Full Length Research Paper

The impact of teachers' and supervisors' involvement on students' skill and affective development in service-learning

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The study reported an assessment of a university-wide curriculum-based service learning program and, based on the assessment data, analyzed the impact of teachers' and supervisors' involvement on students' skill and affective learning outcomes. The study (n=750) showed that in general the students agreed that their participation in service-learning enhanced their communicative and problem-solving skills and contributed to their positive attitude toward service learning and helping others. The study suggested that student journal keeping and discussions among teammates may be the areas that need more attention in program implementation. Using the structural equation model (SEM) method, the study tried to analyze the different effects of involvement of teachers, supervisors, and students on students' learning outcomes. It is found that students' involvement, measured by students' preparation for and understanding of the services as well as students' frequent discussions with teammates, has a significant positive relationship with the learning outcomes. Moreover, the involvement of teachers and supervisors has positive influence on the students' learning outcomes. Further, analysis indicated that the positive influence of the involvement of teachers and supervisors on the learning outcomes is mainly through the "indirect effect" (through the influence on students' involvement, which contributes to learning) rather than through the direct path between the involvement of teachers and supervisors on the learning outcomes.

Key words: Service learning, program assessment, students' learning.

INTRODUCTION

Service-learning has blossomed in higher education institutions and become an effective pedagogical strategy (Steinberg et al., 2010). The Fu Jen Catholic University initiated service learning since 1998 and integrated the service-learning pedagogy into the university's general education. The service-learning program offers students various service opportunities within and outside the campus. In 2008, the College of Management pioneered to immerse service-learning activities into the course "Introduction to University Studies", a required 2-unit general education course for freshmen. In 2010, the

immersion of service learning activities into the "Introduction to University Studies" course was further extended to all colleges of the university.

The study is to assess whether the service-learning program has achieved its goal in improving students' affective and skill development. Specifically, we want to know whether the service-learning program enhances students' sense of civic responsibility as well as communicative and problem-solving skills. In addition, we want to empirically examine the different relationships between the involvement of participants (teachers,

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supervisors, and students) and the learning outcomes.

Service learning pedagogy

Service-learning is the integration of academic study and volunteer service that students participate in organized services for identified community needs and reflect on the service experiences to enhance academic learning and civic responsibility (Jacoby, 1996; Steinberg et al., 2010).

To enhance students' learning, service learning programs should encourage student-faculty interaction, teamwork and active learning (Jacoby, 1996). In addition, the good balancing between community service and academic learning requires clear articulation of goals and careful design and implementation of programs (Sigmon and Pelletier, 1996; Eyler and Giles, 1999; Furco, 2003). A study on the Campus Compact Project concluded that an effective institution-wide service learning program depends on active collaboration among four constituencies: institution, faculty, students, and community (Bringle and Hatcher, 1996).

Service learning can be designed either as a credit-based experience (curricular) or as an extracurricular voluntary service (co-curricular). Most researches confirmed that service-learning enhances students' learning (Eyler and Giles, 1999). A recent survey among member institutions of the Association of American Colleges and Universities (AAC&U) reported that the majority of AAC&U institutions are placing a higher priority on general education, and those institutions are placing more emphasis on "engaged learning practices" in that service learning is one of the most important practices for engaged learning (Hart Research Associates, 2009).

Service-learning practices in higher education in Taiwan

Service-learning has been widely promoted and implemented in higher education institutions in Taiwan, evidenced by that fact that 135 out of the 164 colleges and universities in Taiwan offer service-learning courses (Hong, 2010). Those service-learning courses can be generally categorized into three types: commonly required courses, general education courses with service-learning component, and professional courses with service-learning component. Many universities offer courses of the first type that require all students to take courses, titled "service-learning," with credit or without credit. Those courses usually do not have classroom learning and the learning part is less designed than other types of service-learning courses.

Universities may also immerse service learning into general education or professional courses (Lee and Wang, 2009). Teachers usually play a substantial role in planning and organizing the process of service. Some universities established university centers for service learning that shoulder the role of planner and organizer of the service programs. The service covers a wide range of activities such as campus maintenance, community services, volunteering at grassroots organizations, or overseas services. The emphasis of service varies in degree among service-learning courses. Some courses, mostly the professional ones, place students' service at the center of the course and tight the service closely with the goal, content, and assignments of the course. In contrast, the service part in some courses plays a peripheral role and is treated as an extra activity for students.

The study is basically to assess whether the service-learning program has achieved its goal in improving students' affective and skill development. Jacoby (1996) suggested that service learning may pay focus more on transferrable skills such as critical thinking, problem-solving, and communicative skills. In this research we want to know whether service-learning enhances students' communicative and problem-solving skills. In addition, we want to know whether service-learning contributes a heightened value of service-learning and helping others. Moreover, we want to empirically examine the different relationships between the involvement of participants (teachers, supervisors, and students) and the learning outcomes.

MATERIALS AND METHODS

Program description

Fu Jen Catholic University emphasized holistic education, and the university initiated various types of credit-based service learning programs since 1998 (Yin, 2002). Rather than creating new courses on service-learning, the university encouraged teachers to immerse the service learning element into existing courses in general education or professional education. The university also encou-raged teachers to form teams to leverage the collaborative synergy among teachers and specialties for a common goal.

In 2008, The College of Management pioneered to immerse service-learning activities into the Introduction to university studies, a required 2-unit general education course for freshmen. In 2010, the immersion of service learning activities into the "Introduction to University studies" course was further extended to all colleges of the university. Teachers who would teach this course in the fall semester of 2010 were invited to participate in this project on a voluntary basis. Sixteen teachers joined and a total of 21 classes and 1,050 students were involved in the program. The service opportunities offered by the program include four categories:

Compassion for Campus Services: Volunteering work in this category is to keep the campus clean and beautiful. Students help maintain the campus grounds by raking leaves, manicuring the lawn, and pulling weed. Students also help maintain the campus buildings through sorting of trash and cleaning of restrooms. Each team of six students decides upon a campus section for service and works 2 h per week for the duration of 7-8 weeks. The Compassion for Campus Services received a total of 250 students.

Volunteering with Student Clubs: Volunteering opportunities in this category are provided by a number of service-oriented student clubs. Students formed teams of six and decided upon which student club to volunteer with. A total of 250 students belonged to
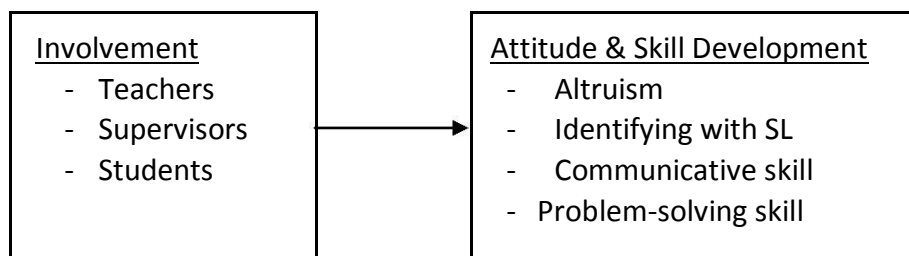
Figure 1. Research framework.

this category.

Volunteering with Volunteer Teams: Students in this category participated in service activities facilitated by the existing volunteer teams organized by the administrative units of the university. A total of 200 students chose this category.

Online Tutoring for Rural Elementary Students: Students worked in teams of eight to help elementary kids in rural areas to improve their reading abilities. Student volunteers and elementary kids read picture books together using an online platform. A total of 350 people participated in this service program.

Design features of the program

During the first week of semester, teachers gave students an orientation about service learning and facilitated students to form teams. An online system was used for student teams to fill in the registration forms. Students who did not join any teams and registered in time would be grouped in teams and given their service work by the Center of Service Learning. The Center also invites on-site workers (who know the best how to perform the various services) to be supervisors of students. For example, the center invites teachers at the elementary school for the online tutoring service to be the supervisors. During the first month of the semester, the Center of Service Learning would facilitate student teams to meet with their supervisors. During the semester, each student is required to serve for 16 h as well as to keep a journal for the purpose of reflection.

The design of the service-learning program is unique for several reasons. First, it does not ask teachers to go to the field. Instead, coordinated by the Center for Service Learning, supervisors provide on-site training and supervision. This substantially reduces the workload of the teachers and increases their willingness to participate. Second, it did not ask the supervisors to adjust themselves for new services or students. Most service learning opportunities are developed within existing services and systems, instead of creating new services and new systems. Students follow the supervisors to perform the services together. Third, this program fosters interaction and connection between students and people in the field. In short, service-learning utilizes existing social capital and further expands it.

Participants and procedure

The student assessment intended to reach the entire 1,050 students enrolled in the 21 "Introduction to University studies" classes participated in the service learning program in the fall semester of 2010. At the end of semester, a survey questionnaire was created and given to students at each class to fill in the survey. A total of 766 students completed the survey that represented a 73% response rate. After accounting for the missing data, a sample of 750 (71%) resulted.

Questionnaire

The survey questionnaire contains three parts. The first part asks for the basic information of the respondent including gender, college, department (major), class/teacher, and category of service. The respondent also indicates whether he or she has participated in the student team formation session facilitated by the teacher. The second part contains 21 questions to assess the respondent's participation as well as the respondent's perception regarding the teacher's and the supervisor's involvement in the various stages of service-learning. The third part contains 28 questions to collect data regarding the respondent's self-reported learning outcomes in civil responsibility and skill development. The civic responsibility aspect

contains five constructs: altruistic attitude toward service learning, attitude toward helping others, respect for others, social responsibility, and a sense of school pride. The skill development contains five constructs: communicative, leadership, teamwork, problem-solving, and social skills. The questionnaire has a total of 55 questions, mostly using a Likert-type, 5-point scale, ranging from strongly disagree to strongly agree.

RESEARCH FRAMEWORK

Our analyses assessed whether the students agreed that their participation in service-learning enhanced their communicative and problem-solving skills and contributed to their positive attitude toward service learning and helping others. In addition, the study analyzed the different effects of the involvement of teachers, supervisors, and students on the students' learning outcomes in attitude and skill development, as shown in Figure 1.

Limitations of research

There are several noteworthy limitations of this study. First, the study was based on students' self-report and thus may be biased (Bringle et al., 2004). Self-report surveys are commonly used in assessing students' learning outcomes, especially in comparing outcomes by service learners and non-service learners (Prentice and Roberson, 2010). It should be noted that self-report outcomes are subjective, and students who liked or disliked their service learning experiences may respond positively or negatively about their outcomes. Second, the study relied on cross-sectional data that lack a longitudinal understanding of the impact of service learning on student learning outcomes. The students in the study were all freshmen at the time, but they might have previous service learning experiences at high school. Third, the study relied on
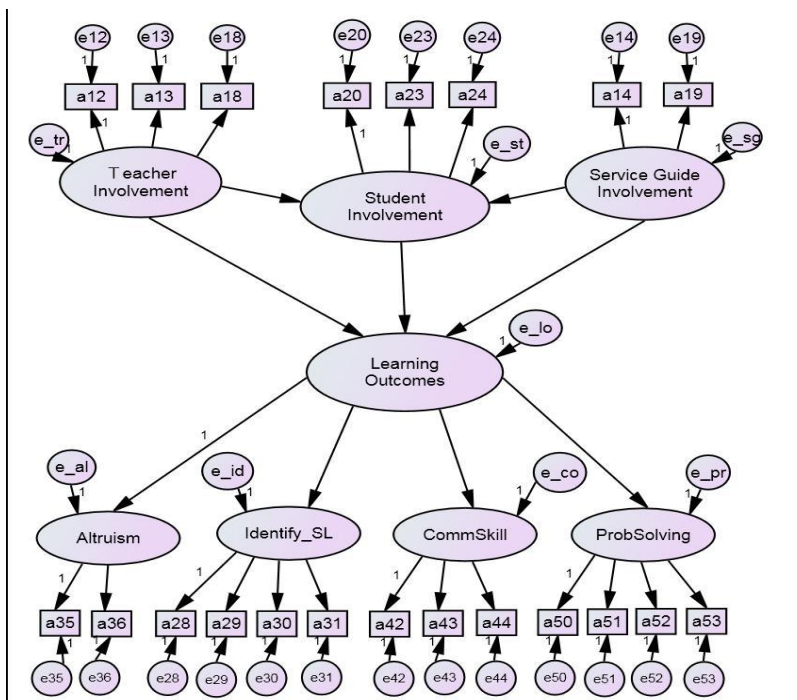
Figure 2. The structural model representation.

students' self-report perception regarding the involvement of teachers and supervisors in the serve learning program, rather than collecting data directly from teachers and supervisors. Direct assessment might provide more reliable evidence. Fourth, the study is based on post-test only. Pre- and post-tests would be better to show the changes of affective attitudes and skills after their participation in service-learning (Steinberg, et al., 2010). Fifth, the study used only quantitative methods. Qualitative data would be useful to flesh out the quantitative findings of the study. In short, the study used self-report, cross-sectional, post-service survey to assess processes and outcomes of service learning and to analyze the different effects of the involvement of participants on the student affective attitudes and skills.

Structural modeling

Based on the research framework, a structural model was developed. The study used the structural equation modeling (SEM) method for several reasons. First, SEM is considered as a good method to estimate latent variables. Second, SEM allows researchers to simultaneously estimate multiple relationships among variables. This study used SEM to analyze the direct and indirect relationships between the involvement of participants (teachers, supervisors, and students) and the learning outcomes. Third, SEM integrates factor analysis and path analysis into a complete model that allows the exogenous latent variables to have measurement errors (Chen and Wang, 2010). In contrast, regression methods usually assume that the exogenous variables do not have measurement errors.

Model representation

Figure 2 is the structural model developed based on the research framework. The three latent variables at the upper part represent the involvement of teachers, students, and supervisors (service guides). Each variable is constructed by specific survey questions. For example, the teacher involvement is constructed and measured by survey questions Nos.12, 13, and 18 (denoted by a12, a13, a18). All survey questions (measurement variables) and endogenous variables allow measurement errors and the error terms are denoted by "e" with the corresponding numbers of abbreviations.

At the middle part of the model is the latent variable "learning outcomes," constructed by four latent variables (the lower part of the model) that represent the four learning outcomes of interest: altruism, identifying with service learning, communicative skill, and problem-solving skill. The model shows the corresponding measurement variables and error terms of each latent variable.

We want to examine the "teacher -> student" and "supervisor (service guide) -> student" relationships as well as the relationships between the three participants (teachers, supervisors, and students) and the students' learning outcomes. Totally, there are five such hypothetical relationships in the model (Figure 2).

Reliability

The AMOS software was used for the analysis of the structural model. The Cronbach's alpha method is commonly used to analyze the internal reliability of Likert-type surveys. The Cronbach's alpha method can be used to evaluate the construct of each latent variable. This research used the Cronbach's alpha method to identify and eliminate survey questions that are not consistent with other questions. Table 1 summarized the resulting constructs of the variables in the research and their corresponding means, standard deviations, and Cronbach's alpha coefficients. The percentage of either agreed or strongly agreed and the percentage of either disagreed or strong disagreed are also reported at the last two columns in Table 1.

A survey or a construct is reliable if the Cronbach's alpha coefficient is higher than 0.5. The overall Cronbach's alpha coefficient

Table 1. Descriptive statistics and cronbach's alpha method summary (n=750).

Variable	Survey question	Mean	SD	Alpha	% of agreed or strongly agreed
Teachers' involvement	12. Teacher clarified in class the meaning of service learning.	3.73	.798		64.1
	13. Teacher explained the relationship between service learning and the course.	3.73	.801	.823	66.1
	18. Teacher cared about my service learning.	3.48	.824		49.2
Students' Involvement	10. Prior the service I already understood the content of the service.	3.67	.829		62.0
	20. I knew the subjects (the institutions or the people) I serve.	3.82	.837	.700	66.1
	23. I kept good service learning journal.	3.49	.849		47.3
	24. I often discussed with teammates about service learning experiences.	3.48	.837		47.3
Supervisors' Involvement	14. The supervisor described clearly the content of the service.	3.77	.844	.734	69.5
	19. The supervisor supervised me and gave me adequate assistance.	3.69	.840		62.4
Identifying with service learning	28. Through the service-learning, I agree with the University's goal in promoting service-learning.	3.58	.910		56.5
	29. Service-learning helped me to become more willing to enhance my professional learning.	3.78	.794	.862	67.1
	30. Through the service-learning, I agree that service learning enriches personal life.	3.90	.795		75.9
	31. Through the service-learning, I agree that service learning is an effective learning method.	3.88	.757		73.3
Altruism	35. Through the service-learning, I agree that care for the society is a basic attitude for citizens.	4.01	.730	.811	80.0
	36. Service-learning helped me to care more about the people and the environment surrounding me.	3.87	.744		70.8
Communicative skill	42. The service-learning helped me to communicate with others more effectively.	3.72	.749		62.3
	43. Service-learning helped me to come up with consensus plans with people who hold different opinions.	3.77	.694	.869	68.1
	44. The service-learning helped me to learn how to express my thinking with order and clarity.	3.74	.709		64.9
Problem solving skill	50. The service-learning helped me to become more confident in coping with urging problems.	3.69	.732		59.9
	51. The service-learning helped me to learn how to use different methods to resolve problems.	3.73	.698	.902	64.0
	52. The service-learning helped me to think and proceed in a systematic manner while dealing with difficulties.	3.68	.733		59.7
	53. The service-learning helped me to confront problems and come up with adequate solutions.	3.68	.714		60.5

Table 2. Model fit summary.

Method	Rule	Result	Model Fit
CMIN /df (Chi-Square/ df)	CMIN/DF < 5	4.78 (860.3/180)	Yes
GFI	GFI > .9	.90	Yes
RMR	RMR < .1	.07	Yes
RMSEA	RMSEA < .08	.07	Yes
AGFI	AGFI > .9	.87	No (close)
NFI	NFI > .9	.91	Yes
CFI	CFI > .9	.93	Yes
RFI	RFI > .9	.90	Yes
IFI	IFI > .9	.93	Yes
PNFI	PNFI > .5	.78	Yes
PGFI	PGFI > .5	.70	Yes

of the survey is .935, suggesting that the survey is   very reliable. Table 1 also suggested that the variables in the model are reliable.

Model Fit.

"Model fit" analyzes to what extent a structural model fits with the data. Various methods have been developed to test the model fit, and the rule of thumb is to use multiple methods while testing the model fit of a structural model (Chen and Wang, 2010). Table 2 summarized the assessment of the model fit of our model, suggesting that the quality of the model fit is good.

Multi-collinearality

Multicollinearity implies two or more predictor variables in a multiple regression model are highly correlated. If multicollinearity exists, the estimates may not give valid results about any individual predictors, and it implies that there exists at least one predictor that is redundant with respect to others. To test multicollinearity, a typical procedure is to regress the model with the multicollinearity test on tolerance, variance inflation factor (VIF), and conditional index (CI). To rule out multicollinearity, it is expected, as rules of thumb, that tolerance > 1, VIF < 10, and CI < 30. Table 3 summarizes the multicollinearity test of the nine explanatory variables (survey questions). For every estimate in the model, the tolerance and the VIF satisfy the non-existent multicollinearity condition. Only the accumulative CI at the last variable in the model became slightly higher than 30. In brief, the results suggested that the model does not have the problem of multicollinearity.

RESULTS

Students' profile

The sample size is 750, and the majority of students (67%) are female. The percentage of each category of service is: campus services (20%), student-club volunteering (40%), services with volunteer teams (15%), and online tutoring (25%). With regard to colleges, College of Management and College of Human Ecology represents 56 and 25% of the profile, respectively.

Involvement of teachers, supervisors, and students

Table 1 indicated that, with three exceptions, the means for the questions are higher than 3.5 (using a 5-point scale) and the percentages of either agreed or strongly agreed are higher than 60%. Only forty-nine percent either agreed or strongly agreed that the teachers cared about students' services (Question No.18). This might reflect the fact that the service-learning program did not ask the teachers to shoulder much responsibility in supervising students' service-learning. Another question receiving relatively lower mean is the students' journal keeping. While the service-learning program emphasized journal-keeping as a way to foster reflection, only 47% either agreed or strongly agreed that they kept good service learning journal (Question No.23). In addition, only 47% either agreed or strongly agreed that they often discussed with teammates about their service-learning experiences (Question No.24). It is thus suggested that the service-learning program can pay more attention to encourage journal keeping and teammates' discussions.

Attitude and skill development

One of our research questions is about students' learning outcomes in altruistic attitude as well as communicative and problem-solving skills. Table 1 summarized the descriptive statistics of students' self-reported learning outcomes, and the means for all questions about attitude and skill development are higher than 3.5. The means are even higher than 3.75 for "service learning helped me to be more willing to enhance professional learning," "through service-learning, I agree that service learning enriches personal life," and ""service-learning helped me to come up with consensus plans with people holding different opinions." Given these findings numbers, it is evident that service-learning has a positive effect on students' attitudes toward altruism and service learning,

Table 3. Collinearity test summary.

Model	Unstandardized coefficient		Standardized coefficient	t
	B Est.	SD	Beta Dist.	
Constant	1.885	.141		13.37
(20) I knew the subjects (the institutions or the people) I serve.	.241	.032	.277	7.58
(23) I kept good service learning journal.	.108	.033	.126	3.31
(24) I often discussed with teammates about service learning experiences.	.060	.034	.069	1.76
(10) Prior the service I already understood the content of the service.	.170	.031	.194	5.41
(12) Teacher clarified in class the meaning of service learning.	.079	.049	.086	1.61
(13) Teacher explained the relationship between service learning and the course.	.072	.048	.079	1.49
(18) Teacher cared about my service learning.	.002	.036	.002	.044
(14) The supervisor described clearly the content of the service.	-.004	.037	-.005	-.11
(19) The supervisor supervised me and gave me adequate assistance.	.035	.037	.040	.931

a. Dependent Variable: (35) Through the service-learning, I agree that care for the society is a basic attitude for citizens.

Table 4. Standardized Regression Weights of the Model.

Relationship			Estimate
Student	<---	Teacher	.438*
Student	<---	Guide	.555*
Outcomes	<---	Teacher	.144
Outcomes	<---	Student	.717*
Outcomes	<---	Guide	-.091
Altruism	<---	Outcomes	.836*
Identify_SL	<---	Outcomes	.812^
CommSkill	<---	Outcomes	.908^
ProbSolving	<---	Outcomes	.864

(Note: *p<.05).

as well as on students' development in communicative and problem-solving skills.

Different effects of teachers' and supervisors' involvement on student learning outcomes

Another research question is the different effects of the involvement of participants (teachers, supervisors, and students) on student attitude and skill development. Table 4 and Figure 3 summarized the estimated coefficients of the structural model using the maximum likelihood method. The followings are the main findings based on the statistical analysis. It is found that the relationship between teachers' involvement and students' involvement is significantly positive (.438), so is the relationship between supervisors' involvement and students' involvement (.555). This confirmed that teachers and supervisors (service guides) play a positive role in facilitating students' service learning.

In addition, the relationship between students' involvement and learning outcomes is significantly positive (.717). This finding suggests that, if students get more involved in service learning (more preparation, more understanding of the services and the subjects, more discussions with teammates, etc.), they are more likely to benefit from the service learning in the affective and skill development.

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Table 5. Standardized direct, indirect, and total effects.

	Direct Effect			Indirect Effect			Total Effect		
	Guide	Teacher	Student	Guide	Teacher	Student	Guide	Teacher	Student
Student	.555*	.438*	-	-	-	-	.555*	.438^	-
Learning Outcomes	-.091	.144*	.717^	.398^	.314*	-	.307*	.458^	.717*
Identify_SL	-	-	-	.249^	.372*	.582*	.249	.372	.582*
ProbSolving	-	-	-	.266^	.396^	.620^	.266	.396	.620^
CommSkill	-	-	-	.279^	.416^	.651^	.279	.416^	.651^
Altruism	-	-	-	.257	.383	.600	.257	.383	.600

(Note: *p<.05).
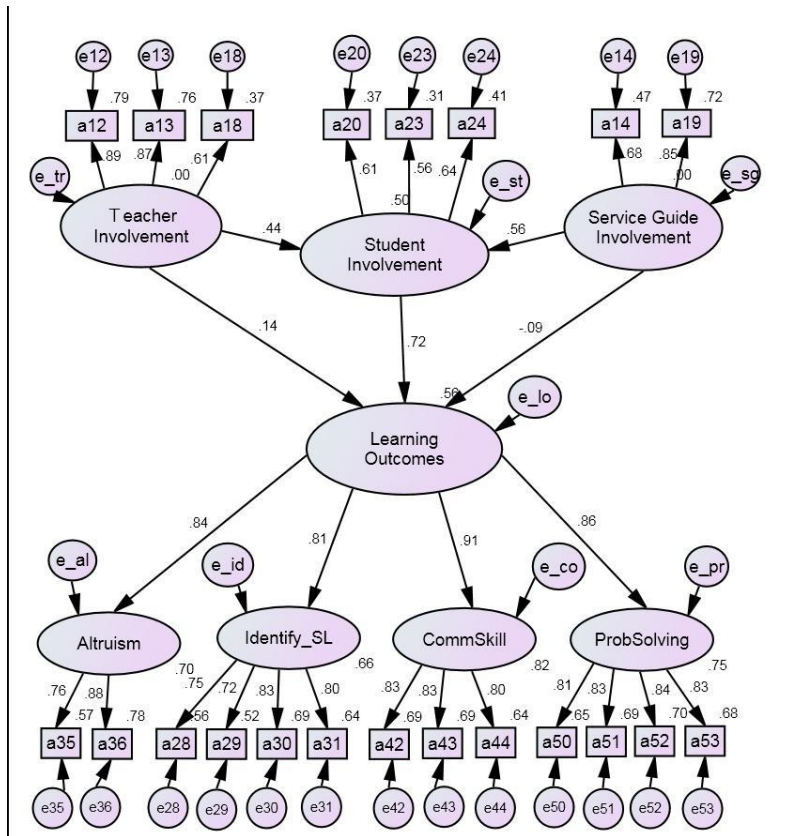
Figure 3. The estimated coefficients of the structural model.

the least. The indirect effect of students' involvement on learning outcomes was .314, which is higher than the direct effect (.144). The indirect effect of supervisors' involvement was high (.398), but the direct effect was insignificantly. These findings suggested that the total effects of teachers' and supervisors' involvement on student learning outcomes were mainly through the in-direct paths. This may be interpreted that teachers and supervisors contribute to students' learning mainly through their influence in getting students more involved: more service preparation, more understanding of the services and the subjects, and more discussions with teammates.

DISCUSSION

The study assessed whether a university-wide curriculum-based service learning program had achieved its goal in improving students' affective and skill development. Based on the students' self-report, post-service survey, the study found that the means for all questions about attitude and skill development are higher than 3.5, with 60% or higher of the students indicating either "agree" or

"strongly agree" that the service learning helped them improve their altruistic attitude and skills in communication and problem-solving.

Scholars emphasized that students, teachers, and supervisors are all important in creating positive service experiences (Prentice and Robinson, 2010). One objective of this study is to use the survey data to analyze the different effects of involvement of teachers, supervisors, and students on students' learning outcomes. The study highlighted three findings. First, students' involvement makes a difference. It is found that students' involvement, measured by students' preparation for and understanding of the services as well as students' frequent discussions with teammates, has a significant positive relationship with the learning outcomes. In other words, the more students got involved, the higher the students valued that they benefitted from the services.

Second, the analysis suggested significantly positive relationships between teachers' involvement and students' learning outcomes, as well as between supervisors' involvement and students' learning outcomes. This may be interpreted that the more teachers or supervisors got involved, the more the students learned from the services.

Third, the study used the structural analysis to estimate the direct, indirect, and total effects of teacher or supervisors' involvement on students' learning outcomes. It is found that the indirect effects out-weighted the direct effects. The positive influence of teacher or supervisors' involvement on the learning outcomes is mainly through the "indirect effect" (through the influence on student involvement, which has a high positive influence on learning) rather than through the direct path between teachers' or supervisors' involvement and the learning outcomes. This finding is of particular interest for teachers participating in service learning programs. The main point is that teachers should try to help students prepare for the services, understand the content of the services, emphasize the subjects they will be serving, and encourage them to discuss with each other. As long as the students are highly involved, positive learning process and outcomes will ensue. In contrast, it would be less effective if teachers try to work exclusively directly on students' learning or service outcomes, such as lecturing the knowledge on problem-solving or communicative methods, sending students for professional services without enough preparation and understanding of the contextual background of the services, focusing on service delivery without facilitating students to discuss and exchange ideas, etc. The study highlighted that service-learning teachers would be more effective if they work more on the indirect path – through their facilitative role of getting students more involved.

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