Research on the Learning Effect of Experiential Learning Theory Applied to Design Education

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The European Conference on Education 2022
Official Conference Proceedings

Abstract
Experiential learning theory enables course study to establish practical experience exchanges, and instructors who take the initiative to provide guidance to learners perform better. Students apply the professional skills learned from their own experience, meet their learning needs, and ask questions from their peers, which can enhance the true value and confidence of cooperative learning. This research mainly investigates the students' learning experience and effect of design education. The advertising design course is used, and the participating students are alternately grouped to serve as the learning group and the teaching group. The survey of learning activities included learning motivation and attitudes, relationship with instructors, and learning effect. The survey of teaching activities included learning ability, peer cooperation and learning involvement in preparing for the course. The research scale adopts the Likert-type five-point scale, and uses the correlation analysis, variance analysis and regression analysis of SPSS to make inferences. The results show that the variables have medium-high correlations, and the involvement of teaching preparation has a significant impact on learning effect. The instructors' learning involvement can predict the learners' learning effect. The exchange of experience in the design field is closely related to peer-to-peer cooperative learning. Traditional learning methods are constantly being revised. If students can accumulate learning experience independently in teaching activities, they will generate new learning abilities and effects. By balancing the roles of learner and instructor in the classroom, students will be able to master what their profession requires and how to achieve learning effect.

Keywords: Design Education, Experiential Learning, Cooperative Learning, Learning Effect

Introduction

Experiential learning theory believes that learning is a process of experience transformation and knowledge creation. This dynamic process of knowledge creation is the result of individual interaction with the environment, conflict and problem solving. Starting from concrete experiences, reflecting on observations, forming concepts and inferences, and testing concepts in new situations. Kolb divides the learning process into two aspects: information reception and information processing. There are four cyclic learning stages including concrete experience, reflective observation, abstract conceptualization and active experimentation (Kolb & Wolfe, 1981). "Concrete experience" arouses learning interest and motivation, so that students are willing to carefully " reflective observation", " abstract conceptualization" thinking planning and "active experimentation" workplace classroom and learning results, and then communicate through the "concrete experience" of experiential learning, restarting the cycle of experiential learning so that learning can enhance student learning (Alcota, & Gonzalez, 2011; Alejos, Fernandez, Sanchez, & Cuinas, 2011).

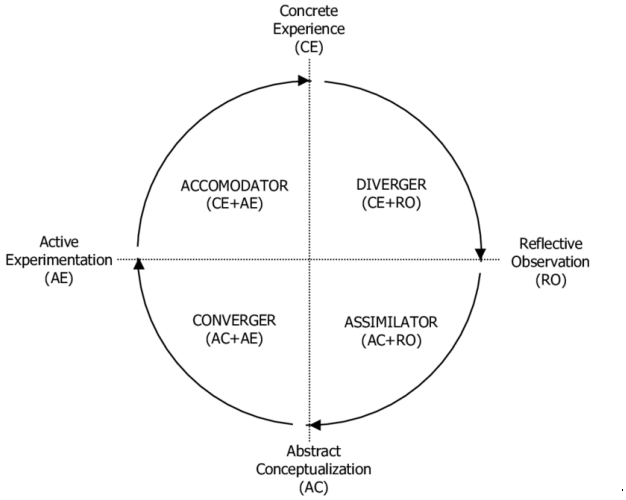

Figure.1: Kolb's Experiential Learning Model

Experiential Learning and Learning Pyramid

Teaching methods derived from experiential learning allow students to effectively acquire professional knowledge and skills, and new teaching methods and strategies should be considered (Kose, Sahin, & Aysegul, 2010). According to the learning pyramid proposed by Edgar Dale, learning can be divided into passive learning and active learning (Dale, 1969). If learners only passively accept learning, their performance will not be significantly improved, and instructors who take the initiative to provide guidance from others perform better than learners. Students' learning is best when they can guide others. They must not only be familiar with the learning content, but also internalize their knowledge for communication. Before teaching, students must think deeply through the individual, transform, and absorb the content, and communicate with each other. The expression of peer thinking can improve students' own potential ability. In addition to the learning effect, different teaching strategies affect the initiative and passiveness of students' learning style. Discussion, practice, and teaching will form the enthusiasm for staged learning, but in experiential learning, direct, indirect, and alternative experience will have influential impact.

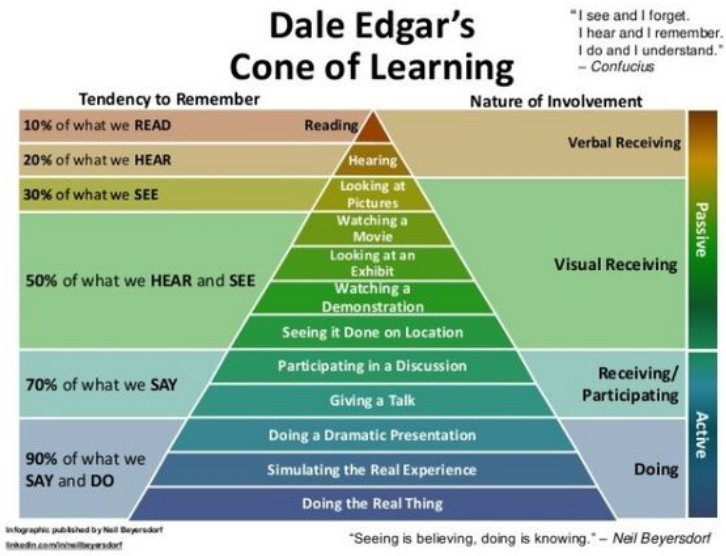

Figure. 2: Learning Pyramid (Adapted from National Training Laboratories)

Experiential Learning and Peer Collaboration

Experiential learning provides a dynamic learning model that describes learning and development patterns among individuals, groups, and organizational environments through periodic cycles of interaction (Kolb & Kolb, 2008). Combining the characteristics of experiential learning with the application of design teaching practice, and matching students' majors and teaching methods.

This research adopts the experiential learning of design practice, and the learning mode of group cooperation. Cooperative Learning uses the concepts of peer interaction, cooperative skills, and shared responsibility to jointly accomplish learning tasks and goals. Teaching and learning are two cooperative roles, thinking about the inheritance and needs of learning experience, internalizing learning difficulties and skills, and then teaching them to learners. Peer learning increases instructor motivation and communication. Therefore, Cooperative learning emphasizes student-centered, and uses the concept of active learning to enhance the learning effect through the exchange of knowledge and skills, discussion, and questioning. The teaching group compiles the professional skills and learning methods that students need based on practical experience, understands the possible difficulties of students' learning, and seeks guidance skills to guide their peers to actively participate. In the learning group, the motivation of the teaching group is used to enhance the learning motivation, observe the learning attitude, and stimulate the interaction with the instructor, which contributes to the overall learning effect.

Experiential Learning and Course Content

The experiential learning theory enables learning and courses to establish professional exchanges in the workplace. Practical experience is closely related to design education. Design work is not limited to professional skills, but workplace communication attitudes and coping abilities are the focus of design majors. Traditional learning methods must undergo a process of constant revision and evolution. If the design experience can be accumulated in teaching activities, there will be interactive influences and new learning experiences. Table 1 shows the comparison of empirical theory and learning activities.

Table 1: The Comparison of Curriculum Activity Planning and Experiential Learning Theory

Oriented	Theoretical basis	Activity steps
Concrete Experience	Arouse the interest of students with concrete experiences of actual participation in activities and workplaces.	Observe and understand the needs of the design field, fill in the learning check content and study sheet, establish the learning goals of professional skills, and trigger learning motivation.
Reflective Observation	Observing industry-academia issues and seeking the value of practical experience	Through the design and participation of practical tasks, and the practical experience, the learning content of the three areas of cognition, skills and affection is summarized.
Abstract Conceptualization	Analyze the feasibility of practice by thinking and internalizing knowledge and experience	Integrate practical experience and professional skills and internalize them into design thinking to establish teaching units and activities for cooperative learning.
Active Experimentation	Learning activities that put functional experience and skills into practice	Plan the structured content of learning materials and implement specific teaching sharing activities to verify the learning effect and value of experiential learning theory for design competencies

Research Method

This study is to evaluate the effect of workplace experiential learning and course peer cooperation, and to use two aspects of teaching activities and learning activities for interactive verification. The teaching group survey includes learning ability, peer cooperation, and learning involvement; while the study group survey includes learning motivation and attitude, learner-teacher relationship, and learning effect. The following are the execution instructions:

Learning preparation for the teaching group

The teaching group of experiential learning needs to learn and experience in-demand skills independently and draw on their own practical experience to guide thinking or receive information. Therefore, it can actively improve oneself, accept changes in the learning process, and actively interact with peers to solve problems (Roehl, 2013). Learning involvement refers to the level of effort and engagement of students in performing learning activities. Instructors are closely related to the enthusiasm and engagement time of cooperative learning and are also affected by the degree of interaction in the classroom.

The learner's learning involvement

When students are actively engaged in learning activities, the interaction between the learner and the instructor will increase, and the learning relationship will also improve, so that better learning achievement or performance can be obtained (Kuh, Kinzie and Whitt, 2011). Research on early learning participation has focused more on behavioral-level performance (e.g., classroom presentations, good grades) and less on intrinsic motivation to learn. The design course focuses on students' practical learning process and experience sharing.

Therefore, the survey of learning participation focuses on three variables: motivation and attitude, relationship with instructors, and learning effect.

Effect evaluation of experiential learning

Learning effect refers to the learning process of learners through teaching, which can be the main basis for evaluating whether teaching objectives and learning expectations are achieved. Blumberg (2016) pointed out that student-centered teaching requires time and practice, and both teachers and students need to understand how to use new teaching methods and how to adapt to changes in classroom teaching to help students improve their learning outcomes. The learning effect of this study is aimed at active learning, so the learning effect is mainly based on the survey of learners, and the learning effect of peer-to-peer cooperative learning is examined based on eight dimensions and 26 factors proposed by Pulkka and Niemivirta (2013). The eight dimensions are included interest, teacher functions, quality of teaching materials, course satisfaction, quality of assessment methods, student effort, achievement, and classroom participation, etc., to measure the effect of experiential learning.

Participants

The participants of experiential learning in this study are the third-year college students of the advertising design course, which is a cooperative learning of design professional skills and knowledge. The course execution had combined learning experiences in the classroom (classroom teaching) and outside the classroom (workplace experience), so each participating student will work in groups of teaching and study groups. The figure of conceptual framework and hypotheses is shown in following.

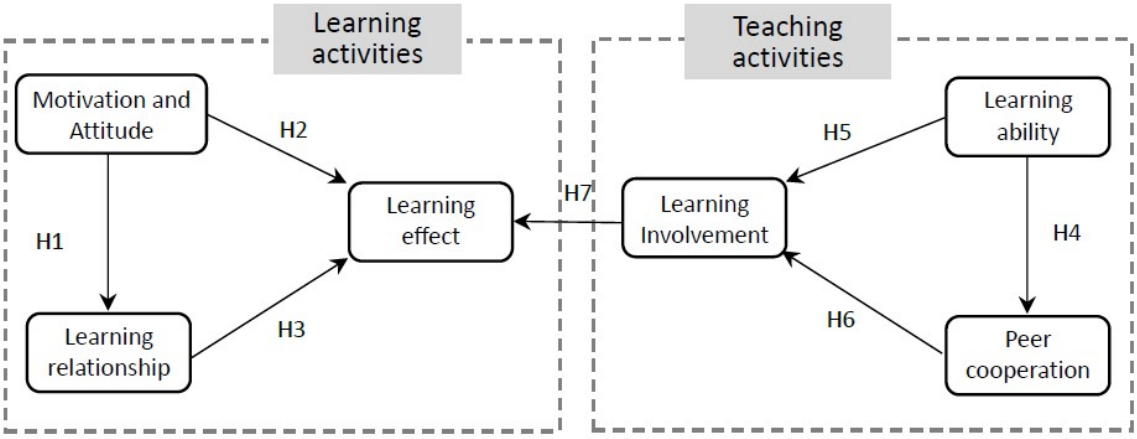

Figure. 3: Conceptual Framework and Hypotheses

Research Hypotheses

According to the research purpose, set specific questions and research hypotheses:

1. There is a significant interaction among learners' learning motivation and attitude, learner-teacher relationship and learning effect

H1: High learning motivation and attitude will establish a better learning relationship
H2: High learning motivation and attitude will lead to high learning effect
H3: Good learning relationships affect learners' learning effect

2. There is a significant interaction among the instructor's learning ability, peer cooperation and learning involvement

H4: High learning ability builds good peer cooperation
H5: Instructors with high learning ability will have higher learning involvement
H6: Good peer cooperation affects the instructor's learning involvement

3. The instructor's learning participation has a significant impact on the learner's learning effect

H7: The instructor's learning involvement affects the learner's learning effect
H8: Instructor's learning involvement can be used to predict learner's learning effect

Research Questionnaires and Tools

Research questionnaires mainly investigate the experience learning and effect, covering learning motivation and attitudes of learning activities (learning interest, time investment, concentration, willingness to participate, learning needs, arousing interest, progress, overall progress, learning self-confidence), The relationship between learners and instructors (peer emotion, learning interaction, and peer attention), learning effect (26 questions); learning ability of teaching activities (learning focus, learning direction, helping learning, loving teaching methods, professional ability, communication skills), cooperation skills and peer interaction (study activities, listening to speeches, expressing opinions, accepting opinions, mutual assistance and cooperation, information sharing, solving problems, taking the initiative to ask for help, support and encouragement, discussing matters and discussing opinions), learning input (worth involvement, professional knowledge sharing, peer recognition and sense of achievement and future work ability). The research scale adopts the Likert-type five-point scale, and the higher the score, the higher the degree of recognition of the students. Correlation analysis, variance analysis and regression analysis will be used for each survey variable data to explore the correlation between dimensions, to understand the interactive relationship between teaching and learning two-stage cooperative learning.

Table 2. Result of One-sample t-test

Variances	M	Sd	T	df	Sig.	Mean Difference	95% Confidence the Difference	
							lower	upper
MA	4.400	0.488	22.785	62	.000	1.400	1.277	1.523
LR	4.217	0.706	13.677	62	.000	1.217	1.039	1.395
LE	4.505	0.481	24.840	62	.000	1.505	1.384	1.626
LA	4.433	0.519	21.922	62	.000	1.433	1.302	1.564
PC	4.508	0.433	27.617	62	.000	1.508	1.399	1.617
LI	4.567	0.550	22.608	62	.000	1.567	1.429	1.706

Note: Motivation and Attitude (MA); Learning relationship (LR); Learning effect (LE); Learning ability (LA); Peer cooperation (PC); Learning Involvement (LI)

Table 3. Correlation analysis results between variables

Group			Learning			Teaching		
Variances	M	Sd	MA	LR	LE	LA	PC	LI
Motivation and Attitude (MA)	4.400	.488	1.000 .					
Learning relationship (LR)	4.217	.706	.599** .000***	1.000 .				
Learning effect (LE)	4.505	.481	.798** .000***	.684** .000***	1.000 .			
Learning ability (LA)	4.433	.519	.752** .000***	.591** .000***	.768** .000***	1.000 .		
Peer cooperation (PC)	4.508	.433	.678** .000***	.687** .000***	.712** .000***	.750** .000***	1.000 .	
Learning Involvement (LI)	4.567	.550	.664** .000***	.698** .000***	.752** .000***	.714** .000***	.748** .000***	1.000 .

Note: *P<.05; **P<.01; ***P<.001

Results

According to the results of one-sample t-test (see Table 2), each variable has reached a significant level, indicating that the participants' motivation and attitude (MA); learning relationship (LR); learning effect (LE); learning ability (LA); peer cooperation (PC); learning involvement (LI) have significant differences. According to the correlation coefficient (see Table 3), there are high and medium correlations between all variables.

According to the results of ANOVA (see Table 4 and Fig. 4), for the participant of Motivation and Attitude (MA), the Learning Relationship (LR) $F_{(14,48)}$=3.486, p=.001<.01; the Learning Effect(LE) $F_{(14,48)}$=13.676, p=.000<.001. For the participant of Learning Relationship, the Learning Effect (LE) $F_{(8,54)}$=9.353, p=.000<.001. For the participant of Learning Ability (LA), the Peer Cooperation (PC) $F_{(12,50)}$=10.470, p=.000<.001; the Learning Involvement (LI) $F_{(12,50)}$=6.304, p=.000<.001; For the participant of Peer Cooperation (PC), the Learning Involvement (LI) $F_{(28,34)}$=9.353, p=.000<.001. For the participant of Learning Involvement (LI)), Learning Effect (LE) $F_{(28,34)}$=7.445, p=.000<.001. Hypothesis 1 to 7 are confirmed.

Table 4. Result of One-way ANOVA

One-way ANOVA						
Learning activities		*SS*	*df*	*MS*	*F*	*sig*
MA→LR	Between	15.590	14	1.114	3.486	.001**
	Within	15.335	48	.319		
	Total	30.924	62			
MA→LE	Between	11.463	14	.819	13.676	.000***
	Within	2.874	48	.060		
	Total	14.337	62			
LR→LE	Between	8.328	8	1.041	9.353	.000***
	Within	6.010	54	.111		
	Total	14.337	62			
Teaching activities		*SS*	*df*	*MS*	*F*	*sig*
LA→PC	Between	8.338	12	.695	10.490	.000***
	Within	3.312	50	.066		
	Total	11.649	62			
LA→LI	Between	11.304	12	.942	6.304	.000***
	Within	7.472	50	.149		
	Total	18.776	62			
PC→LI	Between	16.143	28	.577	7.445	.000***
	Within	2.633	34	.077		
	Total	18.776	62			
Learning and teaching		*SS*	*df*	*MS*	*F*	*sig*
LI→LE	Between	10.409	8	1.301	17.883	.000***
	Within	3.929	54	.073		
	Total	14.337	62			

Note: Motivation and Attitude (MA); Learning relationship (LR); Learning effect (LE); Learning ability (LA); Peer cooperation (PC); Learning Involvement (LI); *P<.05; **P<.01; ***P<.001

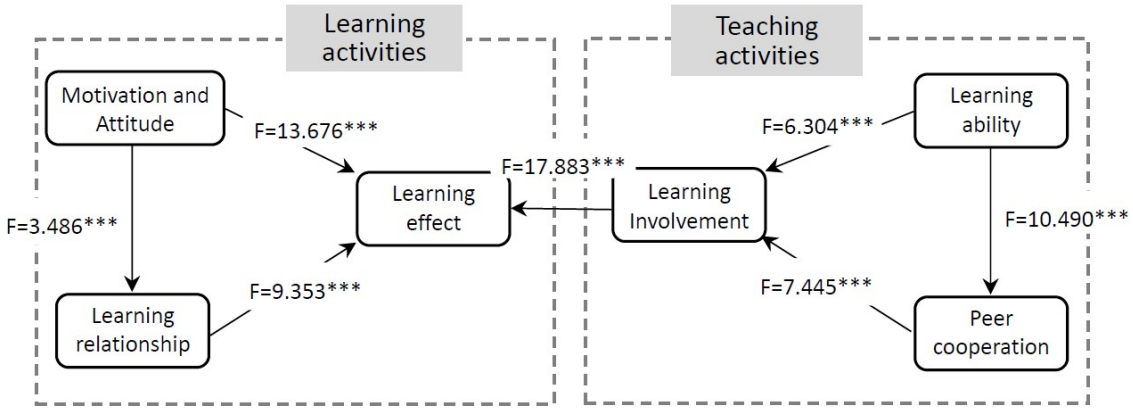

Figure.4: The research framework of experiential learning and the results of ANOVA analysis

Table 5: A simple regression analysis of students' learning activities

Model Summary

Model	R	R square	Adj. of R square	Std. Error of the Estimate	ANOVA	
					F	Sig.
1	.893[a]	.797	.786	.233961	77.116	.000***

a. Predictor: Learning Involvement (LI), Learning ability (LA), Peer cooperation (PC)
b. Dependent variable: overall learning activities

Coefficient (a)

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.066	.312		-.210	.834
	Learning ability (LA)	.264	.095	.271	2.772	.007**
	Peer cooperation (PC)	.344	.119	.295	2.890	.005**
	Learning Involvement (LI)	.376	.091	.409	4.135	.000***

a. Dependent variable: overall learning activities; *P<.05; **P<.01; ***P<.001

Table 5 shows that teachers' variances explained 78.6% of overall learners' activities: $F_{(3,59)}$=77.116, p=.000<.001. Learning Involvement (LI), Learning Ability (LA), Peer Cooperation (PC) are all selected to be predictors of overall learning activities. The relationship between three instructors' variances and overall learners' activities are positive and statistically significant, Learning Ability (β=.264, t=2.772, p=.007<.01); Peer Cooperation (β=.344, t=2.890, p=.005<.01); Learning Involvement (β=.376, t=4.135, p=.000<.001), indicating that the higher the teachers' variances (LA, LI and PC), the greater the influence on the learners' variances (MA, LR and LE).

Findings

Experiential learning in design education, when learners have high learning motivation and attitudes, will enhance the relationship between learners and instructors, and will improve the learning effect of learners. The instructor's learning involvement will be affected by the learning ability of the content and method. Peer interaction and cooperation skills can also enhance the instructor's learning involvement.

Compared with traditional teaching, cooperative learning can improve students' involvement and learning effect. Experiential learning enables the teaching group and the learning group to generate more positive interaction and dependence, enhance personal role responsibility, group cooperation skills, and exchange of actual work and feelings of group process.

Conclusions

The integration of experiential learning into design education fully stimulates students' active learning, and teachers play a leading role in learning and inspire students' goals. Compared with traditional education, experiential learning in design majors enables students to learn more efficiently and actively. There are the following conclusions:

Importance: Improving the teaching methods of traditional design classrooms and flipping students' learning roles in the classroom.

Inspiration: The evolution of students' learning roles can improve learning motivation and course participation, not only in-depth learning, but also strengthen students' internalized learning ability and experience sharing and improve the effect of function-oriented learning.

Implementation: The learning method of workplace experience and classroom co-learning, flipping the learning relationship between students and peers, and combining the roles of learners and instructors in traditional classrooms, so that practical learning and thinking have a synergistic effect.

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