

A Study of Problem-based Learning using Practical-based Approach in Management Education

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Abstract: This study aimed to integrate the Babson entrepreneurial 5P practice method of practical-based approach, which is applied to the teaching courses when guiding students to solve industrial problems. The results showed that through the game-based enlightenment activities, students' willingness to participate in interaction can be improved; the students have made significant progress in the industrial environment and the interaction between the organization itself and other elements; before and after the experiment that the students thought they had more opinions than others after learning, but did not think that these ideas were very different from others; students feel the importance of the team and the self reflection; and students feel that they are more able to reflect on the interaction with others and their emotional reactions after class.

1 INTRODUCTION

This study integrates the Babson entrepreneurial 5P practice method of practical-based approach, which is applied to the teaching courses when guiding students to solve industrial problems. The master program of business administration of Babson's was ranked number one in the entrepreneurship category by U.S. News & World Report. Babson College had won this award for 24 years (1994-2018). In the past few years, the Ministry of Education of Taiwan and universities had sent personnel and teachers to the Babson College for short-term study, and introduced to this education method. However, until now, neither relevant teaching research report has been published nor the teaching courses on the "problem-oriented learning method" of "industry problem analysis and resolution" have been reported. The author of the present study had completed the course in 2015 and introduced it into the innovation and entrepreneurship course. Therefore, firstly, the Babson entrepreneurial 5P practice method of practical-based approach was applied into "problem analysis and resolution" course. The method was also incorporated to develop more systematic structure for relative courses

2 LITERATURE REVIEW

The present study is a teaching practice research, mainly based on Neck et al. (2014), which proposes 5P practice method of practical-based approach of entrepreneurship education (Fig. 1), and points out that the purpose of entrepreneurship teaching is practice.

The following (Figure 1) is a brief description of the 5 practices of entrepreneurship education:

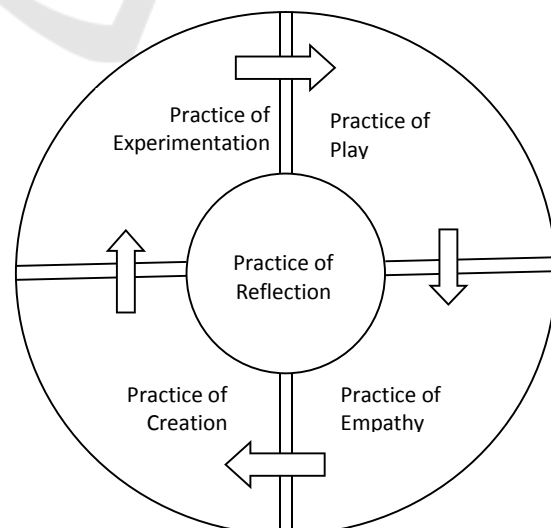


Figure 1: 5P of Babson Model (Neck et al., 2014).

- Practice of play: in terms of entrepreneurship education, play and game are different concepts. Play is voluntary, and this voluntary activity also derives the questions of how to utilize it for teaching practice. Play practice is a fun, engaging, challenging, and enjoyable experience for learning entrepreneurial management methods through games, promoting entrepreneurial management, and encouraging students to think and act in a classroom.
- Practice of empathy: to be successful, entrepreneurs must understand users, be user-centric and user-oriented. Therefore, students must develop their skills to feel and understand the users, and be able to act on this experience in order to be able to connect with actual entrepreneurial initiatives and continue to provide the ideal product or service.
- Practice of creation: to achieve any forms of entrepreneurship, most scholars agreed 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, it develops personal initiative and enthusiasm. Thus, the students' creative ability plays a vital role in creative practice. Therefore, in entrepreneurship management, creative practice is a central role. A major cause is the core of entrepreneurship is to introduce or create a new product, new service, new market, new organization, or new production and supply chain (Schumpeter, 1934).
- 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 (Curran and Stanworth, 1989; Alberti et al., 2004).
- 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 (Procee, 2006). But the practice of reflection is usually not taken seriously in entrepreneurship education. Because reflection is one of the most difficult projects for students to practice. In entrepreneurship management education, we must try to impart such thinking and skills so that

students can use it in any situation in life. Taking the time to think about everything is the key to entrepreneurship education – it is balanced with all things (Doing) and must not be neglected.

2.1 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 (2003) defines problem-based learning as a process that uses identified issues within a scenario to increase knowledge and understanding. Wood (2003) 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 per se, but rather about using appropriate problems to increase knowledge and understanding. Therefore, problem based learning focuses on the tutorial and learning process rather than problem solving with a defined solution. The problem BL process was pioneered by Barrows and Tamblyn (1980) at the medical school program at McMaster University in Hamilton.

The process is clearly defined, and the several variations that exist all follow a similar series of steps as follows.

- Step 1- Identify and clarify unfamiliar terms presented in the scenario; scribe lists those that remain unexplained after discussion.
- Step 2- Define the problem(s) to be discussed; students may have different views on the issues, but all should be considered; scribe records a list of agreed problems.
- Step 3- "Brainstorming" session to discuss the problem(s), suggesting possible explanations on the basis of prior knowledge; students draw on each other's knowledge and identify areas of incomplete knowledge; scribe records all discussion.
- Step 4- Review steps 2 and 3 and arrange explanations into tentative solutions; scribe organizes the explanations and restructures if necessary.
- Step 5- Formulate learning objectives; group reaches consensus on the learning objectives; tutor ensures learning objectives are focused, achievable, comprehensive, and appropriate.
- Step 6- Private study (all students gather

information related to each learning objective).

- Step 7- Group shares results of private study (students identify their learning resources and share their results); tutor checks learning and may assess the group.

The advantages of problem-based learning can be summarized as follows: (1). Arouse students' motivation for learning: students have a sense of sensation and sense of accomplishment from activities; (2). Develop high-level thinking ability: students can stimulate students' criticism through discussion of lack of structure and the ability to create thinking; (3). Strengthen the cognitive ability of students: students learn from the process of defining problems, collecting information, analyzing data, establishing hypotheses, and comparing different solutions, can encourage students to constantly reflect on learning ability; (4). Real situation use: the ability to learn from learning activities contributes to the application of the actual situation.

2.2 Teaching Practice Tools

In 2015, the author of this study completed training based on the framework and teaching materials, and strengthened some textbooks according to the Taiwanese teaching environment. The tools are described as follows and summarized in Table 1.

- Practice of play: through a variety of game-style thinking training, it is impossible to train with "paper-cutting" and "iron nails" first, and then used the training of cotton candy tower in Neck et al. (2014) textbook.
- Practice of empathy: using the empathy map Osterwalder et al. (2010) and the AEIOU method Robinson (1991), observe the problems raised by the industry in the actual field.
- Practice of creative: using the idea-space creative space map developed by Neck et al. (2014), and then creating ideas and creative solutions to the problem in this study.
- Practice of experimental: through three-stage resource assumptions (Neck et al., 2014), students are asked to develop three different solutions and construct the concept. For example, 500 yuan, 5,000 yuan and 50,000 yuan.
- Practice of reflective: at each of the above stages, the structure of the "reflexive exercise" (Neck et al., 2014) is directly applied after the completion of the course.

Table 1: Teaching practice tools in this study.

Theme	Practice steps	Tools
Problem analysis and resolution	Practice of play	Nail and paper-cut/puzzle and patchwork/cotton candy tower
	Practice of empathy	AEIOU and empathy map
	Practice of creation	Idea-space creative space map
	Practice of experimentation	Three stage resource assumptions
	Practice of reflection	

2.3 Assessment Questionnaire

According to the above five teaching practice methods, the **assessment questionnaire** of this research have been developed.

- Practice of play: through a variety of game play. The purpose is to inspire students' participation intensity. Do not participate in the design of this course with too strict constraints, so that the student is willing to engage in discussion and participation with OPEN MIND with classmates or teachers. Therefore, this study proposes the following 7 questions (Table 2) of assessment of play practice.

Table 2: Assessment of practice of play.

No.	Questions	Mean		p-value
		Pre-test	Post-test	
1-1	Discuss with classmates.	4.11	4.15	0.83
1-2	Discuss with the teacher.	3.81	4.04	0.16
1-3	Make your own comments.	4.04	4.11	0.54
1-4	Listen to the opinions of classmates.	4.07	4.37	0.03*
1-5	Listen to the teacher's opinion.	4.11	4.37	0.09
1-6	The environment in which the actual contact problem occurs.	3.96	4.15	0.35
1-7	Events that actually participate in the issue.	4.00	4.04	0.77

- Practice of empathy: its purpose is to expect students to stand in the position of the consumer to observe and understand the elements of the surrounding environment, and to participate and interaction with the attentive, so this study proposes the following 7 questions (Table 3) of assessment of empathy practice.

Table 3: Assessment of practice of empathy.

No.	Questions	Mean		p-value
		Pre-test	Post-test	
2-1	Related activities and processes.	3.67	4.04	0.03*
2-2	The effect of space.	3.67	3.70	0.80
2-3	The role of industrial environmental factors.	3.63	3.96	0.02*
2-4	The role of organizational factors.	3.44	4.00	0.00***

Table 3: Assessment of practice of empathy. (cont.)

No.	Questions	Mean		p-value
		Pre-test	Post-test	
2-5	Interaction of people with other elements.	3.59	4.11	0.00***
2-6	Related use of articles or facilities.	3.67	3.89	0.23
2-7	Related participants.	3.78	3.78	1.00

- Practice of creative: the purpose is to expect students to come up with more specific ideas and to be willing to ask different answers under various assumptions. Therefore, this study proposes the following 5 questions (Table 4) of assessment of creative practice.

Table 4: Assessment of practice of creative.

No.	Questions	Mean		p-value
		Pre-test	Post-test	
3-1	I have different ideas from others.	3.52	3.81	0.06
3-2	I have more ideas than others.	3.48	3.52	0.80
3-3	I have a strange idea.	3.56	3.41	0.40
3-4	I have the idea of changing my hypothesis.	3.52	3.56	0.85
3-5	I have professional idea.	3.59	3.30	0.04*

- Practice of experimental: the purpose is to expect students to be willing to practice and experiment, and conduct an analysis and review based on the actual data. Therefore, this study proposes the following 5 questions (Table 5) of assessment of experimental practice.

Table 5: Assessment of practice of experimental.

No.	Questions	Mean		p-value
		Pre-test	Post-test	
4-1	I have a try to trial sale.	3.33	3.22	0.66
4-2	I have collected actual data.	3.63	3.78	0.44
4-3	I have analyzed actual data.	3.56	3.74	0.35
4-4	The gap between my thoughts and the actual situation is approaching.	3.52	3.67	0.36
4-5	I regard the teamwork is important.	4.11	4.19	0.65

- Practice of reflective: the purpose is to expect students to reflect and review at any time during the above four stages. Therefore, this study proposes the following 9 questions (Table 6) of assessment of reflective practice.

Table 6: Assessment of practice of reflective.

No.	Questions	Mean		p-value
		Pre-test	Post-test	
5-1	I have written diary	3.11	2.70	0.09

	reflective every day.			
5-2	I have written diary note every day.	3.22	3.11	0.64
5-3	I have reviewed the emotion reaction during the process.	3.63	3.81	0.33
5-4	I have reviewed the interaction with others during the process.	3.85	4.00	0.33
5-5	I have reviewed the collected information during the process.	3.70	4.11	0.02*
5-6	I have reviewed the analysis results of the information during the process.	3.85	3.89	0.82
5-7	I have reviewed the analysis method during the process.	3.81	4.00	0.31
5-8	I have reviewed the criteria of making decision during the process.	3.74	4.00	0.15
5-9	I have reviewed the method of making decision during the process.	3.59	4.00	0.02*

3 RESEARCH FRAMEWORK

The subject of this research is third-grade students of the Department of Business Administration. The course is conducted in the compulsory course “SME Management Practice”. The cooperative enterprise is a local specialty food industry in Tainan. It has been established for almost 10 years and has a central factory that distributes its products to more than ten stores across Taiwan.

At the beginning of the course, students are scheduled to visit the cooperative company to learn about the company’s development history, existing product lines, product processes, stores and access, and current business conditions. Next, the director of the marketing and planning department explains the situation, advantages and disadvantages of the festival marketing plan launched in the past three years. Then the director proposes the subject for problem analysis and resolution, and presents the problem situation that needs to be solved. The problem raised by the company is: How to plan more publicity and marketing plan for company’s festival under the fixed cost budget.

Figure 2 shows the teaching practice execution structure.

The course consisted of 35 students, and the students were divided into 7 teams (each team has 5 students), they jointly proposed solutions to the same problem of the same company. The students all had completed the basic management courses

(operation, marketing, financial, human resource, R&D, accounting, economics, and statistics).

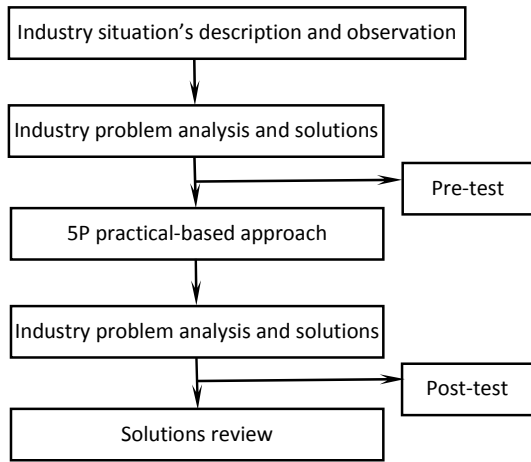


Figure 2: Teaching Practice Execution Structure.

The 7 groups of students had three weeks to collect and analyze data, discuss and think about it, and submitted the organization's proposed solution in the fourth week. The pre-test questionnaire was performed at this time.

Next, the program proceeded to the 5P practice teaching for 4 weeks. It took 3 hours a week, and after each practice method, students were encouraged to use the practice teaching before the end of the course. Three weeks after the practice of the 5P teaching method, students were required to propose a feasible plan for the company's festival marketing. Before the discussion of the feasible plan, the post-test questionnaire was administered.

4 DATA ANALYSIS

This study used experimental methods to understand the significant differences in learning outcomes between students before and after receiving the 5P practice approach. Therefore, this study is utilized the 33 questions designed in this study that incorporated the Likert 5-scale question items. The questionnaires were tested one by one in paired samples. The number of students participating in the class was 35. After excluding students who did not fully participate in the four-week practice method, a total of 27 pairs of samples were obtained. The results of the 33 questions for the 5P teaching practice in this study are as follows:

Table 2 shows the mean of pre-test and post-test, and *p*-value of *t*-test for the play practice. The experimental results show that through the game

based enlightenment activities, students' willingness to participate in interaction can be improved. There is no difference between listening to the teacher's opinion. Through game-based activities, delegates can bring a sense of distance between teachers and students. However, there is no significant difference between the students and the students before and after the discussion. Though the most items didn't reach statistical significance level, but this activity increasing the students to listen and accept the opinions of the other students.

According to the results of the verification (Table 3), after the AEIOU observation exercise, students have made significant progress in the industrial environment and the interaction between the organization itself and people and other elements. However, the definition of nouns in some items may be too abstract (such as space) and overlap with other items, resulting in no significant differences.

In the practice of jumping off the frame (Table 4), this study used the Jiugongge (3 by 3 matrix) divergence method to conduct experiments. The results showed before and after the experiment that the students thought they had more opinions than others after learning, but did not think that these ideas were very different from others. Even after a group discussion, they felt that the idea was not peculiar enough and not professional enough. This is in contrast to the above questions, that is, students are willing to try but have no confidence in their own ideas and dare not strongly recommend their own ideas.

At this experiment stage (Table 5), because of the industrial problems, the actual trial sales were not carried out, so the results before and after the test were not all reach statistical significance level. This part is the gap between the question and the teaching process at the beginning of the design, and it is the part that should be improved in the future. Besides, students think they have a big gap between their ideas and the actual situations. This is because their creative ideas, through the experimental team's discussion, found that the feasibility is not enough in practice. However, it is a major gain to feel the importance of the team and do the self reflection.

In terms of reflection practice (Table 6), students feel that they are able to review the collected information and the method of making decision during the process. Other questions do not reach statistical significance because they do not reflect on the criteria and methods of collecting and analyzing information, and analyzing the actual practice of teaching practice. This improvement might be made in the future.

5 CONCLUSION

This study conducted Babson's entrepreneurial practice teaching framework to apply the 5 practical applications of teaching tools to the analysis and resolution of industrial problems, and to observe whether students' results oriented learning methods can produce better results. The results of the self learning assessment before and after the experimental method are shown.

After adopting the teaching method of this structure, this teaching method is not used. Some of the 5 practical teaching tools have achieved significant and good results. Including the play practice stage to enhance students' willingness to participate, the empathy practice can enhance students' interaction with the industrial environment and the organization itself, people, and other elements. The creative practice teaching method, although letting students to think that they have more opinions than others after learning, do not think that these ideas are very different from others. That is to say, students are willing to try a lot, but they are not confident in their own ideas and dare not to express their own ideas. In the teaching of reflection practice, students are more able to reflect on the interaction with others and their emotional reactions in the process. It also began to review the results of the information analysis during the process. Therefore, the teaching methods of the 5P practical of entrepreneurial practice teaching framework have achieved remarkable results.

This study is the first to apply the 5P practical teaching method to the analysis and resolution of industrial problems. It is might not mature enough in the operation of teaching, and some teaching tools appear to have a gap with the problems to be solved by the industry. Thus, it lacks degree of relevance with the learning outcomes. Thus, the significance of the pre-test and post-test was not shown while it underwent statistical analysis. Therefore, the direction of future research improvement is to strengthen the connection between teaching tools and industrial problems.

According to this connection degree, the question of 5P practical teaching method is corrected. It allows students to answer more questions in the context of the learning process.

Furthermore, the assessment method of this study has not been evaluated for results due to time constraints. In the future, solutions for students can be evaluated by industry and instructors. In addition, it can be observed whether there is a significant correlation between the teaching practice methods of

each group. By doing so, it is expected to be able to confirm the analysis and solution of industrial problems better, and to have a more objective basis for comparison.

REFERENCES

- Alberti, G., Zimmet, P., Shaw, J., Bloomgarden, Z., Kaufman, F., Silink, M. & Consensus Workshop Group. (2004). Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. *Diabetes Care*, 27(7), 1798-1811.
- Barrows, H.S. (1996). Problem-based learning in medicine and beyond: A brief overview. *New Directions for Teaching and Learning*. 68: 3-12. doi: 10.1002/tl.37219966804.
- Curran, J. & Stanworth, J. (1989). Education and training for enterprise: problems of classification, evaluation, policy and research. *International Small Business Journal*, 7(2), 11-22.
- Neck, H. M., Greene P. G. & Brush, C. G. (2014). *Teaching Entrepreneurship: A Practice-based Approach*. Edward Elgar, Cheltenham, UK, ISBN 978-1782540557.
- Osterwalder, A., Pigneur, Y. & Clark, T. (2010). *Business Model Ggeneration*. Hoboken, NJ: Wiley.
- Procee, H. (2006). Reflection in education: A kantian epistemology. *Educational Theory*, 56(3), 237-253.
- Robinson R, Prokopoff, I, Cain, J, & Pokorny, J. (1991) *Doblin group*, Chicago, from: <http://help.ethnohub.com/guide/aeiou-framework>
- Schumpeter, J.A. (1934). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Translated by Redvers Opie, Harvard Economic Studies, ISBN 978-0674879904.
- Wood, D.F. (2003). ABC of learning and teaching in medicine. *British Medical Journal*, 326: 328-330. doi: 10.1136/bmj.326.7384.328.