The Relationships between Purpose in Life, Civic Mindedness, and Class Engagement in Service-Learning: The Moderating Effect of Personal Need for Structure

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Abstract

Understanding the factors that affect student engagement remains important in service-learning. The purpose of this study was to examine the relationships between purpose in life, civic mindedness, class engagement in service-learning, and personal need for structure. Especially, this study investigated the moderating effect of personal need for structure on the relationship between purpose in life and class engagement, as well as the relationship between civic mindedness and class engagement. A cross-sectional non-experimental design was adopted in this study. A total of 171 students were recruited from a service-learning course designed in the 2018 and 2019 spring semesters at a large research university in the USA. SPSS statistical software and Hayes' PROCESS were utilized to analyze the data. Study results showed that purpose in life is positively associated with civic mindedness (β = .41, p < .01) and class engagement (β = 0.21, p < .01). Also, civic mindedness is positively related to class engagement (β = .25, p < .01). Personal need for structure moderates the relationship between civic mindedness and class engagement (β = -0. 38, p < .01). Theoretical and practical implications and limitations were also provided in this study.

Introduction

In the last few decades, service-learning has gained popularity in two and four-year institutions of higher education (Scherrer & Sharpe, 2020). As a form of active learning, service-learning is defined as "course-based, credit-bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility" (Bringle & Hatcher, 1995, p. 112). It utilizes learning methods such as hands-on learning, problem-solving, discussion, and reflective thinking, resulting in a high impact learning experience for students (Goldberg et al., 2006).

Previous studies have documented that service-learning enhances students' psychological states (Litchke et al., 2019), helps them develop leadership and communication skills (Graber et al., 2017; Keshwani & Adams, 2017; Ma et al., 2018), and increase academic performance (Currie-Mueller and Littlefield, 2018; Hébert and Hauf, 2015). In addition, service-learning promotes students' civic engagement and sense of social responsibility (Bringle et al., 2012; Carlisle et al., 2017; Gerholz et al., 2018). However, despite several strengths, service-learning has its "downsides." Some argued that students merely participate in service-learning to feel good about themselves or to put it on their resume (Eby, 1998). Others concern about reduced classroom time, lack of

financial and leadership support, the quality of placement, i.e. the level of challenge students faced, their perceived impact, and the importance of responsibility (Eyler & Dwight, 1999).

While service-learning might be a high impact learning experience, student engagement facilitates this learning experience (Turner & Patrick, 2004). It is widely acknowledged that to achieve desired learning objectives, students must take great effort and actively engage themselves in authentic learning activities in class (Krause and Coates 2008). Student engagement has been identified as a predictor of several positive outcomes such as academic success, increased productivity, and retention in the learning environment (Dewan, Murshed, & Lin, 2019; Kuh, 2009). Fredricks, Blumenfeld, and Paris (2004) proposed that student engagement has three dimensions: emotional, cognitive, and behavioral. To obtain effective learning, students need to attend class and partake in school activities. However, simply exhibiting behavioral engagement in class is not enough. Students also need to show interest in the class learning and to develop positive emotions towards classes. Moreover, cognitively awareness of their goals and accomplishments and control themselves are also necessary for learning.

Understanding the factors that affect student engagement remains important in education (Xerri et al., 2018). Research has indicated that family, community, culture, and education context all affect student engagement (He et al., 2019; Ogbu, 2003). Specifically, Fredricks et al. (2004) identified several factors that predict engagement, including school-level factors (e.g. voluntary choice, students' goals, small size, participation in school policy and management, and involvement in cooperative endeavors) and classroom context (e.g. teacher support, peers, classroom structure, autonomy support, and task characteristics). Also, both internal and external motivations to learn determine how students engage themselves in academic activities (Nayir, 2017). A more recent study by Xerri et al. (2018) not only supported students' relationships with teachers and peer students as good predictors of student engagement, but they also added workload as another antecedent variable.

While most studies focused on external factors, students' personal or internal traits are less utilized as determinants of students' engagement. Ghasemi et al. (2020) explored the strategies to sustain and promote students' engagement in academic and clinical settings. Among others, service-learning was identified as one of the most effective strategies for students' engagement. Service-learning possesses a strong potential to engage learners into real-life situations and to encourage the learner to be an active learner because "it can capture the learners' attention, develop their partnerships, and collaboration" (Ghasemi et al., 2020, p.111). This proposition was supported by several empirical studies conducted cross various disciplines (Abrahams, 2018; Ching, 2018; Collins et al., 2020).

While student engagement in traditional courses have been documented in the literature, the mechanism through which service-learning influences students' engagement remains largely unclear. As an innovative education pedagogy, service-learning is unique in that students are required to learn from unstructured and ill-structured community experiences and merge that learning with the learning from other course resources (Howard, 1993). Nevertheless, we have known little about what factors motivate students to engage in academic activities in this unstructured or ill-

structured service-learning environment. Previous literature showed that purpose in life and civic mindedness might be important outcomes of service-learning, which in turn would boost more participation in service-learning activities (Barry et al., 2017; Shin et al., 2018; Snell et al., 2015). Given that students' personal or internal traits are less explored in determining students' engagement, we introduced three psychological constructs: purpose in life, civic mindedness, and personal need for structure (PNS) in this study. We proposed that these constructs are predictors of students' engagement. To the best of our knowledge, prior studies have not analyzed the nomological network composed of purpose in life, civic mindedness, PNS, and student engagement. In this study, we focus on student class engagement instead of general student engagement. Thus, the purpose of this study is to examine the relationships between purpose in life, civic mindedness, PNS, and student class engagement. Especially, we are interested in the moderating effect of PNS on the relationship between purpose in life and class engagement, as well as the relationship between civic mindedness and class engagement.

With these considerations in mind, we developed a service-learning course that had been offered to undergraduate students from multiple disciplines in 2018 and 2019 at a land-grant university in the USA. Students worked on group projects with emergency food providers (i.e. food pantries) located within a 120-mile radius of the university. Projects were so designed that the open-ended problems in the service-learning scenario could be addressed from different perspectives to ensure the solutions were provided robustly, practically, and impactfully.

Theoretical Background and Hypotheses

Purpose in life

There are several versions of the definitions of purpose in life circulated in the psychological literature (Moran, 2014). Damon, Menon, and Bronk (2003) conceptualized purpose in life as "a stable and generalized intention to accomplish something that is both meaningful to the self and of intended consequence to the world beyond the self" (p. 121). Steger (2009) defined it as people's sense of the significance of purposes, missions, and aspirational goals in their lives, or desire for the accomplishment of these missions and goals. As a psychological construct, purpose in life includes three dimensions: intention to progress toward a meaningful goal, effort to actualize the goal through active engagement, and contribution to the broader world (Bronk, Finch, & Talib, 2010).

Such a purpose can not only offer guidance and direction in people's lives but also provide people "a self-sustaining source of meaning through goal pursuit and goal attainment" (McKnight & Kashdan, 2009, p.242). Therefore, a sense of purpose in life plays an essential role in people's life. An individual with a sense of purpose in life has "goals, intentions, and a sense of direction and tends to feel both present and past lives are meaningful and to hold beliefs that give life purpose (Ryff, 1989). Those who have life purpose are believed to possess more positive psychological states and personality attributes, thus less likely to fall victim to mental illnesses (Windsor, Curtis, & Luszcz, 2015). Empirical studies have shown that purpose in life has a positive relationship with life satisfaction, self-acceptance, hope, optimism, and competence (Boehm & Kubzansky, 2012; Bronk, Hill, Lapsley, Talib, & Finch, 2009. Moreover, having a sense

of purposeful life has now been widely recognized as an important resource for maintaining mental health and well-being over a lifetime (McKnight, & Kashdan, 2009; Windsor, Curtis, & Luszcz, 2015).

In addition to functioning as a critical element of healthy development, purpose in life even serves as a fundamental source of motivation in a person's life and a deep reason for living (Bronk, 2011; Frankl, 1959). More specifically, purpose in life functions as an important motivator to drive individuals' actions toward long-term goals (Emmons, 1999). There are several reasons. First, purpose can foster behavioral consistency, driving people to overcome obstacles and to maintain focus on their goal (McKnight, & Kashdan, 2009). People with a purpose in life are inclined to be more consistent in their thoughts and behaviors. Next, purpose leads people to generate more psychological flexibility (Segerstrom, 2005). While people who live with purpose stick with the determined long-term goals, they are also resilient to changing demands, obstacles, and opportunities in the process of attaining these goals. Third, purpose stimulates productive cognitive, behavioral, and physiological activity (Damon, 2008). People with purpose tend to be more efficient in allocating the limited resources to achieve their goals.

Owing to its cognitive, behavioral, and psychological functioning, purpose in life constitutes an internal asset and attribute for positive young students (Benson, 1997). For the youths, it can act as an important protective factor supporting them to develop goal-directedness, resilience, persistence, success orientation, and hope (Benard, 1991). Clear life purpose can help them to successfully transition to adulthood by dealing with several developmental tasks such as potential explorations, educational pursuits, and future careers (Pettit, Roberts, Lewinsohn, Seeley, & Yaroslavsky, 2011; Shulman, Kalnitzki, & Shahar, 2009). For college students with a sense of life purpose in mind, they can make effort to actualize their goal through active engagement, use their skill gained in college to make a difference, be confident their current pursuit would help them to contribute to the community and the whole society (Bronk, Finch, & Talib, 2010; Sharma, Yukhymenko-Lescroart, & Kang, 2017). Thus, students with purpose in life tend to be more civic-minded.

Civic mindedness

Civic mindedness is often used interchangeably with civic engagement. Despite the different focus, there is minimal difference between these two terms (van Rooij, 2020). Adler and Goggin (2005) define civic engagement as people's participation in the life of a community to improve conditions for others or to help shape the community's future. On the contrary, civic mindedness refers to "a person's inclination or disposition to be knowledgeable of and involved in the community and to commit to acting upon a sense of responsibility as a member of that community" (Pike, Bringle, & Hatcher, 2014, p. 93). While civic engagement focuses on the individuals' activities involved in the community, civic mindedness emphasizes people's orientation toward the community and other people in the community. Civic-minded professionals possess professional skills to act ethically and can work collaboratively with others to achieve the common good (Bringle & Steinberg, 2010). To foster students to function effectively in the workforce, colleges and universities are obliged to educate their students to engage in civic inquiry and activities and demonstrate civic literacy. In this regard, our service-learning project enabled students to interact with the communities and offer them an

opportunity to engage in instructor mediated reflection (Hatcher, Bringle, & Hahn, 2017; Hatcher & Studer, 2015). Actually, one of the essential parts of our service-learning project is to reinforce civic mindedness and commitment to the common good among college students.

Class engagement

Bomia et al., (1997) defined student class engagement as "a student's willingness, need, desire and compulsion to participate in and be successful in the learning process" (p. 294). While class engagement is fundamental for students to succeed in learning, it is the motivation that maintains student's engagement in class (Sternberg, 2005). Generally, students can be intrinsically or extrinsically motivated and both are positively related to active engagement in class (Nayir, 2017). However, despite intrinsic and extrinsic motivations are both important, cognitive evaluation theory posits that intrinsic motivators are more powerful than extrinsic motivators in terms of driving engagement (Deci, 1975). Empirical evidence has been shown that intrinsic motivations are more likely to boost workplace engagement (Putra et. al., 2017; Thomas, 2013). Particularly in education, intrinsically motivated students are more likely to engage in class activities and to have higher achievement levels (Lee, McInerney, Liem, & Ortiga, 2010; Saeed, & Zyngier, 2012). The Self-Determination Theory proposes autonomy, competence, and relatedness are the basis of intrinsic motivation and behavior in the learning environment (Deci, & Ryan, 2008). When the psychological needs of autonomy, competence, and relatedness are met, students are more motivated to learn, therefore driving student academic success. Studies have revealed their importance in promoting positive academic outcomes. In fact, when students are provided with educational learning environments that foster autonomy, competence, and relatedness, they experience engagement (Butz et al., 2014; Hartnett, 2015; Park et al. 2012).

In our service-learning projects, purpose in life and civic mindedness act as motivators to drive students to engage in class learning. Accordingly, we expected that purpose in life is positively related to civic mindedness, which in turn, will be positively associated with class engagement. Students with a high level of purpose in life would demonstrate high civic mindedness and actively engage in class. Our propositions are based on the following reasoning. First, purpose in life inherently includes the intention to accomplish a meaningful goal associated with the self and the broad community through active engagement (Damon, Menon, & Bronk, 2003). Scholars have associated purpose with the awareness of and engagement into the common good (Staples & Troutman, 2010). Second, civic mindedness, in conjunction with the purpose, serves as an intrinsic motivator to encourage students to learn how to serve the community, for example, active involvement in class learning. Purpose in life is positively associated with self-acceptance, hope, optimism, and contentment competence (Boehm & Kubzansky, 2012). Competence and self-acceptance will function as an intrinsic motivator to stimulate class engagement and community involvement. Third, both purpose in life and civic mindedness are oriented toward interdependent goals. According to Stephens et al. (2012), when a student has an interdependent goal for college education, he/she would focus on "being part of the community", as opposed to those with an independent goal who merely focus on "paving one's own path" (p. 1178). For students who have interdependent, the service-learning project that gives back to

the community would appeal to be more relatable, thus, it makes sense that the greater the impact (intrinsic motivation) the students believe their work will have, the more they are motivated to engage in the service-learning class. Empirical evidence has also demonstrated that civic engagement motivates students to academically engaged in class activities (Sessa, Grabowski, & Shashidhar, 2013).

Personal need for structure

Individual difference in people's preferences for structures and hierarchy is best captured by personal need for structure (PNS). In this study, we examine the students' PNS as a boundary condition of the relational process initiated by purpose in life and civic mindedness towards class engagement. As a psychological term, PNS is a personality trait defined as an individual's tendency to seek a simplified structure, to prefer clarity and order, and to avoid uncertainty or ambiguity (Neuberg & Newsom, 1993). High PNS people tend to view social and nonsocial structures simply and straightforwardly. They are inclined to shun information that may prove ambiguous or present a challenge to their existing organizational system (Cavazos, Judice-Campbell, & Ditzfeld, 2012). Although they are often lauded in well-structured organizations, this personality style often leads to rigid, inflective thinking and relies on stereotypes, thus being less effective and successful in creative and challenging environments (Thompson et al., 1989). On the contrary, people with low levels of PNS are prone to perform better in unpredictable environments and feel comfortable when the rules are not clear. They tend to be more innovative and creative and open to new experiences (Rietzschel et al., 2014). In the context of college education, students with low PNS hold a positive attitude towards less structured projects and classes, which grant them the opportunity to use their own skills to solve any problems that may arise (Friesen et al., 2014).Service-learning combines learning objectives with community service and engages students in activities that address the community needs to achieve desired learning outcomes (Jacoby ,1996). Particularly, our project was less structured and multitasks in nature. Students were required to use classroom learning materials, online research, field trip observation, and distant communication (conference calls, Skype meetings) with agency liaisons. Doing so, students developed an understanding of the agency's wishes and evaluated the food pantry's organizational issues, and then brainstormed and proposed feasible, evidence-based solutions to the problems the pantry presented. In other words, students were required to face uncertainty and unpredictability and creatively tackle various challenging tasks when working with food pantry clients. While students with a high level of PNS try to avoid ambiguity and prefer structured situations and tasks, low-level PNS students tend to use their flexibility to address unexpected situations (Felfe & Schyns, 2006). In doing so, their self-efficacy boosted and interest in service-learning further increased, leading to more engagement in this project.

Therefore, we argue that college students low in need for structure are more likely to benefit from the engagement in class prompted by purpose in life and civic mindedness. It is expected that, for college students low in need for structure, both purpose in life and civic mindedness would strongly contribute to students' class engagement. In other words, we expect need for structure to moderate the effects of purpose in life and civic mindedness on class engagement.

Base on the above theoretical underpinnings and literature, the following hypotheses were proposed:

H1: Purpose in life is positively associated with civic mindedness.

H2: Civic mindedness is positively related to class engagement.

H3: Purpose in life is positively related to class engagement.

H4: PNS moderates the relationship between purpose in life and academic engagement, such that the relationship between purpose in life and academic engagement is weaker for students with a high level of personal need for structure.

H5: PNS moderates the relationship between civic mindedness and class engagement, such that the relationship between civic mindedness and academic engagement is weaker for students with a high level of personal need for structure.

Course design

In the spring 2018 semester, the College of Engineering, College of Education and Human Development, and College of Liberal Arts at a land-grant university jointly launched a multidisciplinary service-learning course. It was offered to undergraduate students as a course combined of three courses: SOCI 217 (Introduction to Race and Ethnicity), IDIS 343 (Industrial Logistics), and TCMG 412 (Contemporary Issues in Technology Management). The goal of this course is to offer students a hands-on learning experience while making a positive impact on the local communities. These three disciplines would represent the “People, Process, and Technology” components in a problem-solving process so that the solutions could be socially responsible, thorough, and effective. Based on feedback on the pilot project from students and community partners, we made several improvements and adjustments in course structure and project design.

We utilized a unique “Tuesdays-separate classes and Thursdays-combined classes” course structure to balance the “service” and “learning” components. On Tuesdays, students went to separate classes to learn technical knowledge specific to their disciplines. On Thursdays, they attended a combined class and collaborated as small groups. Each group consisted of a combination of students from a different academic background (majors, academic classifications), and was teamed up with an emergency food provider (i.e. a food pantry) and a food pantry agency liaison. Through classroom learning materials, online research (e.g., using database and mapping tools to obtain demographic information), field trip observation, and distant communication (conference calls, Skype meetings) with agency liaisons, students developed an understanding of the agency’s wishes and evaluated the food pantry’s organizational issues, then brainstormed and proposed feasible, evidence-based solutions to the problems the pantry presented. We have partnered with 30 food pantries and worked on projects themed around operational efficiency, logistics, and social outreach so that agencies could serve more people and expand their community impact. With sponsorship from our strategic partner, we were able to fund some of the best students’ proposals, allowing the pantries to implement the best solutions.

Methodology

A cross-sectional non-experimental design was adopted in this study. Because we used linear regression analysis to test both main effects and interaction effect, G*Power 3.1 was utilized to calculate whether the number of our students met the minimum sample size required. In our study, the predictors were purpose in life, civic mindedness, and personal need for structure while class engagement was the outcome variable. Together with 3 control variables, there were 6 predictors. We used linear multiple regression: Fixed model, R^2 increase as our statistical test in the F test family. We then chose the effect size of .10, the α error probability of .05, power of .90 in G*Power, yielding a minimum sample size of 146. The number of participating students in this study was 171, meeting the sample size requirement.

Participants and data collection

As aforementioned, 171 students participated in this study. All variables were measured using well-validated scales. We recruited students from the beginning of the spring 2018 and 2019 semesters. One of the researchers read the consent to participants in this research; then, students were asked to sign a copy of the consent, indicating whether or not they agreed to participate in the study. Since not all the enrolled students were present during face-to-face consent, emails were sent out to solicit their consent in the following weeks.

To mitigate common method bias (CMB) (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), we ensured the clarity of the questionnaires and guaranteed students' data confidentiality and anonymity. Most importantly, we introduced a temporal separation between the measures of variables. At the beginning of the semester, students completed a survey of measures of purpose in life and personal need for structure, whereas they finished a survey consisting of the measures of civic mindedness and class engagement at the end of the class. Demographic information was also obtained at the very beginning of each semester. Of 171 students, 96 (56.1%) were identified as male students while 70 (40.9%) of participants were reported as women. Students' age range was between 20 and 25 years-old with a mean of 21.28 (SD = 1.19). A majority of them are White (n = 98, 57.3%) and single (n = 159, 93.0%), and 96 students declared they have a faith in Catholic or Christian. The majority of students are in their junior year (n = 86, 50.3%), and about half (48.28 %) of them reported that all of their parents obtained a college or higher degree.

Measures

The survey consisted of two parts. The first part collected students' demographic information, such as age, gender, grade, ethnicity, marital status, parents' education. The second part covered items of purpose in life, civic mindedness, personal need for structure, and class engagement. Students rated all the items of four measures.

Purpose in life: Purpose in life was measured utilizing a 7-item Sense of Purpose in life scale developed by Sharma et al. (2018). Students rated the items on a Likert five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Two of the sample items included "I am striving to make a positive difference in society." and "Through my career, I will aim to make the world a better place." The Cronbach alpha was α = .94 for the current study.

Civic mindedness: Civic mindedness was assessed using Civic Mindedness Graduate (CMG) developed by Steinberg et al. (2011). There were 30 items in the CMG scale. Each item was measured using a Likert six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Two sample items were “This course has enabled me to plan or help implement an initiative that improves the community.” and “I am more confident that I can contribute to improving life in my community.” This scale had a Cronbach alpha of .96.

Personal need for structure: We measured the personal need for structure (PNS) with an 11-item, six-point Likert scale questionnaire developed by Thompson, Naccarato, and Parker (1989). Sample questions included “I don't like situations that are uncertain,” “I become uncomfortable when the rules in a situation are not clear.” The consistency reliability for this scale was .79.

Class engagement: Class engagement was evaluated using Academic Engagement Scales (AES) developed by Petričević, Ljubin Golub, Rovan, (2016), which consists of 15 items. Students were asked to rate their own engagement in class on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Two samples included “I am very focused in this class.” and “I pay attention in this class.” The scale had acceptable consistency reliability with a Cronbach alpha of .76.

Control variables. We controlled for class, gender, and students’ grade in this study. Age was not included because it was highly correlated with grade.

Analytical strategies

Mean, standard deviation (SD), reliability, and intercorrelations between study variables were computed using the SPSS statistical software (version 21). Path coefficients were estimated using Hayes’ PROCESS to test the hypotheses. The test of convergent validity and discriminant validity was conducted using Mplus 7.

Results

Descriptive statistics, reliabilities, and intercorrelations

We conducted data analysis for all the variables, including means and standard deviations, and reliability, as well as the correlation between 7 variables. The results were presented in Table 1. It can be seen in this table that all the control variables (i.e. gender, grade, and class) were not related to the four main study variables (i.e. purpose in life, civic mindedness, PNS, and class engagement). Purpose in life and civic mindedness had a highest correlation ($r = 0.52$, $p < 0.01$). Purpose in life was negatively associated with PNS ($r = -.24$, $p < 0.05$) and positively related to class engagement ($r = 0.29$, $p < 0.01$). Civic mindedness and class engagement were also positively related to each other ($r = 0.25$, $p < 0.05$). However, the relationship between PNS and civic mindedness not statistically significant. Therefore, H1, H2, and H3 are initially supported.

Table 1. Means, standard deviations, reliabilities, and intercorrelations

Variable	Mean	SD	1	2	3	4	5	6	7
1. Gender	1.40	.51							
2. Grade	2.92	.82	-.21						
3. Class	.67	.50	-.40**	.24*					
4. PIF	5.86	1.20	-.11**	-.23*	-.11	.94			
5. CM	4.65	.97	-.08	-.18	.03	.52**	.96		
6. PNS	3.61	.70	.17	.01	-.08	-.24*	-.15	.79	
7. CE	3.77	0.65	.10	-.15	-.00	.29**	.25*	.08*	.76

Notes: N =171; M = mean; SD = standardized deviation;
ˣCorrelation is significant at the 0.05 level (2-tailed); ˣˣCorrelation is significant at the 0.01 level (2-tailed). PIF = Purpose in life; CM = Civic mindedness; PNS = Personal need for structure; CE = Class engagement. On the diagonal are the reliabilities of the variables.

Common Methods Bias, convergent validity, and discriminant validity

As previously indicated, we used various procedural remedy techniques to minimize the common methods bias (CMB) such as guarantees of confidentiality and anonymity and the introduction of temporal separation. However, we still checked whether CMB is a serious issue in the data. The result of Harman's single factor test showed that one single factor explained 27.45% of the variance, much lower than 50%. Therefore, CMB is not a major issue. We also used Mplus 7 to test the convergent validity and discriminant validity of the main variables (i.e. purpose in life, civic mindedness, PNS, and class engagement). Four measurement models were compared. In the four-factor model, these four variables were separate factors. The three-factor model combined purpose in life and civic mindedness as one factor while we combined purpose in life, civic mindedness, and PNS as one factor in the two-factor model. In the one-factor model, we bundled the four variables to form a single factor. The results showed that the four-factor model fit the data better ($\chi^2 = 2400.26$, $df = 273$, RMSEA = .05, CFI = .93, TLI = .94, SRMR = .05). Therefore, all four variables have good discriminant validity. In addition, both factor loadings for the items and average variance extracted (AVE) in the four-factor model were greater than .50, indicating convergent validity was established.

Hypotheses Testing

Table 2 presented the path coefficients and *p*-value to test the hypotheses. Hypothesis 1 posited purpose in life is positively associated with civic mindedness. After controlling for the demographic variables such as gender, grade, and class level, the path coefficient was .41 ($p < .01$). Therefore, hypothesis 1 was supported. Civic mindedness was also positively correlated with class engagement ($\beta = .25$; $p < .01$),

providing support for hypothesis 2. In addition, purpose in life is positively related to class engagement (β = 0.21; p < .01), supporting hypothesis 3.

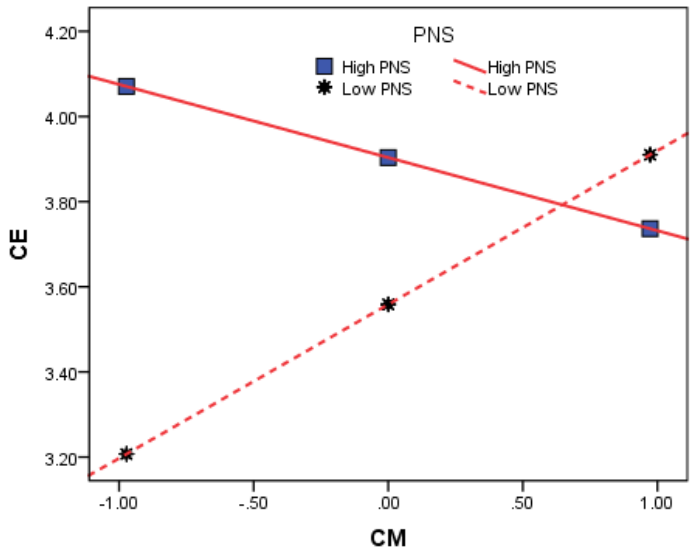
Table 2 Hayes' PROCESS results

Variable	CM		CE	
	Coefficient	*p*	Coefficient	*p*
Constant	.16	p = .77	3.67	p < .01
class	.21	P = .30	.16	P = .26
Grade	-.11	P = .38	-.09	P = .29
Gender	.01	P = .97	.14	P = .29
PIF	.41	p < .01	.21	p < .01
CM			.25	p < .01
PNS			.09	p = .21
PIF*PNS			-.01	p = .96
CM*PNS			-.38	p < .01
R^2	.28	p < .01	.27	p < .01
F	8.01		3.63	

Note: PIL = Purpose in life; CM = Civic mindedness; PNS = Personal need for structure; CE = Class engagement.

In Hypothesis 4, we hypothesized that PNS moderates the relationship between purpose in life and class engagement, such that the relationship between purpose in life and class engagement is weaker for students with a high level of personal need for structure. It was indicated in Table 2 that the interaction term between purpose in life and PNS not significant in predicting class engagement (β = -0. 01; p <=.96). Therefore, hypothesis 4 was not confirmed. Hypothesis 5 predicted that personal need for structure moderates the relationship between civic mindedness and class engagement, such that the relationship between civic mindedness and class engagement is weaker for students with a high level of personal need for structure. As shown in Table 2, the interaction term between civic mindedness and PNS was statistically significant in predicting class engagement (β = -0. 38; p < .01). Therefore, hypothesis 5 was supported. To better capture the nature of the moderating effects, we conducted a simple slope test to visualize the interaction effect. Aiken & West's (1991) approach was followed to decompose the interaction effect by substituting PNS with values of ± 1SD. As showed in Figure 1, the relationship between civic mindedness and class engagement was negative for high-level PNS. The effect of civic mindedness on class

engagement was positive for students with low PNS. The slope for the latter was greater than that of the former. The discrepancy between the high and low PNS groups on class engagement is substantially large under the low level of civic mindedness. As civic engagement goes larger, this discrepancy becomes smaller and smaller. When civic engagement is large enough, the class engagement level for the high PNS group surpasses that of the low PNS group.



Note: CM = Civic mindedness; PNS = Personal need for structure; CE = Class engagement.

Figure 1 Moderating effect of PNS on the relationship between CM and CE

Discussion

In this study, we used 171 students as participants who registered in our service-learning course in the 2018 and 2019 spring semesters. The course adopted a unique "Tuesdays-separate classes and Thursdays-combined classes" course structure to balance the "service" and "learning" components. We examined the relationships between purpose in life, civic mindedness, PNS, and class engagement. We especially investigated the moderating effect of PNS on the relationship between purpose in life and class engagement, as well as the relationship between civic mindedness and class engagement. It was found that purpose in life is positively associated with civic mindedness and class engagement. Also, civic mindedness is positively related to class engagement. While PNS does not moderate the relationship between purpose in life and class engagement, we nevertheless found that the relationship between civic mindedness and class engagement is moderated by PNS. For college students who are in a high level of PNS, the relationship between civic mindedness and class engagement is negative and weaker. College students low in need for structure are more likely to benefit from the engagement in class prompted by civic mindedness.

Theoretical implications

This study has significant theoretical implications. First and foremost, we advanced the service-learning research by methodologically utilizing correlation regression to examine the associations between variables pertinent to a service-learning project and especially investigate the moderating role of PNS. Previous service-learning research largely used t-test or ANOVA to conduct pre-and post-comparisons in terms of outcome variables and few studies using more advanced techniques to conduct the relationship research (Natarajarathinam, Qiu, & Lu, 2020). This study functions as a motivator to encourage more such studies in service-learning research.

Second, in line with theoretical reasoning, our study shows that purpose in life is positively associated with variables such as civic mindedness and class engagement in the context of service-learning. Given that little evidence can be found in the literature indicating that these three variables can be empirically linked together, this result adds valuable knowledge to the literature by contributing to the overarching research on both purpose in life and student engagement. This study underscores the importance of purpose in life in civic mindedness and class engagement. Civic mindedness and class engagement might be outcome variables of purpose in life. Also, purpose in life and civic mindedness can be antecedents of class engagement, thus this study broadens the scope of class engagement research.

Third, our study revealed the boundary conditions of when and how purpose in life and civic mindedness affect class engagement by using PNS as a moderator. As a personality trait, the role of PNS has been examined in marketing (e.g. Davidson, & Laroche, 2016), psychology (e.g. (Kay et al. 2014), leadership (Pundt & Venz, 2017). However, this construct has rarely used in education, more particularly in the service-learning field. Therefore, this study provides a venue and opens up a new perspective for future service-learning study.

Practical implication

This study also has several practical implications. First, the results of our study show that purpose in life positively related to civic mindedness and class engagement. College students with a purpose in life are more likely to have a high level of civic mindedness and involve in class activities. They would more likely participate and engage themselves in community service and class to achieve both personal and societal goals. These findings inform us of the importance of students' purpose in college education practice, specifically in service-learning projects. Second, based on our findings, PNS moderates the effect of civic mindedness on class engagement. Students with a low level of PNS would gain more benefits from the service-learning class engagement induced by their civic mindedness. In our food pantry project, student work is fraught with uncertainty and complexity. Low PNS students with more flexibility and creative mind tend to more effectively solve the problems and deal with unpredictable situations. However, this finding does not mean we avoid recruiting high PNS students in service-learning projects. Our study also shows that PNS does not moderate the relationship between purpose in life and class engagement. Every student can benefit from service-learning through "a further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and

civic responsibility" (Bringle & Hatcher, 1995. P.112). Nevertheless, to achieve the desired goals, we might need to assign different roles based on the students' PNS level.

Limitations

There are several limitations in this study. This first limitation concerns its generalizability. In this study, we recruited the participants from college students enrolled in our food pantry service-learning project in a large research US university. Although we did not place any restrictions on students' enrollment into this project, the participating students may not be representative of the whole student population. To validate the study results, future researchers are encouraged to use participants in other service-learning projects or from other cultures. Next, in this study, we found that purpose in life is positively related to civic mindedness, which in turn, is positively associated with class engagement. Despite we collected data at two-time points, it cannot be concluded there is a causal relationship between purpose in life and civic mindedness or between civic mindedness and class engagement. To derive such a conclusion, a more rigid experimental design might be used to control study conditions. Third, some students did not consent to participating in this study or provided incomplete questionnaires, leading to our final sample of 171. Despite the sample of 171 is sufficient for statistical analysis in this study based on G*Power' sample size analysis, our concern is that this sample size would not provide us a great statistical power to detect differences and thus affect the correlation estimations. Future researchers are certainly welcome to solicit more participants in the study. Fourth, as our focus was on examining the relationships between purpose in life, civic mindedness, PNS, and class engagement, we did not compare students from different three disciplines in terms of the above constructs. Due to the sample size, we did not conduct a measurement invariance test to examine whether there were any differences in the conceptual model among these three discipline students.

Conclusion

In this study, we found that purpose in life is positively associated with civic mindedness and class engagement in service-learning. Also, civic mindedness is positively related to student class engagement. While PNS does not moderate the relationship between purpose in life and academic engagement, the relationship between civic mindedness and class engagement was moderated by PNS. For college students who are in a high level of PNS, the relationship between civic mindedness and class engagement is weaker. College students low in need for structure are more likely to benefit from the engagement in class prompted by purpose in life and civic mindedness. Although its limitations, this study provided important insights into how purpose in life, civic mindedness, PNS, and class engagement are related, thus adding valuable knowledge to both service-learning and student engagement literature.

References

Abrahams, D. (2018). The efficacy of service-learning in students' engagements with music technology. *Min-Ad: Israel Studies in Musicology Online, 15*(2), 164-177.

Adler, R. P., & Goggin, J. (2005). What do we mean by "civic engagement"? *Journal of transformative education, 3*(3), 236-253.

Barry, M., Lowe, L. A., & Twill, S. (2017). Academic librarians' attitudes about civic mindedness and service learning. *The Library Quarterly*, *87*(1), 1-16.

Boehm, J. K., & Kubzansky, L. D. (2012). The heart's content: The association between positive psychological well-being and cardiovascular health. *Psychological Bulletin, 138,* 655–691. http://dx.doi.org/10.1037/a0027448.

Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M., & Sheldon,B. (1997). *The impact of teaching strategies on intrinsic motivation*. Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education.

Bringle, R. C., Clayton, P., & Price, M. (2012). Partnerships in service learning and civic engagement. *Partnerships: A Journal of Service-Learning and Civic Engagement*, *1*(1), 1-20.

Bringle, R. G., & Hatcher, J. A. (1995). A service-learning curriculum for faculty. *Michigan Journal of Community Service Learning 2*,112-122

Bringle, R. G., & Steinberg, K. (2010). Educating for informed community involvement.

American Journal of Community Psychology, 46 (3-4), 428-441. https://doi.org/10.1007/s10464010-9340-y

Bronk, K. C. (2011). The role of purpose in life in healthy identity formation: A grounded model. *New Directions for Youth Development*, *2011*(132), 31–44. doi:10.1002/yd.426

Bronk, K. C., Hill, P. L., Lapsley, D. K., Talib, T. L., & Finch, W. H. (2009). Purpose, hope, and life satisfaction in three age groups. *The Journal of Positive Psychology*, *4*, 500–510. doi:10.1080/17439760903271439

Butz, N. T., Stupnisky, R. H., Peterson, E. S., & Majerus, M. M. (2014). Motivation in synchronous hybrid graduate business programs: A self-determination approach to contrasting online and on-campus students. *Journal of Online Learning & Teaching, 10*(2), 211-227.

Carlisle, S. K., Gourd, K., Rajkhan, S., & Nitta, K. (2017). Assessing the Impact of Community-Based Learning on Students: The Community-Based Learning Impact Scale (CBLIS). *Journal of Service-Learning in Higher Education, 6*.

Cavazos, J. T., Judice-Campbell, N., & Ditzfeld, C. P. (2012). Differing emotional sensitivities in the two factors of personal need for structure. *Journal of Research in Personality, 46*(1), 49-54.

Ching, S. H. (2018). Turning a service-learning experience into a model of student engagement: The Lighthouse Heritage Research Connections (LHRC) Project in Hong Kong. *The Journal of Academic Librarianship, 44*(2), 196-206.

Collins, M. A., Totino, J., Hartry, A., Romero, V. F., Pedroso, R., & Nava, R. (2020). Service-Learning as a Lever to Support STEM Engagement for Underrepresented Youth. *Journal of Experiential Education, 43*(1), 55-70.

Crossan, M., Mazutis, D., Siejts, F., & Gandz, J. (2013). Developing leadership character in business programs. *Academy of Management Learning & Education, 12*, 285-305. doi:10.5465/amle.2011.0024A

Currie-Mueller, J. L., & Littlefield, R. S. (2018). Embracing service-learning opportunities: Student perceptions of service learning as an aid to effectively learn course material. *Journal of the Scholarship of Teaching and Learning*, *18*(1), 25-42.

Damon, W. (2008). The path to purpose: Helping children find their calling in life. New York: Free Press.

Damon, W., Menon, J., & Bronk, C. K. (2003). The development of purpose during adolescence. Applied Developmental Science, 7(3), 119–128.

Davidson, A., & Laroche, M. (2016). Connecting the dots: how personal need for structure produces false consumer pattern perceptions. *Marketing Letters, 27*(2), 337-350.

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian psychology/Psychologie canadienne*, *49*(3), 182-185.

Dewan, M., Murshed, M., & Lin, F. (2019). Engagement detection in online learning: a review. *Smart Learning Environments*, *6*(1), 1-20.

Eby, J. (1998). Why service-learning is bad. *Service Learning, General*, *Paper 27.*

Emmons, R.A. (1999). The psychology of ultimate concerns: Motivation and spirituality in personality. New York: Guilford Press.

Eyler, J., & Giles Jr, D. E. (1999). *Where's the Learning in Service-Learning? Jossey-Bass Higher and Adult Education Series*. San Francisco, CA: Jossey-Bass.

Felfe, J., & Schyns, B. (2006). Personality and the Perception of Transformational Leadership: The Impact of Extraversion, Neuroticism, Personal Need for Structure, and Occupational Self-Efficacy 1. *Journal of Applied Social Psychology*, *36*(3), 708-739.

Frankl, V. E. (1959). *Man's search for meaning*. Boston, MA: Beacon Press.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Friesen, J. P., Kay, A. C., Eibach, R. P., & Galinsky, A. D. (2014). Seeking structure in social organization: Compensatory control and the psychological advantages of hierarchy. *Journal of Personality and Social Psychology, 106*, 590–609. doi:10.1037/a0035620.

Gerholz, K. H., Liszt, V., & Klingsieck, K. B. (2018). Effects of learning design patterns in service learning courses. *Active Learning in Higher Education*, *19*(1), 47-59.

Ghasemi, M. R., Moonaghi, H. K., & Heydari, A. (2020). Strategies for sustaining and enhancing nursing students' engagement in academic and clinical settings: a narrative review. *Korean Journal of Medical Education, 32*(2), 103-117.

Goldberg L. R., McCormick, C., & Wood, L.A. (2006). Active learning through service-learning. *Communication Disorders Quarterly*, *27*(3), 131-145.

Graber, K.C., Chodzko-Zajko, W., O'Connor, J. A., & Linker, J. M. (2017). Developing leadership skills and a commitment to civic engagement during an undergraduate community-based service learning class. *Kinesiology Review 6*(4), 317-322.

Hartnett, M. K. (2015). Influences that undermine learners' perceptions of autonomy, competence and relatedness in an online context. *Australasian Journal of Educational Technology*, *31*(1), 86-99.

Hatcher J. A., Bringle R. G., & Hahn T. W. (Eds.). (2017). *Research on student civic outcomes in service learning: Conceptual frameworks and methods*. Sterling, VA: Stylus.

Hatcher, J. A. (2008). *The public role of professionals: Developing and evaluating the Civic-Minded Professional scale*. Indiana University.

Hatcher, J. A., & Studer, M. L. (2015). Service-learning and philanthropy: Implications for course design. *Theory into Practice, 54*, 11-19. doi:10.1080/00405841.2015.977656

He, H., Zheng, Q., Di, D., & Dong, B. (2019). How learner support services affect student engagement in online learning environments. *IEEE Access, 7*, 49961-49973.

Hebert, A., & Hauf, P. (2015). Student learning through service learning: Effects on academic development, civic responsibility, interpersonal skills and practical skills. *Active Learning in Higher Education*, *16*(1), 37-49.

Howard, J. (1993). *Praxis I. A Faculty Casebook on Community Service Learning*. Ann Arbor, MI: OCSL Press.

Jacoby, B. (1996). *Service-Learning in Higher Education: Concepts and Practices. The Jossey-Bass Higher and Adult Education Series.* Jossey-Bass Publishers, 350 Sansome St., San Francisco, CA 94104.

Kay, A. C., Laurin, K., Fitzsimons, G. M., & Landau, M. J. (2014). A functional basis for structure-seeking: exposure to structure promotes willingness to engage in motivated action. *Journal of Experimental Psychology General*, 143(2), 486-491.

Keshwani, J., & Adams, K. (2017). Cross-disciplinary service-learning to enhance engineering identity and improve communication skills. *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship*, *12*(1), 41-61.

Krause, K. L., & Coates, H. (2008). Students' engagement in first-year university. *Assessment & Evaluation in Higher Education, 33*(5), 493–505.

Kuh, G. D. (2003). What We're Learning about Student Engagement from NSSE: Benchmarks for effective Educational Practices. *Change, 35*(2), 24 32.

Kuh, G. D. (2009). What student affairs professionals need to know about student engagement. *Journal of college student development*, *50*(6), 683-706.

Lee, J. Q., McInerney, D. M., Liem, G. A. D., & Ortiga, Y. P. (2010). The relationship between future goals and achievement goal orientations: An intrinsic–extrinsic motivation perspective. *Contemporary Educational Psychology, 35*(4), 264-279. http://dx.doi.org/10.1016/j.cedpsych.2010.04.004

Litchke, L. G., Dorman, R., Willemin, T. A., & Liu, T. (2019). Mental Health Benefits of a Service-Learning Group Drumming between College Students and Children with Autism Spectrum Disorder. *Journal of Service-Learning in Higher Education, 9*.

Ma, C., Shek, D., Li, P., & Shek, V. (2018). Promotion of Service Leadership: An Evaluation of a Service-Learning Subject in Hong Kong. *Journal of Service-Learning in Higher Education, 8*.

McKnight, P. E., & Kashdan, T. B. (2009). Purpose in life as a system that creates and sustains health and well-being: An integrative, testable theory. *Review of General Psychology, 13,* 242–251. http://dx.doi.org/10.1037/a0017152

Moran, S. (2014a). What "purpose" means to youth: Are there cultures of purpose? *Applied Developmental Science, 18*(3), 163–175.

Nayir, F. (2017). The Relationship between Student Motivation and Class Engagement Levels. *Eurasian Journal of Educational Research, 71*, 59-77.

Natarajarathinam, M., Qiu, S., & Lu, W. (2021). Community engagement in engineering education: A systematic literature review. *Journal of Engineering Education, 110*(4), 1049-1077. doi: 10.1002/jee.20424

Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simple structures. *Journal of Personality and Social Psychology, 65*, 113–131. doi: 10.1037/0022-3514.65.1.113.

Ogbu, J. U. (2003). *Black American students in an affluent suburb: A study of academic disengagement*. Mahwah, NJ: Lawrence Erlbaum.

Park, S., Holloway, S. D., Arendtsz, A., Bempechat, J., & Li, J. (2012). What makes students engaged in learning? A time-use study of within-and between-individual predictors of emotional engagement in low-performing high schools. *Journal of youth and adolescence*, *41*(3), 390-401.

Petričević, E., Ljubin Golub, T. & Rovan, D. (2016). Development and validation of the Academic Engagement Scale (AES). In: *12th Alps-Adria psychology conference*, Rijeka, Croatia, 29 September - 1 October 2016.

Pettit, J. W., Roberts, R. E., Lewinsohn, P. M., Seeley, J. R., & Yaroslavsky, I. (2011). Developmental relations between perceived social support and depressive symptoms through emerging adulthood: Blood is thicker than water. *Journal of family Psychology*, *25*(1), 127-136.

Pike, G. R., Bringle, R. G., & Hatcher, J. A. (2014). Assessing civic engagement at Indiana University–Purdue University Indianapolis. *New Directions for Institutional Research, 162*, 87-97. https://doi.org/10.1002/ir

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–89. https://doi. 10.1037/0021-9010.88.5.879

Pundt, A., & Venz, L. (2017). Personal need for structure as a boundary condition for humor in leadership. *Journal of Organizational Behavior, 38*(1), 87-107.

Rietzschel, E. F., Slijkhuis, J. M., & Van Yperen, N. W. (2014a). Close monitoring as a contextual stimulator: How need for structure affects the relation between close monitoring and work outcomes. *European Journal of Work and Organizational Psychology, 23*, 394–404. doi: 10.1080/1359432X.2012.752897.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67. http://dx.doi.org/10.1006/ceps.1999.1020

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57,* 1069–1081. http://dx.doi.org/ 10.1037/0022-3514.57.6.1069.

Saeed, S., & Zyngier, D. (2012). How motivation influences student engagement: a qualitative case study. *Journal of Education and Learning, 1*(2), 252-267.

Scherrer, C., & Sharpe, J. (2020). Service learning versus traditional project-based learning: A comparison study in a first year industrial and systems engineering course. *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship, 15*(1), 18-32.

Segerstrom, S. C. (2005). Optimism and immunity: Do positive thoughts always lead to positive effects? *Brain, Behavior, and Immunity, 19*, 195–200.

Sessa, V. I., Grabowski, S., & Shashidhar, A. (2013). Service-learning pedagogy, civic engagement: Multiple bidirectional relationships in college freshmen. *International Journal of Research on Service-Learning and Community Engagement, 1*(1). 23-46.

Sharma, G., Yukhymenko-Lescroart, M., & Kang, Z. (2018). Sense of Purpose Scale: Development and initial validation. *Applied Developmental Science*, *22*(3), 188-199.

Shin, J., Kim, M. S., Hwang, H., & Lee, B. Y. (2018). Effects of intrinsic motivation and informative feedback in service-learning on the development of college students' life purpose. *Journal of Moral Education, 47*(2), 159-174.

Shulman, S., Kalnitzki, E., & Shahar, G. (2009). Meeting developmental challenges during emerging adulthood: The role of personality and social resources. *Journal of Adolescent Research, 24*(2), 242-267.

Staples, J. M., & Troutman, S. (2010). What's the purpose? How urban adolescents of color interpret and respond to noble and ignoble purposes constructed in media texts. *Journal of Urban Learning, Teaching, and Research*, *6*, 31–43.

Sternberg, R. J. (2005). Intelligence, competence and expertise. In E. Andrew & D. Carol (Eds.), *Handbook of competence and motivation*. New York. USA: The Guilford Press.

Steinberg, K. S., Hatcher, J. A., & Bringle, R. G. (2011). Civic-minded graduate: A north star. *Michigan Journal of Community Service Learning, 18*(1), 19-33.

Thompson, M. M., Naccarato, M. E., & Parker, K. E. (1989, June). Assessing cognitive need: The development of the personal need for structure and personal fear of invalidity scales. In *annual meeting of the Canadian Psychological Association,* Halifax, Nova Scotia, Canada.

Torney-Purta, J., Cabrera, J. C., Roohr, K. C., Liu, O. L., & Rios, J. A. (2015). Assessing civic competency and engagement in higher education: Research background, frameworks, and directions for next-generation assessment. *ETS Research Report Series*, *2015*(2), 1-48. https://doi.org/10.1002/ets2.12081

Turner, J.C. & Patrick, H. (2004). Motivational influences on student participation in classroom learning activities. *Teachers College Record, 106*(9), 1759-1795.

van Rooij, S. W. (2020). Critical Reflection for Civic-Mindedness: The Executive Blog as "Regeneration Alcove". *Adult Learning*, *31*(2), 78-87.

Snell, R. S., Chan, M. Y. L., Ma, C. H. K., & Chan, C. K. M. (2015). Developing civic mindedness in undergraduate business students through service-learning projects for civic engagement and service leadership practices for civic improvement. *Asian Journal of Business Ethics, 4*(1), 73-99.

Windsor, T. D., Curtis, R. G., & Luszcz, M. A. (2015). Sense of purpose as a psychological resource for aging well. *Developmental psychology*, *51*(7), 975.

Xerri, M. J., Radford, K., & Shacklock, K. (2018). Student engagement in academic activities: A social support perspective. *Higher education, 75*(4), 589-605.

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