Morality and Citizenship Outcomes of Service-Learning in Psychology and Materials Engineering

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ABSTRACT

Student engagement in service-learning is linked to a multitude of positive academic and non-academic outcomes, including morality and citizenship (Eyler, et. al., 2001). However, these two have yet to be examined alongside each other, and across different disciplines. Thus, our study measured changes in moral identity (Aquino and Reed, 2002), *pagkamakabayan* (de los Santos, 2010), and civic engagement (Doolittle & Faul, 2013) among students who participated in service-learning in Psychology and Materials Engineering courses in the University of the Philippines. Both groups experienced increases in *pagkamakabayan*, while only Psychology students had significant changes in civic behaviors and moral identity symbolization. Factors associated with these observed changes are likewise discussed, along with recommendations for service-learning research and implementation.

Higher education institutions hold the responsibility of shaping students, not just to gain academic knowledge, but also importantly, to become responsible and moral citizens. One such means adopted by educators is through academic service-learning. Service-learning involves provision of service to a community using one's academic learning, while simultaneously enriching students' learning about the course (Bringle & Hatcher, 1996). In general, it is a means to make the course content more relevant to the students, increase understanding of the subject matter, and develop students' character and civic engagements. Recognizing these benefits of service-learning, we sought to promote such growth in our students in our respective classes. In doing so, we have received positive feedback about the project – whether through formal and informal discussions with students, written reflections, and formal student evaluation of teachers. However, more concrete empirical evidence of its potential impact is still warranted for us to claim such benefits.

In this study, we examined whether students experience changes in citizenship attitudes and behaviors and moral identity before and after engaging in service-learning. We focused particularly on these areas of student development given the other-oriented nature of service-learning; that is, service-learning may help students become more sensitized to the needs of others and their communities through the exposure they gain outside the classroom. From a psychological perspective, service-learning allows students to engage in prosocial behaviors, which may in turn positively affect their cognitions about themselves (Bem, 1972) and their sense of civic responsibility (Eisenberg, Spinrad, & Knafo-Noam, 2015). By embarking on this research, we sought to demonstrate potential benefits associated with service-learning in important aspects of student development, while also carving out directions for pedagogical practices and research in higher education.

Service-Learning Outcomes

Academic service-learning is a pedagogical approach where students engage in service- oriented activities and reflect on their experiences to guide their learning. Their academic learning, in turn, also guides the services that they engage in

(Bringle & Hatcher, 1996). Such an approach is a means for learning to be contextualized beyond the classroom, thus, linking theory and practice (Astin, Vogelgesang, Ikeda, & Yee, 2000; Conway, Amel, & Gerwein, 2009), and promoting socially responsive knowledge and civic engagement (Duffy & Bringle, 1998). Given these characteristics of service-learning, a robust body of work has demonstrated both its academic and non-academic benefits to students.

Service-learning facilitates positive personal, social, learning, and career outcomes among students, while also strengthening their relationships with the faculty, increasing student satisfaction and their likelihood to graduate (Eyler, Giles, Stenson, & Gray, 2001). Such positive outcomes are more likely when the service-learning involves a reflection component (Conway, et. al., 2009; Levesque-Bristol, Knapp, & Fisher, 2010). Research has consistently shown positive effects of service-learning on students' academic performance, be it in concrete terms such as student grades, test performance, or GPA (Astin, et. al, 2000; Celio, Durlak, & Dymnicki, 2011; Warren, 2012), or more general academic skills such as knowledge of and ability to apply course content, and motivation to learn (Conway, et. al., 2009). Along with these academic outcomes is students' increased satisfaction with the course where service-learning is assigned. In particular, they appreciate the opportunity to contribute to the community, and recognize the enhancement of their academic learning through more relevant applications of the course content in a broader context (Chapdelaine & Chapman, 1999; Hardy & Schaen, 2000; Kogan & Kellaway, 2004).

As mentioned, the benefits of service-learning go far beyond the academic. Personal outcomes such as the development of self-efficacy, identity, spirituality, morality, and interpersonal skills, as well as social outcomes in relation to social attitudes, social responsibility, and commitment to service have also been observed among students who engaged in service-learning (Eyler, et. al., 2001). Of particular interest in this present study are the facets of morality and citizenship.

Service-Learning and Morality

Service-learning may be linked to students' moral development by providing opportunities to observe and reflect on issues on justice and fairness, especially if the service involves interactions with marginalized communities. Several studies have examined the effects of service-learning on students' moral reasoning, but there is a dearth of consensus on these outcomes (Eyler, et. al., 2001). For instance, Boss (1994) found greater increases in moral development among college ethics students who engaged in service-learning as to those who did not. In contrast, Bernacki & Jaeger (2008) found no significant changes in the moral reasoning and orientation of students who participated in service-learning. However, these students did report increased compassion and sensitivity, understanding of social problems, and an increased ability and efficacy to contribute to making the world better — possible precursors to future moral development. Indeed, other research suggests that service-learning is also associated with increased empathy (Lundy, 2007), which is linked to more advanced moral development (Sherblom, 2012).

In these aforementioned studies, changes in moral development were measured using the Defining Issues Test, which asks participants to provide their reasons for coming to a particular decision about a moral dilemma. Such an approach is based on Kohlberg's (2008) cognitive-developmental approach, where mature moral development is conceived as an orientation towards fairness and justice. Bernacki & Jaeger (2008) also considered Carol Gilligan's (1982) theory, which suggests that care for others is another form of moral reasoning along with Kohlberg's justice orientation. However, one's ability to reason maturely about moral dilemmas does not necessarily translate to one's desire to live a moral life. Instead, a proposed link between cognition and behavior resides in one's self-concept and social identity (Aquino & Reed, 2012), or one's moral identity.

A relevant facet of moral self-concept that has yet to be explored in the service-learning research is moral identity — defined as "a self-conception organized around a set of moral traits." (Aquino & Reed, 2002, p.1424). That is, moral identity is

the importance individuals place in possessing characteristics attributed to moral persons, which Aquino & Reed (2002) distilled into nine traits: caring, compassionate, fair, friendly, generous, helpful, hardworking, honest, and kind. Both distinguished between internalization and symbolization of moral identity, with the former representing the private and the latter representing the public facet of identity. Their research demonstrated that internalization and symbolization positively predicted individuals' engagement in volunteer work, and internalization also predicted donation behavior. Thus, it appears that moral identity may contribute to engagement in moral behaviors, which may also be reflected in citizenship behaviors. It would then be worth examining whether interventions such as service-learning can affect one's moral identity, and thus further promote subsequent moral behaviors. In our study, then, we conceptualize morality in terms of moral identity, or the degree to which individuals consider being a moral person an important part of their self-concept. Given the potential impact of behaviors on cognitions, which may include one's self-concept (Bem, 1972; Eisenberg, et. al., 2006), we predict that service-learning would be linked to increases in moral identity.

Service-Learning and Citizenship

Morality shares some similarities with citizenship, as both involve the propensity to act for the benefit of one beyond the self. Indeed, service-learning has had robust evidence of positive citizenship outcomes. A longitudinal study (Moely, McFarland, Miron, Mercer, & Ilustre, 2002) of service-learning outcomes found increases in civic attitudes and skills, including students' self-evaluations of civic skills, attitudes toward social issues, and plans for civic action, especially when students highly valued their service-learning courses. Astin and colleagues (2000) had similarly found changes in students' values, self-efficacy, leadership, plans to pursue a service career, and intention to engage in service after college as a result of service-learning. Among these measures, the greatest impact was on students' decision to pursue a service career. Meta-analyses have also yielded similar findings, with service-learning increasing civic engagement or any outcome oriented toward the community (Celio, et. al., 2011), and behaviors, beliefs, or behavioral intentions reflecting personally

responsible, participatory, and justice-oriented citizenship (Conway, et. al., 2009).

These service-learning studies are among the few that examined citizenship from a psychological perspective. In 2011, Condor noted that only 35 psychological studies in the PSYCHINFO database examined citizenship as a construct. While more research has certainly been done since then, there is still much catching up to do. Thus, the research can contribute to the growth of our understanding of citizenship. More importantly, it will add to what we know of Filipino citizenship in particular. After all, like morality, it is a construct that is likely to show variations among different cultures and groups. For instance, citizenship in the US is oftentimes linked with concerns about immigration and multiculturalism (Condor, 2011), which are less relevant issues in the Philippines. Thus, there is a need for further exploration — both at the theoretical and applied levels within the local setting.

A recent local exploration of a concept relating to citizenship is de los Santos' (2010) study on *pagkamakabayan*, a Filipino term related to citizenship and nationalism. Using surveys among Filipino high school students and interviews with experts, she created a scale measuring this construct consisting of the following facets: active engagement, patriotism, being a good citizen, other-orientedness, positive attitudes, and being Filipino-oriented. However, citizenship should not only apply to the broad context of the country but must also translate to active engagement in one's community. Thus, we will also examine civic engagement, which includes both attitudes about community involvement and behaviors performed to make a difference in the community (Doolittle & Faul, 2013). Summarily, we define citizenship in this study both in terms of *pagkamakabayan* — with a more Filipino orientation, and civic engagement — which pertains to a more general attitudinal and behavioral orientation towards one's community.

The Present Study

The literature demonstrates a wide range of both academic and non-academic benefits of academic service-learning. To our knowledge, however, there is a dearth of such research among

Filipino students. Thus, our study contributes to building this body of work in the local setting. We have likewise seen some evidence of the impact of service-learning on moral reasoning and citizenship in terms of civic attitudes and skills, and an orientation toward service. However, other important facets of morality such as moral identity, and citizenship in the Filipino context, have yet to be explored in relation to service-learning.

Given these gaps, the research aims to understand whether engagement in service-learning among psychology and materials engineering students is associated with changes in moral identity, *pagkamakabayan*, and civic engagement. Based on the literature reviewed, we predict increases in the said domains in both classes after engagement in service-learning.

At a practical level, the study evaluates a pedagogical approach that is meant to simultaneously promote students' learning while also serving communities, and ultimately brings about desired effects such as moral identity and citizenship among university students. By elucidating the outcomes associated with this approach, the study can provide relevant and creative alternatives to higher education institutions to shape their students' characters. Moreover, it examines disciplines (i.e., Psychology and Materials Engineering), where morality and citizenship are indirectly taught, but can still be promoted. To our knowledge, service-learning had yet to be widely adopted in the university at the time of conceptualizing this research, and these two disciplines were among the few that included this as a pedagogical approach. Although there is much evidence of positive student outcomes for each discipline (Conway, et. al., 2009; Duffy, Moeler, Kazmer, & Barrington, 2008) cross-disciplinary comparisons of the effects of service-learning are fewer and far between (e.g. Dostilio, Conti, Kronk, et. al., 2013; Falk, Durington, & Lanford, 2012; Madden, Davis, & Cronley, 2014). Thus, the research presents the opportunity to compare two fields rarely examined alongside each other. In doing so, a stronger case can be made for the breadth of applications of service-learning, as well as its benefits across disciplines and types of services. That is, the research can be an avenue for the promotion of service-learning as an approach for educators from a broader range of disciplines, especially if benefits for students of both disciplines are indeed demonstrated. This comparison then is not only

intended to highlight differences between disciplines but to demonstrate as well common trends in service-learning across disparate disciplines. Should differences arise, these may provide directions for further investigation of relevant service-learning elements and outcomes for future research.

Aside from the potential to meet these educational objectives, the study also highlights an avenue for faculty members to integrate teaching, research and extension, and the balancing of areas of scholarship expected of us (Moore & Ward, 2010; Williams & Sparks, 2011). By describing the process of service-learning, and clarifying its benefits to students, more faculty members will be encouraged to consider this pedagogical approach. In addition, the study strengthens the efforts initiated by individual faculty members, and can also be a benchmark for others already using service-learning to produce their own research. Likewise, it contributes to the body of work that emphasizes the need for institutional support to sustain service-learning and promote greater interdisciplinary collaboration in the implementation and evaluation of this pedagogical approach (Cooper, 2013).

In summary, our research investigates whether students who engage in service-learning will experience increases in moral identity and citizenship attitudes and behaviors. In doing so, we intend to contribute to the literature on service-learning especially in the Philippine context, and demonstrate possible benefits associated with this pedagogical approach.

METHOD

The Service-Learning Projects

The classes involved in the study include a psychology class on principles of learning, as well as a materials engineering laboratory class on ceramics, which we, the authors, were teaching. The psychology class focuses on the major principles and theories of learning, including behaviorism, social cognitive theory, cognitivism, and complex cognition. For the service-learning project, students were asked to implement learning to learn workshops consisting of two 2 ½ hour Saturday sessions at

a nearby public high school. These workshops were intended to teach the high school students to learn more effectively by applying the learning principles tackled in the psychology class. The first session focused on building self-efficacy and motivation, while the second taught students effective learning strategies. Workshop modules were designed by the course instructor, the first author of this paper. Students facilitated the workshops in groups of four to five, with their participants ranging from 10 to 30 per class. Attendance was voluntary. Participants were in 7th and 8th grades and mostly from economically disadvantaged families. After each session, and during the class meetings after the service, psychology students had the opportunity to share their experiences with each other and with their instructor. They were also asked to submit evaluation and reflection papers on the experience, the learning principles that they had used and seen for their service, their changes in perceptions of learning and psychology, as well as their future plans as a result of the experience. These papers were used as basis for grading the service-learning component of the class.

The materials engineering class, which is the laboratory component of the ceramics course, covers the topics of synthesis of ceramics, processing and fabrication techniques, and characterization of ceramic materials. The service-learning project for this course required students to build a ceramic 3D printer for the university's College of Fine Arts, which provided the locally sourced clay to be used and gave some considerations that ceramic artists would likely look for in a printer. The laboratory class was divided into three groups corresponding to the different aspects of the printer: mechanicals, electricals, and software. An existing open source 3D printer design was adopted, which students were free to modify as needed for their material (i.e. local clay). The local clay was also modified to get the proper viscosity for printing. Sourcing of materials, assembly, and printer debugging were carried out by the students with guidance from the instructor and another outside consultant. Students demonstrated the printer in the college's first International Ceramics Conference in November of 2015.

Procedure

The study used a pre- and post-test quasi-experimental design to measure changes in citizenship and moral identity, and compare the two classes' changes in these outcomes. Students completed the pre-test questionnaire during the first week of the semester, and answered a similar questionnaire at the end of the semester after the service-learning had been completed. The post-test questionnaire also included questions on their service-learning experience as well as their self and course evaluations.

Participants

The participants were students enrolled in the aforementioned classes, with 26 engineering students during the pre-test phase, and 23 in the post-test phase. Only 20 answered both pre- and post-tests, and were thus included in the final analysis. Among the psychology students, 56 completed the pre-test, and 63 answered the post-test, with 53 having finished both. Thus, we included a total of 73 students in the final analysis, with 47 females and 26 males. Their ages ranged from 19 to 24 years old (M = 19.07, SD = 1.17). Given that we, the researchers, were also the students' teachers, we took special care to assure students that their responses would remain anonymous, and have no impact on their grades. We used student numbers rather than students' names to match their pre- and post-test scores to maintain their anonymity in the analysis.

Measures

Citizenship outcomes of interest included *pagkamakabayan* and civic engagement. The former was measured using de los Santos' (2010) scale ($\alpha_{Pre} = 0.85$, $\alpha_{Post} = 0.87$). This seven-point scale includes items that pertain to one's beliefs and behaviors in relation to one's country (e.g., "I serve the country with loyalty," "I put into consideration the welfare of the country in my life-decisions."). The civic engagement scale (Doolittle & Faul, 2013), created specifically to evaluate service-learning outcomes, measures both civic attitudes ($\alpha_{Pre} = 0.89$, $\alpha_{Post} = 0.88$) and civic behaviors ($\alpha_{Pre} = 0.83$, $\alpha_{Post} = 0.80$). In contrast to the *pagkamakabayan* scale, the civic attitudes (e.g., "I believe I should make a difference

in my community", "I feel responsible for my community.") and behaviors (e.g., "When working with others, I make positive changes in the community", "I participate in discussions that raise issues of social responsibility.") in the scale pertain to the person's community rather than one's country. Finally, we used Aquino & Reed's (2002) Moral Identity Scale, which measures the self-importance of moral traits. The scale includes a symbolization ($\alpha_{Pre} = 0.64$, $\alpha_{Post} = 0.73$) and internalization ($\alpha_{Pre} = 0.87$, $\alpha_{Post} = 0.74$) subscale. Symbolization is the extent to which the individual gives importance to demonstrating moral traits in one's behaviors (e.g., "I am actively involved in activities that communicate to others that I have these characteristics."), while internalization is the centrality of moral traits to one's self-concept (e.g., "Being someone who has these characteristics is an important part of who I am."). Given the relatively low reliability of the symbolization subscale in the pre-test, we re-examined the items and found that removing one ("I often wear clothes that identify me as having these characteristics.") would improve Cronbach's alpha. Thus, with this item removed in both the pre- and post-test moral symbolization subscales, the new reliabilities were at $\alpha_{Pre} = 0.69$, and $\alpha_{Post} = 0.70$. This revised subscale was then used for the subsequent analyses.

Analysis

We used paired t-tests of pre- and post-tests to measure changes in the outcomes of interest. Analyses were performed separately for each course to find out which one underwent changes in each outcome. An independent samples t-test was also performed on difference scores to compare the Psychology and Materials Engineering classes. Given the uneven sample sizes, we report values with unequal variances assumed for more conservative estimates. Moreover, we ensured that only the variables meeting assumptions of normality were included in these analyses to minimize bias that may come with the small sample size of the Materials Engineering group (Field, 2013). Although an analysis of covariance is typically recommended for comparison of change scores (Dimitrov & Runrill, 2003), the current sample was unable to meet the assumptions necessary for such analyses to be performed.

Results

Table 1. Paired t-tests (Psych N = 53, MatE N = 20)

	Class	Pretest		Posttest					
		M	SD	M	SD	Skewness	Std. Error	t	p
Pagkamakabayan	Psych	5.56	.745	5.78	.732	.18	.33	-3.14**	.003
	MatE	5.54	.531	5.91	.442	.06	.51	-3.78**	.001
Civic Attitudes	Psych	5.49	1.02	5.64	.871	.31	.33	-1.59	.118
	MatE	5.69	.817	5.70	.813	.03	.51	-0.07	.942
Civic Behaviors	Psych	4.29	1.16	4.68	.936	.36	.33	-3.21**	.002
	MatE	3.88	1.12	4.29	1.18	.99	.51	-1.70	.105
Moral Identity Internalization	Psych	4.38	.290	4.49	.516	1.65	.33	N/A	N/A
	MatE	4.37	.441	4.48	.470	-.97	.51	-0.80	.433
Moral Identity Symbolization	Psych	4.13	1.01	4.52	.883	.50	.33	-2.99**	.004
	MatE	4.31	1.27	4.56	1.27	.04	.51	-.664	.515

 * p < .05 **p < .01

We conducted paired t-tests in each class to examine changes in *pagkamakabayan*, civic attitudes, civic behaviors, moral identity internalization, and moral identity symbolization (see Table 1). Comparing student scores on the outcomes of interest before and after service-learning, both Psychology ($t(52)$ = -3.27, p = .003) and Materials Engineering ($t(19)$ = -3.78, p = .001) students experienced significant increases in *pagkamakabayan*. Some gains were present only among Psychology classes – civic behaviors ($t(52)$ = -3.21, p = .002) and moral identity symbolization ($t(52)$ = -2.56, p = .004) both increased significantly after service-learning. In contrast, there were no significant changes in civic attitudes and moral identity internalization. Notably, the Psychology sample could not be subjected to paired t-tests for moral identity internalization due to a negatively skewed sample, violating assumptions of normality. Although paired t-tests yielded some discrepancies in change scores for psychology and materials engineering classes, independent sample t-tests comparing the

change scores of the two classes showed no significant differences (see Table 2). Again, moral identity internalization could not be subjected to t-tests because of the negatively skewed sample.

Table 2. Independent samples t-test of difference scores (Psych N = 53, MatE N = 20)

	MatE				Psych				*t*	*p*
	M	**SD**	**Skewness**	**Std. Error**	**M**	**SD**	**Skewness**	**Std. Error**		
Patriotism	0.375	.444	0.06	.51	0.208	.481	0.179	.33	1.405	.168
Civic Attitudes	0.013	.755	0.03	.51	0.149	.680	0.313	.33	-0.705	.486
Civic Behaviors	0.417	1.10	0.99	.51	0.387	.878	0.362	.33	0.109	.914
Moral Identity Internalization	0.110	.614	-0.97	.51	0.101	.443	1.653	.33	N/A	N/A
Moral Identity Symbolization	0.250	1.68	0.04	.51	0.393	.958	0.503	.33	-.358	.723

Discussion

The research examined whether students of Psychology and Materials Engineering experienced gains in citizenship and moral identity after undergoing service-learning. Among all variables of interest, significant gains for both classes were seen in students' levels of *pagkamakabayan*. Notably, students' civic attitudes did not undergo any changes. This discrepancy may be explained by looking at the focus of these particular aspects of citizenship, alongside the characteristics of the sample, *pagkamakabayan* is oriented towards the country, whereas civic attitudes are geared toward the community. The particular sample in this study is composed of students of the University of the Philippines, who are often called to be *Iskolar ng bayan, para sa bayan* (scholars of the nation, for the nation). Admittedly, this was also a message that had been emphasized in explaining the rationale of service-learning – that engaging in service is a means for students to serve the nation. Thus, it is possible that the idea of serving one's country may have been more salient than serving an unspecified community, given the message inculcated in the students. However, given the absence of a control group that did not undergo service-learning, an alternative explanation may

be a general trend towards increases in *pagkamakabayan* among students of the university. As the students answered the measures at the beginning and at the end of the semester, it is possible that the other classes they had taken had also fostered *pagkamakabayan* in them. Future research with control groups may better clarify this point.

Some changes, particularly in civic behaviors and moral identity symbolization were also evident only in the Psychology, but not to the Materials Engineering students. A possible explanation for such differences may be the nature of the service-learning projects for these two classes. For one, only the Psychology class included a structured reflection requirement – an element of service-learning that has been associated with greater benefits (Celio, et. al., 2011; Conway, et. al., 2009). Moreover, the service was performed outside of the university, and required high levels of interaction with participants coming from very different backgrounds, particularly economically disadvantaged high school students. Indeed, many of the students pointed out that the experience brought them beyond their comfort zones. In contrast, the engineering project involved more work with materials and technology, for the benefit of stakeholders within the university. A more conservative explanation, however, may be the differences in sample sizes of the two classes – a larger sample for the psychology classes may have increased the power of the analysis relative to the engineering class. Indeed, when directly comparing the change scores of psychology and engineering classes, there were no significant differences between the two.

It is also worth noting that no changes were identified in the other components of civic engagement and moral identity — that of civic attitudes and moral identity internalization. In fact, the latter could not be subjected to tests of difference due to the negatively skewed difference scores. Compared to the more behavioral counterparts of these scales, scores in these more internal subscales were relatively higher even at the pre-test phase, thus restricting the range for change. It is possible that the increase in civic behaviors and moral identity symbolization represents a decrease in the discrepancies between the cognitive and behavioral components of civic engagement and moral identity

— that is, after service-learning, cognitions and behaviors more closely corresponded to each other. There is also the consideration that, given the timing of data collection right after service-learning was completed, there may have not been enough time to change attitudes and moral identity internalization, which may be more deeply ingrained. Alternatively, the psychology students could have seen engagement in service-learning as a demonstration of civic behaviors and moral identity symbolization, and factored in their engagement in the service activity in their responses. That these changes were evident only in the sample of psychology students, however, suggests two possible explanations: the type of service they engaged in was more likely to be construed as a demonstration of civic and moral behaviors, or psychology students are more likely to make sense of service in civic and moral terms. These alternatives may be better clarified by comparing projects from different disciplines with similar degrees of interaction with underserved communities, and directly asking students about their perceptions about the moral and civic dimensions of the service-learning activity.

Several implications for both implementation of and research in service-learning can be gleaned from the findings of the study. One, the research further contributes to the body of work that service-learning may have some impact on civic behaviors, depending on the nature of the project. Moreover, the observed differences between classes may show some support for the importance of particular components in service-learning — structured and critical reflection, and interpersonal interactions with beneficiaries within the community may yield greater benefits for students (Astin, et. al., 2000; Celio, et. al., 2011; Conway, et. al., 2009; Levesque-Bristol, et. al., 2010). However, whichever of these two components had greater influence needs to be tested further. Admittedly, both projects could have been improved with more time spent and greater collaboration with the community; nevertheless, some benefits are apparent here.

Undertaking this study also presented the challenges of performing research on service-learning, especially across disciplines. For one, sample size and characteristics are limited by the availability of students enrolled in a particular section, as well as their willingness to participate in both the pre- and post-

test phases of the research. We had also intended to include a control group to strengthen our claims about the impact of service-learning; unfortunately, attrition rates were very high for the control group, and was thus not included in the study. Given this limitation, the current design leaves the possibility that observed changes may be a function of other factors in or even outside of the classes, and not just service-learning per se. Future research with control groups for each discipline may clarify the source of observed differences. Social desirability also remains a possible issue, given that the researchers were also the students' own teachers. Their knowledge of service-learning being implemented in their respective courses may have reflected what they believed their teachers expected of them. Although participants were encouraged to be as honest as possible, and were assured of their anonymity, the existing relationship between researchers and participants may still have factored into the students' responding.

Nevertheless, the study further highlights the importance of interdisciplinary research and discussions on service-learning, providing the opportunity to share both issues and best practices. For instance, reflecting on our own experience, we observed that some elements of service-learning seem to be more "natural" to some disciplines over others – reflection is a regular part of any psychology class, but is not a typical component of engineering courses. One study posited that a major challenge in promoting reflection in engineering education is the difference in the mindset required (Turns, Sattler, Yasuhara, Borgford-Parnell, & Atman, 2014). The researchers claimed that reflection is more inferential, whereas engineering is very objective, structured, and linear. Several studies also pointed out research gaps in the field of reflection in engineering education (Csavina, Nethken, & Carberry, 2016; Turns et al., 2014). For instance, there are few studies focusing on evaluating the effectiveness of and student conceptions on reflection as an assessment tool in engineering courses. Despite this, some researchers found that there is a growing interest for reflection (Sepp, 2015), resulting to service-learning projects using it as a crucial assessment tool (Clive et al., 2005; Onal, Nadler, & O'Loughlin, 2017; Payne, 2018).

Given that structured and critical reflection is a very important component of service-learning, faculty members from various disciplines may be better guided to facilitate this aspect of service-learning among their students. They may also discuss how to facilitate deeper and more meaningful engagements with communities through service-learning, even in disciplines that are not typically associated with such interpersonal interactions. Our own collaboration had fortuitous beginnings, as our use of service-learning in our classes had been a personal choice for us as educators. Higher education institutions may thus better support faculty members' implementation of service-learning in their classes, as well as the conduct of interdisciplinary research on the outcomes of such endeavors.

This research is, by no means, meant to be conclusive about the impact of service-learning on undergraduate students, especially given the limitations in sampling and the absence of control groups. Instead, our findings contribute directions for further questions in subsequent researches, particularly in elucidating the underlying mechanisms of changes in *pagkamakabayan* among both psychology and materials engineering students, and in civic behaviors and moral identity symbolization among psychology students. Finally, our study demonstrates the potential of service-learning, both in students' development beyond academic skills, and opportunities for higher education faculty from different disciplines to collaborate in enriching their teaching, research, and extension work.

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References

Aquino, K., & Reed, A, I. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology, 83*(6), 1423-1440. doi:10.1037//0022-3514.83.6.1423

Astin, A. W., Vogelgesang, L. J., Ikeda, E. K., & Yee, J. A. (2000). *How Service Learning Affects Students*. Los Angeles, California: Higher Education Research Institute.

Bem, D.J. (1972). Self-perception theory. *Advances in Experimental Social Psychology, 6*, 1-62.

Bernacki, M. L., & Jaeger, E. (2008). Exploring the impact of service-learning on moral development and moral orientation. *Michigan Jornal of Community Service Learning*, (Spring 2008), 5-15.

Boss, J. A. (1994). The effect of community service on the moral development of college ethics students. *Journal of Moral Development, 23*(2), 183-198.

Bringle, R., & Hatcher, J. (1996). Implementing service learning in higher education. The Journal of Higher Education, 67(2), 221-239. Retrieved from http://www.jstor.org/stable/10.2307/2943981

Celio, C. I., Durlak, J., & Dymnicki, A. (2011). A meta-analysis of the impact of service-learning on students. *Journal of Experiential Education, 34*(2), 164-181.

Chapdelaine, A., & Chapman, B. L. (1999). Using community-based research projects to teach research methods. *Teaching of Psychology, 26*(2), 101-105.

Clive, D., Agogino, A., Eris, O., Frey, D. D., Leifer, L. J., Dym, C. L., … Leifer, L. J. (2005). Engineering Design Thinking, Teaching, and Learning. *Journal of Engineering Education*, (January), 103-120. http://doi.org/10.1109/EMR.2006.1679078

Condor, S. (2011). Towards a social psychology of citizenship? Introduction to the special issue. *Journal of Community and Applied Psychology, 21*(3), 193-201.

Conway, J. M., Amel, E. L., & Gerwien, D. P. (2009). Teaching and learning in the social context: A meta-analysis of service learning's effects on academic, personal, social, and citizenship outcomes. *Teaching of Psychology*, *36*(4), 233-245.

Cooper, J. R. (2013). Ten years in the trenches: faculty perspectives on sustaining service-learning. *Journal of Experiential Education*, *20*(10), 1-14. http://doi.org/10.1177/1053825913513721

Csavina, K. R., Nethken, C. R., & Carberry, A. R. (2016). Assessing Student Understanding of Reflection in Engineering Education. In *123rd ASEE Annual Conference & Exposition*. New Orleans, LA.

de los Santos, A. C. (2010). *Pagkamakabayan: Pagsuri ng konsepto at pagbuo ng iskala*. Unpublished master's thesis, University of the Philippines, Diliman, Philippines.

Dimitrov, D. M., & Rumrill, P. D. Jr. (2003). Pretest-posttest designs and measurement of change. Work: A Journal of Prevention, Assessment and Rehabilitation, 20, 159-165.

Dostilio, L. D., Conti, N., Kronk, R., Weideman, Y. L., Woodley, S. K., & Trun, N. (2013). Civic learning through public scholarship: coherence among diverse disciplines. *Journal of Public Scholarship in Higher Education*, 43-65.

Duffy, J., Moeller, W., Kazmer, D., & Barrington, L. (2008). Service-Learning Projects in Core Undergraduate Engineering Courses. *International Journal for Service Learning in Engineering, 3*(2), 18-41.

Doolittle, A., & Faul, A. C. (2013). Civic engagement scale: a validation study. *SAGE Open, 3*(3), 1-8. http://doi.org/10.1177/2158244013495542

Duffy, D. K., & Bringle, R. G. (1998). Collaborating with community: Psychology and service learning. In R. G. Bringle, & D. K. Duffy, *With Service in Mind: Concepts and Models for Service Learning in Psychology* (pp. 1-17). Washington, DC: American Association for Higher Education.

Eisenberg, N., Spinrad, T. L., & Knafo-noam, A. (2006). Prosocial Development. In N. Eisenberg (Ed.), *Handbook of Child Psychology: Social, Emotional, and Personality Development* (6th ed., pp. 610-656). New Jersey: John Wiley & Sons.

Eyler, J. S., Giles, D. E., Stenson, C. M., & Gray, C. J. (2001). At a glance: What we know about the effects of service-learning on college students, faculty, institutions and communities, 1993- 2000 (Third edition). Retrieved from http://www.compact.org/wp-content/uploads/resources/downloads/aag.pdf.

Falk, A., Durington, M., & Lankford, E. (2012). Engaging Sharp-Leadenhall: an interdisciplinary faculty collaboration in service-learning. *Journal of Public Scholarship in Higher Education*, (2007), 31-46.

Fazio, R. H., and Olson, M. A. (2003). Attitudes: foundations, functions and consequences. Pp. 139-160 in M. Hogg & J. Cooper (eds.) *The Sage Handbook of Social Psychology*. London: Sage Publications.

Gilligan, C. (1982). In a different voice: *Psychological theory and women's development*. Cambridge, MA: Harvard University Press.

Hardy, M. S., & Schaen, E. B. (2000). Integrating the classroom and community service: Everyone benefits. *Teaching of Psychology, 27*(1), 3-6.

Kogan, L. R., & Kellaway, J. A. (2004). Applied animal behavior course: A service-learning collaboration with the humane society. *Teaching of Psychology, 31*(3), 202-204.

Kohlberg, L. (2008). The development of children's orientations toward a moral order: I. Sequence in the development of moral thought. Human Development, 51, 8-21.

Levesque-Bristol, C., Knapp, T. D., & Fisher, B. J. (2010). The effectiveness of service-learning: it's not always what you think. *Journal of Experiential Education, 33*(3), 208-224. http://doi.org/10.5193/JEE33.3.208

Lundy, B. L. (2007). Service learning in life-span developmental psychology: higher exam scores and increased empathy. *Teaching of Psychology, 34*(1), 23-28.

Madden, E. E., Davis, J., & Cronley, C. (2014). A comparative analysis of service learning in social work and criminal justice education. *Teaching in Higher Education, 19*(January 2015), 470-483. doi:10.1080/13562517.2014.880680

Moely, B. E., McFarland, M., Miron, D., Mercer, S., & Ilustre, V. (2002). Changes in college students' attitudes and intentions for civic involvement as a function of service-learning experiences. *Michigan Journal of Community Service Learning, 9*(Fall 2002), 18-26.

Moore, T. L., & Ward, K. (2010). Institutionalizing faculty engagement through research, teaching, and service at research universities. *Michigan Journal of Community Service Learning, Fall*, (2006), 44-58.

Onal, S., Nadler, J., & O'Loughlin, M. (2017). Applying Theory to Real-World Problems⁄ : Integrating Service-Learning into the Industrial Engineering Capstone Design Course. *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship, 12*(2), 57-80.

Payne, L. (2018). Enhancing Transdisciplinary Learning through Community-Based Design Projects: Results from a Mixed Methods Study. *International Journal for Service Learning in Engineering, 13*(1), 1-52.

Sepp, M. L. A. (2015). On an Upward Trend⁄ : Reflection in Engineering Education On an Upward Trend⁄ : Reflection in Engineering Education. In *122nd ASEE Anual Conference and Exposition*. Seatlle, WA.

Sherblom, S.A. (2012). What develops in moral development? A model of moral sensibility. *Journal of Moral Education, 41*(1), 117-142. http://doi.org/10.1080/03057240.2011.652603

Turns, J. a, Sattler, B., Yasuhara, K., Borgford-Parnell, J. L., & Atman, C. J. (2014). Integrating Reflection into Engineering Education. *2014 ASEE Annual Conference and Exposition, Indianapolis, IN*, 1-16.

Warren, J. L. (2012). Does service-learning increase student learning?: a meta-analysis. *Michigan Jornal of Community Service Learning*, (Spring 2012), 56-61.

Williams, P. H., & Sparks, J. (2011). Collaborative inquiry at a children's museum: benefits for student learning, museum outcomes, and faculty scholarship. *Journal of Public Scholarship in Higher Education*, 31-46.