental group.

Experimental group	N	\bar{X}	S.D.	t-value
Pretest	20	16.25	1.78	-13.68
Posttest	20	23.35	1.49	

According to the analysis of Table 2, it was found that the t value was statistically significant (0.01, df = 38). The t value from the table was 2.457 whereas the t value from the calculation was -13.68. This means that the learning achievement from pretest and posttest for the experimental group was statistically significant. Students with principle teaching approach showed higher learning achievement.

Table 3 :shows the mean, standard deviation and t-test value for the learning achievement pretest of the control group.

Control group	N	\bar{X}	S.D.	t-value
Pretest	20	18.35	2.43	-4.47
Posttest	20	21.85	1.31	

According to the analysis of Table 3, it was found that the t value was statistically significant (0.01, df = 38). The t value from the table was 2.457 and the t value from calculation was -4.47. This means that the learning achievement for pretest and posttest of the control group was statistically significant. Students with conventional teaching approach showed difference in their pretest and posttest learning achievement.

Table 4: shows the mean, standard deviation and t-test of the posttest learning achievement for both experimental and control groups.

Sampling group	N	\bar{X}	S.D.	t-value
Experimental group	20	23.35	1.49	3.38**
Control group	20	21.85	1.31	

** Statistically significant at the 0.01 level



According to the analysis of Table 4, it was found that the t value was statistically significant (0.01, df = 38). The t value from the table was 2.457 whereas the t value from calculation was 3.38**. This means that the learning achievement for posttest of the experimental group and the control group was statistically significant. In other words, the students with principle teaching approach showed higher learning achievement than students with conventional teaching approach.

4. Teacher Academic Competency

Table 5: Academic Competency development from

Programs	μ	σ	Meaning
1.Skill's management	3.49	0.58	average
2. Academic planning	3.79	0.63	high
3. Teaching arrangement	4.13	0.77	high
4. The evaluation in learning information	4.05	0.69	high
Total	3.95	0.67	high

From table 5, overall present conditions of the use of technology for academic administration of the school high level at average 3.92. When considering each program, the use of learning approach for academic has the highest level at maximum average ($\mu= 4.16$). Secondly teaching arrangement has high level at average ($\mu= 4.13$). Thirdly the evaluation in learning information has high level at average ($\mu = 4.05$). Lastly skill's management has the lowest level at minimum average ($\mu= 3.49$)

Table 6: expectations of the use of concept learning technology for academic administration

Programs	μ	σ	Meaning
1.Skill's management	4.49	0.49	high
2. Academic planning	4.68	0.39	highest
3. Teaching arrangement	4.42	0.69	high
4. The evaluation in learning information	4.43	0.53	high
Total	4.56	0.57	highest

From table 6, overall expectations of the use of concept teaching for academic administration of the schools has the highest level at total average 4.52. When considering each program, the use of concept learning for academic has the highest level at maximum average ($\mu= 4.68$). Secondly academic planning has the highest level at average ($\mu= 4.58$).

Thirdly skill's management has high level at average ($\mu= 4.49$). Lastly teaching arrangement has high level at minimum average ($\mu= 4.42$)

5. Conclusion

According to the research on the learning achievement between the experimental and control groups through learning achievement test of 30 items with 4 multiple choices, the scores were analyzed using t-test technique with 2 independent sampling groups and it was found that the experimental group and the control group showed statistically significant difference in their learning achievement at the level of 0.01. The experimental group showed higher learning achievement than the control group. Therefore, the principle teaching approach could help the experimental group students gain better results than the control group with conventional teaching approach.

The results of data analysis, the researcher found concept learning technology is needed to apply for academic administration. Concept learning is used in academic planning related to the evaluation in learning technology, student registration, documentations for various applications, test preparation, teaching arrangement for preparation of lesson plans, exercises, paper work, and research.

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