ISSN:2321-1156

International Journal of Innovative Research in Technology & Science(IJIRTS)

STUDY ON THE APPLICATION OF THE FLIP-PING-CHINESE APPROACH TO THE COURSE OF COMMODITY DESIGN

[1]Yi -Hsueh Shen, Jen-teh Junior College of Medicine, Nursing and Management, Taiwan. [2]Chen-Feng Wu, Yu Da University of Science and Technology, Taiwan. [3]Chia-Ju Tsai, Yu-Da University of Science and Technology, Taiwan.

Abstract

With the rise of flipped classroom in recent years, teachers have begun to think about how to activate instruction and change the traditional instruction. Many teachers have found that the cramming-oriented instruction is no longer consistent with the educational policies today and felt the urgent need to change the traditional education. This study tried adopting the Flipping-Chinese approach to the flipped classroom, so as to enhance students' learning motivation.

This study used the quasi-experiment research method and selected the freshmen of a junior college for the experimental instruction. The learning motivation scale was taken as the research tool of this experiment to discuss students' acceptance and learning motivation of integrating the Flipping-Chinese approach with the courses of visual art. Then, SPSS 22.0 was used in the quantitative analysis of the collected data. Finally, this study reviewed the application of the Flipping-Chinese approach according to the research results.

Keywords: flipped classroom, Flipping-Chinese approach

Introduction

With the rise of flipped classroom in recent years, teachers have begun to think about how to activate instruction and change the traditional instruction. Therefore, in the flipped teaching, teachers stimulate children's learning motivation through guidance and assistance so that students would take initiative to study. Moreover, teachers adjust the instruction according to the learning situation of students and help students develop such abilities as curiosity, inquisition, thinking, judgment and action, so that students would be willing to acquire knowledge with a positive attitude and persistent motivation and be able to take pleasure in study and strengthen the sense of self-value. In the heated wave of the Flipping-Chinese approach in Taiwan in recent years, many teachers have found that the cramming-oriented instruction is no longer consistent with the educational policies today and felt the urgent need to change the traditional education. Therefore, they try incorporating the Flipping-Chinese approach into the flipped classroom. Currently, the Flipping-Chinese approach, which derived from the concept of flipped classroom, is very popular in the instruction.

With the hope of changing the traditional standard and passive learning, this study combined the concept of flipped classroom with courses and adopted the instruction model of "self-learning -> thinking -> expression". Through self-learning before class, the game interaction in class, group discussion and spiritual creation, it helped students with exploration, experience and creation.

In this study, the freshmen with weak learning motivation in a class of a junior college in Miaoli County were taken as the subjects. The research purpose is to discuss the difference in learning motivation of the students before and after the instruction in the application of the Flipping-Chinese approach to the curriculum.

Literature Review

The research purpose of this study is to integrate the Flipping-Chinese approach with the course of Commodity Design to probe into how teachers practice the Flipping-Chinese approach.

A. Flipped Classroom

Flipped classroom is a hot educational topic in recent years. As known as flipped teaching, inverted classroom and flipped learning, flipped classroom is an instruction model which enhances students' learning motivation and effectiveness to follow the change to the times and can change the conventional instruction and solve its problems.

The instruction model of flipped classroom is as follows: students preview the instruction videos designated by teachers as before-class homework; in class, less time is spent on the interpretation of basic knowledge while more time is spent on exercise or discussion, so that students can make their learning efficient, broaden their horizon and deepen their understanding of knowledge. The after-class homework, which was finished at home in the past, is now finished in class, while the interpretation by teachers is now

watched at home. In this way, the class instruction is flipped. The instruction is opposite to the tradition one featuring "doing homework at home in the evening and listening to teachers in classroom during the day", which explains the reason why it is decorated with the word "flipped" (Huang, 2014). In his book the e-Learning Field book published in 2003, Nick Van Dam quoted the hybrid training model for the new managers of Deloitte Consulting. As is shown in Figure 1, the online self-learning in Stage 1 and the face-to-face discussion in Stage 2 well exemplify flipped learning (Liu, 2013).

Stage 1	Form of Communication	Learning Objective	Channel of Learning
Stage 1 E (online)	Self-learning-styled E-Learning 	Acquisition of knowledge	• Read relevant articles • Adopt the self-learning E-Learning module • Use the online self-evaluation module
Stage 2 C (classroom)	Face-to-face 	Exercise and cooperative learning	• Participate in the role play, give feedback, and join group discussion
Stage 3 E (online)	Self-learning-styled E-Learning 	Enhancement of learning effectiveness	• Download and apply the work-assisting and decision-supporting tools • Read a greater number of relevant reference materials • Participate in the discussions in the discussion section

Figure 1 Training Model of New Managers of Deloitte Consulting Source: Liu (2013)
Note: "E" represents "e-Learning", and "C" symbolizes "Classroom"

B. Flipping-Chinese Approach

Flipped teaching emphasizes the change to the instruction models of teachers. There are a variety of flipped teaching models in Taiwan, such as the BTS flipped classroom of Ping-cheng Yeh, the mathematical café of Fu-jian Peng, and the Flipping-Chinese approach and the Waldorf education model of Huei-cheng Chang. This study adopted the Flipping-Chinese approach proposed by Teacher Chang from Zhongshan Girls High School (2013) to design the student-oriented teaching plan, so as to help students develop such abilities as self-learning, reading, thinking, discussion, analysis, induction, and expression. By making a brand-new question-oriented handout and adopting the new learning model featuring "cooperation and competition" among groups, the flipping-Chinese approach gives a dominant role to students in class and changes the teacher into an assistor, a guide and a question raiser. In this approach, the right of learning is returned to students, so as to enhance students' interest in learning and equip them with the abilities like self-learning, thinking and expression.

C. Learning Motivation Theory

ARCS is a motivation model proposed by Professor John Keller. With the systematic design model built to enhance students' learning motivation as the basis, the professor integrated the motivation theory with relevant theories and thus put forward the model. According to him, traditional teaching designs paid inadequate attention to the learning motivation of learners. If the teaching materials developed with a teaching design cannot trigger learners' interest in and attention to learning, the effects of learning will be greatly reduced. Therefore, John Keller hopes that the ARCS motivation model will help educators confirm and understand the strategies of teaching design according to the motivation need of students, so as to stimulate students' learning motivation and effectively improve their learning and performance.

After reviewing the contemporary systematic instruction model, John Keller combined the result achievements of motivation theories in psychology with the teaching design model and proposed the ARCS motivation design model in 1983. Moreover, he divided the model into four elements, namely, "Attention", "Relevance", "Confidence" and "Satisfaction", with the hope of facilitating the curriculum and improving instruction. Besides, he believed that the model was applicable to learners of all ages. The motivation, meaning and teaching strategies of the model are shown in Table 1.

Table 1 Theories of Learning Motivation

Theory of Learning Motivation	Meaning	Teaching Strategy
Attention (catch attention)	Trigger students' interest and stimulate their curiosity	Offer diversity, stimulate the desire for knowledge and master the skills of inquisition
Relevance (be closely related)	Meet students' personal needs and help them fulfill objectives, so that they would develop a positive learning attitude	Associate teaching with familiar things according to learning objectives and design teaching materials according to students' characteristics
Confidence (build confidence)	Help students build confidence and make them confident that they will be able to realize their objectives	Define the standards of and expectation on success and offer the opportunities of self-control and success
Satisfaction (feel satisfied)	Students get internal and external encouragement and reward for their achievements	Provide the opportunity of showing talents and give feedback and rewards

Research Method

To explore the influence of the combination of the flipping-Chinese approach and the curriculum on students' learning motivation, this study adopted the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design as the research tool. This scale derived from the motivation model of John Keller, and the four elements in his ARCS were converted into the four dimensions of this questionnaire scale, including "Attention", "Relevance", "Confidence" and "Satisfaction". First, the draft of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design and the trial test questionnaire were made according to the research purpose. Then, the trial test was conducted to confirm the adequacy and feasibility of the research tool. Meanwhile, 70 students of two classes who didn't participate in the research instruction took the trial test, and the item analysis was made to test the items. After that, the factor analysis was made to establish the construct validity of the scale, and finally the reliability analysis was made to test the reliability of the whole scale. The analysis of the results of the trial test questionnaire was as follows:

A. Item Analysis

The item analysis aimed to evaluate the adequacy of the scale, and the dimensions of the trial test draft were used to analyze and test the items. The criterion of international consistency and relevant analyses were adopted to process the data of the trial test to obtain the critical ration and relevant coefficients as the evidence of the items.

The extremity group comparison was conducted to divide the total scores of the trial test results into the High Score Group and the Low Score Group. In this study, the first 27% of the total scores of the scale were in the High Score Group, and the last 27% were in the Low Score Group. Then, two extremity groups were taken as the independent variables and the scores of items as the dependent ones in the independent samples t test. There should be significant difference in the scores of the differentiable items between the two extremity groups. In this study, the significance threshold was set as "α= 0.05", the items which failed to reach the significant level in the t test were removed. According to the analysis of the test results, 35 items of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design were all statistically significant. Normally, the standard CR is set as "3.00" for the item evaluation. If the CR of an item is lower than "3.00", it indicates that the item is poorly differentiable and can be removed; if the CR of an item is higher than "3.00", it indicates that the item is highly differentiable and can be kept. Additionally, the homogeneity of variance test was conducted to obtain the total scores of the scale and the product moment correlation of each item. If the product moment correlation of an item is lower than "0.4", it means that the homogeneity between the item and the whole scale is low and the item should be removed; if the product moment correlation of an item is higher than "0.4", the result will be opposite. According to the item analysis, the CR of Item 3 was 4.175, higher than the threshold of "3.00", but its product moment correlation was lower than "0.4" (0.389); hence, Item 3 was removed. The CR and product moment correlation of the remaining items were lower than the significant level, so these items were kept.

B. Factor Analysis

To test the construct validity of the scale, the factor analysis was made after the item analysis. The scale originally had 35 items. In the item analysis, one item was removed. Hence, the remaining 34 items were used for the factor analysis. Whether this scale was suitable for the factor analysis was evaluated with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity. KMO is the sampling adequacy which ranges from "0" to "1". If KMO is lower than "0.60", it indicates that the item variables are not suitable for the factor analysis; if the KMO of all item variables is higher than "0.80", it implies that the relevance among the item variables is adequate and that the item variables are suitable for the factor analysis; if the KMO of all item variables is higher than "0.90", it means that the relevance among the item variables is highly adequate and that the item variables are highly suitable for the factor analysis.

Besides, the factor loading of this scale needed to be higher than 0.5; whether there was an inter-factor situation was tested, and the analysis was made according to the standard that the feature value was higher than "1", so as to fully test the construct validity of the scale. After whether the KMO was suitable was confirmed, the factor analysis of the questionnaire scale was made. To make the scale rigorous and adequate, the items of the trial test questionnaire were selected for several times. The selection of the factor analysis is as follows:

(1)The first factor analysis

In terms of adequacy, the KMO was "0.860", indicating that the relevance among the variables was strong and that the variables were suitable for the factor analysis. In the factor loading and feature value test, the factor loadings of Items 4, 15, 17 and 19 were all lower than "0.4"; hence, these four items were removed. Then, the second factor analysis was conducted.

(2)The second factor analysis

In terms of adequacy, the KMO was "0.856", indicating that the relevance among the variables was strong and that the variables were suitable for the factor analysis. In the factor loading and feature value test, the factor loading of

Item 24 was lower than "0.4"; hence, this item was removed. Then, the third factor analysis was conducted.

C. The third factor analysis

In terms of adequacy, the KMO was "0.870", indicating that the relevance among the variables was strong and that the variables were suitable for the factor analysis. But it was found that the communality of Item 26 was lower than "0.5", indicating that this item was not closely related to common factors; hence this item was removed. Then, the fourth factor analysis was conducted.

D. The fourth factor analysis

In terms of adequacy, the KMO was "0.871", indicating that the relevance among the variables was strong and that the variables were suitable for the factor analysis. In the factor loading and feature value test, an inter-factor situation was tested in items 2, 6, 23, 30 and 32; hence, these five items were removed. Then, the fifth factor analysis was conducted.

E. The fifth factor analysis

In terms of adequacy, the KMO was "0.892", indicating that the relevance among the variables was strong and that the variables were suitable for the factor analysis. In the factor loading and feature value test, an inter-factor appeared in Item 12; hence this item was removed and then the sixth factor analysis was conducted.

F. Test on adequacy

The KMO was "0.885", indicating a high level. The chi-square value of Bartlett's test of sphericity was "1048.100"; DOF, ""231"; significance probability, p=.000, indicating a significant level. This demonstrated that the items of the scale had common factors and were suitable for the factor analysis. In the factor loading and feature value test, they all met the preset standards. Therefore, the item selection in this stage was completed. In the factor analysis, there were 34 remaining items after the item analysis; 12 ones were removed after rounds of selection. The data for the final test and analysis are shown in Table 2. All the item numbers were reset in the pre-test and the post-test.

Table 2 KMO and Bartlett's test of sphericity

Kaiser-Meyer-Olkin		0.885
Bartlett	Appropriate chi-square distribution	1048.100
	Degree of freedom	231
	Significance	0.000

G. Reliability Analysis

The so-called reliability is to test the degree of error as well as the degree of consistency of test results. Common reliability measurement methods include the test-retest reliability and the split-half reliability Cronbach coefficient. In this study, the Cronbach coefficient was taken as the evaluation criterion of the questionnaire to measure the consistency and stability among the items of the scale. A higher indicated a more stable scale, and a higher consistency value implied a higher level of consistency among the items. In 1978, Nunnally proposed the evaluation norms of the reliability indicator value of the scale and pointed it out that the accepted minimum α ranged from "0.65" to "0.70". The Cronbach α of the total behavioral scale of this study was "0.949", indicating a high level reliability. The Cronbach α of other dimensions were all over "0.700", also indicating a high level of reliability.
After the item analysis, the factor analysis and the reliability analysis, Items 2, 3, 4, 6, 12, 15, 17, 19, 23, 24, 26, 30 and22 of the original scale were removed, and 22 items were kept. By then, the official scale was finalized.

Results Analysis

With the quasi-experiment method, this study selected 37 freshmen of a class featuring academic underperformance as the subjects and "applied the flipping-Chinese approach to the course of Commodity Design". Then, the data about the students' responses to the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design were analyzed.

The original number of the samples of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design for the Experimental Group was 37. After the processing, all of these samples were valid. The benchmark scale results of the learning motivation scale are shown in Table 3.

Table 3 Benchmark Scale of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

Dimension	Number of Item	Mean of Evaluation Benchmark of Positive and Negative AttitudeS	Pre-test		Post-test	
			Average mean	Standard deviation	Average mean	Standard deviation
Attention	5	15	18.325	0.7212	19.757	0.6471
Relevance	5	15	17.622	0.6313	19.460	0.6471
Confidence	5	15	17.541	0.6643	19.108	0.7465
Satisfaction	7	21	25.27	0.6456	27.243	0.7122
Overall Attitude Toward Using	22	66	78.757		85.568	

In this study, the Likert 5-point scale was adopted for the scoring. The score for each item ranged from "1" to "5", so the mean "3" was taken as the evaluation benchmark of positive and negative attitudes. Then, the mean was multiplied with the number of items of all dimensions. The product would be taken as the evaluation value of positive and negatives attitudes. The statistics are shown in Table 5. As the Experimental Group took the pre-test and the post-test, the paired sample T-test was adopted for the data analysis.

The t test was conducted. If the significance probability value was $p>0.05$, indicating insignificant, it means that there was no significant difference between the score of the pre-test and that of the post-test; if the significance probability value was $p \leqq 0.05$, indicating significant, it means that there was significant difference between the two. The analysis of the paired sample T-test results of the pre-test and the post-test of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design is as follows:

A. Difference in "Attention" before and after the instruction

The significance probability value "p" of the learning motivation scale was "0.049", indicating a significant level. This demonstrates that there was significant difference in "Attention" before and after the instruction based on the combination of the flipping-Chinese and the curriculum. The average of "Attention" after the instruction was higher than that before the instruction. The details are shown in Table 4.

Table 4 Paired Sample T-Test on "Attention" of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

	Difference in Paired Variables					t	DOF	Sig. (two-tailed)
	Average mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of Difference				
				Lower Limit	Upper Limit			
Post-test on "Attention" − Pre-test on "Attention"	0.28649	0.8571	0.14090	0.00073	0.57224	2.033	36	0.049

B. Difference in "Relevance" before and after the instruction

The significance probability value "p" of the two groups of variables in the pre-test and the post-test on t "Relevance" of the paired sample t test on learning motivation was "0.008", indicating a significant level. This demonstrates that there was significant difference in "Relevance" before and after the instruction based on the combination of the flipping-Chinese approach and the course of Commodity Design among the students of the Experimental Group. The average of "Relevance" after the instruction was higher than that before the instruction. The details are shown in Table 5.

Table 5 Paired Sample T-Test on "Relevance" of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

	Difference in Paired Variables					t	DOF	Sig. (two-tailed)
	Average mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of Difference				
				Lower Limit	Upper Limit			
Post-test on "Relevance" − Pre-test on "Relevance"	0.36757	0.7909	0.13003	0.10386	0.63128	2.827	36	0.008

C. Difference in "Confidence" before and after the instruction

The significance probability value "p" of the two groups of variables in the pre-test and the post-test on t "Confidence" of the paired sample t test on learning motivation was "0.034", indicating a significant level. This demonstrates that there was significant difference in "Confidence" before and after the instruction based on the combination of the flipping-Chinese approach and the course of Commodity Design among the students of the Experimental Group. The average of "Confidence" after the instruction was higher than that before the instruction. The details are shown in Table 6.

Table 6 Paired Sample T-Test on "Confidence" of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

	Difference in Paired Variables					t	DOF	Sig. (two-tailed)
	Average mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of Difference				
				Lower Limit	Upper Limit			
Post-test on "Confidence" − Pre-test on "Confidence"	0.31351	0.8661	0.14238	0.02475	0.60228	2.202	36	0.034

D. Difference in "Satisfaction" before and after the instruction

The significance probability value "p" of the two groups of variables in the pre-test and the post-test on t "Confidence" of the paired sample t test on learning motivation was "0.027", indicating a significant level. This

demonstrates that there was significant difference in "Satisfaction" before and after the instruction based on the combination of the flipping-Chinese approach and the course of Commodity Design among the students of the Experimental Group. The average of "Satisfaction" after the instruction was higher than that before the instruction. The details are shown in Table 7.

Table 7 Paired Sample T-Test on "Satisfaction" of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

Post-test on "Satisfaction" − Pre-test on "Satisfaction"	Difference in Paired Variables					t	DOF	Sig. (two-tailed)
	Average mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of Difference				
				Lower Limit	Upper Limit			
	0.28185	0.7412	0.12184	0.03474	0.52897	2.313	36	0.027

E. Difference in "Overall Learning Motivation" before and after the instruction

The significance probability value "p" of the two groups of variables in the pre-test and the post-test on t "Confidence" of the paired sample t test on learning motivation was "0.015", indicating a significant level. This demonstrates that there was significant difference in "Overall Learning Motivation" before and after the instruction based on the combination of the flipping-Chinese approach and the course of visual art among the students of the Experimental Group. The average of "Overall Learning Motivation" after the instruction was higher than that before the instruction. The details are shown in Table 8.

Table 8 Paired Sample T-Test on "Overall Learning Motivation" of the Learning Motivation Scale of Combination of the Flipping-Chinese Approach and the Course of Commodity Design

Post-test on "Overall Learning Motivation" − Pre-test on "Overall Learning Motivation"	Difference in Paired Variables					t	DOF	Sig. (two-tailed)
	Average mean	Standard deviation	Standard Error of Mean	95% Confidence Interval of Difference				
				Lower Limit	Upper Limit			
	0.30958	0.7391	0.12150	0.55600	0.06316	2.548	36	0.015

According to the research results, there was significant difference in "Attention", "Relevance", "Confidence" and "Satisfaction" before and after the combination of the flipping-Chinese approach and the course of visual art among the students of the Experimental Group. Moreover, the average of the scale after the instruction was higher than that before the instruction.

Conclusion

After the students of the Experimental Group received the experimental instruction, this study came to the following conclusions:

(1) The students believed that the combination of the flipping-Chinese approach and the course of Commodity Design was more attractive to them.
(2) The students showed greater satisfaction in "Relevance" in respect of the combination of the flipping-Chinese approach and the course of Commodity Design.
(3) The students showed greater satisfaction in "Confidence" in respect of the combination of the flipping-Chinese approach and the course of Commodity Design.
(4) The students showed greater satisfaction in "Satisfaction" in respect of the combination of the flipping-Chinese approach and the course of Commodity Design.

In this study, the quantitative analysis was adopted to explore the experiment results. However, the actual situation and ideas of the teachers and students in the practice of the flipping-Chinese approach could not be deeply analyzed. It is recommended that future studies record the dialogues among students or make a qualitative study on the feeling and acceptance of students and teachers, so as to give a deeper and more comprehensive interpretation of research achievements.

References

[1] Huang, C.C. (2014). *Monthly of Critique on Taiwanese Education*, 2014, 3 (8), 63-71.
[2] Liu, Y.F. (2013). Flipped Classroom -- An Effective Way to Implement the Teaching Reform Which Focuses on Students and Improve Employment. *Evaluation Bimonthly*, 41.
[3] Chang, H.c. (2013). Flipping-Chinese Approach (Great Flipped Instruction): A New Reform Following My 15-Year Career as a Teacher. *Journal of Zhongshan Girls High School*, 101-113.
[4] Yu, M.N (1992). Application of Test Preparation and Analytical Techniques to Learning Diagnosis. *Educational Research*, 28.
[5] Keller, J.M. (1983), Motivational design of instruction, In C.M. Reigeluth (Eds.), *Instructional design theories and models,* , Hilisdale, NJ: Eribaum.
[6] Nick Van Dam. *The e-Learning Fieldbook,* 2003.
[7] Nunnally, J.C., *Psychometric theory*. Tata McGraw-Hill Education, (1978.)