Comparison of Learning Achievement and Learning Attitude for Computer Application Fundamentals Course between using Task-Based Learning and Traditional Learning in Guangxi Minzu Normal University, China

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Received: 2023-09-12; **Revised:** 2023-09-27; **Accepted:** 2023-10-21

Abstract

The purposes of this study were: 1) to compare learning to learning achievement under task-based learning and traditional learning activities, 2) to investigate students' attitudes towards computer learning after task-based learning. The samples of this research came from 30 students in Class 1 and 32 students in Class 2 of Mathematics Education major in Guangxi Minzu Normal University in the 2023 academic year. Class 1 used task-based learning and Class 2 used traditional learning. The instruments were 1) 4 task-based learning and 4 traditional learning lesson plans. Likert scale was used to evaluate, the index of task-based learning projects was between 4.38-5.00, and the index of traditional learning projects was between 4.24-5.00, 2) learning achievement test paper, the item-objective congruence (IOC) value of each item in the test paper evaluation form was between 0.80– 1.00, and the difficulty (p) of the test paper was between 0.37-0.83, the discrimination (r) of the test paper was between 0.22-0.56. 3) learning attitude questionnaire, which the item-objective congruence (IOC) was between 0.60-1.00, the reliability of the questionnaire was 0.93, and the validity of the questionnaire was 0.70. Data analysis was performed by percentage, mean, standard deviation, and t-test. The results of this research were as follows:

1) The learning achievement of task-based learning was significantly higher than that of traditional learning at the .05 level. 2) The learning attitude of the task-based learning was significantly higher than that of the traditional learning at the .05 statistical level.

Keywords: Task-Based Learning, Traditional Learning, Learning Achievement, Learning Attitude, Computer Application Fundamentals Course

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Introduction

Basic computer skills are skills that people must master in the 21st century. The "Ten-Year Development Plan for Educational Informatization (2011-2020)" of the Ministry of Education of the People's Republic of China (Ministry of Education. 2012) clearly proposes the application of information technology in the field of education. In 2005, the "Opinions on Further Strengthening the Basic Teaching of Computer Applications Fundamentals Course in Colleges and Universities" was released. The opinions emphasized the need to fully understand the laws of basic teaching of computer applications, the need to reform teaching methods, make full use of task-driven teaching methods, and provide intensive teaching and practice. The Computer Applications Fundamentals Course is a compulsory cultural basic course for non-computer majors in Chinese colleges and universities. It cultivates students to master basic theoretical knowledge and basic operational skills of computer, and enables students to have certain computer application ability, so that they can apply knowledge to improve the study of professional courses and future career development.

But there are still certain problems in the teaching and learning of the Computer Applications Fundamentals Course in China. For example, Dai (2016:107) non-computer major students have different computer basics and a single classroom teaching method, Tian (2018:76) some students do not have a deep understanding of the importance of the Computer Applications Fundamentals Course, lack of practical ability, and insufficient practice time. At the same time, the researcher analyzed the average scores of the learning achievement of 51 classes in the first semester of the 2021-2022 academic year at Guangxi Minzu Normal University in the Computer Application Fundamentals Course. Judging from the results of the analysis, the class with the lowest score in the school is 41.5 points, the class with the highest average score is 87.8 points, and the general average score of the school is 74.4 points. There are 3 classes below 60 points, 9 classes with 60-70 points, 26 classes with 70-80 points, and 13 classes of 80-90 points. From the perspective of learning achievement, the learning achievement of some classes is low, which reflects that the school still has problems in the teaching management of the Computer Application Fundamentals course. On the one hand, it is reflected in the learning attitude of the Computer Application Fundamentals course. Students have a negative attitude towards learning, are not full of learning emotions, and are not interested in learning content, resulting in low learning achievement. On the other hand, it is reflected in the fact that the teaching methods used by teachers are relatively outdated, such as only using the traditional learning method of full-time teaching, which is not conducive to cultivating students' independent learning ability.

In order to solve the above problems and improve learning achievement and learning attitude, researcher have studied task-based learning. Task-based learning is based on constructivist learning theory and is learner-centered. Teachers provide specific tasks for learners, and learners complete tasks through collaboration and feedback task completion to the teacher, Willis (1996) pointed out that task-based learning enables learners to communicate more with others, have fun at work, practice solving problems that arise, enhance self-confidence, and improve learning and social skills.

In summary, it is feasible to adopt task-based learning in Computer Application Fundamentals course. Researcher compared task-based learning with traditional learning to prove that task-based learning is more conducive to students acquiring skills, improving learning achievement, and improving learners' attitudes than traditional learning.

Research Purposes

1. To compare learning to learning achievement under task-based learning and traditional learning activities.
2. To investigate students' attitudes towards computer learning after task-based learning.

Research Hypothesis

Students who use task-based learning have significantly improved learning achievement at the .05 level than students who use traditional learning.

Literature Review

1. Task-based learning

The researcher studied the definition, components, implementation steps, and benefits of task-based learning. Task-based learning originated from language teaching. In Ellis's (2003:4) book, task was “an activity which required learners to arrive at an outcome from given information through some process of thought, and which allowed teachers to control and regulate that process”, so task was an activity for learners. Learners completed the task by thinking while learning and then evaluating the task to conclude, Nunan (1989:10-11) pointed out that the components of a task were 1) Goals, 2) Inputs, 3) Processes, 4) Rules, 5) Outputs. Task-based learning in this study meant that teachers design corresponding tasks according to the requirements of course teaching, arrange the required teaching content into each task, and the teacher publishes task goals.

As for task-based learning activity steps, Ellis (2003) divided task-based learning steps into 1) pre-task stage, 2) task cycle stage, and 3) post-task stage. Willis (2013) refined the steps of task learning management in task-based teaching, including the following steps: 1) Course introduction, 2) Define mission outcomes and mid-term goals, 3) The starting point of the task: input and timing of the task start-up phase, 4) Preparation and planning before the task, 5) Control the "agenda" of the task and clarify the structure of the task, 6) Identify task interaction patterns and roles of participants, 7) Task cycles, "pushing" task output for accuracy and 8) Post-task activities, including text recycling analysis, reporting tasks phase, repeating tasks, evaluation and reflection, and review phases. This study integrated the task-based learning programs Ellis and Willis, and proposed the implementation steps of task-based learning used in this study:

1) Propose the mission objectives, the teacher prepares the preliminary work in advance and puts forward specific task goals.

2) Teamwork and collaboration, the members of each group cooperate in the computer room.

3) Task Implementation, the members perform the task according to the group division of labor.

4) Produce Results, the group will summarize the task results and prepare to report materials.

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6) Evaluate Feedback, Mutual evaluation between groups, mutual evaluation of teachers and students.

7) Summarize and improve, teachers and students summarize the knowledge points together.

On the benefits of task-based learning, Willis (1996) discussed the benefits of task-based learning: learners speak with more confidence, take the initiative to work, practice problem-solving skills, enhance confidence in using the target language, develop language skills and social skills, etc. Fan (2017) consider that task-based learning has the advantages of learners' exploration, improved information literacy,

teamwork assistance in communication and problem solving, improved ability of independent exploration and learning, and students' acquisition of knowledge.

2. Learning achievement

Good, & Merkel (1973) proposed that learning achievement refers to the results of testing personal abilities in teaching practice, Genesee, et al. (2006: 176-222) achievement broadly refers to the communication, mathematics, science, social science, and thinking skills and abilities that enable students to succeed in school and society.

In summary, learning achievement was a tool to measure the amount of knowledge students acquire in the process of teaching and learning under the guidance of teachers. It was one of the indicators of the quality of education and teachers must have access to manuals for measuring and evaluating learning performance.

3. Learning attitude

Greenwald (2014) attitude was a person's tendency to react positively or negatively to an object, a person, a system or an event, or to any other discernible aspect of the world, Wegener, D. T., & Gregg, A. P. (2000) attitude was a manifestation of people expressing their likes and dislikes through emotion, cognition and behavior.

In summary, the attitude of students towards learning computers in this study meant to determine students' likes and dislikes towards learning computers and to make students realize the importance of learning computers.

Research Framework

The picture shows the research framework:

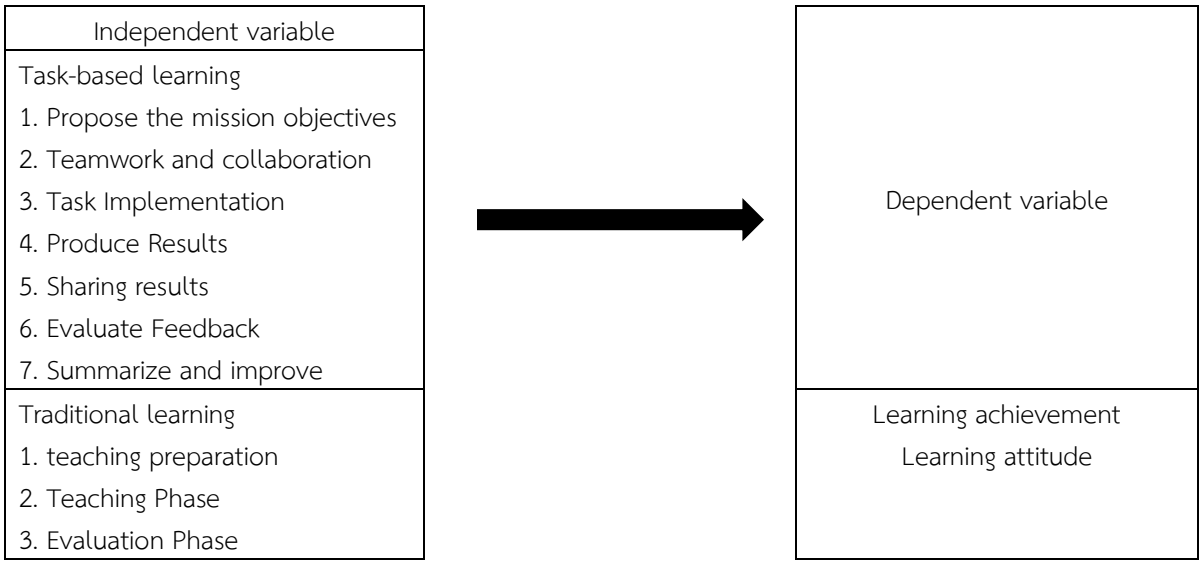

Figure 1 Research Conceptual Framework

Methodology

Population and Sample

The population used in this study was the first-year students majoring in mathematics education at Guangxi Minzu Normal University in China, in the 2023 academic year with 3 classes of 95 students.

The sample groups used in this study were 30 students in class 1 and 32 students in class 2 studying mathematics education at Guangxi Minzu Normal University in China, in the 2023 academic year. Random sampling is as follows:

The experimental class was composed of 30 students in class 1, applying task-based learning management technology. The control class consisted of 32 students in class 2, and their learning was managed according to traditional learning.

Research instrument

The research instruments used in this study include:

1. Lesson Plan: 4 task-based learning and 4 traditional learning lesson plans.

Five experts evaluated the lesson plans. 2 of whom were teachers of subject teaching methods, 2 experts were backbone teachers of Computer Application Fundamentals Course, and 1 expert was the editor-in-chief of textbooks. Each lesson plan lasted 3 hours, totaling 12 hours. Using Likert scale evaluation, the index of task-based learning projects was between 4.38-5.00, which was higher than 3.51, and the index of traditional learning projects was between 4.24-5.00, higher than 3.51. Lesson plans showed that both methods were suitable and can be used in teaching Computer Application Fundamentals course.

2. Learning achievement test paper

The question types were 30 multiple-choice questions and 2 operational questions. The item-objective congruence (IOC) value of each item in the test paper evaluation form was between 0.80– 1.00. The IOC analysis results showed that all test items were suitable for testing. The difficulty (p) of the test paper was between 0.37-0.83, and the discrimination (r) of the test paper was between 0.22-0.56, which proved that the quality of the test paper was very good.

3. Questionnaire on learning attitude

5-level scale questionnaire, 20 questions, and its index of the item-objective congruence (IOC) was between 0.60-1.00, which proved that the questionnaire could be used to evaluate the learning attitude of this course. The reliability of the questionnaire was 0.93, higher than 0.80. The validity of the questionnaire was 0.70, between 0.70 and 0.80. It proved that the data reliability of the questionnaire was relatively high, and the internal consistency of the data was relatively high.

Data collection

Data collection in this study followed the following aspects:

1. Used the learning achievement test paper to conduct a pre-test on the sample.
2. Used task-based learning and traditional learning lesson plans to implement teaching and collect process data.
3. After the classroom teaching was implemented, the post-test was carried out on the samples with the same set of learning achievement test paper as the pre-test.
4. Used questionnaires to investigate students' learning attitude.

Data analysis

In this study, basic statistical analysis, namely percentage, mean, standard deviation, and independent sample T test was used to analyze and compare the pre-test and post-test learning achievement and students' learning attitudes between task-based learning and traditional learning.

Research result

1. Pre-test and Post-test Results of Learning Achievement

This study was based on the comparison design of pre-test and post-test of two classes of samples. A pre-test was carried out at the beginning of the experiment. The results of the pre-test was shown in table 1:

Table 1 independent sample t-test results of pre-test learning achievement

variable	class	N	$\bar{x}$	S.D.	t	p-value
learning achievement	experimental class	30	42.73	3.05	-.83*	.41
	control class	32	43.53	4.39		

*p> .05

Table 1 showed the mean score and standard deviation of the pre-test of the experimental class and the control class. The index of the experimental class ($\bar{x}$=42.73, S.D=3.05), the index of the control class ($\bar{x}$=43.53, S.D=4.39) and the p-value was 0.41> .05, indicated that there was no significant difference between the experimental class and the control class, and the basis of the two groups was the same.

An independent sample t test was conducted on the post-test learning results of the experimental class and the control class. The statistical results were shown in table 2:

Table 2 Comparison of ask-based learning and traditional learning posttest results

variable	class	N	$\bar{x}$	S.D.	t	p-value
learning achievement	experimental class	30	85.53	5.82	5.76*	.00
	control class	32	75.69	7.48		

*p< .05

Table 2 showed the mean score and standard deviation of the post- test of the experimental class and the control class. The index of the experimental class ($\bar{x}$=85.53, S.D=5.82), the index of the control class ($\bar{x}$=75.69, S.D=7.48). The difference between the two was 9.84, and the p value was .00< .05, indicated the learning achievement of task-based learning was significantly higher than that of traditional learning at the .05 level.

Table 3 compared the average pre-test and post-test scores of the experimental class and the control class

variable	class	score	$\bar{x}$	S.D.	t	p-value
learning achievement	experimental class	posttest	85.53	5.82	35.55*	.00
		pretest	42.73	3.05		
	control class	posttest	75.69	7.48	32.52*	.00
		pretest	43.53	4.39		

*p< .05

Table 3 showed the comparison results of the pre-test and post-test learning scores of the experimental class and the control class. The data were obtained by paired sample t-test. The average post-test score of the experimental class was 85.53, and the pre-test score was 42.73. The average post-test score was 42.80 more than the pre-test score. The average posttest score of the control class was 75.69, the average pretest score was 43.53, and the average posttest score was 32.16 more than the pretest score, p=0< .05. There were significant differences between the posttest and pretest scores of the experimental class and the control class, however, the improvement of students' learning achievement in Computer Application Fundamentals Course was more obvious after using task-based learning.

2. Comparison of Learning Attitudes

The questionnaire in this study aimed to investigate students' attitudes towards Computer Application Fundamentals Course learning. This questionnaire was composed of two parts. The first part was the basic information of the students, class, gender, age, and the second part was to measure the students' attitude towards the Computer Application Fundamentals Course, using the 5-point Likert scale system. This questionnaire was released to sample students in the experimental class and the control class to fill in. The statistical results of the returned questionnaires were shown in table 4:

Table 4 comparison results of learning attitudes

variable	Class	N	$\bar{x}$	S.D.	t	p-value
Learning attitude	experimental class	30	4.30	.81	2.35*	0.02
	control class	32	3.92	.41		

*p< .05

Table 4 showed the learning attitude towards Computer Application Fundamentals Course. The average score of the experimental class was 4.30, and the average score of the control class was 3.92. The learning attitude of the task-based learning was significantly higher than that of the traditional learning at the .05 statistical level.

Discussion

The purpose of this research was to compare the learning achievement of the Computer Application Fundamentals Course under task-based learning and traditional learning activities and to investigate students' attitudes towards computer learning after task-based learning activities. In terms of comparison of learning achievement, the independent sample t-test was first used to compare the pre-test

learning achievement of the two classes. The average score of the experimental class was 42.73, and the average score of the control class was 43.53. The P value was 0.41> .05, indicating that there was no significant difference between the two classes at the .05 statistical level, proving that the learning basis of the two classes was the same. Then an independent sample t-test was used to analyze the difference in post-test learning achievement between task-based learning and traditional learning. The post-test score of the experimental class was 85.53, and that of the control class was 75.69. The average difference between the post-test scores of the experimental class and the control class was 9.84, with a significant p value of .00. The results showed that at the statistical level of .05, there was a significant difference in the post-test scores of the experimental class and the control class. In other words, task-based learning is better than traditional learning in improving students' learning achievement.

This result is consistent with related research on task-based learning, such as Luo (2018) the development of communicative ability and attitude toward Chinese language of secondary school's students 5 based on task-based language teaching. After class, Chinese listening ability, reading ability and writing ability were significantly higher than their pre-class scores at .05 level. Liu and Su (2018) studied the effect of using task-driven classroom teaching on students' learning attitudes and learning effectiveness in an information technology course. The results showed that the comprehensive score of the experimental group was significantly higher than that of the control group. In addition, Han (2020) researched on the application of task-driven teaching method in the teaching of Information Technology in secondary vocational schools taking the teaching of Computer Application Foundation as an example. The experimental results show that the theoretical foundation score of the experimental class was higher than that of the control class, and the practical operation score was 11 points higher than that of the control class, P< .05, there was a significant difference, which proved that the teaching effect of the task-driven teaching method was good. Musengimana, Kampire, & Ntawiha (2022) researched the effect of task-based learning (TBL) of chemistry on chemical reaction topics in Rwandan lower secondary school students, it showed that students' learning achievement in chemistry improves significantly if they are actively involved in building their knowledge.

In the study of students' attitudes towards computer learning, the average value of students' attitudes towards using task-based learning was 4.30, and the average value of learning attitudes towards traditional learning was 3.92. It showed that the students' attitude towards task-based learning was better than that of traditional learning in the Computer Application Fundamentals Course, which was at a relatively high level. It shows that students are willing to learn and help others learn together while doing tasks. The motivation and attitude of learning support the progress of tasks, making students more interested in learning. This is consistent with the research of Wiriyakarun (2001), discussed student responses to task-based learning. Surveys showed that students respond positively to task-based courses. Luo (2018) the results of learning attitude showed that the average score of learning attitude was 4.12, task-based learning attitude was relatively high, and Liu and Su (2018) said that in terms of learning attitude, the t-test analysis method was used. The experimental class had a higher acceptance of information technology than the control class.

Suggestions

1. Suggestions for practice

1.1 Teachers strengthen students' independent practice when organizing task-based learning activities, and encourage students to improve practical skills, express opinions, participate in discussions, and increase knowledge in the process of participating in activities.

1.2 Create a good learning atmosphere and study in groups, so that every student can participate in every step of the group activities.

1.3 Try to apply task-based learning to Chinese students' learning of other subjects.

2. Suggestions for next research

Considering the level of the researcher, the time of the study and the geographical limitations of the study, the following suggestions are made:

2.1 In the next step, we can further expand the task-based learning method for variables such as gender and age, and study the learning situation and academic performance of students.

2.2 The research time of this research is only 12 class hours, which is relatively short. It is suggested to strengthen the time of task-based learning activities to make the research results more significant.

2.3 Mix a variety of learning methods in the teaching process, such as case-based learning and project-based learning.

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