

# A Study on the Effect of Learning Outcomes of the Five Practical Methods in Entrepreneurship Education

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## ABSTRACT

The present study investigated the effect of learning outcomes of the five practical methods in entrepreneurship education. The two classes of junior students became the experimental and control group. After learning the five practical methods, the experimental group can produce better results than the control group. Each type of teaching practice, the so-called learning outcomes in this paper were evaluated in four levels: reaction, learning, behavior and result. The results showed that there were no significant differences between the two groups at the level of reaction and learning. At the behavioral level, in practice of play and creation, the experimental group was significantly better than the control group. However, there were no significant differences in the level of result. This result showed that the practice of play and creation are easier to show the teaching results, and the other types of practical teaching modes results require long-term study and observation.

**Keywords:** Learning outcomes, five practical methods, entrepreneurship education.

## 1 INTRODUCTION

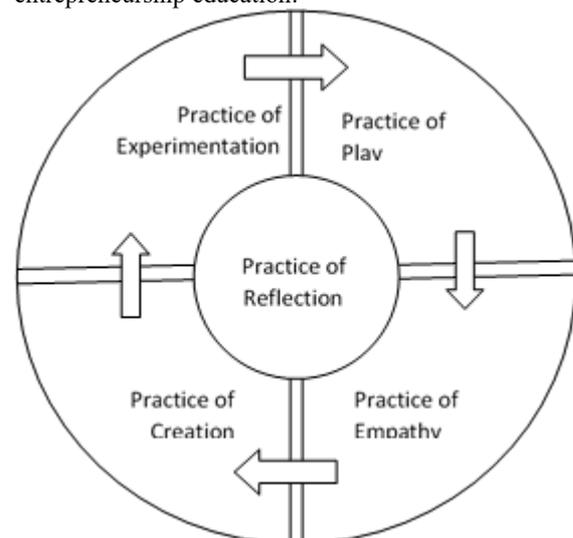
At present, colleges and universities are in line with the industry, carrying out a large number of industry-university cooperation, and introduced industrial cases into the teaching site or thematic production. This trend is emphasized and amplified in the schools of vocational system. Most of the courses in industrial practice or the problem-based learning usually use the “brainstorming method”. At this time, the student’s solution is based on random ideas. There are no architectural guidance, strategies and tools. The students can only learn from the experience of the teacher and the industry resources at that time. Thus, there is a high degree of uncertainty in such learning modes. The present study introduces Babson’s entrepreneurial five practical teaching modes, which is applied to the teaching scene when guiding students to solve industrial problems, so that the “problem analysis and resolution” becomes more structured and systematic, and it is expected to propose an improved structure and direction for industrial-innovative practical teaching.

In the process of innovation and entrepreneurship education, finding and defining problems from existing industries, and analyzing and solving them is also an important unique feature of innovation and entrepreneurship teaching. From the beginning to integrate into problem-based learning (PBL) thinking, it can be said that it is innovative with actual industrial cases, which is one of the important development directions of teaching. The main purpose of present study is to understand whether there is a significant difference in the learning outcomes of “brainstorming” and “entrepreneurial teaching practice”. The four levels of “reaction”, “learning”, “behavior” and “result” were used for differential analysis to propose specific teaching effectiveness improvement programs.

## 2 LITERATURE REVIEW

### 2.1 Entrepreneurship Teaching Practice

The present study is about teaching practice mainly based on Neck et al. [1], which proposed five practical methods in entrepreneurship education, and pointed out that the purpose of entrepreneurship teaching is practice. Figure 1 is a brief description of the five practical methods in entrepreneurship education:



**Fig. 1.** Five practical methods in entrepreneurship education based on Babson Model [1].

1. Practice of play: in terms of entrepreneurship education, play and game are different concepts. Play is voluntary, and this voluntary also derives the questions of how to become a teaching practice.
2. Practice of empathy: to be successful, entrepreneurs must understand users, be user-centric and user-oriented.
3. Practice of creation: to achieve any form of entrepreneurship, most scholars agree that creating a product or service of new value is the core direction. The process of creation requires some kind of entrepreneurial action to create new products, new processes, new markets, and new logistics, furthermore, develop personal initiative and enthusiasm. Thus, the students' creative ability plays a vital role in creative practice.
4. Practice of experimentation: entrepreneurship is an experimental process, trying certain things, seeing what is the outcome, learning from the results, and then trying again. The experimental practice in entrepreneurship is to "get the knowledge related to entrepreneurship" and learn from it by actively experimenting with the project [2;3].
5. Practice of reflection: entrepreneurship teaching is a practical method. Beyond understanding, focus on specific matters, that is, practice of play, empathy, creativity, experiment, and reflection. Reflection is considered one of the most important innovations in education [4].

## **2.2 Problem-Based Learning**

Problem-based learning (PBL) is a student-centered pedagogy in which students learn about a subject through the experience of solving an open-ended problem found in trigger material. Wood [5] defined Problem-Based Learning as a process that uses identified issues within a scenario to increase knowledge and understanding. Wood [5] also indicated that in Problem-Based Learning, students use "triggers" from the problem case or scenario to define their learning objectives. Subsequently, they do independent, self-directed study before returning to the group to discuss and refine their acquired knowledge. Thus, Problem-Based Learning is not about problem solving process, but rather it uses appropriate problems to increase knowledge and understanding. Therefore, Problem-Based Learning is focused on the tutorial and learning process rather than problem solving with a defined solution. The PBL process was pioneered by Barrows and Tamblyn [6] at the medical school program at McMaster University in Hamilton.

The advantages of PBL can be summarized as follows: (1) Arouse students' motivation for learning: students have a sense of sensation and accomplishment from activities; (2) Develop high-level thinking ability: students can stimulate their criticism through discussion about the lack of structure and the ability to create thinking; (3) Strengthen the cognitive ability of students: From the process of defining problems, collecting information, analyzing data, establishing hypotheses, and comparing different solutions, students are encouraged to constantly reflect on learning

ability; (4) Real situation use: the ability to learn from learning activities contributes to the application of actual situation.

## **2.3 Brainstorming**

Brainstorming is a methodology designed to stimulate creativity and strengthen divergent thinking. This method was firstly created in 1938 by Alex Osborne, founder of the American BBDO (Batten, Beroton, Durstine and Osborn) advertising company. This method must adhere to the four principles: (1) Pursuit the number of creative ideas. (2) Prohibit criticism of creative ideas. (3) Advocate unique creative ideas. (4) Integrate and improve the proposed ideas. This method is currently widely used in university education.

## **2.4 Learning Assessment**

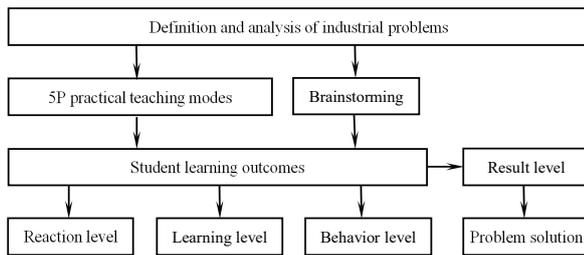
Kirkpatrick's [7] framework is generally used for the assessment of learning outcomes, and it is considered that the four levels of reaction, learning, behavior, and result should be evaluated. This standard is also used in the Ministry of Labor's Talent Development Quality Management System (TTQS). The following four levels are explained below:

1. Level 1: The reaction level is basically a survey of customer satisfaction. Assess the trainee's perception and satisfaction at all levels of the curriculum, including the subject, lecturer, teaching methods, materials and equipment.
2. Level 2: The learning level, which measures the performance of trainees' specific knowledge, skills and attitudes to examine the effectiveness and efficiency of the training itself.
3. Level 3: The behavior level, which measures the changes in behavior of the trainee after the training course, that is, the learning transfer caused by the training.
4. Level 4: The result level, after the participants complete the training, their work-related behaviors have changed and can contribute to the management of the organization. It is also the final result of training, such as increased sales, increased productivity, etc.

## **3 RESEARCH METHOD**

Based on the class of "SME Management Practice Seminar" for junior students, the study divided the two classes of the compulsory course in the same semester into experimental and control group. The experimental group adopted the entrepreneurial practice teaching mode, and the control group used the brainstorming mode to carry out the final work of analyzing and solving industrial problems.

### 3.1 Research Structure and Hypotheses



**Fig. 2.** Teaching Practice Execution Structure.

Figure 2 shows the teaching practice execution structure of present study. First, the two groups of students first understand the background and problems of the cooperative manufacturers by means of the teaching method and the visiting method, and evaluate the teaching satisfaction (level 1) and the paper test (level 2). The problem is an actual project. The experimental group students were introduced to the five practical methods in entrepreneurship education, while the control group students analyzed and solved the problems according to the brainstorming method. At this time, the teacher was responsible for observing and evaluating the behavior of the students in the process of defining and analyzing the problem (level 3). In the final stage, the two groups of student proposed a solution, which were supervised by the manager of the partner company and get evaluated for the effectiveness of the solution (level 4). The two groups of students had basically completed the basic professional courses of management, accounting, economics and statistics before the sophomores. The two classes are basically the same in the training that is accepted in the basic academic ability.

Both classes experienced a consistent teaching process (company introduction, visit and manufacturer problem description) during the first half of the course. In the second half, one class used the traditional brainstorming method (control group), and the other class used the five practical methods (experimental group) of the study to implement the problem definition and resolution analysis planned by the project.

Thus, there should be no significant difference in teaching satisfaction and paper test in the above assessment instructions. However, in the second half of the course, the students in the experimental group and the control group adopted different practical modes to plan the analysis and solution of industrial problems. Therefore, there may be a certain gap in the behavior and final solution planning.

Therefore, the present study proposes four research hypotheses:

Hypothesis 1: There is no significant difference in teaching satisfaction between the experimental group and the control group.

Hypothesis 2: There is no significant difference in the average scores of paper tests between the experimental group and the control group.

Hypothesis 3: There is a significant difference between the experimental group and the control group in the analysis and resolution of the problem.

Hypothesis 4: There is a significant difference between the experimental group and the control group in the effectiveness of the problem-solving solution.

### 3.2 Experimental Procedure

1. This experiment invites the CEO of the company to conduct a three-hour corporate introduction, and then conduct a two-hour corporate visit after 1 week to let the students understand the operation status of the company. Then, paper test of the first-stage (level 1) about teaching satisfaction survey and level 2 about understanding the company problems was carried out.
2. We divided the experimental group and the control group into 6 sub-groups, in which each sub-group contained about 4-6 students, in order to facilitate team discussion and teaching experiments.
3. In the next four weeks, the experimental group first conducted the five practical methods of entrepreneurship teaching, and the control group conducted the brainstorming method using the general case to practice.
4. We proposed the question of the company: how to carry out effective marketing activities for three weeks, and the teachers of the two classes observed the students' behavior during the discussion of each sub-group.
5. Finally, each student produced an individual's report and submitted a solution to the industrial problem. Two CEO's of the company conducted the evaluation of the two lines of results.

## 4 DATA ANALYSIS

The present study conducted the experimental method to distinguish the scores of the experimental group and the control group, regardless of the teaching satisfaction, the paper test score, the behavioral observation scale, and the problem definition and analysis effectiveness evaluation scale. Therefore, the present study used the "group" for independent sample t-tests to check if there was a difference in the teaching satisfaction, paper test scores, behavioral observation scales, and problem definition and analysis effectiveness assessment scales.

According to the four hypotheses proposed in present study, the data analysis was conducted as follows. The number of samples was inconsistent, because the invalid questionnaire was deducted and the number of students attending each week was different.

### 4.1 Teaching Satisfaction (Reaction Level)

This section conducted a questionnaire survey consisting of 18 items about teaching satisfaction for the two groups of students based on the overall performance. The rating object

were the teaching performance of the CEO and the company instructors. There were 28 valid questionnaires received from the experimental group and 19 valid questionnaires from the control group. The average teaching satisfaction scores were 4.50 and 4.49, respectively. The t-test ( $t = 0.093$ ,  $p = 0.927$ ) showed that there was no significant difference, which was consistent with the hypothesis 1. Thus, there was no significant difference in the teaching satisfaction in the first stage between the experimental group and the control group.

#### 4.2 Paper Test (Learning Level)

According to the company visit and teaching content from the CEO, there were 15 questions contained in the right or wrong test. There were 29 valid data received from the experimental group and 20 valid data from the control group. The average testing scores were 10.86 and 11.30, respectively. The t-test ( $t = -1.103$ ,  $p = 0.276$ ) showed that there was no significant difference, which was consistent with the hypothesis 2. Thus, there was no significant difference in the average testing score in the first stage between the experimental group and the control group.

#### 4.3 Problem Analysis (Behavior Level)

The students in the experimental group and the control group were trained about the five practical methods and brainstorming method, respectively.

The discussion process about the problem analysis and resolution used the same industry problem. The two teachers took the behavioral observation of each student during the three-week discussion course. After averaging the behavioral scores rating to the students by the two teachers, five independent t-tests were performed between the experimental group and the control group. Table 1 shows that the average behavioral scores of “play” and “creative” from the experimental group were significantly higher than those from the control group. However, the mean differences of the other assessment index did not show statistical significance.

#### 4.4 Problem Solving Proposal (Result Level)

After following the sub-group discussion, the students proposed their personal problem analysis and solution writtenly. The two CEO’s of the company gave the ratings personally according to the four criteria in Table 1. Table 1 shows that all the assessment index did not reach statistical significance.

This result violated hypothesis 4 and was also out of expectation. This might happen because the learning period was too short (only 4 weeks) to generate significant learning effect. If the teacher continued to employ the five practical methods in long-term, the students might be able to show the expected learning outcome.

**Table 1.** The t-test of the behavioral and the problem solving proposal scores rating

Assessment index	F-value	Levene test	t-value	df	Significance	Mean difference
Play	0.005	0.944	2.480	53	0.016*	0.72011
Empathy	2.067	0.156	0.714	53	0.478	0.18886
Creation	0.883	0.352	2.164	53	0.035*	0.65625
Experimentation	0.009	0.926	0.251	53	0.803	0.07065
Reflection	0.057	0.812	0.374	53	0.710	0.13995
Assessment index	F-value	Levene test	t-value	df	Significance	Mean difference
Professional	0.813	0.371	0.647	53	0.521	0.16576
Feasibility	1.909	0.173	0.977	53	0.333	0.25679
Creative	2.317	0.134	0.349	53	0.729	0.09511
Integrity	0.009	0.923	0.210	53	0.835	0.05842

## 5. CONCLUSION

The present study investigated the effect of learning outcomes of five practical methods in entrepreneurship education. The two classes of junior students were the experimental and control group. The five practical methods are: practice of play, practice of empathy, practice of creation, practice of experimentation, and practice of reflection. Each type of teaching practice, the so-called

learning outcomes in this paper are evaluated in four levels: reaction, learning, behavior and result.

The reaction level was measured by the course satisfaction, and the learning level was evaluated by the individual paper test of the students. After the two levels of evaluation were conducted, the results were indistinguishable. This is the original hypothesis. Because the two levels did not give different teaching methods in this experiment, the hypothesis was supported. However, in the future, we should adopt the “brainstorming method”, the teaching

satisfaction of the “five practical methods”, and the basic cognitive assessment of problem analysis and resolution, rather than just assessing the teacher's teaching satisfaction and rating from the CEO.

At the behavioral level, the teacher evaluated the five practice models with the rubrics. We invited the CEO's to evaluate the four assessment index. At this stage, a total of 30 students participated in the “five practical methods” and 23 students in the control group were taught by the “brainstorming method”. The results showed that the experimental group was significantly better than the control group in practice of play and practice of creation at the behavioral level. This result confirms that the fun of the game can stimulate the participation of the students, which will help the creative thinking in the later stage. It can also be said that creating a relaxed and funny discussion environment can improve the creativity of problem analysis and resolution. This result also showed that there are five practical methods in entrepreneurship teaching, in which the play and creative teaching effects are easier to show. Others are the three types of practical teaching, such as empathy, experimentation and reflection, that may require long-term study and observation.

Finally, at the level of result evaluation, there was no significant difference between the five practical methods of entrepreneurship teaching and the brainstorming method. This result also showed that the two teaching methods could not produce the significant difference in short-term, especially for a “problem analysis and resolution” program, which is a complex planning problem. However, if this experiment can strengthen the adoption of these five practical methods in entrepreneurship teaching frameworks in many courses in the future, it may be possible to produce significant results in terms of learning outcomes.

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