

DEVELOPMENT MODEL OF PATISSERIE PROJECT-BASED LEARNING

Ana

Department of Home Economics
Faculty of Technical and Vocational Education
Universitas Pendidikan Indonesia
Email: ana_syarief@yahoo.co.id

Lutfhiyah Nurlaela

Department of Home Economics
Faculty of Engineering
Universitas Negeri Surabaya
Email: luthfiyahn@yahoo.com

ABSTRACT

The study aims to find a model of patisserie project-based learning with production approach that can improve effectiveness of patisserie learning. Delphi Technique, Cohen's Kappa and percentages of agreements were used to assess model of patisserie project based learning. Data collection techniques employed in the study were questionnaire, check list worksheet, observation, and interview sheets. Subjects were 13 lectures of expertise food and nutrition and 91 students of Food and Nutrition Program from UPI, UNY, UNESA and UM. The results shows that model of patisserie project based learning with production approach can be used in patisserie learning, with a fairly high level of agreement, which is 0.78 average Cohen's Kappa coefficient. The model was implemented very well, as shown by 94.77% average implementation. Thus, model of patisserie project based learning with production approach can be used to improve the quality of patisserie learning. The results shows that model of patisserie project based learning with production approach can be used in patisserie learning with a fairly high level of agreement in 0.78 average Cohen's Kappa coefficient. The model was implemented very well, as shown by 94.77% average implementation. Thus, model of patisserie project based learning with production approach can be used to improve the quality of patisserie learning.

Keyword: *Patisserie, Patisserie Project-Based Learning Model*

1. Introduction

There is a high demand for Institute of Teachers' Education (LPTK) to be able to account for educational process that takes place in the institution. Until now, criticism of LPTK is still considered separate from the centers of science development, so that its quality and relevance are doubted (Higher Education, 2005). The LPTK's programs are considered less relevant to real workforce needs, and furthermore its graduates lack the skills required in work field. Vocational education in particular has some troubles with the inability of its graduates in entering the work field (Wahyu Nurharjadmo, 2008). The situation emerged due to quality inadequacy of the graduates, which is far from market expectation, and the wide discrepancy between the high "supply" and low "demand" of the graduates.

One important issue that needs to be discussed and solved is how much the organization of learning in the implementation of competency-based curriculum in universities and in line with the needs of the society, particularly workplace, business and industrial world. As we know, the characteristics of future work field require a high level thinking, problem solving and collaborative working skills. The recent study results indicate that companies all over the world are looking for graduates that are able to develop communication, teamwork, and problem-solving abilities (Jaques, 2000). Regarding the uncertain future of work field, the ability to construct and adapt knowledge, attitudes and skills, as well as adjusting it to the context at hand, become essential for future work force.

The development of business and industrial world in Indonesia especially in culinary sector has been contributing significantly to economic growth of this country for years. According to the data of Indonesia Culinary Industrialist Association (GAPMMI), turnover value of national culinary in 2011 was predicted to reach 493 billion Rupiahs; in other words, it was increased 12% over last year. Furthermore, national patisserie turnover in 2010 increased 8 to 9%. Gandamana (2009) stated this industry was improved significantly in five years. Moreover, in 2006, Food Hotel Asia reported that Indonesia achieved 34% improvement; it was the highest growth of patisserie industry among Asia. Thus, patisserie becomes the leading sector in culinary business.

Today, the field of patisserie has undergone rapid development in processing techniques, shapes varieties, decoration, delivery and packaging. Its growth is collaterally with developments of business world, especially culinary business. Jacques Torres (in Machlauchland, 1999), pastry chef at Le Cirque France, stated that there has been a lot of evolution in the field of patisserie in the last 10 years, including new techniques, materials and art of delivering patisserie products. These indicate that the patisserie field demands high adaptability and, thus, requires efforts to align its learning process in LPTK with work field and business needs.

2. Statement of the Problem

2.1. Research Objectives

This study involves four purposes as the following:

1. To develop a model of patisserie project-based learning,
2. To asses model of patisserie project-based learning by patisserie curriculum experts and practitioners.
3. To test suitability of the model from students' quality aspect, and
4. To get lecturers' and students' responses toward the model implementation

3. Methodology

The Model of patisserie project-based learning was developed on the basis of Oakey's (1998), Sharan's (1998), Purnawan's (2007) and Kayla's study (2008). The studies have inspired other researchers to develop further model. The writers argue that production approach on patisserie expertise seems more appropriate than any PjBL model.

3.1. Population and Sample

The population of this study is faculty/lecturers and students majoring Food Studies Program at the Department of Home Economics (PKK) in UPI, UNY, UNESA and UM. The number of respondents who become research participants depends on the offering arrangement of the subject that is 91 students taking patisserie in assessing the P2BL model, expert judgment was used through Delphi technique. The Delphi technique is a way to organize the experts' ideas in order to fix future situation. In this technique, varying opinions of people with relevant interest may be collected, looked for point of agreements and summarized as a consensus to define a particular purpose. One of Delphi's purposes, as stated by Dalkey (Fazio, 1987), is to search for information that can generalize consensus in respondents group. The use of the Delphi technique in this study is to obtain unanimity of experts and practitioners on the design of developed patisserie project-based learning model.

To measure the level of inter-rater reliability of the model and its classroom implementation, Cohen's Kappa (Wilkerson & Lang, 2007) and the percentages of agreements (Grinnell, 1988) were used. Cohen's Kappa coefficient (k), in turn, used a formula proposed by Cohen (2001) as follows:

$$k = \frac{\sum f_o - f_e}{N - \sum f_e}$$

Where:

κ = level of assessor agreement (inter-rater reliability coefficient)
fo = observation result frequency
fe = expected frequency
N = number of items assessed (classified)

To calculate the percentages of agreements between assessors whose data are only yes or no, a formula proposed by Grinnell (1988) was then used as follows:

$$\text{percentages of agreements} = \frac{\text{Agreements}}{(\text{Disagreements} + \text{Agreements})} \times 100\%$$

Lower limit of good reliability coefficient, that is 0.70 (Linn, 1989, Wilkerson & Lang, 2007).

3.2. Instrumentation

The main technique of data collection was questionnaire. It was distributed to students and lecturers on the purpose of knowing the effectivity of patisserie project-based project model implementation in their class. Check list worksheet was given to patisserie curriculum experts and practitioners to validate the model. Observation and interview were also employed to assess the applicable level of model design and to get students' and lecturer's reponses respectively.

4 Findings and Discussions

4.1 Development model of Patisserie Project-Based Learning (P2BL)

The fundamental concept model of patisserie project-based learning (P2BL) is the importance of equipping students with problem-solving skills, divergent thinking, creativity and collaborative teamwork skill. Characteristics of this model are its challenging learning pattern and its ability to foster a sense of responsibility in achieving success. Success is not solely the work of individual, or competition, but the result of teamwork.

Based on literature review, the development of patisserie project-based learning model refers to production model of Oakey (1998), Sharan (1998) and Kayla (2008). Here is the operational view of patisserie project-based learning development design:

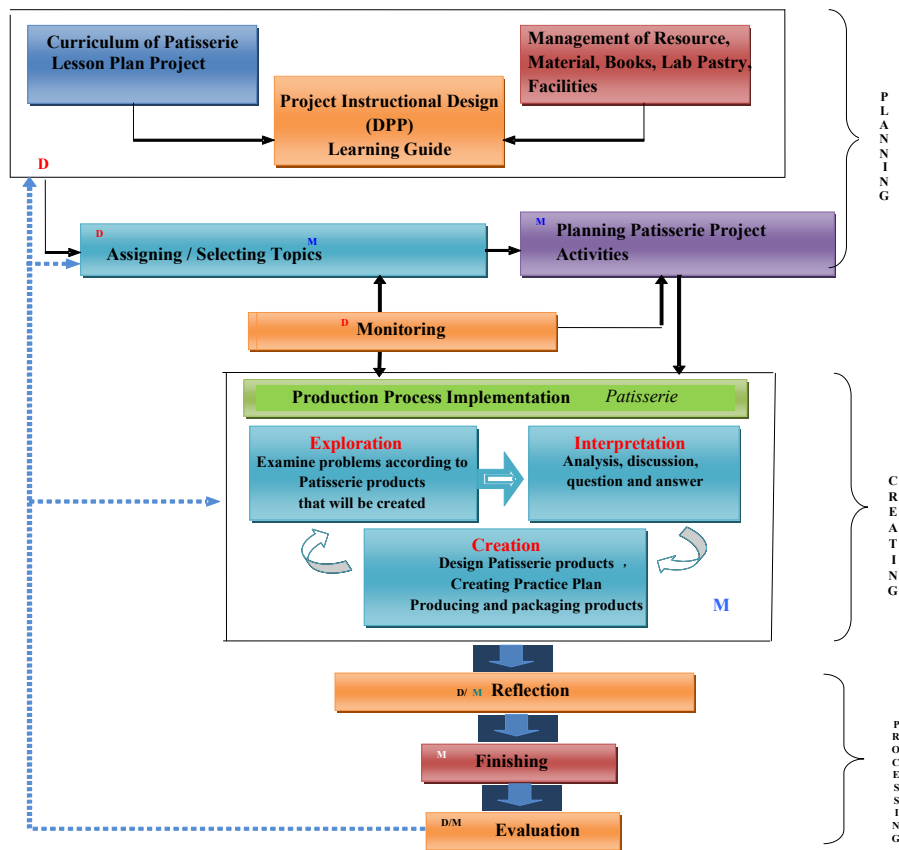


Figure 1. Design of P2BL Development

(Adapted from production model of Oakey (1998), Sharan (1998) and Kayla (2008))

Notes: D = Lecturer, M = Student

According to Figure 1, Patisserie project-based learning model can be explained as follows:

1 PROJECT PLANNING PHASE

a. Project Curriculum.

This stage was done by selecting lesson plan for Patisserie learning process, which would later be packed into the project instructional design (DPP), based on preliminary survey conducted to lecturers and student. The lesson plan was selected according to lecturers' and students' needs toward teaching materials, which were still considered difficult and therefore need a specific

learning model. The arranged patisserie learning materials are: Cakes, Choux paste, Yeast bread, as well as puff and danish pastry.

b. Resource Management.

This stage is designed to collect all sources that can be used to support the project-based learning.

c. Project Instructional Design (DPP)

The phase of project instructional design is created by using production approach with its four stages: planning, creating and processing.

d. Assignment / Selection of Topics.

At this stage, teachers gave assignments about topics specified in the project design stage. The proposed topics are related to real daily cases. This can help students to be able to identify their real problems. The students in group can choose a wide range of topics provided by the lecturers according to their project design. The students selected a topic and set goals to create final product. During this stage, the lecturers organized the class, regulated group formation, gave assignment and activities schedule.

e. Planning Activities.

This stage is about creating project management plan (plan activity) and starting the project. Students were given the opportunity to be responsible for completing the project together. Students also got the opportunity to collaborate with others in completing a task.

2 IMPLEMENTATION PHASES OF PRODUCTION PROJECT

a. Exploration stage.

At this stage students examined the topics they have chosen. The students were given the opportunity to conduct exploration on the science concepts being studied and interpret the results of such exploration. Students were free to explore a variety of sources which is relevant to the topic / concept / issue under review.

b. Interpretation stage.

During this stage, the results of exploration were interpreted through analysis, discussion and question and answer. The students were encouraged to find their own concepts through the various interpretation processes, such as observation, discussion, or trial of patisserie products creation. In this way, the concept is not transferred by the lecturer to the students, but is formed by the students through their experience and interaction with the environment during exploration. In other words, the students were encouraged to construct meaning from their experience so that their understanding of the phenomenon under study increases.

c. Creative stage.

At this stage, the students were guided to do designing process. The working group was directed to produce a product as designed in the previous stage. Project activities within this stage involve various types of work, which may be performed in parallel.

3 COMPLETION PHASE.

a. Reflection and feedback

Reflection and feedback, i.e. reviewing what they've found and done in the learning process, receiving feedback and making improvement efforts to increase product quality. The lecturers and students could provide feedback on project planning, activity management, product assessment and project completion. Feedback is essential in P2BL. Presentations and discussions are good feedback means. During this stage, the lecturers organize feedback procedure.

b. Monitoring / Evaluation.

Monitoring and control are carried out in the process and production stages. Process and product are two assessment aspects used in the project-based learning. The assessment techniques employed include: observation, peer assessment, and written exam containing problem solving skills.

Table 1. Syntax of P2BL Production Approach

No	Phase	Procedure/Strategy	Role	
			Lecturers	Students
1	Planning / Project Design	Determine theme and topics. Create the situation by bringing up the issue Link material to real case on daily basis Organize teamwork	Understand project content Create open ended situation Provide sufficient knowledge about the project to be undertaken Provide learning guide Facilitate learning process.	Select a topic Ask questions about the products to be made Establish a group Create a project activity design
2	Implementation of Production Project	Gather information Analyze data Communicate ideas in large / small group Create product Test the product	Provide learning resources Provide advice or guidance in the process of project execution Monitor progress of the project	Cooperate with learning groups during project execution Collect data and analyze information from exploration activities Discuss with the group and test products Document all findings in report form
3	Project completion / reflection, feedback and evaluation	Monitor the progress of student learning Assess the progress of group and individual projects	Provide assessment tools Assess performance Involve external parties to assess performance Create a conducive situation when providing feedback and assessment	Demonstrate comprehensive competency Exchange information through presentation Reflect on their own learning activities Understand the assessment procedures of the lectures

4.2. Assessment model of Patisserie Project-Based Learning

The results of model evaluation by experts and practitioners indicate that the model is good and can be used with no revisions to the 2nd phase model evaluation. The prerequisite referred is standard and communicative language, theory conformity, and constructed syntax, which has composed of the underlying principles.

Summary of the assessment of P2BL model by the rater (assessor) is presented in table 2. In Table 2, it appears that all the three assessors provide good scores for all aspects assessed. By then, the general assessment in this model validation stage can be used with little revision. However, after being revised, all the assessors state that the P2BL model can be used without revision.

Table 2. Assessment Results of P2BL Model

No	Aspects Assessed	Assessment Result	
		Phase 1	Phase 2
1	Supporting theories	Good	Good
2	Scenario of class instructional model	Good	Good
3	Stages in syntax	Good	Good
4	Phases in syntax	Good	Good
5	Use of formal language which conforms grammar of Bahasa Indonesia	Good	Good
6	Formulation of communicative statements	Good	Good
7	Use of understandable sentences and words	Good	Good
8	General assessment	B	A

Description:

- A = Can be used without revision
- B = Can be used with few revision
- C = Can be used with many revisions
- D = cannot be used

Level of reliability of the three assessors in providing the assessment can be explained by calculating the coefficient of reliability using Cohen's Kappa coefficient (k) and comparing the results with the minimum criteria. It is said to be reliable if the coefficient k is > 0.70 . The reliability is calculated by computing the average inter-rater reliability coefficient. Summary of calculation results are presented in Table 3. As shown in Table 3, the assessor reliability in assessing P2BL model for two times has met all the prerequisites for reliability coefficient.

Table 3. Coefficient of Reliability (Cohen's Kappa) in P2BL Assessment Model

No	Assessment Time	Coefficient k	Criteria	Description
1	Stage 1	0,79	$>0,70$	Reliable
2	Stage 2	0,76	$>0,70$	Reliable
	Average of Coefficient k	0,78	$>0,70$	Reliable

Project Instructional Design (DPP) is validated in two different time levels, namely at the initial stages of model development (stage 1) and preparation for entering model trial (stage 2). There are four DPP: DPP 1 of Cake Development, DPP 2 of Choux Paste Development, DPP 3 of Yeast Bread Development, and DPP 4 of Danish and Puff Pastry Development.

Summary of validation results is presented in Table 4. As displayed in Table 4, the results of the assessor validation are considered to be in good category. Good category in the sense that in assessors' point of view, the DPPs can be used as guides for lecturers and students in implementing patisserie project-based learning (P2BL) in the classroom. The assessors state that each DPP can be used with little revision related to learning context, modules and guide. Prior to classroom use, all the DPPs should be revised and improved in accordance with the assessors' advice. Then, the DPPs are re-assessed and can be used without revision.

Table 4. The assessment result of Project Instructional Design (DPP)

No	Assessed Aspects	Assessment Results							
		DPP1		DPP 2		DPP 3		DPP 4	
		Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2
1	Instruction in learning context	Good	Good	Good	Good	Good	Good	Good	Good
2	Instruction in learning guide	Good	Good	Good	Good	Good	Good	Good	Good
3	Hands out content	Good	Good	Good	Good	Good	Good	Good	Good
4	Learning resource content	Good	Good	Good	Good	Good	Good	Good	Good
5	Learning topic	Good	Good	Good	Good	Good	Good	Good	Good
6	Learning guide tools	Good	Good	Good	Good	Good	Good	Good	Good
7	Use of language that conforms grammar of Bahasa Indonesia	Good	Good	Good	Good	Good	Good	Good	Good
8	Formulation of communicative statements	Good	Good	Good	Good	Good	Good	Good	Good
9	Use of understandable sentences and words	Good	Good	Good	Good	Good	Good	Good	Good
10	General assessment	B	A	B	A	B	A	B	A

A = Can be used without revision

B = Can be used with few revision

C = Can be used with many revisions

D = cannot be used

DPP 1 = Cake Development

DPP 2 = Choux Paste Development

DPP 3 = Yeast Bread Development

DPP 4 = Danish and Puff Pastry Development

The reliability level of the three assessors in stages 1 and 2 in providing assessment for each DPP can be explained by calculating the average coefficient of inter-rater reliability using Cohen's Kappa coefficient (k). Summary of the calculations results are presented in Table 5. Based on the information from Table 5, it appears that the assessors have given assessment for each DPP for two assessment periods. In phase 1, assessment of DPP 2 still cannot meet requirements for reliability coefficient. However, all DPP have met assessors' reliability and reliability coefficient requirements in stage 2. Thus, according to data found, the assessor reliability toward learning features of DPP 1 and DPP 2 on P2BL model can be used in the implementation of patisserie learning.

Table 5. Coefficient of reliability (Cohen's Kappa) in DPP 1 – 4 Model P2BL

No	DPP	Assessment Period	Coefficient k	Criteria	Description
1	DPP 1	Stage 1	0,73	> 0,70	Reliable
		Stage 2	0,72	> 0,70	Reliable
2	DPP 2	Stage 1	0,63	> 0,70	Less Reliable
		Stage 2	0,74	> 0,70	Reliable
3	DPP 3	Stage 1	0,73	> 0,70	Reliable
		Stage 2	0,76	> 0,70	Reliable
4	DPP 4	Stage 1	0,76	> 0,70	Reliable
		Stage 2	0,73	> 0,70	Reliable

Description:

- DPP 1 = Cake Development
- DPP 2 = Choux Paste Development
- DPP 3 = Yeast Bread Development
- DPP 4 = Danish and Puff Pastry Development

The learning features in model P2BL are in accordance with the requirements and therefore can be used in the implementation stage without having to be revised. Similarly, all Project Instructional Design (DPP) 1 to 4 containing learning context, resources and study guides, can be used within the implementation stage without being revised. Assessment tools for each DPP have already stated good and can be used in the implementation stage.

4.3. Implementation model of Patisserie Project-Based Learning

Observations of P2BL model implementation on model validation, which were conducted by lecturers, practitioners and students, can be performed very well. P2BL model with 16 sessions, covering the all 4 DPP has been smoothly implemented by the patisserie lectures according to the syntax of P2BL Model.

The observation of P2BL Model implementation was conducted by three observers in 16 sessions. There are 16 aspects that are rated by the observers by giving \surd mark in column exist or not exist. The assessed aspects include introduction, core and closing activities. In the introduction activities, there are three observed aspects, 9 observed aspects in the core activities, and four more observed aspects at the closing. All these aspects should be observed during the sessions, from DPP 1 to DPP 4.

The assessment result of the three observers is presented in Table 6. From Table 6, it can be seen that the implementation of P2BL Model, specifically on DPP 1 – DPP 4, is very good.

Table 6. Assessment Results of Classroom P2BL Model Implementation based on Observer Model Validation

DPP	Average (%) of P2BL model implementation	Description
DPP 1	83,25	Good
DPP 2	97,92	Very Good
DPP 3	97,92	Very Good
DPP 4	100	Very Good
Total Average	94,77	Very Good

Thus, the overall of P2BL model syntax has been performed very well. The lecturers could implement the model syntax very well with total average of 94.77%. Trend of each meeting in DPP 1 to 4 shows growing percentage. However, if we examine more, DPP 1 has the lowest implementation average. This is considered reasonable because the patisserie class has just started to use P2BL model for the first time.

The observers' level of consistency and stability in observing P2BL Model implementation, from DPP 1 to DPP 4, is revealed from the calculated percentage of agreement (Grinnell, 1988). Level of consistency and stability of the observer in observing the model implementation is very high. This is indicated by a high percentage of agreement (≥ 94), that is 94.77%. Thus, all the three observers share similar level of opinion and perception on P2BL model implementation that is the class has a high level of stability in all DPPs.

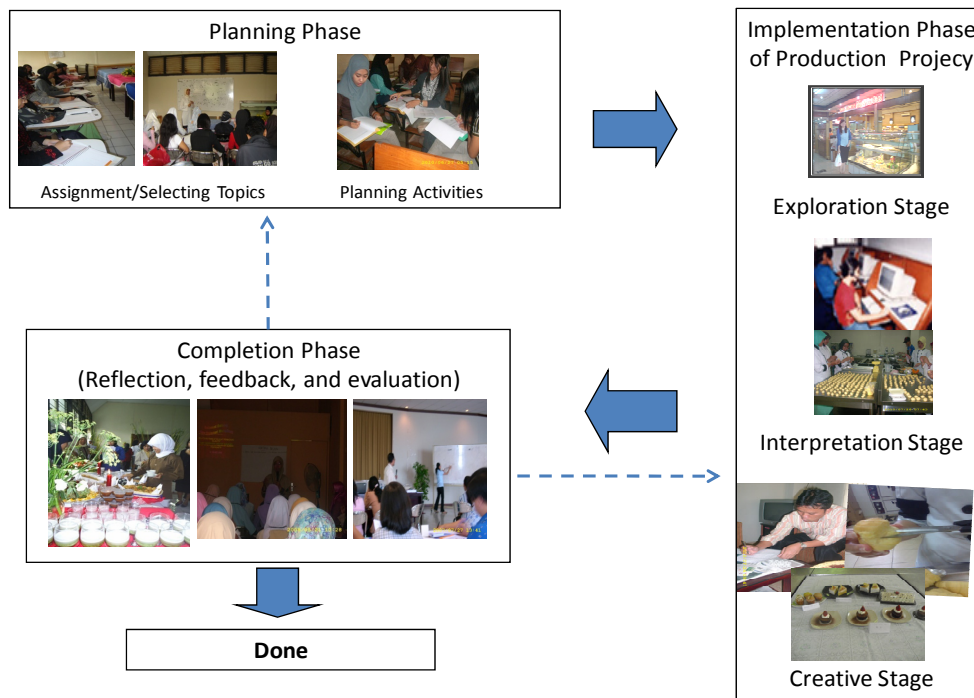


Figure 2. Implementation of P2BL Model (Researchers' Documents)

4.4. The Responses Towards the Implementation of P2BL Model

The responses towards the implementation of P2BL Model were obtained through interviews with several lecturers, observers and students. In general, the lecturers say that the P2BL model patisserie make patisserie learning more meaningful, challenging and fun. Learning activity becomes more exciting for students as they are given many opportunities to explore. Observation activities to some patisserie business sites help the students to get information about the new products on recent market. Interpreting activities provide more active learning environment, because many students are given the opportunity to discuss with the lecturers and their groups. Furthermore, in creative activities stage, many students could improve their skill mastery, that is the skills to complete the project and develop their creativity skills.

The lecturers state that there were many new patisserie products created during learning process. The students are more willing to experiment and produce creative products, so that competition level between groups increases.

According to the students, they and the lecturers are given the opportunity to provide feedback on the products made. This feedback sharpens their understanding on all problems found in making patisserie products, and also improves their skills in making the product.

In addition, after completing the project students feel more confident in developing patisserie products. They also feel the benefits of expanded knowledge after they deliver a presentation. The students learnt a lot from other students when they presented different project topics. Assessment involving external parties in DPP activities is considered very meaningful for improving the quality of learning by the lecturers and students.

The lecturers add that they did not experience difficulty in applying the P2BL model because all the learning features were complete and available in the form of study guide equipped with syllabus and Lesson Plan (RPP), learning context, learning resources, learning guides and assessment tools.

Challenges faced by the lecturers during the implementation of the model are the time for completing the project. The lecturers feel that there needs to be an agreement and shared commitment about project completion time among lecturers and students.

Thus, generally speaking the teachers and students agree that the implementation of P2BL Model provides a different, meaningful, and more challenging learning atmosphere.

5. Conclusion

1. The developed P2BP model involved three stages; they are planning, creating, and completing.
2. The result of model evaluation by experts and practitioners showed that P2BP model had been already good and applicable in the classroom and had fulfilled some requirements: the language used was formal and communicative, the theory was suitable, the arranged syntax was based on related principles.
3. Over all, the syntax of P2BP model had been very well applied by the lecturers.
4. Responses on the Implementation of P2BL Model showed that this model assisted lecturers' role as facilitators, and encouraged them to utilize the findings of a new patisserie products to develop learning materials. The implementation helped students to learn patisserie more easily, fostered self-confidence to invent new patisserie products, and to encourage students in being more active.

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