On Culinary Teaching Steps from the Perspective of Problem-Based Learning

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ABSTRACT

One of the goals when teaching students in technical and vocational education is to train them in logical thinking and problem solving skills. However, the current education system places the emphasis on memory and ignores the needs for problem-solving in the circles of industry. Domestic and foreign researches generally indicate that Problem-Based Learning (PBL) emphasizes how teachers can encourage students to conduct self-learning through guidance, and trigger the motivation for the exploration of knowledge. Groups are used to accumulate data and discuss how to enhance the learning effectiveness of students, solving the above-mentioned problem of students lacking problem-solving skills. This study invites six scholars and experts and adopts a focus group interview (FGI) to accumulate data for reference to the appropriateness of development items in the subsequent quantitative research questions. The results show that it is better to allow students to conduct a practical operation than explanation and demonstration. When the students encounter difficulties and are able to deeply understand that they need instructions to solve problems, it is easier to arouse their learning motivation and enhance their learning effectiveness. However, this method is costly and can consume large amounts of learning material. Therefore, practical teaching should aim at the differences among learners and adjust the teaching steps to achieve teaching goals. Consequently, at the very beginning of teaching, this study suggests that a teacher-oriented unit teaching style should be adopted initially to allow the students to become familiar with the teaching implementation, following which subtle adjustments are made in order to avoid any neglect of teaching effectiveness.

Keywords: Problem-Based Learning, PBL, Culinary Teaching, Focus Group Interview, FGI.

INTRODUCTION

The catering service industry needs to address customer needs through professional services. However, the abilities required to address customer needs or problems still deeply puzzle the catering service industry. Regarding the root causes, although there are numerous higher educational institutions that catering service industry skills in Taiwan, the related professional abilities taught in schools fail to satisfy the expectations of the catering service industry (Cervera-Taulet & Ruiz-Molina, 2008; Belhassen & Caton, 2011; Shani, Belhassen & Sokolne, 2013). Several studies show that although there are numerous related catering service courses, the course attributes and goals are different, and the content of the courses are varied (Hu, 2010). In addition, due to complicated market needs miscellaneous, it is hard to extend course planning. Curricula cover too many courses and the core professional abilities are not deep enough (Hu, 2010; Belhassen & Caton, 2011). Hu (2010) held that the main problem of catering courses is that the catering course structure is biased with some higher educational institutions overemphasizing the theory. However, practical courses need to focus on practical operations, which is
the core ability needed for the catering service industry. In other words, vocational education places the emphasis on culinary skills, but lacks the cultivation of problem solving and response abilities in a real workplace. Shani, Belhassen and Soskolne (2013) also held the same opinion that catering service related courses need to not only emphasize the development of culinary and practical management skills, but also pay more attention to logical thinking and problem solving skills to remain updated with current demands.

In summary, it is of great significance and urgency to cultivate the skills required to solve the problems in the workplace in response to future work needs (Cervera-Taulet & Ruiz-Molina, 2008). Each vocational and technological college and university has its own strengths, but expected to distinguish and understand how to enable students of the catering service department to meet the industrial need to solve problems. Fortunately, foreign scholars have proposed effective paths for problem-based learning and related studies have confirmed that these methods are conducive for the cultivation of logical thinking and problem solving skills for students (Mansor et al., 2015; Trinter, Moon & Brighton, 2015). Consequently, this study plans to further analyze how to combine problem-based learning and teaching steps to enhance the problem solving skills of vocational and technological college and university students.

**PROBLEM BASED LEARNING (PBL)**

Problem-based learning, also known as problem-guided learning, is a teaching method that starts with problems (Mansor et al., 2015; Vardi & Ciccarelli, 2008). Traditional teaching methods require teachers to transfer related knowledge to the students through the suggestion of concepts and systematic lectures. PBL emphasizes the use of problems to lead group discussions and data collection to construct the knowledge system for students (Trinter, Moon & Brighton, 2015). During the process of discussion, teachers do not participate or respond but play the role of consultant or guide. The related literatures empirically show that PBL can effectively enhance the logical thinking, critical thinking and problem solving skills of students (Stefanou, Stolk, Prince, Chen & Lord, 2013.), is conducive for the self-directed learning of students (Wijnia, Loyens & Derous, 2011), and enhances learning motives and learning effectiveness (Mansor et al., 2015). However, some scholars hold different perspectives, and questioned the effectiveness of PBL. For example, insufficient teaching guidance was unfavorable to learners who have insufficient prior knowledge (Kirschner, Sweller & Clark, 2006). Also, the factors, including learners’ immature learning attitude (Wijnia, Loyens & Derous, 2011) and sharing mode of communication, have negative effects upon PBL learning results (Vardi & Ciccarelli, 2008; Wells, Warelow & Jackson, 2009; Wijnia, Loyens & Derous, 2011). Comparing to traditional teaching methods, PBL is time-consuming and has varied outcomes for learning (Vardi & Ciccarelli, 2008). Labor costs resulting from ratio of students and teachers make dramatic increase of educational funds (Wells, Warelow & Jackson, 2009). In other words, successful PBL is constructive with effective teachers (Trinter, Moon & Brighton, 2015; Wells, Warelow & Jackson, 2009) and active learners (Stefanou et al., 2013; Wijnia, Loyens & Derous, 2011).

PBL certainly has its own contribution toward teaching practices but it needs empirical studies to check the appropriateness for students in our department, especially how to introduce PBL into practical culinary skill courses. Another important learning motive of this study is to further enhance the problem solving skills of students. Therefore, this study expects to satisfy the practical needs of catering industries and the employment requirements for students by adopting analysis, design, course development, implementation, and evaluation, etc. to effectively enhance the learning mode for the occupational skills
of the students in our department. Through literature exploration, this study initially seeks to understand the adaptation factors of key execution points of PBL at each stage with reference to actual situations in our department. With the help of a symposium of culinary teachers and practical industry practitioners to continuously revise the course planning, and with the focus on teaching content and course development details, the study integrates actual teaching scenarios to verify the validity of this model and as the basis for further honing of the PBL teaching model in the future.

**METHODOLOGY**

**Focus Group Interview (FGI)**

The focus group research method was first adopted in the 1940s by Robert Merton and Patricia Kendalls (Elman & Kapiszewski, 2014; Merton, Fiske & Kendall, 1990). Subsequently, this method has been popular in marketing process. This research method has been widely applied in academic and industrial circles and is one of the most frequently used methods for qualitative researches for data collection. The feature of a FGI lies in the good usage of interaction between team members and this can encourage members to express their individual, rich practical experience and thoughts. In other words, this method makes use of the interaction among team members to conduct brainstorming and stimulative thinking to enable members to exchange ideas through conversation, multi-layer expression and various research topic related experiences, emotions, attitudes and opinions(Elman & Kapiszewski, 2014; Lupia & Elman, 2014). The focus group research method emphasizes that participants are able to express their own viewpoints and share experiences freely. Generally, there are several participants involved in a discussion for one to two hours, which can save a lot of time (Liamputtong, 2011). During the discussion, the host needs to listen, think, dig out and shape the intuition and opinions of the participants, observe the status quo of the group discussion and lead and summarize the discussion accordingly. If there are important questions outside the questionnaire, they can be adopted for deep and further discussion (Elman & Kapiszewski, 2014). Consequently, the data of the focus group already contains a relatively wide range of answers, but the users of a focus group can still gain access to the opinions of the participants with regards to events and the causes for the standpoints, respectively, as the basis for research questions of questionnaires and hypotheses (Lupia & Elman, 2014; Prabhakar, 2012).

Regarding object selection and representation of the inference of the mother groups, the external validity of a FGI is often questioned. In addition, the interaction among the interviewees and between the hosts and the interviewees probably leads to biased interview content. Furthermore, it is hard to conclude and accumulate data to acquire effective conclusions, which is difficult for the implementation of a FGI (Elman & Kapiszewski, 2014; Lupia & Elman, 2014). However, the usage of a FGI leads to further understanding of how to apply problem solving skills into the teaching of culinary techniques and a FGI is definitely an appropriate time and energy-saving method for this teaching scenario.

**Research Implementation**

This study adopts a problem-based direction to establish the teaching steps of culinary technique courses. The researchers investigated the literature in advance and took on the role of hosts for the FGI. During the whole teaching process, the professional teachers are responsible for the teaching. The researchers participated in the courses and offered suggestions on how to adjust the teaching steps based on the learning motives and effectiveness of the learners. During this period, the researchers collected
culinary works as the proof of learning outcome and adopted the data for the learning process for each group to understand the actual learning situations and outcomes.

The research teaching implementation consisted of six steps, which are summarized briefly as follows: (1) Unit problems and background analysis of learners: Shani, Belhassen and Soskolne (2013) believed that the release of teaching problems has a certain degree of influence on the learning motives of students. Consequently, the setting of unit teaching problems needs to consider learners’ abilities and the achievement of teaching goals. This study, through the FGI, has conducted systematic researches to understand the teaching practices, the development of teaching steps, enhancement of the learning environment, and improvements in learners’ learning effectiveness, etc. (2) The confirmation of problems and information collection: before teaching, the researchers planned the topics for unit teaching and constantly reflected on the course, the analysis, and the understanding of the difficulties during the information collection. It was conducive to accumulate information and define the opinions of the topic problems to assist students to execute, inspect and clarify the implications of the problems. (3) Project development and self-learning programs: PBL emphasizes that learners should face their learning environment, have plans and constantly explore, adjust and reflect during the self-planning learning process. In addition, they should constantly understand and analyze the nature of problems and constantly adjust their learning methods to address such problems and find out the best strategy and plan. (4) Confirmation and fine adjustment of the teaching model: with the help of the interactive dialogue process during a FGI, this study firstly accumulated and mastered the perspectives and feelings of students towards PBL courses. It then adopted the learning files that could show the learning outcome of students and the process of cognition transformation in order to analyze the specific contributions of PBL courses for students. This study functioned as the basis for the research purpose of the FGI, learning files and in-field teaching observations. (5) Comprehensive analysis and confirmation of the steps of teaching modules: there is a certain degree of complexity for the solution strategy for culinary technique courses. Consequently, before teaching, teachers should confirm the inspection points and evaluation indicators for each teaching stage through a FGI to guarantee the appropriateness of the teaching and the teaching quality. (6) Ability inspection and self-evaluation: before classes, the researchers discussed with the teaching assistants about the teaching methods and curricular activities design for their class. During the classes, the researchers observed and recorded the subsequent events as the discussion axis. After classes, the researchers discussed the whole teaching process with the teaching assistants, and distinguished and revised the details of the teaching activities to develop appropriate teaching steps. Lastly, in line with learning files and observation records, the researchers conducted ability inspections of the students and self-evaluation references for the teachers.

Research Objects

The research objects for this study are the students involved in studies of Chinese Cuisine, and Chocolate Making at a private vocational and technological college and university in Central Taiwan. The total number of students in these two classes was 91, with 39 boys and 52 girls. Before the classes, the researchers classified the students based on the general and vocational high school status of their original classes to offset the heterogeneity of the students involved in the discussions. The classified groups are shown in the following Table 1. The main consideration for the grouping benchmark is whether or not the students were involved in cuisine related majors. For example, if the total number of the male and female students with non-cuisine majors is 20, if we divide them into 10 groups, each group would have only one male or one female student with a non-cuisine major. If we cannot divide them evenly, we have to discard
the factor of gender and mainly consider whether or not they have cuisine-related majors. In addition, their general and vocational high school educational background is a secondary factor for consideration.

<table>
<thead>
<tr>
<th>General and vocational high school and Departments</th>
<th>Boys</th>
<th>Percentage</th>
<th>Girls</th>
<th>Percentage over total number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior High School (including comprehensive high school academic courses)</td>
<td>12</td>
<td>(13%)</td>
<td>15</td>
<td>(17%)</td>
</tr>
<tr>
<td>Vocational high school (including comprehensive high school employment courses)</td>
<td>19</td>
<td>(21%)</td>
<td>25</td>
<td>(27%)</td>
</tr>
<tr>
<td>Culinary-related majors</td>
<td>8</td>
<td>(9%)</td>
<td>12</td>
<td>(13%)</td>
</tr>
<tr>
<td>Non-Culinary Majors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>39</td>
<td>(43%)</td>
<td>52</td>
<td>(57%)</td>
</tr>
</tbody>
</table>

This study aims to understand the learning steps of PBL for culinary arts courses. Consequently, after the preliminary plan for the teaching steps, the researchers subsequently confirmed the textbooks and the teaching plans for the courses. PBL originates from constructivism that emphasizes how knowledge is generated by the interaction between students and teachers or among students. Therefore, the teaching model of this study adopted group discussion. Furthermore, PBL places the emphasis on the heredity of group members. This study adopts the factor of whether or not these students used to be those with culinary-related majors or not as the basis for grouping. It encouraged learners to generate multi-dimensional discussions due to mutual differences, develop further strategies for problem-solving and learn the skills of cooperation and group learning to attain relatively better learning achievements.

**FINDINGS AND DISCUSSIONS**

This study conducted research on culinary teaching steps from the perspective of PBL, which can be used as a reference towards the implementation of future technique course teaching. The important findings worthy of discussion can be divided into (1) teacher-oriented or student-oriented concerns; (2) the collaboration between professional teaching training and systematic teaching.

**Research Findings**

After long-term discussions and revision, PBL has been developed into four teaching models. Based on the attributes of the research objects, there were about 8-10 people in each group and each group was appointed with a team leader. The whole process of learning was student-oriented and teachers were standing by to offer immediate guidance (Stefanou et al., 2013). The teaching process was accompanied by a floating facilitator model to make sure that the learners had enough time for discussion. Furthermore, using a walk through and inquiry, teachers were involved in each group through floating facilitation to confirm the degree of understanding and the learning outcome of the learners.

The above-mentioned is a learner-oriented teaching model that needs to consider the learning motives and self-learning capabilities of learners (Trinter, Moon & Brighton, 2015). In order to guarantee the learning outcome, this study adopted peer guidance and group discussion with the help of the teaching assistants. After several teaching processes, this study found that the teachers should play the role of initiator for problem discussions. Except for encouraging students to actively participate in the published topics by teachers, teachers should require learners to accumulate information, conduct real practices, learn the arrangement of culinary material, demonstrate results, report results, and share resources, etc. Consequently, the research tends to prefer the teacher-oriented teaching model (Ko & Chung, 2015;
Trinter, Moon & Brighton, 2015). In other words, this teaching model adopted a floating facilitator model, and planned the teaching practice model for Chinese Cuisine and Pulling Sugar courses. There were about 8-10 students in each group. At the very beginning, this study adopted a teacher-oriented model to enable the students to become familiar with the learning steps and acquire the prerequisite knowledge and skills. Subsequently, in collaboration with the floating facilitation of the teachers and the help of group leaders, students were offered real-time guidance and assistance. Subsequently, based on the learning situations in each class, the teachers-oriented teaching method became student-oriented so as to guarantee the learning outcome.

This study adopted the current classes as the research objects. After literature exploration and a FGI interview, this study was adjusted slightly based on the real teaching scenarios and the design of the PBL teaching models for appropriate culinary unit courses. There are six steps for this model: (1) Unit problems and background analysis of learners; (2) The confirmation of problems and information collection; (3) Project development and self-learning programs; (4) Confirmation and fine adjustment of the teaching model; (5) Comprehensive analysis and confirmation of the steps of the teaching models; (6) Ability inspection and self-evaluation. This study concludes and summarizes the teaching models for all the culinary technique courses in Table 1. In the meantime, it needs to be emphasized that some content needs possible adjustment: (1) publish the topics for discussion the week before; (2) students in groups need to search for solutions; (3) group discussion and first practice; (4) teachers enhance the teaching themselves through demonstration, illustration or observation of each group; (5) demonstrate the results of the second practice and evaluate; (6) teachers offer conclusion, evaluation and suggestions (Ref. Table 2).

<table>
<thead>
<tr>
<th>Teaching Steps</th>
<th>Students</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit problems and background analysis of learners</td>
<td>Grouping of Students and Group Learning</td>
<td>Based on work experience, teachers define the questions, distinguish the level of difficulties of the problems and ascertain possible solutions based on the prerequisite knowledge and discuss the planning of the teaching content with experts.</td>
</tr>
<tr>
<td>Confirmation of problems and information collection</td>
<td>Based on the analysis of problems, students reach conclusions and plan specific action plans, including execution time, method, group division of work and project management, etc.</td>
<td>During teaching, teachers can read and listen to the plan of the solutions to problems suggested by the students and offer suggestions and concerns at any time and adjust the teaching content respectively.</td>
</tr>
<tr>
<td>Project development and self-learning planning</td>
<td>Learners conduct self-oriented learning and are responsible for searching, taking notes of related learning resources and information. They can ask for help from the teaching assistants and teachers to conduct in-time learning. The team members need to constantly discuss and offer mutual guidance.</td>
<td>Observe the learning activities and progress of the students, research related learning units, record students’ performance and related main points of the learning content, offer related information and resource inspection and manage the learning process.</td>
</tr>
<tr>
<td>Confirmation and the fine adjustment of the teaching model</td>
<td>Apply the newly acquired knowledge to inspect the problems once again. Based on the new knowledge, students conduct an inference test or experiments and adopt words, graphs and reports to record the process of implementation.</td>
<td>Continuously observe the learning behavior and progress of students, confirm the appropriateness of the teaching model, adjust the teaching progress in real time and offer appropriate tools or remedial education for learners.</td>
</tr>
</tbody>
</table>
Comprehensive analysis and confirmation of the steps of the teaching models

As per the information and results acquired in the previous stages, confirm the effectiveness of the teaching model.

Analyze whether or not the problems are solved. If not, repeat the stage to conduct information collection and application into the test once again.

After successfully solving the problems, search for similar problems discuss, and generate general reports.

Ability inspection and self-evaluation

Read and analyze the related information and learning outcome of the students.

Reflect on the problem solving process steps and effectiveness and conduct peer evaluation and self-evaluation.

Observe and evaluate the performance of the students.

Discussion of the Results

Compared to the traditional teacher-oriented or lecture teaching model, student-centered PBL and small group learning certainly broadens the horizon of the teaching courses (Kirschner, Sweller & Clark, 2006). However, the actual teaching process in this study shows that the most appropriate teaching method is small group learning with PBL. That is to say, teachers are in charge of the teaching content featuring small group discussion or learning, also called problem-simulated learning (Mansor et al., 2015).

However, studies from foreign countries show that a teacher-centered teaching method is one of the most important reasons leading to the failure of PBL. Furthermore, PBL places special emphasis on accurate and systematic steps and the gradual guidance of learners (Merton, Fiske & Kendall, 1990; Stefanou et al., 2013; Wijnia, Loyens & Derous, 2011), pay attention to small group learning (Trinter, Moon & Brighton, 2015; Wijnia, Loyens & Derous, 2011) and multi-dimensional assessments (Stefanou et al., 2013; Trinter, Moon & Brighton, 2015). Consequently, it can cultivate advanced conclusion skills and problem-solving skills (Merton, Fiske & Kendall, 1990; Trinter, Moon & Brighton, 2015; Wijnia, Loyens & Derous, 2011) and the self-learning of learners (Wijnia, Loyens & Derous, 2011). On the contrary, regarding teaching practices, without teacher-centered teaching methods, the above-mentioned core abilities cannot be effectively developed.

Curriculum planning and arrangement is the central axis of PBL. Consequently, the establishment of a permanent full-time training department can offer training and related professional teaching resources to assist teachers to properly plan and write their lesson plans (Wijnia, Loyens & Derous, 2011). In addition, it is of great significance during teaching assessments and resource cooperation. A department with due responsibilities can develop a teachers’ manual to offer guidance and references to PBL for those people who are willing and interested to be teachers based on actual situations. Regarding the content, the manual should take knowledge content, learning attitude and an illustration of teaching steps into consideration at the same time. Another worry of this study lies in the original learning model of the students whose learning is aimed at examinations, which will affect their learning attitude and motives. Therefore, Hybrid PBL is an appropriate method and an easy way to achieve learning outcome. Of course, this study agrees that we should fully expand PBL courses and the teaching environment, generate chances for self-learning and small group discussion and promote student-centered self-learning. However, this ultimate goal can be achieved through different steps.

Another concern of this study is the small group discussion. Merton, Fiske and Kendall (1990) believed that discussion refers to a group of people who propose opinions on a certain topic and where all involved inspect different perspectives and respond to them. Afterwards, this group of people develops
topic-related knowledge, understanding and judgment. At the preliminary stage of teaching, this study predicts that rash and hasty attacks cannot acquire the expected results. Consequently, we should design teaching related content as problems whilst classifying the students into different groups to encourage them to offer their own opinions during small group discussions, respond to classmates’ opinions, cooperation, ascertain the answers to problems and share the discussion results with the rest groups of the class. If other groups have different opinions, they can tolerate the different opinions and discuss these with the group or any other members. Because the teaching goal of the course design is to complete the goal of learning culinary material set by teachers, the evaluation indicators consist of color, smell, taste, implied meaning, and shape, etc. Consequently, the core of group discussion teaching is to offer enough problems for discussion and arrange groups so as to favor cooperation. In order to cultivate problem solving and logistical thinking skills, this study places special requirements on the design process of the teaching plan and introduces problems that can trigger discussion. In order to avoid the problems caused by having to memorize facts or problems requiring memory, this study places the emphasis on the thinking behind and attitude toward problem-solving, which agrees with the proposal put forward by Cowie and Rudduck (1990), and Kirschner, Sweller and Clark (2006).

Regarding the traditional evaluation, teachers evaluate the tasks, performance and tests of students. However, evaluations of PBL need to adopt multi-dimensional and flexible evaluation methods, such as behavior or skills checklists, emotion or attitude scales, classroom observations, file assessments, report writing, and oral presentations etc. (Kirschner, Sweller and Clark, 2006). Furthermore, PBL places the students in the evaluation process, including the establishment of evaluation standards, the implementation of evaluations and judgment of the results. Self evaluation and mutual evaluation are conducted to reduce the student's defense mentality and encourage their classmates to share their ideas and learn to share the achievement of their classmates.

IMPLICATIONS AND SUGGESTIONS

This study, through the results of PBL, acquires culinary teaching steps that can be used as samples for a reference for the implementation of culinary technique courses. There needs to be further evaluation of teaching effectiveness.

The case school is suited to adopting PBL learning steps. That is to say, this method firstly adopts a teacher-centered teaching model and transfers to a student-centered teaching model when the students are familiar with the courses. In other words, the PBL learning model is a strange teaching method for freshmen. After the students become familiar with the PBL teaching model and steps, they get used to discussing problems with their team members, seek the topics and information they need to learn and conduct group discussions, converse to trigger thinking, interact with their teachers and classmates and distinguish related questions for food materials and cooking steps, the students can acquire possible solutions. However, because students in Taiwan become used to the traditional teaching method, which mainly consists of lectures by the teachers, if we give students leadership at the very beginning of their courses, it will make students uncomfortable, and maybe even reject this teaching method. We encountered this problem at the preliminary stage of this study and have adjusted the above teaching steps.

This study adopts culinary technique courses as the unit content. However, because some students do not have culinary-related majors, lack prerequisite knowledge, and even lack learning motives or techniques, they cannot be involved in the courses on unit teaching. In addition, some students are unable to get used to actively speaking in front of others or performing culinary techniques in front of a crowd.
This leads to higher pressure and time delays. Therefore, before the implementation of the courses, this study suggests that some introductory activities are needed to establish students’ confidence and reciprocal understanding of each member. Regarding the team leaders, we need to choose prudently as they are expected to lead their group of students with active involvement and the enhancement of learning outcome.

Regarding the suggestions towards future courses, the duration of small group discussions and publications should be specified to guarantee the teaching quality and the effectiveness of courses. In addition, after the implementation of teaching practices, some students believe that when the group they belong to has finished their small group discussion, it may be that other groups are still in discussion and the whole course will be delayed. Regarding the feedback of the learning units, some students believe that the time for course discussions should be limited; otherwise some groups spend too long or too short a time on each discussion. Furthermore, researchers also found that if the discussion time is not specified before the discussion begins, some groups will unintentionally lengthen the discussion and those groups that have reached a conclusion earlier will have to be stopped due to waiting. Consequently, the researchers in this study believe that at the beginning of PBL courses, teachers should specify the time allocated for discussion and publication to enhance the students’ abilities in time control, guaranteeing the effectiveness of the courses.

REFERENCES


