

Designing a Project-based Service-Learning Course for Pre-dental Education: A Theoretical Exploration

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This study is a theoretical exploration of project-based service-learning and its application in designing pre-dental curricula. As a response to the limitation of community service courses, service-learning has been implemented as pedagogy in higher education practices. Service-learning connects service and learning by engaging students in activities that address community needs with intentionally designed learning opportunities while adding value to and transforming both service and learning. Project-based service-learning is an extended and more active version of service-learning. Whereas service activities are arranged by instructors in the original service-learning, project-based service-learning provides students with opportunities for exploring problems and root causes on site and then devising and implementing solutions of their own using their talents and creativity. This study proposes a theoretical approach to project-based service-learning and suggests six design components, namely, related curriculum, reflection, reciprocity, service and community engagement, evaluation and recognition, and creative problem solving. Based on the components, 20 design strategies are formulated. The exploration is aimed to provide design guides for professionals attempting to implement project-based service-learning in higher education.

Keywords: Project-based service-learning, Service-learning, Community service, Pre-dental education, Dentistry education, Design components, Design strategies

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Introduction

Higher education institutions are recognizing or reaffirming their leading role in addressing growing problems of society (Bok, 2006). Accordingly, colleges and universities are renewing their educational visions to foster graduates with moral character and social responsibility. Students are required to have a conscious understanding of diverse social issues, to become advocates for people in need of help, to have proper vision of their role in the community, and to acquire necessary competencies to fulfill such role. Although this trend has been spreading across academic disciplines, the fields of health care professionals, such as medical, dental, or nursing schools, especially have longstanding attention on cultivating altruistic, humanistic, and socially responsible practitioners (Burks & Kobus, 2012; Coulter, 2007).

In responding to the demand for higher education institutions and their graduates, colleges and universities have offered courses called “community service” or “volunteer service” in the curricular of liberal education and specific disciplines (Hong, 2013). These courses generally engage students in service experiences in which they can actively help underserved people and try to solve problematic issues in the community. Through the activities of community service, students are expected to develop prosocial characters and values of civic responsibility. Although research has found that these qualities can be taught by curricular means and training (e.g., Cohen, 2007; Satterfield & Hughes, 2007), pessimistic opinions against the genuine learning outcomes of these courses persist (Shapiro, Coulehan, Wear, & Montello, 2009). The development of such attitudinal qualities cannot be automatically achieved as a result of experience itself but of specific components explicitly designed for them.

The problems regarding community or volunteer service courses can be categorized into three. First, such courses usually count students’ actual time commitment and a one-time superficial report in giving them designated credit.

Attention is not on what students learned and achieved through the service experiences, thereby making the activities peripheral and inconsequential (Shapiro, Coulehan, Wear, & Montello, 2009). Second, the service activities in community service courses are usually assigned by social welfare organizations. Students' tasks or roles during service are thus fixed according to situations of the organizations with little room for flexible alterations or creative tryouts (Chang, 2012). Students with specific talents or creativity barely enjoy the opportunity to explore, design, or propose their own intervention possibilities to solve problems at hand. Third, community service courses usually take a one-way paternalistic approach without sincerely empathizing with people and fully understanding the root causes of problems (Jacoby, 1996). This approach holds the supremacy assumption that a more competent person should provide assistance to a less competent person. In such a case, the learning outcomes of community service seem difficult to attain.

As a response to the limitation of community service courses, service-learning has been implemented in higher education practices. Service-learning is a pedagogy that connects service and learning. In other words, it links community service and academic study by engaging students in activities that address community needs with intentionally designed learning opportunities (Ehlich, 1996; Jacoby, 1996; Yoder, 2006). Learning is facilitated by studying required knowledge and skills as well as involving reflection activities, including reflection discussions or reflection journaling (Jacoby, 1996; Yoder, 2006). In service-learning, service and learning have a symbiotic and synergistic relationship in which each adds value to the other, and each strengthens and transforms the other (Honnet & Poulsen, 1989). Most researchers on service-learning agree that it is distinct from community service in terms of the reciprocal nature among the students, community, and the higher education institutions, which stands for reciprocity between the service and learning. Consequently, service-learning has explicit learning goals and objectives, whereas community service does not have explicitly declared learning goals or objectives (Hong, 2013).

“Service-learning” originated as a form of a volunteerism movement in 1967 that saw a resurgence in the 1980s in the US and was adopted in Korea in the late 1990s. Project-based service-learning is a recent approach that the present study aims to propose as an extended version of service-learning. It adds more constructive and creative components to the part of learning by empowering learners in their own learning (Stenhouse & Jarrett, 2012). In project-based service-learning, students start interacting with people on site while empathizing with their situations and pains; in this process, students explore problems and then identify the root causes of such problems. Based on their proactive investigation, students devise a creative solution, collect feedback, revise their original approach, and implement it on site. Compared with the original service-learning, project-based service-learning retains the components of knowledge and skill preparation and structured reflections, but adds creative problem-solving activities. In sum, project-based service-learning is a more active version of the original service-learning that allows students to demonstrate their learning, talents, and creativity.

Integrating service-learning courses into higher education curricula has not been a simple task. Developing a project-based service-learning course can be an even more challenging task. In the field of medical or dental education, as sub areas of educating future health professionals, implementing such courses is imperative but more demanding. Although international standards for graduating dentists or physicians endorse the improvement of empathy and other humanistic qualities in dental and medical students, research indicates that students’ altruistic and empathetic qualities decline as they approach graduation (Rosenthal, Howard, Schlusser, Herrigel et al., 2011). Another problem is that the pre-clinical years, such as pre-dental or pre-medical period, may be overlooked as an optimal period to begin integrating project-based service-learning. The pre-clinical period is when the traditionally favored scientific curricula are less emphasized (Glannon & Ross, 2002; McGaghie, Mytko, Brown, & Cameron, 2002), and more importantly, it is when the barrier of the “white coat” may not hamper with communication with people

(Burks & Kobus, 2012; Yoder, 2006). Even if the phases of generic service-learning or project-based service-learning seem familiar to educators, the existing resources are limited in identifying what exactly comprises the approach, how dynamic variables should be handled, and how an actual course can be designed. The current study offers a theoretical synthesis of project-based service-learning and a sample pre-dental project-based service-learning course based on the theoretical exploration under the following research questions:

1. What can be synthesized from previous literature on project-based service-learning?
 - 1.1. What can be the components of project-based service-learning?
 - 1.2. What strategies can be applied in designing project-based service-learning?
2. How can a project-based service-learning course be designed for pre-dental education?

Project-based Service Learning Approach

Service-learning

The term “service-learning” emerged from the volunteerism movement in 1967 in the US, which led to the establishment of related organizations such as the National Center for Service-Learning. However, this movement only lasted until the 1970s. The decline of the service-learning movement is attributed to the lack of reciprocity between related parties and between learning and service (Jacoby, 1996). In other words, in the early version of service-learning, the students, community, and academy did not reap equal benefits because it focused on charity or one-way aid (i.e., helping others or doing something for them). In addition, the service experience neither brought significant learning outcome nor effective service,

thereby falling short of the mission of educational institutions (Kendall, 1991). In the 1980s, service-learning gained the attention of university presidents, who formed an organization to encourage its application. In Korea, community service courses or mandatory commitment of community service have been implemented in the educational practice from K12 to higher education since the 1990s. Service-learning has been adopted in a few higher education institutions in Korea since the mid-1990s, and is receiving attention along with recent interest on character education (Chang, 2010; Hong, 2013).

Service-learning can be defined as an experiential pedagogy in which students engage in service activities, which address community needs, complementing intentionally designed learning opportunities; consequently, service-learning adds value to and transforms both service and learning (Jacoby, 1996; National Service-Learning Clearinghouse, 2008). The most critical feature of service-learning that distinguishes it from community service or volunteer experiences is the newly added learning part and the intentional integration of learning and service. Further, these two—learning and service—interact with each other and add value to each. Service can be more effective by employing knowledge, skills, and attitudes that have been prepared for the service, whereas learning can be even deeper and longer lasting by applying what has been learned to real-world contexts. Table 1, modified from materials by the Corporation for National Community Service (2008), describes the difference between service-learning and community service.

Although the balance between learning and service varies as categorized in Sigmon (1994)¹, equally weighted learning and service is usually advocated. Furco (1996) explained that the different levels of balance bear other types of experiential learning as shown in Figure 1. However, designers or instructors of service-learning can decide whether to take ‘service-centered’ service-learning or ‘learning-centered’

1 Sigmon (1994) proposed a service and learning typology: service-LEARNING (learning receives more focus), SERVICE-learning (service receives more focus), service-learning (service and learning are completely separate), and SERVICE-LEARNING (both receive focus with equal weight). In this work, “service-learning” refers to SERVICE- LEARNING, that is, the two receive equally balanced focus.

service-learning based on their circumstances (Morton, 1996). The balance between learning and service must be set to achieve synergy in integrating the two.

Table 1. Difference between service-learning and community service

	Service-learning	Community service
Learning and service relationship	<ul style="list-style-type: none"> ▫ Similar weight ▫ Learning is a critical component ▫ Each can be strengthened by the other 	<ul style="list-style-type: none"> ▫ Service receives much larger weight ▫ Learning is assistive tool for service
Related curricula	Curricular course	Non-curricular/ Extra-curricular
Learning goals/objectives	Clear learning goals/objectives	No clear learning goals/objectives
Structured critical reflection	Included as a critical component	Not included or included as a superficial component

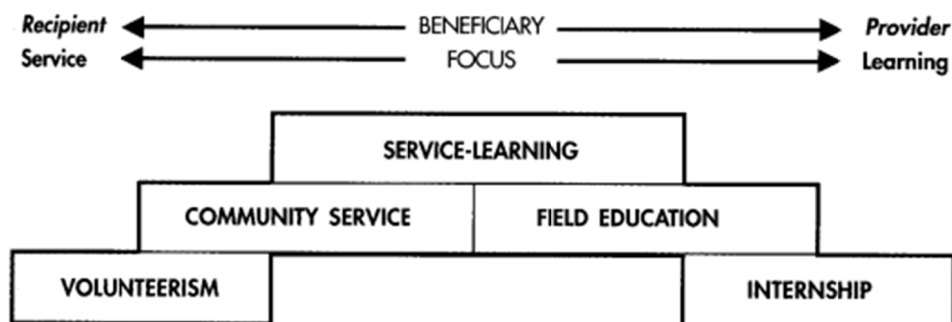


Figure 1. Distinction among service programs (Furco, 1996, p.10)

Project-based service-learning

This study proposes an extended version of service-learning called project-based service-learning. It takes a more active approach to service-learning. It also can be explained as an integration of community service and action learning. In the original service-learning, service activities are arranged by instructors in such a way that learning can be optimally applied. Project-based service-learning provides students with opportunities for exploring problems and root causes on site, and then for devising and implementing solutions of their own using their talents and creativity. As students are empowered to lead the service project, they can approach people in need of help more empathetically and engage in perspective-taking more actively because the investigation process of analyzing problems, sub-problems, and related social problems, followed by finding their root causes and formulating possible solutions, naturally entails more immersed interactions (Stenhouse & Jarrett, 2012).

Project-based learning has been adopted as a constructivist learning model since the 1990s. It is a type of teaching and learning strategy that engages students in investigation where they pursue solutions by “*asking and refining questions; debating ideas; making predictions; designing plans and/or experiments; collecting and analyzing data; drawing conclusions; communicating their ideas and finding to others; asking new questions, and creating artifacts*” (Blumenfeld, Soloway, Marx, Krajcik & et al., 1991, p. 371). In project-based service-learning, students’ service activities include these activities.

However, these activities require a specific component to foster good project-based learning: *reflection*. As a form of experiential learning, service-learning has its theoretical ground in Kolb’s (1984) experiential learning cycle that puts reflection at the center of the learning process: *concrete experience – reflection on the experience – synthesis and abstract conceptualization – active experimentation*. In the context of project-based service-learning, “concrete experience” can correspond to the “service” component, and “reflection on the experience” can be the crucial one, a

part of the “learning” component that can be iteratively implemented through reflection journal assignments or class discussions. The “synthesis and abstract conceptualization” step precedes reflection, which can be considered as deeper learning: analyzing diverse issues on site, identifying their interrelationships, and connecting these to broader social issues. The “active experimentation” step can correspond to the latter part of project-based learning, such as designing plans and/or experiments or creating artifacts. Project-based service-learning can be visually presented in relation to other theoretical approaches as in Figure 2.

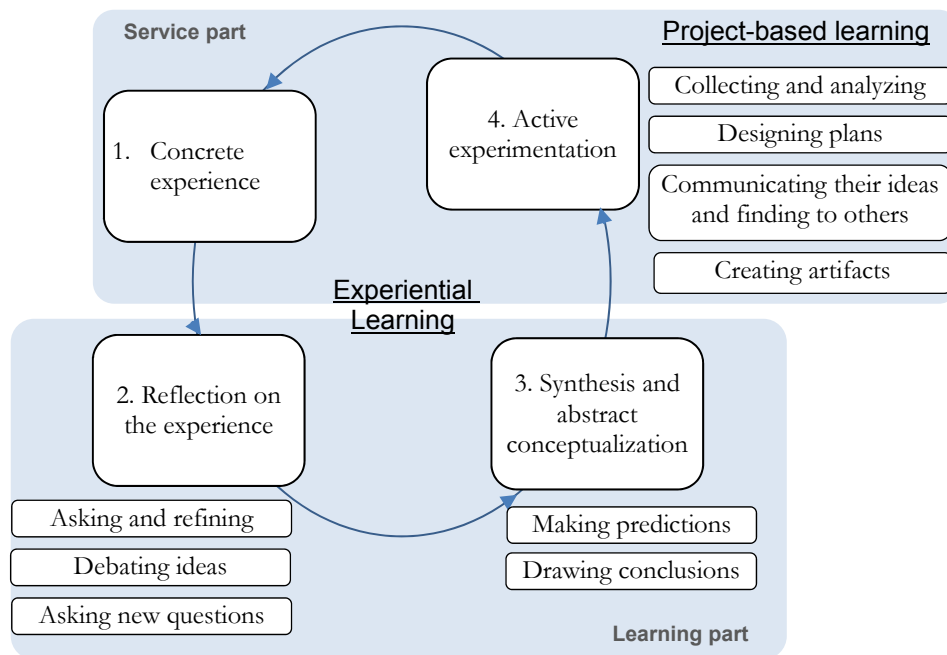


Figure 2. Project-based service-learning in relation to relevant theoretical approaches

Components of project-based service-learning

Studies on service-learning have proposed components using varied terms and categories (see Table 2), which can be grouped into five constituents: curriculum, reflection, reciprocity, service and community engagement, and evaluation.

Curricula (academic link, objectives, skill, and knowledge learning)

First, studies include the curriculum component, which covers the curricula or academic link with service-learning objectives. Under the curricula structure and course objectives, knowledge or skill learning is recommended as preparation for the service. Clear course objectives are crucial as these provide the exact direction of the course. Research on the effects or outcome of service-learning provides implications for defining the objectives of service-learning courses. Service-learning has brought outcomes on the improvement of (1) academic achievement, such as acquisition of knowledge and skills required on site and also link to the curricula (e.g., Ahn & Jung, 2013; Chang, 2010); (2) interpersonal skills, such as leadership communication skills, negotiation, or teamwork (e.g., Govekar & Rishi, 2007; Jacoby, 1996); (3) social responsibility or social consciousness (e.g., Toncar et al., 2006); (4) moral character, such as altruistic attitude, empathy, or perspective taking (e.g., Davis, Wright, Gutierrez, Nam et al., 2015); (5) critical-thinking skills, such as problem solving or well-reasoned decision making (e.g., Enos & Troppe, 1996). Different service-learning courses emphasize different types of learning goals and objectives. Individual course educators or designers need to consider these possible learning outcomes and then define the goals and objectives of their courses, which should be also evaluation criteria at the end of the course.

Table 2. Service-learning components proposed by studies

Chang 2010	Jacoby 1996	Mintz & Hesser 1996	Choi 2012	Yorio & Ye 2012	Yoder 2006
Related curricula			Curricular link		Academic link
					Service-learning objectives
		Orientation and training	Preparation		Broad preparation
	Reflection	Reflection	Reflection	Reflection	Guided reflection
	Reciprocity				Reciprocal learning
Service opportunity		Meaningful action	Service		Sustained service
Community needs		Community voice		Reality	Community engagement
Community partnership			Partner collaboration		Sustained community partnership
					Community engaged scholarship
Structured evaluation tools		Evaluation	Evaluation and recognition/ celebration		Evaluation and improvement

Reflection (guided and structured reflection)

Second, the most agreed component is reflection. Jacoby (1996) considered reflection as a central component for ideal service-learning, claiming that guided and structured reflection should be intentionally and explicitly designed to foster learning. In reflection, students are encouraged “to step back and ponder [their] own experience, to abstract from it some meaning or knowledge relevant to other

experiences” (Hutchings & Wutzdorff, 1988, p.15). Reflection is thus the crucial feature of service-learning that connects service experience to learning and transforms experience into learning. In practice, reflection should occur immediately after the service and should place the experience into a broader social, psychological, political, and ethical context (Mintz & Hesser, 1996). Reflection can be implemented using dialog, class discussion, or reflection journal keeping.

Reciprocity (service and learning reciprocity, partner reciprocity)

Third, service-learning should have reciprocity, which can be approached in two ways: reciprocity between learning and service, and reciprocity among related partners, such as the academe, students, and community. Learning and service should enjoy mutual benefit in that learning becomes deeper while being applied in the context of service, and service becomes more effective while employing trained skills and knowledge. This scenario is what sets service-learning apart from community service. The people or organization involved in service-learning should have reciprocal interrelationships. The student server and the person or group being served, as well as universities, colleges, and community, should achieve a certain outcome to meet their own needs.

Service and community engagement

Fourth, studies include service components with diverse terms and sub-components. In service-learning, service is one of the central components. This component makes learning real and concrete and also provides students with deeper and contextualized understanding of social issues within the community, such as poverty, disability, unemployment, and diversity (Godfrey, Illes, & Berry, 2005; Govekar & Rishi, 2007). Service opportunities should engage students in meaningful actions that would help them feel their effort has brought differences. These opportunities should be where students’ learning is utilized.

Another crucial constituent related to service is community partnership. Ideally, the community should actively engage in the process of and provide support for service-learning. To establish a mutually beneficial relationship with the community, related parties should share goals and visions and implement joint strategies while communicating on a regular basis (Mintz & Hesser, 1996).

Evaluation, recognition, and celebration

Fifth, service-learning should have a meaningful conclusion by way of evaluation and recognition or celebration. Students' learning should be evaluated at both the outcome and process levels. As such, proper evaluation tools are needed (Chang, 2010). Once the criteria for evaluation are set, evaluation methods can be implemented, including portfolio, self-, peer, and faculty assessment. Feedback from community members or site supervisors can be also reflected in the evaluation.

Recognition is critical in recognizing students' accomplishments along with the program's success (Choi, 2012; Morton, 1996). It includes rewarding outstanding contributions, holding receptions, publishing features in newspapers, and conferring of president's appreciation or certificates. A celebration party can be a meaningful closing that would help students appreciate their enjoyable and valuable learning experience.

Creative problem-solving

In addition to the components for generic service-learning, project-based service-learning adds one more component: creative problem-solving. Whereas the generic version does not focus on creative solutions, project-based service learning values unique smart solutions to identified problems in the community. In creative problem solving, the process usually proceeds as follows: (1) examining problems from different perspectives, (2) generating extraordinary ideas with promising potentials, and (3) planning for action (Isaksen & Treffinger, 1985). For

collaborative work, students can develop both divergent and convergent approaches prior to generating meaningful new connections, simultaneously analyzing, selecting, and developing new possibilities. The components of project-based service-learning are summarized in Figure 3.

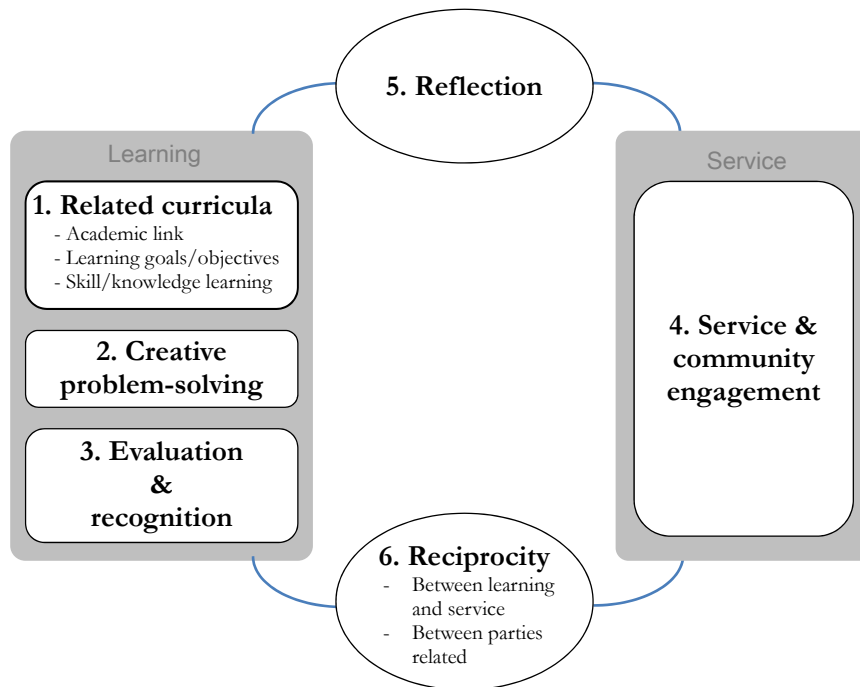


Figure 3. The components of project-based service-learning

Strategies for Designing Project-based Service-Learning

Project-based service-learning can differ dramatically by the way they are designed and implemented. These variations can have distinct effects on student learning. Educators or designers of project-based service-learning should make critical decisions facing diverse related issues. Based on the components identified and related literature on design principles, a set of strategies can be proposed. Wingspread principles (Honnet & Poulsen, 1989) that had brought the renaissance

of service-learning in the 1980s are also adopted for inclusion. Table 3 shows a synthesis of the literature.

Table 3. Project-based service-learning design strategies

Components	Design strategies
Curriculum	1. Articulate clear service and learning goals. - Decide whether it is learning-centered or service-centered. - Define generic goals and discipline-specific goals if applied. - Define objectives in terms of knowledge, skill, and attitude.
	2. Prepare students' required knowledge and skills on the service site and train them in utilizing what they prepared.
Reflection	3. Provide both individual and group reflection.
	4. Provide structure and guidance to extend reflection on site to the broader social, psychological, political, and ethical context.
	5. Provide reflection assignment shortly after service experience.
Reciprocity	6. Make students utilize their learning at the service site, and teach what will be utilized on site.
	7. Match service providers and service needs.
	8. Allow for those with needs to define such needs.
	9. Clarify the responsibilities of each person and organization involved.
Service/ community engagement	10. Engage people in responsible and challenging actions for the common good.
	11. Expect genuine, active, and sustained organizational commitment.
	12. Include supervision, monitoring, and support to meet service and learning goals.
	13. Ensures that the time commitment for service and learning is appropriately flexible and in the best interests of all involved.
Evaluation/ recognition	14. Evaluate students' learning outcome and process based on the objectives defined.
	15. Collect data from multiple sources: self, peer, faculty, site supervisor, and community members.
	16. Provide a meaningful closing to make students feel that their experiences were enjoyable and valuable.
Creative problem solving	17. Select service sites where students can take flexible and creative approaches to the problems identified.
	18. Provide opportunities for generating varied and unique solutions; consider the potentials of the each solution.
	19. Provide structure to enable meaningful connections among variables.
	20. Guide students to plan for action and collect feedback on site.

A Sample Pre-dental Project-based Service-Learning

Referring to the design strategies proposed, a sample project-based service-learning for pre-dental education is presented here. Dental education should produce graduates with a broader understanding of health and society, and with humanistic qualities for advocating patients or community members in need of help (Yoder, 2006). Integrating project-based service-learning into dental curricula will foster graduates who are better prepared to practice as competent, empathetic, and socially responsible dentists with an appropriate vision of their role in their community. Especially, the pre-clinical years represent the optimal period for implementing project-based service-learning as it is when scientific courses are less favored and the “white coat barrier” has not yet interfered with communication with people.

For the curriculum component, the goals and objectives are formulated as follows:

Course goals:

- *Students will be able to recognize diverse social inequities in their community;*
- *Students will be able to utilize systematic skills to analyze problems and then devise and implement solutions;*
- *Students will be able to contribute in solving community problems while actively and creatively exploring solutions and collaborating with peers;*
- *Students will be able to foster altruism, empathy, social responsibility, and leadership.*

Course objectives:

- *Knowledge on underserved people related to diverse inequities*
- *Knowledge on methods for social contribution (education, funding, social enterprise, advertising, and others)*
- *Skills for needs analysis, developing a social welfare program, and evaluating programs*
- *Skills for communication and conflict/ risk management*

- *Value for social service*
- *Altruistic, empathetic, socially responsible attitude*

For the reflection, the course can assign an *individual reflection report within 24 hours after every site activity*. The course includes a *small group debriefing discussion* every two weeks, and two *large-group discussion* after the proposal and final presentations. The structure of the reflection report is provided. The report will require students to fill out the following: *what I prepared for the service; what I did on site; what kind of problems I identified and what I felt; what kind of social problems are related and what other issues are related to the problem at hand*.

For the reciprocity, the knowledge and skills covered are all utilized at the service site, which can help add effectiveness to service activities, and such knowledge and skill will be strengthened when applied in practice. Selecting the service site is a challenging task. Students can work in groups of six to seven members, and they can explore sites by themselves, *ask people or organizations with needs to describe their needs*, and then clarify the responsibilities and conditions for collaborative work.

For service/community engagement, educators can arrange community engagement as supervision and support for students' learning. Service sites that are not suitable for meaningful activities should be screened. Support from university organizations can be obtained for easy administration.

For evaluation, each course objective must have a corresponding evaluation tool. Knowledge and skills can be tested in the mid-term exam or a project proposal. For the attitude objective, a reflection report after watching a related movie can be recommended. Changes in attitude can be evaluated via assessment from peers, faculty, or supervisor. A celebration party where a part of students' portfolio can be displayed can be arranged, and people involved in the project can be invited. Financial support can be solicited or raised using social financing methods.

For the creative problem solving aspects, the most important issue would be site selection. The main criterion for service site selection should be openness to

students' flexible and creative approaches. The course instructor should communicate with students to ensure that they choose a proper site. A set of creative thinking tool templates can be provided to elicit divergent and convergent thinking. Educators must guide students to plan for action, consider the feasibility of the possible solutions, and then collect feedback from people on site.

Discussion and Conclusion

This study presents a theoretical exploration of project-based service-learning and its application to pre-dental education. It proposes pedagogical approaches of project-based service-learning, including design components and strategies, and then offers a sample course.

Project-based service learning turned to be a learning model that combines generic service-learning, experiential learning and project-based learning. The service part pertained to first step of 'concrete experience' and the fourth step of 'active experimentation' while the learning part corresponded to the second and third step, which are 'reflection on the experience' and 'synthesis and abstract conceptualization'. As processes of project-based learning were mapped on the four steps, the reflection step and active experimentation step received more weights. In other words, by taking the project-based learning approach to service-learning, reflection in the learning part and experimentation in the service part get more focus.

The six components of project-based service learning were: related curriculum, creative problem-solving, and evaluation/recognition in the learning part; service and community engagement in the service part; and reflection and reciprocity, the components that connect the learning and service parts. Considering the core features of service-learning, the central constituents could be reflection and reciprocity, which is in line with Jacoby's (1996) position. One of distinctive feature

that other learning model does not have is recognition. Recognition can be diverse format that closes students' service and learning experiences meaningful and enjoyable, which helps the experiential learning cycle recursive in the long run.

Designing a project-based service-learning course can be guided with 20 design strategies, which spread across the six components. Those strategies imply that there should be active collaboration between community and academy. Those collaboration can be administrative support, pedagogical monitoring, or mutually beneficial relationship building. The two parties need to construct a sort of infra-structure for the proposed project-based service-learning to be effectively and efficiently implemented in practices.

Higher education institutions have renewed their mission to foster graduates with humanistic qualities and social responsibility. Institutions for educating health professionals, such as medical, dental, and nursing schools, are particularly paying attention to fostering "good" doctors, dentists, and nurses with both competency and strong moral character. Project-based service-learning is a response to the social responsibility of higher education and demand for creative problem solving. The most significant feature of service-learning is its potential for sustainability. On the one hand, service and learning receive mutual enforcement, and on the other hand, parties involved gain mutual benefits. Its creative tryout is an effective and efficient way of searching for smart solutions for issues at hand. Pedagogically, it is a more constructivist version of the generic service-learning, and a proactive version of community service, thereby offering more possibility for student growth. Service-learning educators or designers should consider how project-based service-learning can optimally contribute to producing "good" graduates. As service-learning experiences can differ substantially by the way they are designed, and the design variations can render influential effects on student learning, courses should be deliberately designed based on relevant theoretical bases.

This study is limited in that it only proposes project-based service learning from

theoretical perspectives, which entails a need for further practical validation of both components and strategies, and the resultant sample course in the near future. This explorative study hopes to provide design guides for professionals aiming to implement project-based service-learning in higher education.

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