

Study of the Practical Application of Problem-Based Learning to a Major Class of Dental Hygienics: Focused on the Clinical Dental Hygienics Subject

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Purpose: To i) use outcomes of professional development on PBL for curriculum renewal that leads to more active student learning ii) use academic and clinical peers to develop a learning package that integrates education and practice of Clinical Dental Hygienics and iii) present and evaluate the authentic cases used as stimulus material that is learner-centered.

Methods: Professors of Dental Hygienics used professional development sessions to inform curriculum renewal and development of the stimulus material. Others with recent clinical experience used their expertise to assist with the development of learning packages. The PBL package was applied to two junior classes of Dental Hygienics and evaluated for perceptions of student satisfaction.

Results: The journey through PBL Package development and implementation, using peer support through Professional Development, is reported on. Responses to statements from a survey on learning experience indicated there was a high level of student satisfaction with learning; after the application of PBL (91.4%) responded positively to the statement, "I actively attended this class".

Conclusions: It is necessary to develop more packages that reflect the field of Dental Hygienics and extend the use of PBL to verify its effect. Additional evaluation of the use PBL packages needs to focus on learning outcomes that demonstrate links to actual practice and students' problem-solving, self-directed learning, and team-work abilities that can be cultivated through PBL methods.

Keywords: Professional development; Problem-Based Learning; Clinical Dental Hygienics; Learning outcomes

INTRODUCTION

Recently, demands for a new image of man within society also led to calls for change in approaches to education (Hangyo, 2006). Increases in available information and access to knowledge are evident in our society. While schools are often the primary sources of information, it has become more and more impossible to apply and utilize that information in actual life (Hwang, 2002). In modern times, it is meaningless to make knowledge acquisition and simple memorization of details as the main objectives of education. The central ability in future society should be to utilize the acquired knowledge effectively. Creation of new knowledge will arise from enquiry processes and, education should aim to develop this ability (Yoon, 2009).

The purpose of contemporary education is to encourage self-directed learners with prob-

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lem-solving ability. It is necessary to create a learning environment that allows learners with intrinsic motivation to apply related knowledge in the learning process (Kim & Kim, 2009). The abilities required in future society, besides the acquisition of basic knowledge, are problem-solving, creativity, information utilization, communication, team-work, and self-direction in learning (Kim et al., 2006). It is necessary to seek a learning method where students can learn about and acquire these various abilities effectively.

From survey feedback on the need for the development of an integrated curriculum for Dental Hygienics and Clinic-related subjects (Lim et al., 2016), a standardized curriculum was seen as necessary regardless of whether it was a three and four-year program. Integrating all clinical subjects in a role-centered curriculum was seen as necessary to produce dental hygienists with the expertise to cope with various actual situations from the clinical field. Bae, Shin, Jang, Chung & Shin, (2014) evaluation found that it would be necessary to integrate academic subjects like Basic Dental Hygienics with Clinical Dental Hygienics. The objectives and content would overlap and assessment of outcomes include the same competency statements for both. To ensure students' knowledge expansion, application of knowledge to practice, and development of problem-solving ability, it is necessary to combine education methods, such as seminars, placements, team-based education, Case-Based Learning (CBL) and PBL. It is also necessary to develop a method for evaluating the actual competencies comprehensively. To realize the competence necessary for the clinical field, Dental Hygienics subject designers proposed the introduction of PBL as a central philosophy and method because it could involve all elements listed above. The designers aimed for more integration across subjects; they wanted to enhance the students' problem-solving ability by using mutually agreed connections between theories and practical situations in the college curriculum (Bae, Shin, Jang, Chung & Shin, (2014); Kim, Kim, Oh & Nancy, 2009; Kim, Jang & Oh, 2009; Jeong, 2003).

In order to meet objectives and ensure competent performance of various tasks required of new dental hygienists, a move to competency-based models and a break from knowledge-centered learning was necessary. Competencies are behaviors reflecting vocational values, including integrated and comprehensive problem recognition and problem-solving ability. Instead of seeing 'the performance of skill' in a narrow sense, it would now include the knowledge and skill for performing the dental hygienists' role (Jeong, 2009). For this, it was necessary to renew the curriculum to enhance the learning situations to focus more on student-centered problem-solving within an integrated education.

Given the discussion above, it was decided that a renewal project would include development of a learning package consistent with the principles underpinning integrated education and practice of Clinical Dental Hygienics. Cases as stimulus material would enable the use of creative teaching methods so that learners are the center of the progress of learning about the roles and functions of Clinical Dental Hygienists.

Research Questions

The renewal project was underpinned by a number of questions that demanded answers:

How would the curriculum designers develop a learning package that reflected integrated concepts relevant to Clinical Dental Hygienics? How do curriculum implementers ensure that learners are the center of the processes of learning about the practice of Clinical Dental Hygienics? How will educators discover problems reflecting typical situations that may occur in clinics but also demand solutions to problems? How can the design of stimulus material for learning reflect both the clinical field and education for the competency necessary in clinics?

Processes of reflection on the methods applied to curriculum renewal project are described. The results of the redesign initiative are then provided along with the feedback from the survey on student perceptions of their learning experience.

Study Limitations

Since this study did not include verification of clinical competency within package development, it was not possible to evaluate the learners' problem-solving ability in the actual situations. There are insufficient preceding studies of PBL package development or examples of integrated education of Clinical Dental Hygienics; opportunity for comparison of outcomes is minimal.

METHODS

The research plan involved an iterative and collaborative curriculum renewal journey and the use of a survey on student satisfaction with learning processes and outcomes. To begin, the authors undertook some professional development, assuming the role of learners. They developed the Learning Package using consultation with PBL experts. They engaged in various PBL-related training courses such as PBL Learning Package Development and Tutor Skill Development (Halla/Newcastle PBL Center, 2019).

Professors of Dental Hygienics and Dental Hygienists with a clinical career of over five years collected examples of actual clinical situations. They aimed to integrate core concepts within two

theoretical and practically oriented subjects. Two junior classes of students in Dental Hygienics were to use the PBL package. Summative evaluation using a survey would determine students' levels of satisfaction with the learning stimuli and check perceptions of the effect of the learning package.

Research Approval and Ethical Considerations

The student participants in this study listened to explanations about project content, including the necessity, purpose, method, anonymity guarantees for participation in research, the voluntary nature of participation in the project, potential for agreement and rejection, and possible advantages and disadvantages of the PBL method. When we formally applied to use PBL, students had agreed to participate. Approval for the study was from the Dong-Eui University Institutional Review Board (IRB Approval No: DIRB-201902-HR-E-02).

Design of Subjects as PBL Units of Study

The 'major' Clinical Dental Hygienics, was selected for introductory use of PBL methods. This is a subject in which the students first learn about integrated concepts and content presented, to build up to the detailed 'major' of Dental Hygienics. Early building blocks include completion of basic prerequisite subjects offered to freshmen and sophomores. This subject presents the standard 'core' competencies and other competencies, e.g. for health promotion, disease prevention, and the application of Dental Hygienics management, to allow the students to accomplish expertise and quality outcomes as dental hygienists necessary in clinics (Choi et al., 2017). Thus, the Clinical Dental Hygienics units of study should involve processes that cause the students to comprehensively think and make judgments using the concepts explored in prerequisite subjects. The designers concluded it would be effective to apply PBL methods to this sub-

ject. There was a need to develop and apply actual cases in clinics as stimulus material in a PBL package.

PBL Package Development

Having seen the need for a PBL method, bibliographical searches around PBL package development applicable to Clinical Dental Hygienics took place from November 2018 through January 2019. The researcher constructed a preliminary package. By participating in sessions on 'PBL Tutor Skills' and the 'PBL learning textbook,' and acting on expert advice (Halla/Newcastle PBL Center, 2019) the package development was completed in February 2019. Table 1 outlines the research procedures.

PBL Package Application

As already noted the Department of Dental Hygienics of D. University in Busan agreed to become the trial site for application of the Package to a Clinical Dental Hygienics subject. In Week 4, February 2019, junior students were given explanations of the proposed change in learning processes; 35 participants gave consent to participate. Finally, we created two classes from the original group of 35; each class consisted of 4 teams of 4 to 5 persons, (8 teams in total).

RESULTS

PBL Package Development

Bibliographical research on how to develop a PBL package for a Clinical Dental Hygienics subject provided evidence of the approach. The researcher then enrolled in 'PBL Tutor Skill Development' and 'PBL Learning Textbook Development' (Halla/Newcastle PBL Center). Mentorship and expert advice helped with Package development completed in February 2019.

Package Application: Processes involved in the PBL Package

Table 1. Research procedure

	Research content	Research method
preparation	Problem-Based learning related training : Total 3 times, attended related workshops (2018-2019) Collect package situations related to the subject : Expert advice Select the person to apply Collection of literature related to Problem-Based Learning(medicine, dentistry, nursing, pedagogy, clinical hygiene, etc.), expert interview Selection of measurement tools through literature research	Literature research
Development	Develop a package that includes the clinical situation	Literature research Package development
Evaluation	Multi-faceted evaluation of package composition and application - PBL Expert Assessment - Clinical expert evaluation	Expert evaluation

for Clinical Dental Hygienics were: Determining the overall concepts, objectives and content, selection of learning tasks, clinical scenarios and choice of references, setting the outcomes of learning and composing scenarios, drawing up supplementary materials and preparing teaching guidelines, evaluating the validity of the learning package, and modifying and supplementing the original ideas. The five steps in PBL processes used were those proposed by Barrows (1998). These included class development, problem presentation, subsequent steps in problem-solving, suggestions for results and presentation, conclusions and solution to the problems. An algorithm was used for the effective utilization of time during the learning process.

The learners, working in groups, checked problems and discussed solutions, collected information, presented and shared the information. They acquired the knowledge, skill, and aptitude for problem-solving and evaluated problem-solving and learning results according to each step. The Professor presented the objectives of learning, facilitated discussions and summarized the learners' ongoing work, asking them to supplement any perceived deficits. The learners had two laptop computers in each team so that they could explore problem-solving methods during the class; reference materials were also available in the classroom. One PBL package operated weekly (4 hours); the class used six packages over 15 weeks. Figure 1 shows the operationalization of PBL steps.

Selection of Situations: Capacity to reflect concepts that inform learning topics is critical. Contemporary situations frequently faced in practice should be reflected as learning stimuli and be appropriate for the learners' level. Examination of existing subject content (across years) occurred in advance of PBL design processes. A profile of concepts and content from the freshmen year through the second semester of the sophomore year included Clinical Dentistry 1, 2, and 3, Preclinical Phase, Periodontics, Dental Health Pedagogy and Practice, Clinical Dental Hygienics and Practice 1 and 3, Dental Cleaning-related subjects, Clinical Dental Hygienics and Practice 2 and 4 (Preventive Dentistry and Preventive Dentistry Practice). Based on these details, the necessary scenario composition reflecting actual practice (content and level) was evident. For example, the topic dental caries, included pathophysiology concepts, other theoretical knowledge, treatment methods, and dental health educator's activities as well. The situations to be explored should mirror those in clinics. The following were elements of preparation (from Objectives to Selection of Scenarios and Situations as stimuli for learning) that warranted careful consideration.

Learning Objectives: This refers to a description of the outcomes for learners as a result of completing the unit (HRD Korea, 2010). Usually, objectives for learning are outcome state-

ments. However, here, importance was attached to objectives that reflect both processes and outcomes from the PBL experience. Objectives may limit the width of the learners' thinking and exploration if they are too concrete. It is desirable to describe them comprehensively but focus on concepts. The objectives of the learning process need to be consistent with the learning method informing the development of the Learning Package (Lee & Park, 2001).

Timetable: The main subject concepts are classified, the objectives of learning set, a plan set for the week and semester in which PBL classes occur and the method and place of learning chosen. Package topics for each week were available to teachers' timetables; details of Package use recorded semester and term of application and the number of the Packages. Timelines for Packages were available to learners.

Composition of Scenario: A scenario should include an unsolved problem and be appropriate for presenting various hypotheses. Also, it should be composed so that it causes in-depth thinking and exploration by the learners through the scenario cues. The topic of the scenario should effectively integrate ideas from various clinical fields. It should involve a problem that leads to a possible solution in the given class hour, and objectives, content, and difficulties of learning appropriate for the learners should be considered. Stimuli for exploration of 'problems' occurs in various ways - use of notices, questionnaires, news articles, fairy tales, pictures (photos), diaries, letters, conversations, cartoons, videos, standardized (simulated) patients, patients' medical histories, and results of diagnostic checks. This scenario presented data progressively, dividing it into Parts 1, 2, and 3 using unstructured problems so that the issues and information could be 'discovered' by students.

In Part 1, understanding the 'cues' to the exploration of the social and environmental conditions within the text was necessary. For example, "Sitting in the waiting room, he is immersed in playing a mobile game"; or another part where the dental hygienist did not respond to the pain, and where the mother said, "My son is afraid of dentist's office" and "He tends to skip meals and likes to have snacks". If the cues are recognized, the problem situations and the inferences lead to further exploration. The process of identification of issues involves cooperative learning within the group.

In Part 2, where the patient responded, "I don't know" to the dental hygienist's question, "Was there anything you felt was uncomfortable?" and in response to the text, "Tell your mom", it suggest a need to understand the role of behavior therapy in Dental Hygienics. The students need to find the relevant information but when the dentist uses terminologies such as 'inlay' and 'resin filling' in explanations, Hygienists need to use terms

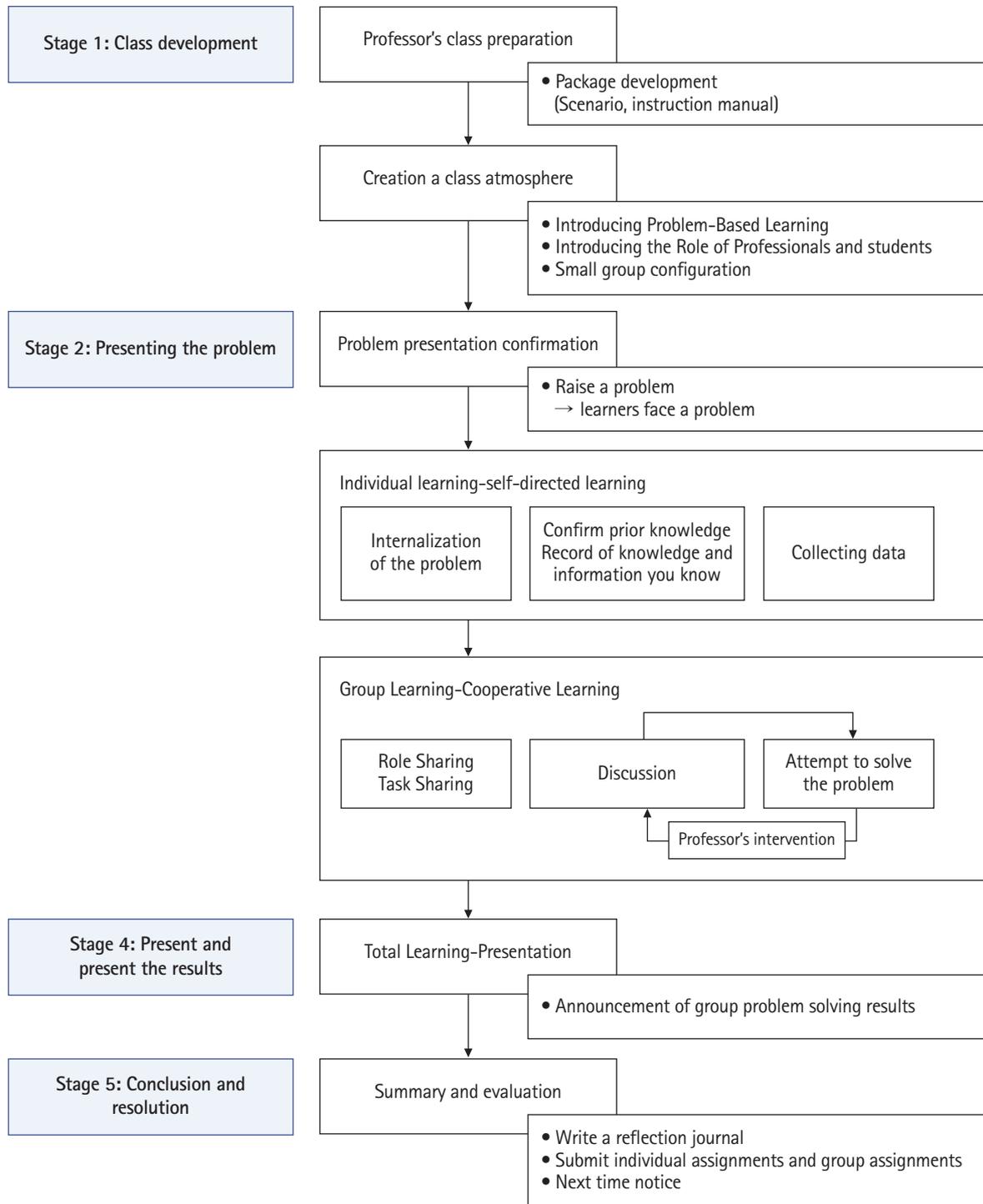


Figure 1. Problem-Based Learning Application Stage.

appropriate for the client. They also need to find useful information, for example, on medical ethics for overtreatment in response to the “mandibular full mouth photo,” or when looking at the treatment plan in charts available. If relevant information is found, the problematic situations are understood, and solutions found through collaboration with peers in the group.

In Part 3, the Package begins and ends based on details learned from Parts 1 and 2. It finishes by revisiting the actual roles of the dental hygienist and the learning from the entire Package.

Selection of Situations: Capacity to reflect concepts that inform learning topics was critical. Contemporary situations frequently faced in practice were reflected as learning stimuli and

were appropriate for the learners' level. Examination of existing subject content (across years) occurred in advance of PBL design processes. A profile of content and levels was evident. Topics reflected integration, for example dental caries, included pathophysiology concepts, other theoretical knowledge, treatment methods, and dental health educator's activities as well. The situations mirrored those in clinics.

The following are reflections on elements of our PBL development journey.

Learning Objectives: Here importance was attached to objectives that reflect both processes and outcomes from the PBL experience; the learners' thinking and enquiry processes led to active exploration of concepts. Objectives of learning were set by part, adjusting for difficulty.

Timetable: The main subject concepts were classified, objectives set, and plan set for the week and semester chosen. Package topics for each week were available for teachers' timetables; details of Package use recorded semester and term of application and the number of the Packages. Timelines for Package were available to learners.

Composition of Scenario: Unsolved problems presented various hypotheses that led to in-depth thinking and exploration of ideas within the group. Effective integration of various clinical fields occurred. Exploration of 'problems' occurred in various ways across Parts 1, 2, and 3. The processes of identification involved cooperative learning. Relevant information was found, the problematic situations understood, and solutions found through cooperative learning.

Problem-solving approach: Situations were analyzed in connection to the objective of learning. A 'guide' helped arouse the learners' interest for voluntary participation, developing hypotheses and analyzing problems. This package allowed the simultaneous roles of stimulation and guidance for the achievement of the objective of learning in each part, allowed for various thoughts to be aired around the primary problem-solving approach and analysis and classification of information and the expected cultivation of the learners' problem-solving ability.

Tutor Guide: An effort was made to present a detailed Tutor Guide so that another tutor could also follow the discussion and overall operational plan for the introduction of the scenario, and the arrangement and method for group discussion and presentation time. However this was organized from the perspective of the learner, allowing for feedback so that students did not deviate from the topic for discussion.

Learners' expected responses: The expected student responses were drawn up in advance with consideration of their need to

move to higher level outcomes and a need for consistency with the problem-solving approach (Jeong et al., 2006). Expected responses were drawn up, taking various aspects into account and included in guidelines on PBL processes developed for facilitators.

Evaluation Plan: The purpose of evaluation or assessment in PBL is to induce students to engage actively with learning processes. Another aim is to induce comprehensive integration and application of knowledge, development of skills and attitudes. Learners evaluate the process of learning as well as the results of learning. These assessment tasks are composed by the teacher, using evaluation guidelines. Existing evaluation was mostly 'academic' testing knowledge acquisition. However, evaluation in PBL methods is more comprehensive and reliant on various forms and methods. The learner's self-evaluation was de-identified and not recorded. PBL offers a chance for the learners to diagnose learning themselves, and for a tutor to prepare supplementary lectures to produce results like those in 'usual' evaluation. As a result, it can weigh up the learners' academic accomplishments. Evaluation between team members and between teams can have a positive impact through the facilitation of discussion and learning. Another step involves modifying the Package as a result of learners' evaluations of the Professor or the Package itself. The researcher recognized the value of PBL in subjects where the Package was applied; evaluation was positive and offered a chance to explore use with the 'major' subject Dental Hygienics. The final evaluation involved inter-group, peer, task and presentation evaluations.

Satisfaction with learning after completion of the PBL Package:

The evaluation tool, a survey on satisfaction with learning processes, was selected. The tool was modified by the researcher, referring to Park's (2004) research tool for satisfaction with learning. The validity of the questionnaire was reviewed by two curriculum developers, and amendments to the tool completed. This questionnaire consisted of 15 questions about interest in learning, understanding in the problem-solving process, and satisfaction with the teacher variables. As a result of a survey on reliability and the application to the research subjects, Cronbach's α coefficient was .85.

Table 2 shows details on 'Satisfaction with learning after PBL' (Kwon, 2010). Frequency analysis of the subjects' ($n = 35$) satisfaction with PBL, most (91.4%) responded, "I actively attended this class," and 77.1% responded positively - "I think I can utilize the content I learned in the practical class of Clinical Dental Hygienics in my actual life"; 62.9% responded, "I think my knowledge about Clinical Dental Hygienics-related subjects improved

Table 2. Satisfaction with Learning after PBL

Content	Unlikely	More or Less	Likely
I actively attended this class.	1 (2.9)	2 (5.7)	32 (91.4)
I found the progress of this class very interesting.	3 (8.6)	12 (34.3)	20 (57.1)
I think my knowledge about Clinical Dental Hygienics-related subjects improved through this class.	4 (11.4)	9 (25.7)	22 (62.9)
I didn't have difficulty in solving problems of Clinical Dental Hygienics after taking this class.	8 (22.9)	11 (31.4)	16 (45.7)
I could easily get help anytime when I needed the professor's help during the class.	4 (11.4)	12 (34.3)	19 (54.3)
I was free to ask the teacher questions and respond to them during the class.	3 (8.6)	10 (28.6)	22 (62.9)
I could clearly understand what I would know through this class.	1 (2.9)	15 (42.9)	19 (54.3)
I would like to recommend this class to friends in other classes.	2 (5.7)	18 (51.4)	15 (42.9)
I would like to take this class again.	7 (20.0)	16 (45.7)	12 (34.3)
I want other classes to be conducted in the same way as this class is conducted.	9 (25.7)	11 (31.4)	15 (42.9)
The learning topic (content) presented in each week's class was very interesting.	4 (11.4)	13 (37.1)	18 (51.4)
I found the given PBL problem-solving process difficult.	5 (14.3)	14 (40.0)	16 (45.7)
The PBL problem-solving process was overall pleasant.	1 (2.9)	22 (62.9)	12 (34.3)
I got interested in and paid attention to the subjects related to Clinical Dental Hygienics after this class.	3 (8.6)	19 (54.3)	13 (37.1)
I think I can utilize the contents I learned in the practical class of Clinical Dental Hygienics in my actual life.	0 (0.0)	8 (22.9)	27 (77.1)
Total		35 (100.0)	

through this class” and “I was free to ask the teacher questions and respond to them during the class.” None of them (0%) responded, “I do not think I can utilize the contents I learned in the practical class of Clinical Dental Hygienics in my actual life.” A few (2.9%) responded negatively, saying - “I did not attend this class actively,” “I couldn’t clearly understand what I would know through this class,” and “I didn’t find the PBL problem-solving process pleasant overall”.

Satisfaction with learning after applying the developed package for PBL

As for the evaluation tool with which a survey on satisfaction with learning was conducted, the tool was reconstructed by the researcher, referring to Park’s (2004) research tool for satisfaction with learning. The validity of the questionnaire was reviewed by two curriculum majors, and the questionnaire was completed by modification and supplementation based on this. This questionnaire consists of 15 questions about interest in learning, understanding in the problem-solving process, and satisfaction with the teacher variables. As a result of a survey on reliability and the application to the research subjects, Cronbach’s α coefficient was .85.

Satisfaction with learning after PBL (Kwon, 2010) is like Table 2. As a result of a frequency analysis of the subjects’ satisfaction after PBL-centered learning, most of them (91.4%) responded positively to the statement “I actively attended this class”; 77.1%, “I think I can utilize the contents I learned in the practical class of Clinical Dental Hygienics in my actual life”; 62.9% acknowledging, “I think my knowledge about Clinical

Dental Hygienics-related subjects improved through this class” and “I was free to ask the teacher questions and respond to them during the class.” None supported the statement “I don’t think I can utilize the contents I learned in the practical class of Clinical Dental Hygienics in my actual life” but 2.9% supported the statements “I did not attend this class actively”, “I couldn’t clearly understand what I would know through this class,” and “I didn’t find the PBL problem-solving process pleasant overall”.

DISCUSSION

This study reported on the processes involved in the development, evaluation, modification, and application of a PBL package for practical application to the Dental Hygienics major classes using PBL and evaluated students’ satisfaction with learning. The results have a limitation in generalization given the focus on application of PBL methods to one Clinical Dental Hygienics subject. However the curriculum designers concluded that it will be possible to develop other packages for other Clinical Dental Hygienics subjects. As a result of this study, the following suggestions are made.

First, based on this experience, it was judged as necessary to develop various packages for each field of Dental Hygienics that could enhance learners’ satisfaction with programs. It is expected that the students would learn from professional placements in clinics and enhance their problem-solving and critical thinking abilities. Enhanced ‘sociability’ could also be achieved through better integrated clinical experiences. The provision of learning

Package Part 1

1) Scenario For Part 1
(February 10, 2018 09:30 am)

You are a dental hygienist working at the front desk of a dental clinic. Today is the first day of your shift at the front desk of the dental clinic. You are in the middle of examining the list of appointments. A male student with a youthful face enters the clinic, looking about, and sits down in the waiting room before becoming absorbed by his mobile game. His mother who comes along with him approaches you.

Mother: We came because my son says his upper tooth hurt.
 You: Hi. Is that so? Have you ever been to our dental clinic before?
 Mother: No, this is out first time here.
 You: Oh, I see. Will you wait for a minute?
 We'll check his tooth in the dentist's office in a short while.



(Intraoral Photograph)

You: It must hurt a lot. Did you just endure the pain until it became this condition?
 Jae-hong: ...(silent)
 Mother: (sighing) My son is scared of coming to the dentist.
 You: Is that so?
 Mother: And he also tends to skip meals and eat snacks.
 Sigh... He doesn't brush his teeth often either.
 Honestly, it was hard to even bring him here today.

Package Part 2

Part 2
1) Scenario For Part 2
(March 26, 2018 10:30 am)

Jae-hong Kim has received 16 treatments since coming to the clinic. Today, he has an appointment for a gold crown attachment and treatment for other posterior oral cavities.

You: Jae-hong, was there any discomfort where your left-side molar was crowned?
 Jae-hong: I'm not sure.
 You: Oh... Is that so? Today we will be completely attaching the crown. As I explained last time, we need to treat the lower tooth with a cavity. Just wait for a minute... The dentist will explain it to you again.
 Jae-hong: Just talk to my mother. About that... (10 minutes later Jae-hong's mother enters the dentist's office, and dentist Park inspects Jae-hong's mandibular caries...)
 Dentist Park: The cavities in his lower teeth are severe. So, inlays must be done on these two right-side molars. It looks like resin fillings can be done for these two left-side molars...
 Mother: Isn't that expensive? How much will it cost?
 Dentist Park: Our dental hygienist will explain it to you in detail, but it's in the range of about 400,000 won per tooth.
 Mother: (Perturbed... She silently looks at you.)
 Then, will the treatment begin immediately today?
 (While the mother is in discussion, dentist park moves to another chair.)
 You: Yes... Do you have any questions?

2) Related data

1. medical examination by interview

Chart No.	21811975	The first medical examination	2018.02.10
Name	Kim Jae Hong	Resident registration number	010529-3850291
Address	HyundaiApartment 103-dong 504 in Gaya 2-dong, Jun-gu, Busan		
Cell phone number	010-4475-7187		

The following survey will help you with your treatment, so we would appreciate your detailed response.

1. Is there anything in particular you'd like the dentist to check today?	<input type="checkbox"/> My Tooth and gums are bleeding <input type="checkbox"/> Caries treatment <input type="checkbox"/> Tooth sensitivity <input type="checkbox"/> Extraction of a tooth <input type="checkbox"/> the others	<input type="checkbox"/> Food jam <input type="checkbox"/> Swelling and bleeding gums <input type="checkbox"/> Prosthesis <input type="checkbox"/> Implant <input type="checkbox"/> Regular checkup
2. Surgical hospitalization experience	<input type="checkbox"/> No <input type="checkbox"/> Yes	
3. The disease that is being treated?	<input type="checkbox"/> No <input type="checkbox"/> Yes	
4. Allergic drugs?	<input type="checkbox"/> No <input type="checkbox"/> Yes	
5. Pregnancy or breastfeeding?	<input type="checkbox"/> No <input type="checkbox"/> () Months pregnant <input type="checkbox"/> Breast-feed	
6. Presence of systemic diseases?	<input type="checkbox"/> High blood pressure <input type="checkbox"/> Hepatitis <input type="checkbox"/> Diabetes <input type="checkbox"/> Stroke <input type="checkbox"/> Heart disease <input type="checkbox"/> Sinusitis <input type="checkbox"/> Gastrointestinal disease <input type="checkbox"/> Kidney disease <input type="checkbox"/> Neurology <input type="checkbox"/> Asthma <input type="checkbox"/> Cancer <input type="checkbox"/> The others	
7. How long have you been smoking?	<input type="checkbox"/> Less than 6 months <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input checked="" type="checkbox"/> Never	
8. Experiencing anesthesia or bleeding during dental treatment?	<input type="checkbox"/> None <input type="checkbox"/> Have Symptom (I don't know)	
9. Why did you come to this hospital?	<input type="checkbox"/> Introduction of acquaintances() <input checked="" type="checkbox"/> Internet search <input type="checkbox"/> close by <input type="checkbox"/> When I heard the rumor that you were good	
10. What do you want before treatment?	<input type="checkbox"/> After the whole consultation, I want to be treated in all the bad places. <input type="checkbox"/> Even if I don't get the full treatment, I want to get a comprehensive checkup <input checked="" type="checkbox"/> First of all, I want to get treatment only in urgent places <input type="checkbox"/> the others	

2. Radiographic Photography (#16)



2) Related Date

① Kim Jae-hong's Chart

DATE	LOCATION	TREATMENT	NOXT TX.
2/10	6	C.C 환상임플란트 환복 뒤 아교나자 너무 아파요 St. tatione cavity preparation pulp chamber opening pulp extirpation	canal preparation
2/24	6	P: 10.5 mm MB: 12 mm DB: 11.6 mm canal preparation&drressing	canal filling impression temporary crown
3/3	6	canal filling resin core crown preparation impression temporary crown	gold crown temporary setting
3/23	6	gold crown temporary setting	G.c.r setting 76 inlay prep 67 RP

② Mandibular full mouth photo



Package Part 3

Part 3
1) Scenario For Part 3

Very much concerned over the cost, Jae-hong's mother decides to do resin fillings for tooth 37, 46, and 47, and a sealant for tooth 36. She is able to reduce the overall treatment costs because the sealant is covered by insurance for those up 18 years old.

(Overall Summary)
 Jae-hong has slightly improved his awareness towards the need for oral health management due to his memory of suffering from a cavity in tooth 16, his experience of nerve treatment, and the several sessions of oral health education you repeatedly administered to him. Jae-hong's mother was highly satisfied over the low-costing treatment and returned home promising regular checkups in the future.

Figure 2. Development package.

<p>Inter-group Assessment Sheet for the Dental Hygienics and Practice V 3-1-5 Package</p> <p>Grade 3 Class _____ Package 1. Group _____ Name: _____</p> <p>The following questions are about the activities of other groups while learning the Jae-hong Kim package. Assess the activities of other groups after discussing it with your group members and briefly describe the grounds behind your assessment.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Items</th> <th style="width: 10%;">Group</th> <th style="width: 30%;">Grounds</th> </tr> </thead> <tbody> <tr> <td>1. Which group offered the most information related to the lesson goals?</td> <td></td> <td></td> </tr> <tr> <td>2. Which group offered opinions by citing reasonable grounds and reasons after collecting and analyzing a variety of data, and then presented the results of their studies in an easily understandable way?</td> <td></td> <td></td> </tr> <tr> <td>3. Which group most actively participated in the lesson, taking a keen interest?</td> <td></td> <td></td> </tr> <tr> <td>4. Which group led the lesson with the appropriate attitude, respecting opinions between group members and helping each other?</td> <td></td> <td></td> </tr> <tr> <td>5. Which group offered the most constructive feedback to the other groups during class?</td> <td></td> <td></td> </tr> </tbody> </table>	Items	Group	Grounds	1. Which group offered the most information related to the lesson goals?			2. Which group offered opinions by citing reasonable grounds and reasons after collecting and analyzing a variety of data, and then presented the results of their studies in an easily understandable way?			3. Which group most actively participated in the lesson, taking a keen interest?			4. Which group led the lesson with the appropriate attitude, respecting opinions between group members and helping each other?			5. Which group offered the most constructive feedback to the other groups during class?			<p>Colleague Assessment Sheet for the Dental Hygienics and Practice V 3-1-5 Package</p> <p>Grade 3 Class _____ Package 1. Group _____ Name: _____</p> <p>The following questions are about activities by colleagues in the same group while learning the Jae-hong Kim package. Assess the activities of all group members and briefly describe the grounds behind your assessment.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">Items</th> <th style="width: 20%;">Colleague Name</th> </tr> </thead> <tbody> <tr> <td>1. Who most actively participated in problem-solving activities?</td> <td></td> </tr> <tr> <td>2. Who displayed comments or an attitude most helpful for problem-solving activities?</td> <td></td> </tr> <tr> <td>3. Who came up with solutions or ideas in the most logical manner?</td> <td></td> </tr> <tr> <td>4. Who was actively attentive to the comments of others?</td> <td></td> </tr> <tr> <td>5. Who most faithfully worked for the group activity results?</td> <td></td> </tr> <tr> <td>6. Who collected and utilized a variety of information?</td> <td></td> </tr> <tr> <td>7. Who most flexibly responded to and mediated between opposing opinions?</td> <td></td> </tr> </tbody> </table> <p style="text-align: center;">Score your group members (including yourself on a 5-point scale) *However, you may not give everyone the same score or a perfect score.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Name</th> <th style="width: 15%;">Score</th> <th style="width: 70%;">Grounds behind your scoring</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Items	Colleague Name	1. Who most actively participated in problem-solving activities?		2. Who displayed comments or an attitude most helpful for problem-solving activities?		3. Who came up with solutions or ideas in the most logical manner?		4. Who was actively attentive to the comments of others?		5. Who most faithfully worked for the group activity results?		6. Who collected and utilized a variety of information?		7. Who most flexibly responded to and mediated between opposing opinions?		Name	Score	Grounds behind your scoring																																																																																															
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Figure 3. Evaluation table.

frameworks for students would allow them to apply these in novel situations that are not directly linked to a learning package.

Second, to confirm the effect of the application of the Package using PBL, it is suggested that it is necessary to increase the term of the application of PBL or develop a package in another field and verify its effects.

Third, for the development of the PBL package proposed in this study, the final draft was developed through peer support and expert advice (Clinical expert and PBL expert) was invaluable. However, it is necessary to evaluate if this Package can demonstrate learning outcomes such as the acquisition of expertise in Dental Hygienics and other outcomes that reflect problem-solving, self-direction in learning, collaboration in teams; these abilities can be cultivated through PBL.

ACKNOWLEDGEMENTS

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