Spring 5-2021

# Contributing to Engineering Colleges Students' Development Through Out-of-Class Involvement: A Survey of Chinese Private Colleges' Engineering Students

Wanlu Li
*Chapman University*, wali@chapman.edu

# Contributing to Engineering College Students' Development Through Out-of-Class Involvement: A Survey of Chinese Private Colleges' Engineering Students

A Dissertation by

Wanlu Li

Chapman University

Orange, CA

College of Educational Studies

Submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Education,

Emphasis in Leadership

May 2021

Committee in charge:

Kelly Kennedy, Ph.D., Co-Chair

Angel Miles Nash, Ph.D., Co-Chair

Nicol R. Howard, Ph.D.

The dissertation of Wanlu Li is approved.

Kelly Kennedy, Ph.D., Co-Chair

Angel Miles Nash, Ph.D., Co-Chair

Nicol R. Howard, Ph.D.

May 2021

Contributing to Engineering College Students' Development Through Out-of-Class Involvement:

A Survey of Chinese Private Colleges' Engineering Students



by Wanlu Li

# DEDICATION

This dissertation is lovingly dedicated to my family, especially...

to my parents, *Gang Li* and *Fengli Shan,* my biggest supporter and champions, for their words of wisdom and encouragement and their active involvement in my academic pursuits.

# ACKNOWLEDGEMENTS

Words cannot describe how thankful I am for my committee chair, Dr. Kelly Kennedy. You have been there, championing this project, this degree, and every step of the way. Your guidance, patience, encouragement, enthusiasm, and support are more than I could have ever asked for. Without you, this would not have been my dissertation topic. Thank you for guiding me to find a topic that aligns with my passion. Beyond the dissertation process, I appreciate all of the words of wisdom you have shared with me along the way. You are an incredible role model and mentor and will always be someone I look up to and respect.

Thank you to my committee, Dr. Angel Miles Nash and Dr. Nicol R. Howard, for your feedback, guidance, encouragement, and support of this project. Angel, you have a calming and caring personality that is a gift to those around you. Thank you for your every feedback that helps me clarify the logic, and I am impressed. I found your teaching methods inspiring. Nicol, thank you for participating in this process and always supporting me.

It is important to me to thank Dr. Dawn Hunter, Dr. Whitney Mclntyre Miller, and Dr. Ryan Allen for your academic and cultural guidance, caring, encouragement, and support during this learning journey. Dawn, I am deeply impressed by your optimistic and caring personality. The homemade brownies, the breakfast, the instant replies meant so much to me at the time. Whitney, I am always inspired and impressed by your leadership and wisdom. Ryan, without your patience and support, I cannot imagine the first-year learning journey. Your guidance, encouragement, and wisdom help me to always be on the right track. Similarly, at Chapman

University, I had this valuable opportunity of learning from inspirational professors who have made contributions to my professional and academic experience.

Thank you to my cohorts, my family, and my friends. Thank you all for supporting and caring for me both in learning and life. Our Shanghai cohort, your persistence, hardworking, passion influence me a lot. We made it! My working place cohort, thank you for sharing the work pressure and unlimited encouragement and support for me these past few years. My family, your company, tolerance, generosity, and support have meant so much to me. Love you all. My friends, you always enlighten me when I am anxious and struggling and celebrate me in the crucial moments.

Last, and certainly not least, I am most grateful for my teachers. For Yunlin Cao, your valuable advice, guidance, and support enabled me to have the opportunity of this academic journey. Without you, it would have been hard for me to make up my mind and have the courage to start my PhD program. For Guoxing Wu, thank you for your valuable recommendation letter and encouragement as always. Your trust has always encouraged me to persist until the end.

# ABSTRACT

Contributing to Engineering College Students' Development Through Out-of-Class Involvement: A Survey of Chinese Private Colleges' Engineering Students
by Wanlu Li

The purpose of this study was to investigate the primary characteristics of engineering college students' involvement in out-of-class activities (OA) at one private college in China through the use of the translated and culturally adapted Chinese version of the Postsecondary Student Engagement Survey (PosSES 2.1). This study provides the statistical analyses of the survey data completed by 283 senior engineering students on their perceptions about their levels of involvement related to positive/negative outcomes students perceive and affective engagement. Data results showed all levels of involvement have a significant influence on positive outcomes. Besides, active involvement degree, hours, and types of OA have significant differences in engineering students' affective engagement. Only the number of OA in which students were involved has a significant influence on negative outcomes and had no difference for affective engagement. Moreover, results reported a strong correlation between affective engagement and positive outcomes. These findings confirmed the importance of participation in OA and indicated paying attention to the quality of OA involvement other than the quantity was essential for colleges and universities, educators and policymakers, and engineering undergraduates. Furthermore, this study provides descriptive statistics on participants' reported data on identifying incentives for and barriers to out-of-class involvement. To date, existing Chinese literature has primarily focused on student engagement and learning outcomes. However, this

study provides evidence that OA involvement is a practical pathway to Chinese engineering college students' development and makes affective engagement a significant contributor to student engagement measures in engineering education. Significantly, the PosSES 2.1 (Chinese version) that measures different facets of engineering students' out-of-class engagement meets the urgent need of Chinese higher education to investigate and understand the status quo of engineering students' OA involvement. Additionally, this study provides new insight for educators and policymakers to analyze the reasons for problematic out-of-class involvement that could help them design meaningful OA and create new approaches to mitigate the crisis of engineering undergraduates' low retention rate and persistence. Future researchers should consider exploring more complex dimensions and broaden the research perspective in this area.

# TABLE OF CONTENTS

**Page**

# LIST OF TABLES

# CHAPTER 1

# INTRODUCTION

In the background of the rapid development of China's social economy, the popularization of higher education, and fierce job competition, the mission and methods of higher education are changing. The traditional model of talent cultivation based on in-class learning education has gradually exposed its disadvantages. This model is not the only way to cultivate students' comprehensive abilities and professional skills, or prepare them to meet the requirements of undergraduate talent training and the demand of competitive employment in the new era (Guo et al., 2017; Lin, 2008; Zeng et al., 2017). Traditional education's concept of valuing knowledge over practice no longer meets the requirements of the times. Also, traditional approaches for cultivating student success have biased students' perception of out-of-class activities (OA) as irrelevant (Lin, 2008). Unfortunately, such a phenomenon is particularly prominent among engineering students in China (Gan, 2014; Guo et al., 2017; Z. Wang, 2019).

The characteristics of engineering students' enrollment, the difficulty of the coursework in their majors, and the lack of interactions with peers and faculty have mainly caused the crisis of engineering students' low retention rate and persistence. These traits have also led to a large proportion of engineering students with learning difficulties, inactive extracurricular participation, a shortage of liberal education, and poor interpersonal communication skills (e.g., Dong, 2012; Hao & Wang, 2018; Z. Wang, 2019). The lack of attention and research on this

phenomenon will undoubtedly bring severe losses to the cultivation of future engineers and the development of scientific and technological innovation in China.

Findings in the literature (e.g., Astin, 1984; Bao & Du, 2016; Kuh et al., 2011; Pascarella & Terenzini, 2005; Simmons, Van Mullekom, & Ohland, 2018; Sun & Ding, 2010; G. Yang, 2016b) strongly support the arguments that out-of-class engagement played an essential role in achieving the mission of higher education and contributed to student development. Also, out-of-class engagement has been considered as a practical pathway to improve student engagement (Finn & Zimmer, 2012; Sun & Ding, 2010) and a more comprehensive indicator of higher education output for measuring student development (Astin, 1999; Kuh et al., 2011; Pascarella & Terenzini, 2005).

During the last two decades, OA in Chinese higher education have changed positively in terms of policy support (Zheng, 2016), perceptions of educators and undergraduates (X. Wu, 2016), and the quantity of relevant research (Zeng et al., 2017). In 2018, the Central Committee of the Communist Youth League and the Ministry of Education (MOE) jointly issued the policy of *Opinions on the Implementation of the second classroom Transcript system in Higher Education* (MOE, 2018a). This policy identified the role of the second classroom (i.e., out-of-class engagement) that is relative to the first classroom (i.e., in-class learning) and mainly refers to educational activities that occur outside the university classroom, aiming to enrich students' extracurricular experience and improve students' all-round ability development (Peng & Xie, 2011). Additionally, some government initiatives emphasized the importance of

engineering undergraduates' participation in OA. Also, the colleges and universities were required to engage at least half the engineering students in various types of OA during their undergraduate education (MOE, 2018b).

However, compared with the United States' adequate educational resources (e.g., settings, funds, faculty advisers) and higher education's distinctive out-of-class training mode, which is centered on college students realizing the combination of in-class and out-of-class learning, nature and humanities, teaching, and scientific research (X. Wu, 2016; Zhao, 2015; Zheng, 2016), OA in Chinese higher education are still developing and improving. Moreover, although the theoretical and empirical research on college students' extracurricular activities has gradually developed, there is a considerable gap with the research results in the United States. At present, there are few questionnaires about undergraduates' out-of-class engagement in China. In the existing surveys, the definition of OA is vague. Some researchers (e.g., W. Wang, 2017; Q. Wu & Jiang, 2017) investigated only a few activities to reflect students' participation in OA, while others (e.g., Guan et al., 2018) simply used the term "extracurricular activities" to describe the overall phenomenon abstractly, which led to overly broad or similar results and lack of guidance. Measures of engineering students' OA are limited—or nonexistent—in current Chinese instruments. Therefore, my research will cite the Postsecondary Student Engagement (PosSE) Survey (Simmons et al., 2015, 2019; Simmons, Ye, et al., 2017) that measures different facets of engineering students' out-of-class engagement.

## Problem Statement

Out-of-class activities (OA) are an embedded feature of a U.S. education; more than three fourths of students participate in some extracurricular activities (Gibbs et al., 2015). Astin's (1984) seminal theory on student involvement suggests all of the experiences of a college student are important, not just time spent in class. Furthermore, the field of engineering depends on engineers who are not only knowledgeable in core sciences and mathematics, but also are astute and adaptable to emergent issues and can manage the socioeconomic challenges of the future. To equip future engineers with these skills, the educational experiences for engineering students need to be well-rounded and must prepare these future engineers to take on leadership roles in interdisciplinary challenges. Students who are positively engaged in educational activities develop lifelong learning skills that ensure total personal development. However, in China's higher education, it was not until 2018 that the policies (MOE, 2018a, 2018b) issued by the Ministry of Education promoted the development of undergraduates' out-of-class engagement. Inevitably, there are few pieces of research related to this topic, especially in the field of private higher education in China. Therefore, the field of higher education is in urgent need of such measurement tools to understand the status quo of engineering students OA involvement. Using data from the PosSE Survey, a profile of engineering college students' out-of-class activities engagement will be created, especially for private colleges in China. Also, the data may suggest reasons for the gap between engineering undergraduates' expectations of OA and the educational mission of colleges and universities.

## Purpose of the Study

The purpose of the study was to capture the primary characteristics of engineering college students' involvement in OA at one private college in China. Through the use of the translated and culturally adapted Chinese version of PosSE Survey (i.e., PosSES 2.1), the purposes of this study were to:

1. Examine the levels of involvement and engineering students' perceived outcomes and affective engagement, which can lead to the active involvement degree, hours, numbers, and identification of types of OA in which engineering students' involved related to positive/negative outcomes and affective engagement.
2. Explore the correlation of affective engagement and engineering students' perceived outcomes from OA involvement.
3. Identify the incentives for, and barriers to, participation for engineering students that would help engineering educators and policymakers to revise pathways or mechanisms that influence students' development.

## Theoretical Framework

My research is guided by the framework of Astin's (1984) involvement theory with the variables of the levels of involvement (i.e., active involvement degree, hours, numbers, and types of OA in which students participate) and Finn's (1989) participation-identification model with the variable of affective engagement. These two are models feature both contextual and intrapersonal views, which are used to identify the factors that influence students' behavioral

engagement, affective engagement, and cognitive engagement related to desired educational outcomes.

### Astin's (1984) Involvement Theory

Astin's (1984) theory on student involvement suggests all of the experiences of a college student are important and not just time spent in class. He defined involvement as an investment of physical and psychological energy that occurs along a continuum and had both quantitative (e.g., time spent) and qualitative (e.g., amount of focus or depth) features. The hypotheses of this theory emphasized students' learning gains and personal development have a positive relationship with the effort and energy students devoted to any educational activities. Also, the effectiveness of any educational policy or practice is directly related to improving student engagement.

### Finn's (1989) Participation-Identification Model

Finn's (1989) participation-identification model contributes to student engagement as a portfolio concept with two primary forms of behavioral engagement and affective engagement. This model explained how participation (i.e., behavioral engagement) and identification (i.e., affective engagement) interact to impact the likelihood of academic success. The process is cyclical that engagement and emotion reciprocally influence each other (Finn & Zimmer, 2012).

## Research Questions

In this study, I aimed to answer the following research questions:

**Research Question 1 (RQ1):** What is the nature of engineering students' perceptions of the outcomes of out-of-class activities (OA)?

**RQ1a:** How do levels of involvement in OA relate to positive and negative outcomes?

**RQ1b:** How do levels of involvement in OA relate to affective engagement?

**Research Question 2 (RQ2):** To what extent is the level of affective engagement in OA related to engineering students' outcomes?

**Research Question 3 (RQ3):** What do engineering students perceive as the incentives for OA involvement?

**Research Question 4 (RQ4):** What do engineering students perceive as the barriers to OA involvement?

**Hypothesis Statements**

**Research Question 1 (RQ1):** What is the nature of engineering students' perceptions of the outcomes of out-of-class activities (OA)?

**RQ1a:** How do levels of involvement in OA relate to positive and negative outcomes?

**RQ1b:** How do levels of involvement in OA relate to affective engagement?

There are a number of hypotheses to be tested as a means of answering this question:

**Hypothesis $1a_1$ ($H1a_1$):** The degree of active involvement has significant differences for engineering students' perceived positive outcomes.

**$H1a_2$:** Hours engineering students spent weekly in OA has significant differences for engineering students' perceived positive outcomes.

**$H1a_3$:** Numbers of OA in which engineering students were involved has significant differences for engineering students' perceived positive outcomes.

**$H1a_4$:** Different types of OA in which engineering students participated have significant differences in engineering students' perceived positive outcomes.

**H1b$_1$**: The degree of active involvement in OA has significant differences for engineering students' affective engagement.

**H1b$_2$:** Hours engineering students spent weekly in OA has significant differences for engineering students' affective engagement.

**H1b$_3$:** Numbers of OA in which engineering students were involved have significant differences for engineering students' affective engagement.

**H1b$_4$:** Different types of OA in which engineering students participated have significant differences in engineering students' affective engagement.

**Research Question 2 (RQ2):** To what extent is the level of affective engagement in OA related to engineering students' outcomes?

**Hypothesis 2 (H2):** The level of affective engagement in OA has a significant influence on engineering students' perceived positive outcomes.

**Research Question 3 (RQ3):** What do engineering students perceive as the incentives for OA involvement?

**Hypothesis 3 (H3)**: This is a descriptive question, and therefore there is no hypothesis.

**Research Question 4 (RQ4):** What do engineering students perceive as the barriers to OA involvement?

**Hypothesis 4 (H4)**: This is a descriptive question, and therefore there is no hypothesis.

## Significance of the Study

By using data from the PosSE Survey, I will create a clear profile of engineering college students' out-of-class activities engagement, especially for private colleges in China. This research is not only an essential contribution to the research in this field by measuring in detail the different types of OA and the multidimensional factors that influence the desirable outcomes,

but also address the gap between expectation of engineering students and higher education. Moreover, based on the research results, engineering undergraduates can gain a better understanding of out-of-class engagement that helps them become more likely to participate in personalized and precise OA under limited time and energy. Furthermore, this research could indicate effective mechanisms for colleges and universities, especially for engineering educators and stakeholders, to improve out-of-class engagement, to strengthen undergraduates' connectedness with colleges, and eventually, to cultivate well-rounded college students.

## Operational Definitions

The following definitions serve to provide a succinct understanding of the terms used throughout the dissertation.

### Student Engagement

Student engagement is defined as the energy and effort students devote to educationally effective practices, both academic and nonacademic activities, which are linked to a range of measurable outcomes (e.g., Astin, 1984; Kuh et al., 2011; Quaye et al., 2015).

### Affective Engagement

Affective engagement refers to the emotional responses toward school or others (e.g., faculty and peers), including interest, boredom, happiness, sadness, anxiety, valuing of school, and feelings of acceptance and belonging (Finn & Zimmer, 2012; M. Hu, 2015; S. Li, 2013). Affective engagement was viewed as forms of connectedness to school and persons in school (Simmons et al., 2019). Students' sense of connectedness was reflected in affective behaviors, such as satisfaction and achievement striving, and engaging with peers and faculties, that help students persist and positively engage in educational activities in and out of classrooms (Marra et al., 2012).

**Out-of-Class Activities**

In this dissertation, the term out-of-class activities consists of curricular, co-curricular, and extracurricular activities based on the framework from Simmons, Creamer, and Yu's (2017) and G. Yang and Zhang's (2018) 12 categories of out-of-class activities, including thematic education activities, the party organization activities, culture and art activities, daily management activities, difficulty assistance activities, academic guidance activities, scientific and technological innovation activities, entrepreneurship education activities, social practice activities, volunteer activities, student association activities, and health education activities.

**Curricular Activities**

Associated with a course and connected to academic learning, curricular activities are tied to academic credit but occur outside of the classroom (Simmons, Creamer, & Yu, 2017).

**Co-Curricular Activities**

Co-curricular activities complement what students are learning in a course or major but are not connected directly to a particular course (Simmons, Creamer, & Yu, 2017).

**Extracurricular Activities**

Extracurricular activities are not explicitly linked to a course or major program of study (Simmons, Creamer, & Yu, 2017).

**First Classroom**

The term "first classroom" refers to in-class learning in the Chinese context.

**Second Classroom**

In the Chinese context, "second classroom" refers to out-of-class engagement that is relative to the first classroom. It mainly applies to educational activities that occur outside the classroom (Peng & Xie, 2011).

## Outcomes

In this dissertation, the term outcomes refer to students' gains from out-of-class involvement, including positive and negative outcomes. Positive outcomes include personal development, social engagement, communication skills, satisfaction with college experience, leadership skills, sense of belonging to college, opportunities to be independent, resilience and flexibility, intellectual development, professional development, ethical standards, social development, civic development, academic engagement, practical ingenuity, creativity, cross-cultural awareness, global competence, and business and management skills. Negative outcomes include free time being reduced, schedule being less flexible, increased expense, academic time-line extended, decreased academic engagement, decreased GPA in college, damaged interpersonal relationships, declined personal health, social development negatively impacted, decreased social engagement, and personal development negatively impacted.

## Conclusion

This chapter provided an overview of undergraduates' out-of-class engagement with a focus on engineering students who are at risk of comprehensive development in Chinese higher education. Different levels of involvement that would influence students' out-of-class engagement were explored in the context of both U.S. and Chinese higher education. Astin's involvement theory and Finn's participation-identification model were introduced as theoretical frameworks for examining the variables related to students' levels of involvement in OA and affective engagement. The following chapter provides a more detailed review of the pertinent literature in the areas of Chinese engineering students' crisis, student engagement, out-of-class activities, outcomes associated with out-of-class involvement, implications for OA development in Chinese higher education, and problematic issues.

# CHAPTER 2

# LITERATURE REVIEW

The purpose of this review was to provide a background for my research study by contextualizing the literature on the links between undergraduates' out-of-class activities (OA) involvement and affective engagement, especially engineering students. This research study was conducted within the framework of Astin's (1984) involvement theory and Finn's (1989) participation-identification model with the variables of the levels of involvement (i.e., active involvement degree, hours, numbers, types of OA in which students were involved), affective engagement, and students perceived outcomes. To adequately examine the literature, it is essential to give attention to the crisis of engineering students. An analysis of student engagement provides insight into factors related to students' OA involvement. An overview of OA in the United States and Chinese higher education systems provides a contextual understanding of the need for more research on students' OA involvement in China. I also discuss outcomes associated with levels of involvement and affective engagement. As a final point, I summarize the problematic issues existing in current engineering undergraduates in Chinese higher education.

## Theoretical Framework

Research on student involvement and related theories mainly include Astin's (1984) student involvement theory, Finn's (1989) participation-identification model, Connell's (1990) self-system process theory, Newmann's (1992) student engagement theory, and Furlong et al.'s, (2003) multiple contexts of school engagement framework (N. Li & Ren, 2013). Among them, Astin's student involvement theory and Finn's participation-identification model are models with

features of both contextual and intrapersonal views, which are used in the theoretical framework of this research.

**Astin's (1984) Involvement Theory**

Astin's (1984) theory on student involvement suggests all of the experiences of a college student are important and not just time spent in class. His theory is principally concerned with how college students devote their time and effort to activities designed to produce desirable outcomes and how various institutional factors, processes, and opportunities facilitate development. The theory has five underlying assumptions:

- Involvement refers to students' physical and psychological investment into different activities, including abstract activities (e.g., student experience) and specific activities (e.g., preparing for an experiment).
- Involvement is a continuous process. For example, different students will show different degrees of involvement in a given activity, or one student will show different levels of involvement in different activities.
- Involvement has qualitative (e.g., amount of focus or depth) and quantitative (e.g., time spent) characteristics.
- In any educational activity, students' learning gains and personal development have a positive relationship with the effort and energy students devoted.
- The effectiveness of any educational policy or practice is directly related to improving student engagement.

The fourth and fifth hypotheses are the most important because they provide pathways to the design of more effective educational activities. Therefore, this theory can not only be used to

understand the research findings regarding student development, but it can also be used to help educators and administrators in higher education design a more productive college environment.

### Finn's (1989) Participation-Identification Model

Finn's (1989) participation-identification model contributes to student engagement as a portfolio concept with two primary forms of behavioral engagement and affective engagement. This model explained how participation (i.e., behavioral engagement) and identification (i.e., affective engagement) interact to impact the likelihood of academic success. According to this model, patterns of engagement and disengagement in the early grades have a long-term influence on students' identification and participation in the later years. Students who actively participate in educational activities will enhance their feelings of acceptance and valuing of school, which are essential components of affective engagement. However, students who lack active participation may also have unsuccessful school outcomes (e.g., lower grades), which in turn may lead to emotional withdrawal. Meanwhile, the development of positive emotions of valuing and belonging helps perpetuate students' educational activities' participation. Simultaneously, dis-identification is associated with nonparticipation in activities, resulting in even less academic success. The process is cyclical, in that engagement and emotion reciprocally influence each other (Finn & Zimmer, 2012).

## A Brief Overview of Engineering Students' Crisis

According to the education statistics in 2018 (Ministry of Education, Peoples Republic of China [MOE], 2018c), the number of engineering students in China is approximately 6.8 million, accounting for 40.1% of the total number of undergraduates, and the number of undergraduate students in 2018 is estimated to be 1,648,894. The quality of engineering undergraduates has a significant impact on the quality of higher education in China. With the

growth of the number of graduates every year and the shortage of jobs, engineering college students face more and more pressure from employment competition (Guo et al., 2017).

With the continuous development of China's economy and society, comprehensively improving the literacy and accomplishment of college students has become an essential part of China's higher education reform and development (Hao & Wang, 2018; Z. Wang, 2019). In 2018, the MOE, the Ministry of Industry and Information Technology, Peoples Republic of China, (MIIT) and the Chinese Academy of Engineering, Peoples Republic of China jointly issued the policy of *Opinions on Accelerating the Development of New Engineering, Implementing Excellent Engineer Education, and Training Plan 2.0* (MOE, 2018b). This policy pointed out the need to merge various practice pathways for improving the cultivation quality of engineering talent. Among them, the initiative of training college students' innovation and entrepreneurship required colleges and universities to engage more than 50% of engineering undergraduates participating in the relevant OA. The policy also mentioned colleges and universities should pay attention to cultural edification and train modern engineers with the concept of benefiting humankind and sustainable development (MOE, 2018b).

While education reform of literacy and achievement levels for college students is being carried out in China, engineering undergraduates are facing many difficulties. The characteristics of students' enrollment, the difficulty of majors, and the shortage of education resources may be responsible for many of the challenges faced by engineering students. The crises lead to a large proportion of engineering students with learning difficulties, inactive extracurricular participation, lack of liberal education, and imbalance of employment (e.g., Dong, 2012; Hao & Wang, 2018; Z. Wang, 2019). More discussion of engineering students' crisis is included in the problematic issues section of this chapter.

## Student Engagement

Student engagement (and disengagement) was conceptualized in the 1980s as a way to understand and reduce student boredom, alienation, and dropping out (Finn & Zimmer, 2012). Many scholars have conducted research on student engagement and formed many conceptual frameworks. For example, Tyler's (1930s) time on task, Pace's (1960–1970s) quality of effort, and Astin's (1984) student involvement theory discussed that the more time and effort students invest in learning tasks, the more knowledge they learn (Kristen & Li, 2008). Additionally, Tinto (1987) and Chickering and Gamson (1987) provided good practices in undergraduate education that believed the integration of academic and interpersonal affects students' development. Moreover, Kuh (2003) suggested higher education institutions should provide and create an excellent educational environment and conditions to encourage students to participate.

### Defining Student Engagement

In general, researchers struggle to determine the most appropriate definition of student engagement due to its multifaceted nature. There are three main views on the definition of student engagement that consider participation as a kind of behavior, a mental activity, or the organic unity of behavior, cognition, and emotion (M. Hu, 2015). For example, Newmann (1992) defined engagement as “the student's psychological investment in an effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote” (p. 12). Astin (1984) defined student involvement as “the amount of physical and psychological energy that the student devotes to the academic experience” (p. 297). S. Hu and Kuh (2002) described student engagement as “the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes” (p. 555). These three definitions of student engagement were representative in

different periods and the most cited. Although the emphasis is slightly different, both of them discuss the close relationship between the quality of students' participation and their gains from engagement.

Chinese scholars have also studied the concept and connotation of student engagement from different perspectives. Zhao (2015) considered student participation a process in which students actively participate in teaching activities under the guidance of teachers and realize the subject construction and development of students. X. He and Chen (2008) believed that student engagement refers to a positive emotion and complete cognition related to learning activities, which is manifested in that students devote their time and energy to it. Kong (2000) summarized the concept of student engagement in three aspects, including behavioral engagement, cognitive engagement, and emotional engagement.

In the literature of student engagement, the word “engagement,” “involvement,” and “participation” are often used. Although Quaye et al. (2015) argued it is entirely possible to be involved in something without being engaged, which indicated a qualitative difference between involvement and engagement, in this study, all three words are used as the meaning of the same degree of engagement. Student engagement is defined as the energy and effort students devote to educationally effective practices, both academic and nonacademic activities, which are linked to a range of measurable outcomes (e.g., Astin, 1984; Kuh et al., 2011; Quaye et al., 2015).

**Components of Student Engagement**

According to Fredricks et al. (2004), student engagement is a multidimensional construct with three dimensions, including behavioral engagement, cognitive engagement, and affective engagement framed by the taxonomy of educational objectives (Bloom, 1956). This view is supported by official institutions such as the National Center for School Engagement (NCSE)

and the National Research Council, and also cited by many Chinese researchers (e.g., X. He & Chen, 2008; M. Hu, 2015; Kong, 2000). Each type of engagement defines aspects of students' involvement with curricular and extracurricular activities and has a significant impact on learning outcomes and student retention or dropout from school (Massoni, 2011; Stuart et al., 2011).

Behavioral engagement refers to the involvement of individuals in academic or nonacademic activities in school, which are explicit and observable. Some engagement behaviors, such as student attentiveness, completing assignments, and compliance with rules and regulations, can take place in curricular time. In addition, extracurricular participation is an obvious form of students' behavior engagement. Other engagement behaviors, like activity intensity (e.g., attention, persistence, time, and effort commitment), can take place both in curricular and extracurricular time. Therefore, there is a link between the participation behavior and the intensity of students' activities in and out of the classroom that can promote both in-class engagement and out-of-class engagement (Finn & Zimmer, 2012; Fredricks et al., 2004; M. Hu, 2015).

Cognitive engagement refers to any exercise of thinking, including students' cognitive strategies while solving problems or watching a recording of their learning activity. The process of students' cognitive engagement includes students using learning strategies such as rehearsal, summarizing, an elaboration to understand, and memory knowledge. Also, students can manage and control their efforts on learning tasks (e.g., by insisting on or suppressing interference) to keep their cognitive participation. Thus, students who use high-level learning strategies have greater cognitive involvement and more apparent characteristics of learning independence than those who use low-level learning strategies (Kong, 2000).

Affective engagement refers to the emotional responses toward school or others (e.g., faculty and peers), including interest, boredom, happiness, sadness, anxiety, valuing of school, and feelings of acceptance and belonging (Finn & Zimmer, 2012; M. Hu, 2015; S. Li, 2013). According to Krathwohl et al. (1964), affective taxonomy included receiving, responding, valuing, organizing, and internalizing. It describes how learners begin by being willing to accept experiences, begin to respond, attach importance to education, organize in their larger values and attitudes, and eventually internalize those values. They no longer need external stimuli to trigger relevant emotions and emotional responses (Shulman, 2002). Other researchers (e.g., Connell, 1990; Connell & Wellborn, 1991; Finn & Zimmer, 2012; Kong, 2000; S. Li, 2013; Simmons et al., 2019) proposed that positive emotions (e.g., interest, happiness, valuing and belonging of school), compliance with norms, and negative emotions (e.g., boredom, anxiety) are three elements of affective engagement. Among them, valuing of school and feeling of belonging is the direct evidence for affective engagement. Additionally, positive reciprocal relationships with teachers and peers are considered other indicators for affective engagement (Finn & Zimmer, 2012; Simmons et al., 2019).

There is no doubt the three dimensions of student engagement are dynamically interrelated within the individual (Fredricks et al., 2004). The remarkable feature of behavioral engagement is that it can be observed, and it is the representation of cognitive and affective engagement. Affective engagement is the motivation for students' participation, which will directly or indirectly influence behavioral and cognitive engagement in the learning process (M. Hu, 2015).

Additionally, researchers (e.g., Fredricks et al., 2004; Shulman, 2002) emphasized the idea of commitment because it implies there exist qualitative differences in the level of

engagement along with each component. The idea of commitment is experienced as people internalize values, develop character, and in turn, make new engagements possible and even necessary. For example, behavioral engagement can range from only participating in activities or student organizations to participating in leadership positions in those organizations. Affective engagement can range from liking to keep feelings of valuing and belonging to the institution. Cognitive engagement can range from superficial learning to the use of self-regulated learning strategies that promote deep understanding. These qualitative differences in each dimension have different effects on the intensity and duration of involvement, which can be specific and short-term, or stable and long-term.

**Why Engagement Matters**

The engagement has emerged as a way to improve educational outcomes for students and to ameliorate education risks (Finn & Zimmer, 2012; Fredricks et al., 2004), such as educational failure, disaffection, and high dropout rates. The reasons for the growing interest in engagement are summarized as follows. First, many studies (e.g., Finn & Zimmer, 2012; Fredricks et al., 2004; M. Hu, 2015; Tinto, 2000) have confirmed that engagement contributes to academic achievement, attainment, dropout rates, and persistence. Second, participation is considered to be malleable, which can not only serve as an indicator for the process evaluation of students' learning to continuously improve the academic outcomes, but also promote the goal of students to become lifelong learners through the interaction between individuals and the context (Fredricks et al., 2004; M. Hu, 2015). Third, engagement proves to be the single most significant predictor of persistence, which is an essential outcome of schooling (Tinto, 2000). If students do not participate actively in activities, do not cognitively engage in learning, do not

fully develop a sense of college belonging, they have a substantial possibility of experiencing difficulties that reduce the likelihood of school success.

Although student engagement is often thought of as one of the most critical aspects of learning (Shulman, 2002), studies have also shown that the way students engage with co-curricular and extra-curricular activities impacts their entire educational experience. For example, students' engagement in out-of-class activities has been linked with higher cumulative grades (e.g., Y. He & Dai, 2014), improved analytical, group, and leadership skills (Carini et al., 2006; Simmons et al., 2014), increased student-faculty interaction (Pike et al., 2011), and more developed ethical development (Burt et al., 2013).

Given the changes in students' needs and current reform in higher education, researchers (Kuh et al., 2011; Quaye et al., 2015; Ross, 2009) have also pointed out that it is vital to provide the conditions under student engagement is likely to occur. According to Ross (2009), these certain conditions and activities include college impact, desired behavior, the relationship between peers and faculty, motivation, and other social-related factors (e.g., family responsibility). Also, action, purpose, and cross-institutional collaboration are requisites for engagement and deep learning (Kuh et al., 2011). Moreover, researchers (Finn & Zimmer, 2012; M. Hu, 2015; Simmons et al., 2019; Simmons, Ye, et al., 2017) suggested, when assessing and evaluating student engagement, considering emotional participation factors can improve the accuracy of the analysis results that lead to the desired outcomes such as persistence, satisfaction, and graduation.

**Affective Engagement and Outcomes**

According to engagement models, affective engagement provides a driving force for students' educational experience and interacts with these behaviors along with the school years

(Finn, 1989, 1993; Fredricks et al., 2004; Kong, 2000; Newmann et al., 1992). It is essential to fully recognize the relationship between emotional involvement, cognitive involvement, and behavioral involvement. Besides, some studies (Fredrickson & Losada, 2005; Simmons, Ye, et al., 2017; Waugh & Fredrickson, 2006) of the relationship of specific constructs combined under the term emotional engagement, such as interest, value, boredom, anxiety, also show varying associations with outcomes.

Affective engagement has been shown to influence students' cognitive and behavioral engagement significantly. Having a sense of academic belonging and students' relationship with others in school plays a prominent role in their ability to engage with classroom and out-of-classroom activities (Marra et al., 2012) and influences students' determination to succeed in school and enhance personal development. Apart from positive learning outcomes, affective engagement has been suggested to help students persist and sustain a sense of resilience (Fredrickson & Losada, 2005; Waugh & Fredrickson, 2006). For example, Waugh and Fredrickson (2006) tested participants who had just arrived at their first year of college and did not know their new roommate via questionnaires three times. The results have shown positive emotions broaden students' sense of self to include others, which may produce feelings of self-other overlap with new roommates. These feelings of social connection may, in turn, predict a more complex understanding of others and smooth the progress of the relationship. Fredrickson and Losada (2005) surveyed 188 participants to identify flourishing mental health and asked participants to provide daily reports experienced positive and negative emotions over 28 days. Results showed that a positivity ratio at or above 2.9 is associated with human flourishing, which means to live in an optimal range of human functioning, one that connotes goodness, generativity, growth, and resilience. The findings further indicated positive emotions

carry multiple, interrelated benefits, including widening attention, broadening behavioral repertories, increasing intuition, creativity, and predicting resilience to adversity, happiness, and psychological growth.

On the contrary, students who are less emotionally engaged with the school are more likely to be less engaged in behaviors and cognitive engagement with learning tasks both in and out of the classroom. Disengaged students may: (a) enter college without adequate cognitive or social skills, (b) find it difficult to learn basic engagement behaviors, and (c) fail to develop positive attitudes that perpetuate their participation in the class. Alternatively, some students may enter school with marginal habits that reduce their engagement resulting in learning difficulties, abnormal interactions with faculties and peers, or close relationships with other disengaged students (Finn & Zimmer, 2012). If the student is repeatedly frustrated, they may develop a sense of failure, fear of difficulties, and social isolation that has an impact on their decision to drop out (Finn, 1989; S. Li, 2013).

## Overview of Out-of-Class Activities

Extracurricular involvement allows students to associate academic knowledge with practice, which is beneficial for students' academic achievement and personal development (Bao & Du, 2016). The student development classification method generally uses cognitive and noncognitive indicators to measure students' development, which is a more comprehensive and reasonable indicator of higher education output than academic performance or academic achievement (Astin, 1999; Kuh et al., 2011; Pascarella & Terenzini, 2005). Therefore, out-of-class activities have been considered a unique way to improve student engagement in and out of the classroom (e.g., Finn & Zimmer, 2012; Kuh, 1993; Sun & Ding, 2010).

**Out-of-Class Activities in the United States**

Higher education institutions in the United States have used out-of-class activities as an efficient pathway to support students' physical and mental development. Colleges and universities put effort into exploring the availability and selection of various extracurricular activities. Astin's (1984) seminal theory on student involvement suggests all of the experiences of a college student are important and not just time spent in class. Astin (1999) defined involvement as an investment of physical and psychological energy that occurs along a continuum and had both quantitative (e.g., time spent) and qualitative (e.g., amount of focus or depth) features. Since 1999, researchers and practitioners (e.g., Nesheim et al., 2007; Simmons,Creamer, & Yu, 2017; Zimmerman-Oster & Burkhardt, 1999) have used involvement theory to develop programs, modify curricula, make administrative decisions, and conduct research. Also, researchers and student affairs professionals are asked by the American College Personnel Association to put effort into blurring the boundaries between academic affairs and student affairs to create seamless learning environments (Kuh et al., 2011) for fostering student engagement (Nesheim et al., 2007; Pascarella & Terenzini, 2005). Meanwhile, some partnership programs between academic and student affairs units have been advocated as one means to bridge the academic, social, and affective elements of students' experiences to encourage students to take advantage of learning resources that exist both inside and outside the classroom (Kuh et al., 2011; Nesheim et al., 2007).

Furthermore, a substantial body of literature exists on how college impacts student development (Pascarella & Terenzini, 2005). Most empirical studies particularly examined the ways that out-of-class involvement related to undergraduate students' gains, including their cognitive, psychosocial, academic, or intellectual development. Specifically, researchers (e.g.,

Campbell & Nutt, 2008; Simmons, Creamer, & Yu, 2017) argued students who engage in activities outside of the formal classroom setting are more likely than their disengaged peers to persist toward graduation. Moreover, out-of-class involvement also develops students' intellectual skills (e.g., Foreman & Retallick, 2013; McClellan, 2013; M. Yang & Chau, 2011), communication and leadership skills, and social skills (e.g., Simmons et al., 2015; Simmons, Creamer, & Yu, 2017). Other researchers (e.g., Chesbrough, 2011; Simmons et al., 2018) explored the factors and barriers about students' involvement in extracurricular activities and discussed the degree of involvement related to students' outcomes (e.g., Foreman & Retallick, 2013; Foubert & Grainger, 2006).

**Out-of-Class Activities in China**

In China, colleges and universities have carried out various forms of extracurricular activities and accumulated lots of practical experience. In an overview from the literature in the Chinese higher education context, educators, and researchers (e.g., L. Li, 2010; W. Li, 2013; Peng & Xie, 2011; Shen, 2012) confirmed both *the first classroom* (i.e., in-class learning) and *the second classroom* (i.e., out-of-class experience) together constitute an organic whole of the university education system. Although some theoretical and empirical studies related to this field have gradually developed, there is still a huge gap compared with U.S. research results.

First, the current research is lacking clarity related to the theoretical basis for engagement in extracurricular activities. Authors of recent studies mainly discussed the status quo and strategies of carrying out extracurricular activities (e.g., S. Hu & Xie, 2009; S. Li, 2018; Qin, 2011; Tian, & Huang, 2001; G. Yang & Zhang, 2018), connotation and extension of the second classroom (Yan, 2006; G. Yang, 2016a; Yu, 2017), and the approaches to strengthen the management of out-of-class activities (Guan et al., 2018; M. Zhang, 2012; Zheng, 2016; Zhuang,

2007). Only a few experts and scholars focus on the internal relationship between college students' involvement in extracurricular activities and their development (e.g., G. Yang, 2016b).

Second, the research perspective of college students' extracurricular activities is relatively narrow. For example, most of the undergraduates' extracurricular activities are discussed as a whole (e.g., Cui, 2010; L. Li, 2010) with regard to their influence on college students' education quality (e.g., Q. Wu & Jiang, 2017; B. Wu & Wang, 2012). There are few pieces of research on the in-depth analysis of different types of extracurricular activities associated with its functions on the growth of college students' core competitiveness.

Furthermore, the research methods used to study extracurricular activities in China have demonstrated mono-method bias. Most extant empirical research is quantitative, only used questionnaire methods, and was limited to factor analysis (e.g., Y. He & Dai, 2014; Sun & Ding, 2010; W. Wang, 2017; Zhu, 2010) in the data analysis process. Any single data analysis process might have led to a high degree of similar results and failed to capture differences in diverse students. In particular, items related to college students' out-of-class activities are only part of the questionnaire, and the analysis and discussion of the measured dimensions and results are not in-depth. For example, existing empirical studies (e.g., Bao & Du, 2016; W. Wang, 2017) on student participation mainly use the National Survey of Student Engagement (NSSE) survey to study the relationship between student participation and learning outcomes. However, NSSE measures a whole host of students' experiences.

**Categories of Out-of-Class Activities**

A review of the literature revealed a need to account for several activities in a comprehensive manner and investigate their impact on outcomes. Some of the activities listed are undergraduate research (e.g., Carter et al., 2016; Seymour et al., 2004), partnership programs

(Nesheim et al., 2007), extracurricular organizations (e.g., Foreman & Retallick, 2013), academic and design competition (e.g., Strauss & Terenzini, 2007), and internships (e.g., Simmons, Van Mullekom, & Ohland, 2018). According to Simmons, Creamer, & Yu (2017), out-of-class activities in the United States consist of curricular, co-curricular, and extracurricular activities that contain 20 types of activities associated with each other.

However, there is no unified classification standard for extracurricular activities in China's higher education system (Zhao, 2015). The types of out-of-class activities are clarified vary by researchers. For example, some extracurricular activities are divided into academic learning activities, professional knowledge activities, recreational sports activities, social services activities, and leisure activities (e.g., Sun & Ding, 2010; W. Wang, 2017). Another way to classify activity types is to divide them into learning activities inside or outside teaching plans and work-study activities according to its functions (e.g., B. Wu & Wang, 2012).

G. Yang and Zhang (2018) suggested 12 categories of college extracurricular involvement, which cover all types of out-of-class activities in the current Chinese colleges and universities. Specifically, the 12 categories include thematic education activities, party organization activities, culture and art activities, daily management activities, difficulty assistance activities, academic guidance activities, scientific and technological innovation activities, entrepreneurship education activities, social practice activities, volunteer activities, student association activities, and health education activities.

To better understand the role of out-of-class activities in the Chinese higher education context and accurately identify outcome for future research, this review first identified the categories of out-of-class activities based on the framework from Simmons, Creamer, & Yu (2017) and Yang and Zhang's (2018) 12 categories of out-of-class activities. (see Table 1).

**Table 1**

*Categories of Out-of-Class Activities*

| Activity type | Description | Specific examples | Authors |
|---|---|---|---|
| Curricular | Associated with a course and connected to academic learning and tied to academic credit, but occurring outside of the classroom (Simmons, Creamer, & Yu, 2017). | Group projects;<br>Studying for an exam;<br>Extracurricular self-study;<br>Enter oneself for an examination professional qualification certificate/skill level certificate. | (Simmons, Creamer, & Yu, 2017; Sun & Ding, 2010; W. Wang, 2017; B. Wu & Wang, 2012; Zhu, 2010; ) |
| Co-curricular | Complement what students are learning in a course and/or their major but are not connected directly to a particular course (Simmons, Creamer, & Yu, 2017). | Undergraduate Research;<br>Internships and co-ops;<br>The second classroom;<br>Partnership Programs;<br>Living-learning Programs. | (Bao & Du, 2016; Carter et al., 2016; Inkelas et al., 2006; Nesheim et al., 2007; Seymour et al., 2004; Simmons, Creamer, & Yu, 2017; Simmons, Van Mullekom, & Ohland, 2018; W. Wang, 2017) |
| Extracurricular | Not explicitly linked to a course or major program of study (Simmons, Creamer, & Yu, 2017). | Culture and art, sports activities;<br>Innovation and entrepreneurship activities;<br>Social practice;<br>Volunteer service;<br>Extracurricular organizations;<br>Competitive teams;<br>Greek system or clubs;<br>Fraternity or sorority;<br>International Experiences. | (Baker, 2008; Bao & Du, 2016; Chesbrough, 2011; Foreman & Retallick, 2013; Foubert & Grainger, 2006; Y. He & Dai, 2014; Rubin et al., 2002; Simmons, Van Mullekom, & Ohland, 2018; Strauss & Terenzini, 2007; Sun & Ding, 2010; Tutt & McCarthy, 2006; W. Wang, 2017; B. Wu & Wang, 2012; Zhao, 2015) |

## The Role of Out-of-Class Activities in Higher Education

It is no longer controversial that out-of-class activities play an increasingly important role in higher education (e.g., Kuh et al., 2011; Simmons, Van Mullekom, & Ohland, 2018). Previous research findings proved that out-of-class involvement has a positive influence on student development associated with several outcomes (e.g., academic and social engagement, career and professional development, communication, and leadership skills). Besides, U.S. higher education institutions have already used various out-of-class activities as an effective way of creating a seamless learning environment (Kuh et al., 2011), promoting student development (Astin, 1999; Simmons, Van Mullekom, & Ohland, 2018), and achieving the mission of education (Pascarella & Terenzini, 2005).

Compared with the role of extracurricular activities of the U.S. education system, Chinese higher education institutions have recognized the function of out-of-class activities in promoting college students' academic participation, and have carried out a series of research studies and policies to promote *the first classroom* (i.e., in-class experience) through *the second classroom* (i.e., out-of-class experience). At the same time, in the context of the rapid development of national education and economy, colleges and universities also committed to exploring the role of out-of-class activities on multiple dimensions student engagement, scientific and technological innovation, student success training, and other aspects (Bao & Du, 2016; Zeng et al., 2017). As a result, out-of-class involvement was the best platform for higher education institutions to strengthen the construction of campus culture. (G. Yang & Zhang, 2018; Zhuang, 2007).

**The Factors Related to Students' Out-of-Class Engagement**

In addition to considering the types of out-of-class activities, researchers (e.g., Baker, 2008; Chesbrough, 2011; Simmons, Ye, et al., 2018; Sun & Ding, 2010) also suggested considering the level of involvement related to different outcomes. Sun and Ding (2010) found the quantity and frequency of students' participation were associated with students' development in different dimensions and directions, respectively. Hours spent significantly predicted interpersonal skills such as communication, initiative, decision making, teamwork, and leadership skills (e.g., Foreman & Retallick, 2013; Rubin et al., 2002). However, there are upper limits for students' involvement in extracurricular activities, and the effects of those forms of involvement on student development have diminishing marginal rates. For example, Foreman and Retallick (2013) found the optimum number of clubs or organizations to be actively involved in is three to four. Additionally, the quality of students' out-of-class involvement differed in students' officer status or leadership roles (Rubin et al., 2002). Results from some students' self-reported survey showed students benefit from participation in extracurricular activities through autonomy. The higher the quality of their participation, the more development in terms of competence, independence, and clarity of purpose students obtained (e.g., Foubert & Grainger, 2006).

Other researchers (e.g., Baker, 2008; Bao & Du, 2016; Chesbrough, 2011; Sun & Ding, 2010) found the time devoted to extracurricular activities varied in gender, grades, majors, types of university, and economic conditions. For example, Y. He and Dai (2014) found 90% of students who scored between 60 and 90 (i.e., Chinese universities use a total score system of 100 points in all subjects in general, with scores above 60 as passing, 70–80 as a medium, 80–90 as very good, and 90 as excellent) spent an average of 2 hours on out-of-class activities, but

those who scored below 60 (i.e., unpassed score) spent less than an hour. Data showed students with better grades spent more time in extracurricular activities on average, which also showed participation in extracurricular activities had no significant negative impact on students' academic performance. The results further indicated students with better scores have more explicit learning goals and career plans, but those who are lacking in the study have no definite plans or goals for study and work.

W. Wang (2017) analyzed NSSE-China 2015 questionnaire data and found senior students had the highest level of out-of-class involvement. Moreover, there was a significant difference in out-of-class involvement among first-year students, sophomores, and juniors ($p$ = 0.000). Among them, female students' ($M$= 32.27) degree of active participation in extracurricular activities was higher than male students' ($M$= 27.28). The arts students ($M$= 31.61) were higher than engineering students ($M$= 28.85).

Furthermore, incentive factors and barriers should be considered as predicted variables influencing the degree of activeness of students' out-of-class involvement. The incentive factors included personal interest (e.g., Simmons, Ye, et al., 2018; Sun & Ding, 2010; Zhao, 2015), development of communication and social skills (e.g., Y. He & Dai, 2014), faculty and peer interaction (e.g., Bao & Du, 2016; Inkelas et al., 2006), residence hall environments (e.g., Inkelas et al., 2006), and college educational concept (e.g., Sun & Ding, 2010). Lack of time, knowledge and interest, scheduling issues, and cost (time and money) were identified as barriers (e.g., Simmons, Ye, et al., 2018; Zhao, 2015), preventing students' participation in extracurricular activities. Therefore, educators and policymakers should consider these factors during the process of developing policies related to educational activities.

## Outcomes Associated With Out-of-Class Involvement

Research indicated students who engage in activities outside of the formal classroom setting are more likely than their disengaged peers to persist toward graduation (Pascarella & Terenzini, 2005), achieve learning outcomes (e.g., Baker, 2008; Bao & Du, 2016), and obtain personal and social development (e.g., Foreman & Retallick, 2013; Foubert & Grainger, 2006). Most of the researchers discussed student out-of-class involvement outcomes, mainly within the eight categories (see Table 2). Table 2 shows the description of the specific outcome, frequency, percentage, and rank of 27 empirical articles.

**Table 2**

*Frequency of Articles Reporting Positive Student Involvement Outcomes*

| Category | Description of Outcomes | Frequency (%) | Rank | Authors/Year |
|---|---|---|---|---|
| Academic and social engagement | Refers to academic effort and engagement in educational activities while interacting with peers and faculty, campus engagement, and student of students' chapters. | 13 (48.1%) | 1 | (Baker, 2008; Bao & Du, 2016; Chesbrough, 2011; Foubert & Grainger, 2006; Y. He & Dai, 2014; Inkelas et al., 2006; Keen & Hall, 2009 ; Nesheim et al., 2007; Simmons, Creamer, & Yu, 2017; Simmons, Van Mullekom, & Ohland, 2018; Sun & Ding, 2010; B. Wu & Wang, 2012; Zhao, 2015) |
| Personal and social development | Refers to students' identity development, self-confidence, time management skills, self-esteem, treating each other fairly, and civic activism. | 13 (48.1%) | 1 | (Bao & Du, 2016; Chesbrough, 2011; Foreman & Retallick, 2013; Foubert & Grainger, 2006; Y. He & Dai, 2014; Keen & Hall, 2009; Seymour et al., 2004; Simmons, Creamer, & Yu, 2017; Simmons, Van Mullekom, & Ohland, 2018; Sun & Ding, 2010; Tutt & McCarthy, 2006; B. Wu & Wang, 2012; Zhao, 2015) |
| Intellectual development | Refers to students' gain in academic knowledge, learning outcomes, analytical skills, and critical thinking skills. | 12 (44.4%) | 3 | (Baker, 2008; Bao & Du, 2016; Chesbrough, 2011; Foubert & Grainger, 2006; Y. He & Dai, 2014; Nesheim et al., 2007; Simmons, Creamer, & Yu, 2017; Simmons, Van Mullekom, & Ohland, 2018; Sun & Ding, 2010; Tutt & McCarthy, 2006; B. Wu & Wang, 2012; Zhao, 2015) |

| Category | Description of Outcomes | Frequency (%) | Rank | Authors/Year |
|---|---|---|---|---|
| Career and professional development | Refers to students' post-college plan, job preparation, and gains in professional skills. | 11 (40.7%) | 4 | (Bao & Du, 2016; Foubert & Grainger, 2006; Y. He & Dai, 2014; Nesheim et al., 2007; Seymour et al., 2004; Simmons, Creamer, & Yu, 2017; Simmons, Van Mullekom, & Ohland, 2018; Strauss & Terenzini, 2007; Sun & Ding, 2010; B. Wu & Wang, 2012; Zhao, 2015) |
| Intercultural competence | Refers to the ability to understand the differences between people from diverse cultures and effectively communicate, cross-cultural awareness, and skills. | 10 (37.0%) | 5 | (Bao & Du, 2016; Foubert & Grainger, 2006; Inkelas et al., 2006; Keen & Hall, 2009; Rubin et al., 2002; Simmons, Creamer, & Yu, 2017; Strauss & Terenzini, 2007; Sun & Ding, 2010; B. Wu & Wang, 2012; Zhao, 2015) |
| Communication and leadership Skills | Refers to the ability to convey information effectively and efficiently and the process through which students gain the capacity to collaborate, delegate, and guide. | 9 (33.3%) | 6 | (Bao & Du, 2016; Carter et al., 2016; Foreman & Retallick, 2013; Foubert & Grainger, 2006; Rubin et al., 2002; Simmons, Creamer, & Yu, 2017; Sun & Ding, 2010; B. Wu & Wang, 2012; Zhao, 2015) |
| College belonging and persistence | Refers to the psychological perception of the extent to which students feel accepted and respected in a school setting. | 3 (11.1%) | 7 | (Nesheim et al., 2007; Simmons, Creamer, & Yu, 2017; Tutt & McCarthy, 2006) |
| Satisfaction with college experiences | Refers to students' level of contentment with their college experience, major, and advising quality. | 1 (3.7%) | 8 | (Simmons, Creamer, & Yu, 2017) |

The results identified the top two ranked outcomes of undergraduates' involvement are academic and social engagement (48.1%) and personal and social development (48.1%). This result is consistent with the argument of the previous literature and indicates that the outcome of participating in out-of-class activities is the cultivation of competitive undergraduates required by society and higher education. In contrast, the last two ranking outcomes were college belonging and persistence (11.1%) and satisfaction with college experiences (3.7%), which fully reflects the considerable gap in college students' affective engagement.

A growing body of literature on higher education has aimed to uncover the positive and negative outcomes students gain from participating in out-of-class activities. Within the body of literature, the out-of-class activities vary vastly, and the related outcomes associated with student involvement are diverse (see Appendix C). Out-of-class activities, in general, were shown to have a positive influence on students' academic, personal, and even cognitive development (Simmons, Ye, et al., 2018), whereas reduced free time and schedule issues were adverse outcomes.

### Types of Out-of-Class Activities and Outcomes

Some researchers (e.g., Y. He & Dai, 2014; Keen & Hall, 2009; Strauss & Terenzini, 2007) discussed the outcomes of involvement in co-curricular activities. For example, partnership programs, living-learning programs, and service-learning programs were linked to a higher level of engagement in college activities (Inkelas et al., 2006; Keen & Hall, 2009; Nesheim et al., 2007), an increase in acclimation to the institution (Inkelas et al., 2006; Nesheim et al., 2007), and an increase in cross-cultural awareness and skills (Keen & Hall, 2009; Nesheim et al., 2007). These programs were also shown to support students' intellectual development, career and professional development, and personal development (Tutt &

McCarthy, 2006). Scholars have also shown participation in undergraduate research is a significant predictor of communication skills (Carter et al., 2016) and professional gains (Seymour et al., 2004). However, Carter et al. (2016) found when curriculum and classroom experiences are taken into account, there is no significant effect of undergraduate research on teamwork and leadership skills.

Other researchers (e.g., Baker, 2008; Chesbrough, 2011; Rubin et al., 2002) examined the outcomes of extracurricular activities. Extracurricular activities have been shown to have a positive influence on communication and leadership skills (Foreman & Retallick, 2013; Rubin et al., 2002), career and lifestyle planning (Foubert & Grainger, 2006), interpersonal skills (Rubin et al., 2002; Sun & Ding, 2010), and academic autonomy (Baker, 2008; Bao & Du, 2016; Foubert & Grainger, 2006).

In general, co-curricular programs were shown to support students' intellectual development, career and professional development, and personal development (Tutt & McCarthy, 2006), whereas extracurricular activities were more likely to promote students' interpersonal skills (Rubin et al., 2002; Sun & Ding, 2010), intercultural competence (Strauss & Terenzini, 2007; Sun & Ding, 2010), and civic awareness (Bao & Du, 2016). This finding suggests educators could take specific steps to improve students' development (Simmons, Van Mullekom, & Ohland, 2018). For example, the results of a purposed sample of 649 engineering students survey (Simmons, Van Mullekom, & Ohland, 2018) offered that the categories of the job (16.8%), sports (12.5%), design competition team (11.9%), culture, faith, gender, and identity (8.5%), and professional experiences (6.8%) were the most popular choice. The first three categories, each with more than 10% of the respondents choosing it, were extracurricular, and the other two activities have a more direct connection to the academic curriculum. The

results indicated at least some engineering students in this sample have interests in things other than engineering, such as humanities-related activities, and are likely to value experiences not related to engineering courses. Thus, educators should consider developing some of the skills more typical of humanists for engineering students and supplement out-of-class activities that students anticipate.

Additionally, some co-curricular activities (e.g., partnership programs, living-learning programs) were identified as the most beneficial programs to accomplish the requirement of creating a seamless learning environment for both higher education institutions and student success (Inkelas et al., 2006; Nesheim et al., 2007). These results highlighted the need for more research integrating functions of out-of-class activities, especially for Chinese higher education institutions, to promote *the second classroom* (i.e., out-of-class experience) mechanism that may have lasting impacts on students' academic performance and retention in their major.

### Levels of Out-of-Class Involvement and Outcomes

Scholars (e.g., Foreman & Retallick, 2013; Pascarella & Terenzini, 2005; Rubin et al., 2002) argued different levels of involvement would influence the outcomes. Factors, such as time and frequency (Sun & Ding, 2010), the number of activities in which students were involved (Foreman & Retallick, 2013), and leadership positions (Foubert & Grainger, 2006; Rubin et al., 2002) profoundly influenced the quality of involvement (Astin, 1984; Y. He & Dai, 2014). For instance, students who participate in extracurricular activities with an official status or a leadership role significantly improved their communication, decision-making, and teamwork skills while not significantly related to the initiative (Rubin et al., 2002).

Undergraduate students' interest, goals (Simmons, Ye, et al., 2018), faculty/peer interaction with students (Bao & Du, 2016; Inkelas et al., 2006), college environment impact

(Pascarella & Terenzini, 2005; Sun & Ding, 2010) are closely linked to the degree of activeness out-of-class involvement. Also, incentive factors and barriers would affect the degree of students' participation in out-of-class activities. The findings indicated that the only adverse outcomes related to civil engineering students' out-of-class involvement were reduced free time and inflexible schedules (Simmons, Ye, et al., 2018). Not surprisingly, the results were consistent with factors that led engineering majors to be less active in extracurricular activities.

### Implications for Out-of-Class Activities Development in Chinese Higher Education

Researchers (e.g., Baker, 2008; Bao & Du, 2016; Zhu, 2010) emphasized that educators and practitioners need to have a better understanding of each category of out-of-class activities to improve student out-of-class involvement. Out-of-class engagement is not only a practical pathway to maximize the all-round development of students, but also is an essential factor in improving their satisfaction of college. From the above, this review of literature also supplied the following implications for Chinese higher education institutions on taking full advantage of college students' out-of-class involvement.

The first implication is that educators should give full consideration to the characteristics, diversity, and complexity of contemporary college students and highlight their role in out-of-class participation as they develop action plans for reaching student development outcomes. As discussed, figuring out students' incentives for and barriers to out-of-class participation was useful to inform the design of programs intended for students of different majors (Simmons, Ye, et al., 2018). Besides, paying attention to students' interests and needs is necessary to develop more valuable extracurricular activities (Guan et al., 2018; Y. He & Dai, 2014).

The second implication is that institutions should pay more attention to the quality of out-of-class involvement, not just the quantity and time students spent participating. The results that there were the upper limits of the quantity in which students participated (e.g., Foreman & Retallick, 2013; Sun & Ding, 2010) suggested that when the numbers of out-of-class activities exceed the desirable limit, then the quality of the involvement is less and the positive outcomes are reduced. Aside from lack of interest, schedule issues (Simmons, Ye, et al., 2018) are the main barriers to students' disengagement from out-of-class activities. Therefore, colleges and universities should firstly use influential and attractive publicity platforms (e.g., students' favorite network software or application platform) to improve students' perceptions of extracurricular activities and figure out its contribution to their success. Then, educators and administrators should guide students to reasonably allocate spare time for achieving a balance between college education objectives and student development.

The third implication is that educators and policymakers should integrate all kinds of available resources, such as cross-departmental cooperation, cross-disciplinary cooperation, and cooperative projects, to promote the all-round development of students (e.g., Simmons, Ye, et al., 2018; Strauss & Terenzini, 2007; Sun & Ding, 2010). From a practical point of view, this can not only make up for the low participation caused by the lack of resources (e.g., budget, setting, faculty resources), but also promote students from different majors to learn from each other, especially engineering students to break up engineering/humanities divide. Besides, Nesheim et al. (2007) argued that partnership programs are only one means to create educationally prevailing conditions, which can use strategies such as active learning, faculty and peer interaction, undergraduate research, and celebration of achievements to involve students in purposeful curricular and co-curricular activities. Through achieving a seamless learning

environment (Kuh et al., 2011), Chinese higher education institutions could cover the gap between students' out-of-class development efficiently and promote the second classroom mechanism constructs.

## Problematic Issues

As discussed previously, although education reforms of literacy and achievement levels for college students is being carried out in China, engineering undergraduates are facing many difficulties and fail to engage actively in and out of class (e.g., Hao & Wang, 2018). The characteristics of students' enrollment, the difficulty of majors, and the shortage of education resources may be responsible for many of the challenges faced by engineering students. Specifically, four main problematic issues worth to be discussed, including discouraging learning engagement, inactive extracurricular participation, neglected liberal education, and inadequate soft skills for employment.

### Discouraging Learning Engagement

According to the annual report on the education of many higher education institutions (MOE, 2018c), college students' learning involvement needs to be further strengthened. The problem is mainly reflected in the large number of students who take makeup exams and retake courses, have low academic performance, and a mediocre GPA. Among all the majors, the proportion of students with learning difficulties in engineering majors is relatively high (W. Wang, 2017). In addition, the rate of retention, makeup examination, retaking courses, and graduation is lower than those of other majors. Taking the data of the 2018–2019 academic year's undergraduate teaching quality report of Shanghai Normal University Tianhua College as an example, the school of engineering has the most significant proportion of students who transfer to another major. Of the 22 students who transferred out, 13 were from the school of

engineering, accounting for 59.1%. Additionally, there were 1,103 engineering students (29.96%) who took the makeup examination and 849 engineering students (33.52%) who applied for the retake courses. Additionally, the graduation rate of all seven majors of the engineering college was lower than the average graduation rate of Shanghai Normal University Tianhua College (90.9%). The specific graduation rates of seven majors were as follows: electronic information engineering (78%), mechanical and electronic engineering (81.3%), mechanical design and manufacturing (71.8%), computer science and technology (85.7%), automobile service engineering (80.6%), communication engineering (82.9%), and network engineering (80.6%).

The main reasons leading to the learning difficulties of engineering students include unclear learning motivation, low learning interest, and poor learning habits (W. Wang, 2017). According to a survey on the study attitude of 500 engineering college students (J. Zhang et al., 2006), the motivation for learning is mainly from their parents, diploma, and job hunting. Only 45% of the students agree study is their interest, and most students adopt a passive study attitude. The data also showed the enthusiasm of engineering students to participate in learning activities is not high; only 12.2% of the students fully agree they actively participate in learning activities, while 23.3% never participate in any activities. Additionally, influenced by Chinese traditional cramming teaching mode, some students still did not get used to active learning, especially in the university with a more relaxed atmosphere. College students' lack of self-management ability is manifested in their inability to reasonably plan their study and life, and their addiction to the Internet and games (Hao & Wang, 2018).

### Inactive Extracurricular Participation

Compared with non-engineering students, engineering undergraduates have a more substantial academic burden, and they have to spend a lot of time and energy to complete the

assignments and experiments. They generally lack enthusiasm and interest in recreational activities and literacy lectures, resulting in a low level of involvement in extracurricular activities (Hao & Wang, 2018). Survey results on the use of spare time by engineering college students (e.g., Dong, 2012; W. Li, 2011; G. Wang, 2002) reflected that spare time planning is unclear and the quality of their after-school life is not optimistic. The results also indicated students preferred personal indoor activities to collective outdoor activities, and the content of activities was relatively simple. For example, Dong (2012) surveyed 300 engineering undergraduates about their usage of weekdays' spare time, 128 students (42.6%) had more than 4 hours of spare time a day, 100 students (33.3%) had spare time of 2 to 4 hours a day. Data have shown most college students have plenty of spare time. However, the top four activities on which they spent spare time were assignments or experiments (54.7%), surfing the Internet or playing computer games (35.8%), reading novels (26.7%), and sleeping (31.9%). Additionally, 10.2% of students considered their out-of-classroom life busy and planned, while the proportion of them who felt relaxed and casual (42.1%) and flat and empty (12.3%) was far higher than that of those who planned.

Moreover, G. Wang (2002) investigated 1,354 engineering students via questionnaires of their after-class time. Data showed 34.6% of students had never participated in any self-training in their spare time, and 14.3% of students hardly ever went to the library. During their weekends, 41.4% of students spent time on their assignments, which again confirmed engineering students have a heavy workload. Not surprisingly, playing a computer game (6.3%) was selected as the first choice college students often do on the weekend. Chatting (13.1%) and meeting with friends (7.1%) were selected as the second and third choices. The options of social work or tutor ranked at the bottom. These results not only indicated some engineering students had not

realized the contribution of out-of-class involvement to their personal development, but also reflected their inadequate self-learning consciousness and ability. Only focusing on professional skills and neglecting social participation led to unbalanced student development and job competition (e.g., Dong, 2012; Hao & Wang, 2018; W. Li, 2011).

The characteristics of contemporary college students' out-of-class activities' choice are electronic, online, personalized, utilitarian, and entertaining (W. Li, 2011), which caught the attention of educators and researchers. Because students spend much of their time in man-machine communication, they miss out on many hands-on opportunities, and also neglect physical exercise and interpersonal communication. The weakening of communicative competence will lead to changes in students' mental health and even lead to psychological problems, such as social phobia and personality disorders (Z. Wang, 2019). Also, being addicted to the Internet causes students to neglect their studies, which is one of the main factors for students to suspend or drop out of school (Deng, 2010). Many college students tend to choose learning and practice that can bring practical benefits to them during their spare time. However, out-of-class activities, such as speech contests, sports competitions, student clubs, which cannot be converted into abilities or skills in a short time are neglected (W. Li, 2011). Such utilitarian choices will influence undergraduates' values, morals, and culture. Hence, educators and researchers must explore meaningful out-of-class activities and, especially, give support to engineering students.

### Neglected Liberal Education

In 2010, the Ministry of Education (MOE) issued an initiative, the *National Medium-Term and Long-Term Educational Reform and Development Program (2010–2020;* MOE, 2010). This policy pointed out Chinese higher education should emphasize both liberal

education and scientific education in the 21st century. Liberal education is critical and beneficial for cultivating well-rounded college students to meet society's needs (C. Wang et al., 1999). Many researchers (e.g., Guo et al., 2017; Z. Wang, 2019) have emphasized, in addition to imparting professional knowledge and skills to students, higher education also needs to cultivate soft skills for career development and life growth of college students, such as social responsibility, ethical quality, professional dedication, and moral concepts. In fact, college students' soft skills are not only the concrete embodiment of these professional skills, but also the goal of liberal education in higher education.

However, the lack of liberal education in science and engineering universities in China is widespread (Z. Wang, 2019). In engineering colleges, educators and policymakers focused on the imparting of students' professional learning and weakened the cultivation of humanistic spirit. It is also a reflection of the severe defects of the traditional exam-oriented education mode in China (Dong, 2012). Although most engineering college students have solid professional knowledge, they know little about the humanities and social sciences. Even if colleges and universities offer relevant humanities courses, most engineering students are not interested in them and do not pay enough attention to humanities instruction (Hao & Wang, 2018; W. Li, 2011; Z. Wang, 2019). As a result, engineering college students have a weak cultural foundation, humanistic outcomes, and aesthetic taste (Hao & Wang, 2018). Besides, factors such as the lack of professional teachers, the single curriculum setting, and the insufficient atmosphere of humanistic quality education on campus all bring obstacles to the development of humanistic education for engineering students (Z. Wang, 2019). These deficiencies also directly led to the fact that engineering students lack soft skills for employment.

## Inadequate Soft Skills for Employment

According to Kantrowitz (2005), soft skills include communication and persuasion, performance management, self-management, interpersonal skills, leadership and organization, politics and culture, and skills to control negative results. The job market needs graduates with comprehensive abilities (Hao & Wang, 2018), but Chinese colleges and universities generally lack effective pathways to the cultivation of students' soft skills. At present, many colleges and universities have a mismatch between the talent cultivation goal and the market demand for employee' skills (Guo et al., 2017). Similarly, as discussed previously, engineering college students generally pay little attention to training and activities in addition to professional knowledge; they also do not pay much attention to the cultivation of soft skills.

According to a survey of 86 engineering employers conducted by researchers (Guo et al., 2017), more than 90% of managers believed employees' soft skills were one of the necessary conditions for the long-term development of enterprises. In the interview, 86 participants described the following problems of engineering graduates:

- Poor communication ability. Participants mentioned engineering graduates had difficulty in describing the application process of the project fully and accurately, and in addition, the reports submitted were not standardized.
- Inadequate ability to analyze and solve problems. Engineering graduates were described as valuing knowledge over practicing and lacking critical thinking when dealing with the problems at work.
- Lacking a teamwork consciousness. Respondents mentioned companies have increasingly high demands on employees in terms of interpersonal communication

and cooperation, whereas college graduates tend to be self-centered, reflecting a lack of work responsibility and team consciousness.

- Lacking self-management and self-regulation ability. Engineering graduates were described as being ineffective at making plans for their career development that influenced their enthusiasm for daily work and resilience in the face of pressure or difficulty.

These deficiencies are consistent with the crises of engineering students. Therefore, paying attention to the engineering students' engagement, both in- and out-of-class, and improving the quality of educational activities are essential for educators and researchers in higher education (Tan et al., 2009).

## Conclusion

Previous research has shown the factors affecting the quality of students' extracurricular life are not intelligence, but are soft skills, such as positive attitude, self-management concept, thinking mode, self-confidence, and perseverance. Given the challenges and crises faced by engineering college students, many scholars (e.g., Hao & Wang, 2018; W. Li, 2011; G. Wang, 2002; Z. Wang, 2019) have stressed the need to update the cultivation concept of engineering undergraduates and train them to acquire knowledge and skills in humanities, science, and other fields. Meanwhile, educators should fully mobilize the individual initiative of engineering students to help transition them from passive learning to active learning. Moreover, higher education institutions should support administrators, counselors, and peers to build good connections with engineering students to promote their engagement and enhance social responsibility (Hao & Wang, 2018). As Guo et al. (2017) suggested, liberal education provides a pathway to cultivate soft skills for life growth and career development of college students.

Additionally, the amount of spare time of engineering college students is not only an important parameter to measure the rationality of their curriculum setting, but also one of the indicators for student administrators to scientifically guide their out-of-class involvement (Dong, 2012). Researchers (e.g., Dong, 2012; Hao & Wang, 2018) call on colleges and universities to fully explore the effectiveness and influence of extracurricular activities, a practical pathway to student development and academic success.

# CHAPTER 3

# METHODOLOGY

In this quantitative research study, I served as an objective observer, independent of the actual study. The research process was deductive and value-free, and results were used to explain the nature of engineering students' perceptions of the outcomes of participating in out-of-class activities (OA). With the increasing maturity of higher education in China, the study of college students' extracurricular activities is increasingly valued by educators and supported by government policies (MOE, 2018a, 2018b). However, most research on college students' extracurricular activities in China are theoretical studies (e.g., F. Li, 2009; Tian & Huang, 2001; G. Yang, 2016b), and the empirical research is limited. Existing empirical studies on student engagement (e.g., Bao & Du, 2016; W. Wang, 2017) only use the Chinese version of the National Survey of Student Engagement (NSSE-China) to study the relationship between student participation and learning outcomes (Luo et al., 2009).

The NSSE instrument is used to measure a whole host of students' experiences and only includes high-impact activities, such as learning communities, service learning, undergraduate research, internships, and study abroad. It is difficult to explore the influence of OA focused on only a few of the myriad activities in which students have the opportunity to participate. However, the primary focus of the Postsecondary Student Engagement (PosSE) Survey (Simmons et al., 2015; 2019; Simmons, Ye, et al., 2017) is on students' out-of-class engagement. As such, it is urgent and appropriate to use the PosSE survey, a population-specific (e.g., engineering students) outcome assessment instrument, to conduct this quantitative research study on students' engagement in OA.

## Research Purpose and Research Questions

The purpose of the study is to capture the primary characteristics of engineering college students' involvement in OA at one private college in China. Through the use of the PosSE Survey (Simmons et al., 2015), findings from this study will be used to improve the understanding of engineering students' affective engagement and disengagement factors, and to generate outcomes that will allow policymakers and student affairs professionals to design and carry out much more efficient and targeted OA. Additionally, this research will help engineering education stakeholders revise pathways or mechanisms that influence students' development. The specific research questions under investigation are:

**Research Question 1 (RQ1):** What is the nature of engineering students' perceptions of the outcomes of out-of-class activities (OA)?

**RQ1a:** How do levels of involvement in OA relate to positive and negative outcomes?

**RQ1b:** How do levels of involvement in OA relate to affective engagement?

**Hypothesis 1a (H1a):** Different levels of involvement in OA have significant influences on positive outcomes.

**H1b:** Different levels of involvement in OA have significant influences on engineering students' affective engagement.

**RQ2:** To what extent is the level of affective engagement in OA related to engineering students' outcomes?

**H2:** The level of affective engagement in OA has a significant influence on engineering students' perceived positive outcomes.

**RQ3:** What do engineering students perceive as the incentives for OA involvement?

**H3**: This is a descriptive question, and therefore there is no hypothesis.

**RQ4:** What do engineering students perceive as the barriers to OA involvement?

**H4**: This is a descriptive question, and therefore there is no hypothesis.

## Overview of Survey Methodology

Survey research is the most widely used quantitative design to gather information about people in social science (Leavy, 2017). A survey is defined as "a systematic method for gathering information from (a sample of) entities for the purposes of constructing quantitative descriptors of the attributes of the larger population of which the entities are members" (Groves et al., 2009, p. 2). The primary way of collecting information is by asking study participants standardized questions that can be analyzed statistically (Fowler, 2013). Fowler (2013) described survey design as consisting of sampling, question design, and data collection methodologies. Procedures used to conduct a survey have a significant effect on the likelihood that the resulting data will describe what is intended; therefore, each aspect of a survey can affect its precision, accuracy, and credibility (Fowler, 2013; Leavy, 2017).

Moreover, Fowler (2013) emphasized two critical fundamental premises of the survey process: one is that the sample group must have characteristics similar to the larger target population so that results may be generalized; the other is related to the quality of respondents' answers to questions; that is, how well answers measure characteristics to be described. If researchers omit these principles of the survey, errors occur. These errors are known as measurement errors and sampling errors (Fowler, 2013; Leavy, 2017).

Reliability and validity are two main criteria for evaluating survey research. According to Groves et al. (2009), reliability refers to ensuring the consistency of measurement in the same measurement structure, whether it is across occasions or across items. Validity refers to the accuracy of the survey measurement to reflect the intended construct. The relationship between

validity and reliability is that validity is the primary condition for survey research, and reliability is the necessary condition for validity. The difference between reliability and validity is reflected in error involved; that is, the former measures the influence of random error, and the latter reflects the systematic error caused by the variables irrelevant to the purpose of measurement (C. Li & Xin, 2008).

Cross-cultural and international collaborative studies are needed in education research, and using an existing instrument that has substantial evidence of reliability and validity in a variety of populations is more cost-effective than starting from scratch to develop and validate an instrument. However, any educational measurement scale derived from a particular culture will inevitably be subject to the problem of acculturation if it is used in another social culture (Luo et al., 2009). Instruments have been a challenge to China-based students studying remotely in the West as they struggle with research contextualization of relevance to their home culture (Hsieh et al., 2005).

In the 21st century, China's higher education reform has entered a stage of quality improvement. The quality of the educational measurement is the most prominent problem in the practice of Chinese higher education evaluation (X. Yang, 2007). The most current questionnaires used in the field of education research in China are from the United States, which require higher education researchers conducting cross-cultural studies to have access to reliable and cross-validated instruments in other cultures. Thus, in the following section, I outline the research design, including the setting, sampling, and access followed by an introduction of instrumentation, especially a detailed process of translating and validating the Chinese version of the PosSE Survey. Next, this chapter introduces the data collection procedure, the data

analysis process, and ethical issues of this research. The last section will include the limitation and conclusions of this research study.

## Research Design

This research works within the framework of Astin's (1984) involvement theory, with the variables of the levels of involvement (i.e., active involvement degree, hours, numbers, and types of OA in which students were involved) and Finn's (1989) participation-identification model with the variables of affective engagement. These two are models with features of both contextual and intrapersonal views, which are used to identify the factors that influence students' behavioral engagement, affective engagement, and cognitive engagement related to desired educational outcomes.

I used a descriptive survey approach in this study, and the participants selected were engineering students in one private college in China. First, participants were surveyed to examine their levels of involvement, the types of OA in which they participated, the quantity and quality of OA involvement related to positive/negative outcomes students gain, and affective engagement. Second, I conducted this study to explore the correlation of affective engagement and students' perceived outcomes from OA involvement. Third, I analyzed the results to identify the incentives for and barriers to participation for engineering students. Results from this research will help engineering stakeholders and educators revise pathways or mechanisms that influence students' development.

### Instrumentation

What follows is an introduction of the structure and content of the original PosSE Survey (Simmons et al., 2015; 2019; Simmons, Ye, et al., 2017). In addition, I discuss the process of development and verification of PosSE Survey (PosSES).

### *Construction of the PosSE Survey*

The PosSES is a tool used to assess engineering student engagement relative to their disposition toward their out-of-class involvement and affective engagement indicators (i.e., major satisfaction, academic discipline belonging, major valuing, achievement striving, peer interaction, and positive faculty relationship). Unlike the NSSE, which focuses on engagement measures a whole host of students' experience based on cognitive and behavioral engagement indicators (e.g., level of academic challenge, active and collaborative learning, student-faculty interaction, supportive campus environment, high impact practices), the PosSES primarily uses indicators of different facets of affective engagement and students' participation in OA. Affective engagement is a relatively underutilized dimension for engagement measures in engineering education despite its inherent relationship to both cognitive and behavioral engagement. The PosSES instrument conducted by Simmons et al. (2015, 2017, & 2019) is funded by the National Science Foundation with the CAREER grant # EE-1351156.

The item development of PosSES was guided by a thorough literature review, web searches, Q-study using focus group meetings, a panel of experts, and think aloud sessions to identify an initial list of items related to out-of-class involvement (Simmons et al., 2015). The PosSES consists of eight constructs, including (1) students' demographic information, (2) levels of involvement in OA, (3) positive outcomes as a result of participation in OA, (4) negative outcomes as a result of participation in OA, (5) factors that promote students' participation in OA, (6) factors that prevent students' participation in OA, (7) affective engagement constructs: major satisfaction, academic discipline belonging, major valuing, achievement striving, peer interaction, positive faculty relationship, and (8) Angela Duckworth's Grit (Duckworth & Quinn, 2009; I did not use this section). The first five constructs relate to OA and the affective

engagement subscale consisting of 23 items and six factors. This instrument uses a Likert scale with a score of 1 referring to *strongly disagree* and 4 referring to *strongly agree*.

***Reliability***

The commonly used reliability test methods include test-retest reliability, equivalence reliability, split-half reliability, and internal consistency reliability (DeVellis, 2016; Leavy, 2017; C. Li & Xin, 2008). Reliability coefficients range from 0.00 to 1.00. The higher the coefficient, the more consistent, stable, and reliable the measurement results are (e.g., Chai, 2010; Kimberlin & Winterstein, 2008; C. Li & Xin, 2008). The most widely used method for estimating internal consistency reliability is Cronbach's alpha, symbolized as α (DeVellis, 2016; Kimberlin & Winterstein, 2008; Leavy, 2017). Cronbach's alpha is a function of the average inter-correlations of items and the number of items in the scale (Kimberlin & Winterstein, 2008). Generally, it is best for Cronbach's alpha levels to be above 0.8 to represent an excellent quality of scale (C. Li & Xin, 2008; Urdan, 2016).

***Reliability of PosSES***

Simmons, Ye, et al. (2017) conducted two rounds of reliability analysis and exploratory factor analysis (EFA; $n = 126$) to validate the affective engagement subscale of the PosSES with 27 items. Exploratory factor analysis is often used for gathering information about the interrelationships among a set of variables to establish the structural validity of the instruments (Pallant, 2013). One survey item was removed to improve internal reliability (with a Cronbach alpha of .649 increasing to .747 after deleting the item). The current PosSES instrument contains 26 items, with reliability coefficients (Cronbach's coefficient α) for all constructs that were high, .87 for major satisfaction, .82 for academic discipline belonging, .72 for academic

discipline to career link, .75 for major valuing, .78 for achievement striving, .75 for peer interaction, .78 for positive faculty relationship.

### *Validity*

According to DeVellis (2016), validity is inferred from how a scale was constructed, its ability to predict specific events, or its relationship to measures of other constructs. Three types of validity correspond to these operations: content validity, criterion validity, and construct validity (DeVellis, 2016).

The commonly used evaluation method of content validity is an expert method (DeVellis, 2016). The experts who are knowledgeable in the content are needed to review items for relevance to the domain of interest to maximize item appropriateness. The process of experts reviewing can not only confirm or invalidate the items' definition, clarity, and conciseness but also provide suggestions about contents or phenomenon the researcher has failed to include (DeVellis, 2016).

According to DeVellis (2016), construct validity is the extent to which empirical correlations matched the predicted pattern provides some evidence of how well the measure behaves, as does the variable it is supposed to measure. These correlations would be indicative of convergent validity and discriminant validity. As suggested by C. Li and Xin (2008), the evaluation of the construct validity of a questionnaire can be divided into two steps: first, the structural hypothesis is proposed, and then the structural hypothesis is verified.

### *Validity of PosSES*

The items of PosSES were firstly verified by a panel of experts to guarantee the content validity (Simmons, Ye, et al., 2017). Then, to validate the PosSES as an instrument that measures different facets of affective engagement, Simmons et al. (2019) used several statistical

techniques including EFA and confirmatory factor analyses (CFA; $n$ = 976) to measure the engagement subscales. The EFA analysis indicated six factors best explained the covariation matrix, and approximately 72.25% of the variances were observed in the dataset. All items displayed a precise and robust fit with each factor except three items with factor loading below .40. According to Floyd and Widaman (1995), a factor loading of .40 or above is meaningful. As a result, three items were deleted for cross-loading and lacking a precise fit with anyone factor on which they cross-loaded. The final 23 items on the survey cleanly loaded onto the six factors, with the factor loading of all items exceeding .5. Also, reliability coefficients (Cronbach's coefficient α) were improved, ranging from .80 and .90, which is considered very good (DeVellis, 2016, P. 136). Furthermore, the CFA conducted to support the best-fit 6-factor model that resulted from EFA. The results indicated PosSES was a conceptually meaningful 23-item, 6-factor inventory of student engagement dimensions.

**Translating and Validating of PosSES**

There are four primary phases in translating and validating process, including preparation work before translating, translating process, cultural adaptation process, and validating process. Many researchers (e.g., Cha et al., 2007; Gjersing et al., 2010; Hilton & Skrutkowski, 2002; Wild et al., 2005) emphasized the importance of ensuring concepts in an instrument are equal between the original and target language, time, and context. Even studies may have a linguistic translation process, and this still does not ensure instruments' construct validity and reliability. Hence, good practices for translating and validating the survey instrument should include comprehensive translating and cultural adaptation process.

### *Preparation Phase*

Wild et al. (2005) suggested preparation work that involves obtaining permission to the original instrument, developing an explanation of concepts of the instrument, and recruiting critical in-country persons to the project should be completed prior to translation. To that end, I invited the PosSES instrument developer to be involved and obtained copyright permission. To fulfill the four requirements of translating cross-cultural survey research, I identified three critical factors related to the quality of translation process that included the translator resource, choices of translation methods, and evaluation process (Harkness et al., 2010). According to Harkness et al. (2010), a translation in cross-cultural survey research is expected to fulfill the following four requirements: first, keep the content of the questions semantically similar; second, keep the question format similar within the bounds of the target language; third, retain measurement properties, including the range of response options offered; and fourth, maintain the same stimuli.

### *Translation Phase*

Concerning translation methods, several factors may influence the selection of methods, including the objectives of the study, the availability of translators, judges and bilingual subjects, the budget, and time (Maneesriwongul & Dixon, 2004). I selected the committee translating approach (Harkness, 2003), which is characterized by requiring several people with disciplinary expertise and different skills to participate in the translation and using a multistage process (Behr et al., 2016). The entire process, initially developed by Harkness (2003) is also known as "TRAPD" (p. 36), which stands for translation, review, adjudication, pretesting, and documentation. The first reason for selecting the committee translating approach is because the TRAPD process combines multiple techniques (e.g., experts reviewing, pretesting) and a

rigorous translation process to enhance the quality of translation. The second reason is reviewing and adjudication processes focus on procedures for ensuring the equivalence between the translated and original versions of the instruments, which are the crucial issues related to cultural adapting and validating. The third reason is due to the committee approach. It provides an additional safety mechanism because including different relevant experts in the translation process reduced sources of error (Behr et al., 2016).

First, during the translation process, I revised the original English version of PosSES into English-version 1.0, deleting or revising some items irrelevant to my research purpose. Information deleted and revised items and the reasons are shown in Table 3. For example, I deleted Question 19 (Q19), "Did you serve or are you currently serving in the armed forces of the United States" because the content was not applicable in Chinese culture. I also deleted Questions 11.29 through 11.36 (Q11.29 to Q11.36) because those items contained Duckworth's 8-item Grit Scale (Duckworth & Quinn, 2009), which was not used in this study. I discussed the PosSES 1.0 with my committee members and instrument developer before starting translation. After receiving their feedback and permission, I revised the options of eight items according to the actual situation of Chinese universities. For example, Questions 25 and 28 (Q25, Q28) are about types of OA not applicable for Chinese students. Therefore, based on the literature results and the types of extracurricular activities in Chinese universities, I modified the types of activities and corresponding examples. All other deleted and revised questions were items for collecting demographic data (e.g., Question 5, which asked about student enrollment status, was deleted because my research participants were all full-time college students), so their modification did not alter the key structure of the original questionnaire.

**Table 3**

*Information for Deleted and Revised Items and Reasons*

| PosSES Reduced items-- PosSES 1.0 | |
|---|---|
| **Deleted items** | **Reasons** |
| Q3 | The questions about the race/ethnicity are not applicable in China. |
| Q4, Q5, Q7, Q10, Q12 | Participants in this study will be full-time residential senior students, so there is no need to repeat answers to these questions. |
| Q11.6,11.10,11.11,11.12,11.28 | Developer deleted this item after reliability and validity test. |
| Q11.29---Q11.36 | Angela Duckworth's 8-item Grit Scale was deleted because the items of this scale were not used in this research study. |
| Q14, Q18, Q19, Q20, Q21 | These five items were deleted because the contents were not applicable in Chinese culture. |
| Q22, Q23 | These two items were deleted because the contents are about students' high school experience that had little to do with my research purpose. And senior students might not give correct answers for long-time memory. |
| Q26.13, Q27.4 | Developer deleted these items after reliability and validity test. |
| Section III Q36-Q38 | This section about the top activity and outcomes are not applicable for my research purpose. |
| **Revised items** | **Reasons** |
| Q2(keep "man" and "woman" options) | The options of "trans," "others," and "I don't want to respond" were deleted because the content are too sensitive for Chinese undergraduates. |
| Q6 (keep "first year" to "senior" four options) | The options of "Fifth year and beyond" and "graduate student" were deleted because this research will be conducted in a 4-year undergraduate education institution, which does not include these two options. |
| Q8 | I have added major options to the setup of engineering majors according to the actual research institutions. |
| Q13 | I changed the open-ended form of this question to single choice, because seniors already have final GPA. I divided the range of GPA into four options according to the standard GPA Settings of Chinese universities, so that the results would be clearer. |
| Q17 | I changed "the income level in your household" into "Did you apply for the low-income subsidy this academic year?" because low-income subsidy is |

| | |
|---|---|
| | more applicable for students to evaluate their income level. |
| Q25, Q28 | The activity type, name and classification of the original questionnaire are not applicable for Chinese students. Therefore, according to the literature results and the types of extracurricular activities in Chinese universities, I modified the types of activities and corresponding examples. |
| | PosSES 2.0 After Pretest --PosSES 2.1 |
| **Deleted items** | **Reasons** |
| Q8, Q9, Q10 | Because the panel of experts suggested that these three questions will not affect my research questions and purpose, the deletion can make students more focused on answering the questions of the main structure. |
| **Revised items** | **Reasons** |
| Q11, Q15 | Change the "the current/previous semesters" into "during the four years in college." |
| Q18 | Modify the way of expression of the degree of activeness of participation in the activity in Chinese, easy for students to understand. |
| Q6.7, 6.8 | Modify the way of expression in Chinese, easy for students to understand. |
| Q6.19 | Add examples for the "social issues" to help students understand. |
| Q6.20 | Add examples for the "cultural issues" to help students understand. |

Next, I conducted two independently executed translations, including the forward-translation and back-translation with three translators. One critical factor here was considering a requirement that translators have bilingual competence (i.e., is fluent in the source and desired target language; e.g., Garyfallos et al., 1991; K. Wang, 2005) and has bicultural experience (i.e., has in-depth experience in the culture of the source and desired target language of the instrument; Sousa & Rojjanasrirat, 2011). As translator No. 1, I translated PosSES 1.0 into a Chinese version (PosSES 2.0) because I am fluent in English and have a clear grasp of the framework of the instrument, methods, and the applicable respondents (Liu et al., 2010). Another independent translator (Translator No. 2) conducted the back-translation of PosSES 2.0 into English-version 1.1. Translator No. 2 was not knowledgeable about student engagement and the construct of the instrument and had no prior knowledge of the instrument as well. This step

allowed for clarification of words and sentences used in the translation (Sousa & Rojjanasrirat, 2011).

Second, during the review and adjudication process, a comparison of the back-translations of the instrument (PosSES 1.1) and the revised English-version instrument (PosSES 1.0) was conducted by Translator No.1 and Translator No. 3 to evaluate similarity of the instructions, items, and response format regarding wording, sentence structure, meaning, and relevance (Beck et al., 2003; Sousa & Rojjanasrirat, 2011). After that process, I used a multidisciplinary committee consisting of one methodologist, one education professional, and two bilingual and bicultural translators to review the Chinese version of PosSES 2.0 as well to resolve any ambiguities and discrepancies. In this phase, I aimed to synthesize the translated version of the instrument to ensure the quality of translation that would be influenced by equivalent issues (e.g., vocabulary equivalence, grammatical-syntactical equivalence, experiential equivalence; Cha et al., 2007). The experts affirmed the lists of types of activities, believing the content covered all types of OA in private colleges in China. In addition, Translator No. 3 adjusted some words in PosSES 2.0. For example, one of the options of Question 13.13, "To what extent do you agree the following reasons could prompt you to participate in out-of-classroom activities?" is "to break down barriers of any kind (i.e., religion, race, gender, sexual orientation)." Considering the annotated content is not applicable to Chinese undergraduates, translators changed the annotated content as "region, gender, religion, nationality" in Chinese.

Third, I conducted a pretest with undergraduates from the target population to assess the level of comprehension and cognitive equivalence of the translation and to figure out any items that may be inappropriate at a conceptual level. The recommended appropriate sample size of

pretest participants is between 10 and 40 (Sousa & Rojjanasrirat, 2011). Respondents were asked to express their understanding and acceptability of the instrument so I could discern if there were any confusing items in the translated questionnaire.

Affected by the COVID-19 outbreak, I conducted a small-scale online pretest in Shanghai in April 2020 with 10 participants via the *Wen Juan Xing* app, which is widely used in China. When I sent out the link to the questionnaire, I also told pretest takers to record the time it took them to complete the questionnaire and to note any confusing items they could not understand. The following paragraph is the report of the pretest results.

The pretest participant sample was made up of four female and six male juniors from different majors of the college of engineering in one private college. Ten students completed the questionnaire in an average of 15 minutes, with the longest time of 20 minutes. Overall, participants proposed that the questionnaire was easy to understand, and that the contents of the items were detailed and triggered their critical thinking on the significance of participating in OA, which was meaningful for my subsequent research. They also identified some areas that were confusing and put forward valuable suggestions. These suggestions included:

1. Six participants had difficulty understanding the items of "I do not feel like 'part of the family' in my academic discipline" (Q6.6, PosSES 2.0) and "I do not feel 'emotionally attached' to my academic discipline" (Q6.7, PosSES 2.0).
2. They suggested I add some explanation to the items of "I discuss social issues with peers" (Q6.19, PosSES 2.0) and "I discuss cultural issues with peers" (Q6.20, PosSES 2.0).

3. One participant suggested I rephrase the options of "how actively have you participated in the activities you selected" (Q18, PosSES 2.0) in more accurate degree of activeness expression.
4. Participants found Q18 and Q19 were systematically incorrectly assigned to multiple choice questions.

The fourth step of the translation phrase was to revise and finalize the PosSES 2.0 based on the feedback and results of the pretest. According to Sousa and Rojjanasrirat (2011), an expert panel consisting of 6 to 10 members is highly recommended to examine further the semantic adjustments and pretest results. I asked seven experts, including the dean of student affairs, dean of the College of Engineering, two education professionals, a methodologist, and two bilingual and bicultural translators, to discuss the pretest results and check for minor errors missed during the translation process and finalizing the PosSES 2.0. After the discussion, the panel of experts helped me rephrase the questions (Q6.6, Q6.7, Q6.19, Q6.20, Q18) that had confused participants, using words that were easier for students to understand.

They also suggested I delete the items of "what is the highest level of formal schooling completed by parents/guardians?" (Q8, PosSES 2.0), "has one of your siblings completing a four-year degree or higher" (Q9, PosSES 2.0), and "did you apply for the low-income subsidy this academic year" (Q10, PosSES 2.0) from collecting students' basic information. Their rationale was these three questions would not affect my research questions and purpose, so the deletion would make students more focused on answering the questions of the main structure. Moreover, they asked me to change the question "which of the following out-of-classroom activities have you participated in for the current/previous semesters" (Q15, PosSES 2.0) to "which of the following out-of-classroom activities have you participated in during the four

years in college." Due to the impact of the COVID-19 outbreak, Chinese college students are in the state of not returning to school in the spring semester this year. The experts were concerned the expression "the current semesters" may cause a misunderstanding among students' choices and affect the accuracy of the final result. Hence, I accepted these two suggestions. The finalized PosSES 2.0 was named as PosSES 2.1, with 19 items and are included as Appendices A and B.

In addition to considering the factors of the respondents' reading level and burden (e.g., complexity of questions and time; Kimberlin & Winterstein, 2008), experts also suggested I consider the additional quality-control conditions, such as an online questionnaire format and layout (Luo et al., 2009) and distribution and data collection methods (Cha et al., 2007), to improve the reliability and validity of the instrument.

## Procedure and Participants

The finalized survey, named PosSES 2.1, consisted of 19 items. I used an individual-based online method to collect engineering students' self-report data on their out-of-class involvement and affective engagement outcomes via an online program called *Wen Juan Xing*, which is widely used in China. To determine the representative nature of the sample, I collected demographic data, including age, gender, college year, and major.

### Data Collection Procedures

The survey and procedure were approved by the Institutional Review Board of Chapman University. The PosSE 2.1 Survey was conducted at a medium-sized Chinese private college in Shanghai, which has seven colleges: College of Engineering, College of Business, College of Preschool Education, College of Elementary Education, College of Culture and Language, College of Art Design, and College of Health. The total undergraduate enrollment

was 9,650 in 2020. Students were from 26 provinces, autonomous regions, and municipalities directly under the central government.

There were 1,166 students enrolled in the College of Engineering, including 243 first-year students, 265 sophomores, 338 juniors, and 320 seniors. The College of Engineering was established in 2013 with the integration of the previously established departments of mechanical engineering, electronic information, and computer science. Within this college, there are seven undergraduate programs: mechanical design, manufacturing and automation, mechanical and electronic engineering, automotive service engineering, communication engineering, electronic and information engineering, computer science and technology, and network engineering.

The target population of this study was engineering undergraduates of one private college in Shanghai, China. I used a convenience sampling strategy to select the sample for this research. Convenience sampling is a type of nonrandom sampling approach and is described as a sample created from members of a population who happen to be readily available (Terrell, 2015). The target sample size was 320 senior students majoring in engineering, which would account for about 27% of the whole population ($n$ = 1,166). This sample was used to represent undergraduate engineering students' characteristics, to help to ensure generalizability of the survey results (Terrell, 2015). In addition, seniors were the most representative because they had had the most time to engage in all OA available to them, whereas first-year students, for example, are likely to engage in more extracurricular activities later in college.

I used various procedures to distribute the survey. The first distribution method I used was to provide a consent document and a link to the survey to the dean of the College of Engineering for dissemination. For the second procedure, I sent the link and consent document

to class counselors and then, with their help, to students. The students received the invitation to participate and a link to the anonymous survey via the WeChat and Dingding platforms, two popular Chinese social media apps. Data collection occurred across one month, from July 11 to August 11, 2020. Due to the impact of COVID-19, I was not optimistic about the rate of students' online completion of the questionnaire at first, so I contacted counselors via WeChat up to 3 times over 14 days to reduce nonresponse. A total of 320 surveys were sent out, and 313 were collected, with a response rate of 97.8%. Of the 313 participants, there were 12 students who chose not to participate and 18 students did not complete the questionnaires. I removed these 30 respondents; thus, I had 283 valid survey responses, accounting for 88.4% of returned surveys.

**Participants**

A total sample of 283 participants completed the survey (see Table 4). Of the 283 participants, 67.14% ($n$ = 190) identified as male and 32.86% ($n$ = 93) identified as female. All participants ($n$ = 283) were senior students, because I only sent this survey to senior students; selecting other grades would automatically stop the question-and-answer process. The majority of participants, 21.55% ($n$ = 61) were Computer Science and Technology majors, 20.49% ($n$ = 58) were in Mechanical Design, Manufacturing and Automation, 13.78% ($n$ = 39) were in Network Engineering, 12.01% ($n$ = 34) were in Electronic and Information Engineering, 11.66% ($n$ = 33) were in Automotive Service Engineering, 9.89% ($n$ = 28) were in Communication Engineering, and 10.6% ($n$ = 30) were in Mechanical and Electronic Engineering.

**Table 4**

*Sample Characteristics*

| Characteristic | *n* | % |
|---|---|---|
| Gender | | |
| Male | 190 | 67.14 |
| Female | 93 | 32.86 |
| College Year | | |
| First year | 0 | 0 |
| Sophomore | 0 | 0 |
| Junior | 0 | 0 |
| Senior | 283 | 100 |
| Major | | |
| Computer Science and Technology | 61 | 21.55 |
| Network Engineering | 39 | 13.78 |
| Electronic and Information Engineering | 34 | 12.01 |
| Communication Engineering | 28 | 9.89 |
| Automotive Service Engineering | 33 | 11.66 |
| Mechanical Design, Manufacturing and Automation | 58 | 20.49 |
| Mechanical and Electronic Engineering | 30 | 10.6 |
| Switched Major or Not | | |
| Not switched major | 270 | 95.14 |
| From a STEM major | 10 | 3.53 |
| From a non-STEM major | 3 | 1.06 |
| GPA | | |
| GPA < 1.0 | 4 | 1.41 |
| 1.0 ≤ GPA < 2.0 | 49 | 17.31 |
| 2.0 ≤ GPA < 3.0 | 180 | 63.6 |
| 3.0 ≤ GPA < 4.0 | 50 | 17.67 |
| Out-of-class activities (OAs) Experience | | |
| Have been involved in OAs during the college year. | 232 | 81.98 |
| Not involved in any OAs during the college year. | 51 | 18.02 |

The percentage of participants who switched from a STEM major to their current major was 3.53% ($n$ = 10), and of those who switched from a non-STEM major to their current major

was only 1.06% ($n$ = 3). The majority of participants did not switch their majors during the 4 college years at 95.41% ($n$ = 270).

Of the 283 respondents, 63.3% ($n$ = 180) of participants reported their cumulative GPAs at the end of this semester was between 2.0 and 3.0 (2.0 ≤ GPA < 3.0), 17.67% ($n$ = 50) indicated their GPAs between 3.0 and 4.0 (3.0 ≤ GPA < 4.0), and 17.3% ($n$ = 49) reported their GPAs were between 1.0 and 2.0 (1.0 ≤ GPA < 2.0). Only 1.41% ($n$ = 4) of participants' reporting having a GPA lower than 1.0.

According to the data, 81.98% ($n$ = 232) of participants had been involved in OA during the 4 years in college. In contrast, 18.02% ($n$ = 51) reported they had not been involved in any OA during their 4 college years.

**Data Analysis**

After data were collected with the PosSES 2.1 instrument, I used SPSS 25.0 to analyze the data. To accomplish the research purpose, I used both descriptive statistics and inferential statistics. I examined the reliability of the affective engagement subscale before I conducted the following data analysis because the total scores of the affective engagement were need. Affective engagement subscale consisting of 23 items and six factors: major satisfaction, academic discipline belonging, major valuing, achievement striving, peer interaction, positive faculty relationship. Cronbach's alpha of affective engagement subscale is .924 (see Table 5), which is very good and can be considered reliable for research purposes (Urdan, 2016).

**Table 5**

*Reliability Statistics of the Affective Engagement Subscales*

| Cronbach's alpha | *N* of items |
|---|---|
| .924 | 23 |

For Research Question 1 (RQ1), I used ANOVAs to analyze the data. The independent variables are the levels of involvement (i.e., active involvement degree, hour, number, and types of OA in which students were involved), and the dependent variables are outcomes and affective engagement, respectively for RQ1a and RQ1b.

Next, I used the Pearson correlation analysis to analyze the RQ2 to determine the correlations of affective engagement in OA and engineering students' perceived positive and negative outcomes. Following that, RQ3 and RQ4 are descriptive questions, and I used descriptive statistics to describe each factor of the incentives and barriers for both involved and uninvolved students for OA.

## Ethical Issues

There are three overarching principles for conducting research using human subjects: beneficence, respect for persons, and justice (Terrell, 2015). Therefore, I had to deal with participants in a respected way during the data collection process (Fowler, 2013) to ensure any research step was designed and conducted to maximize benefits and avoid risks to participants. Additionally, I started the data collection process only after securing IRB approval. During this process, I informed participants of the purpose of the research, provided assurance that participation was voluntary, and noted respondents could skip any questions they did not want to answer. Also, I anonymized the data from all respondents, and no participants were identified by name or by any other manner during or after the survey. I collected all data on a secure network after prospective participants signed the informed consent. I will also keep the data and information in a password-protected computer and will destroy it after one year.

Furthermore, because I conducted this research study at my workplace, there may have been ethical concerns. For example, students were concerned the attitude of their participation in

the questionnaire and the quality of their answers would affect their evaluation or relationship with teachers. Hence, I selected senior students who were not in my classes to avoid participants feeling they were obliged to participate in the research. Additionally, I was careful to publicize survey results appropriately with the consent of participants and the college.

## Summary

The different factors and components to be considered when using a cross-cultural survey were presented in this chapter, followed by an explanation of how the survey used for this study was translated and cultural adapted. To verify the translation, response format, and content of the survey, the survey was shared with a multidisciplinary committee to review and provide feedback on the survey. Another method of validation was via a pretest with undergraduates from the target population to assess the level of comprehensibility and cognitive equivalence of the translation and to figure out any items that may be inappropriate at a conceptual level. Based on the results of the pretest, the feasibility, logistics, and adequacy of the PosSES 2.1 were supported.

The PosSES 2.1 consisted of 19 questions with seven constructs. The first construct, demographics, consists of seven questions asking students' basic information. The second construct is affective engagement constructs, including major satisfaction, academic discipline belonging, major valuing, achievement striving, peer interaction, positive faculty relationship. The affective engagement subscale consisting of 23 items and six factors. The following five constructs related to the OA, including levels of involvement in OA, positive outcomes as a result of participation in OA, negative outcomes as a result of participation in OA, factors that promote students' participation in OA, factors that prevent students' participation in OA.

A total of 320 surveys were sent out via the WeChat and Dingding platforms, two popular Chinese social media apps, and 283 were valid, with a response rate of 88.4%. The procedures taken to distribute the survey and participant demographics were presented in this chapter. In the next chapter, I present descriptive and correlation results from the survey data.

# CHAPTER 4

# RESULTS

This chapter provides the descriptive statistics and statistical analyses of the survey data completed by senior engineering students on their perceptions about their levels of involvement, including types of out-of-class activities (OA), the quantity and quality of OA involvement related to positive/negative outcomes students perceive, and affective engagement. In addition, I conducted a correlation analysis to explore the correlation of affective engagement and students' perceived outcomes from OA involvement. I present descriptive statistics followed by the identification of incentives for and barriers to participation for engineering students.

**Descriptive Analysis**

As previously noted in Chapter 3, I sent out a total of 320 surveys, of which 313 were returned – a response rate of 97.8%. Of the 313 participants, 12 students chose not to answer the questionnaire after reading the informed consent, and 18 students did not complete the questionnaires. These 30 responses were removed, thus leaving 283 valid surveys, accounting for 88.4% of possible participants. Of the 283 participants, 67.14% ($n$ = 190) identified as male, and 32.86% ($n$ = 93) identified as female. All participants ($n$ = 283) were senior students because this survey was only sent to senior students; selecting other grades automatically stopped the survey (see Table 6).

**Table 6**

*Descriptive Analysis of Demographic Information*

| Variable | Category | *n* | % |
|---|---|---|---|
| Gender | Male | 190 | 67.14 |
| | Female | 93 | 32.86 |
| College Year | Freshman | 0 | 0 |
| | Sophomore | 0 | 0 |
| | Junior | 0 | 0 |
| | Senior | 283 | 100 |
| Major | Computer Science and Technology | 61 | 21.55 |
| | Network Engineering | 39 | 13.78 |
| | Electronic and Information Engineering | 34 | 12.01 |
| | Communication Engineering | 28 | 9.89 |
| | Automotive Service Engineering | 33 | 11.66 |
| | Mechanical Design, Manufacturing and Automation | 58 | 20.49 |
| | Mechanical and Electronic Engineering | 30 | 10.6 |
| GPA | < 1.0 | 4 | 1.41 |
| | 1.0≥ < 2.0 | 49 | 17.31 |
| | 2.0 ≥ < 3.0 | 180 | 63.6 |
| | 3.0 ≥ < 4.0 | 50 | 17.67 |
| OA experience | Involved in OA during the 4 years in college | 232 | 81.98 |
| | Not involved in any OA during the 4 years in college | 51 | 18.02 |

According to the data, 81.98% (*n* = 232) of participants have been involved in OA during the 4 years in college. Approximately 18% (*n* = 51) reported they had not been involved in any OA during their 4 college years. The average number of OA in which students participated was eight. The top five OA participants chose were as follows: 64.66% of students (*n* = 150) participated in evening parties, 60.78% (*n* = 141) participated in campus training activities, 55.17% (*n* = 128) participated in themed educational activities, 52.59% (*n* = 122) participated in daily management activities, and 43.97% students (*n* = 102) participated in student clubs. Only 5.17% (*n* = 12) participated in international experience activities. Students

could select more than one OA; therefore, the sum total is greater than 100% (see Table 7). In terms of incentive to participate in activities, the options "to try something new" and "to fulfill my interests" were the top two selected by students who have participated in OA during the 4 years in college. The options "cost (time and money) of joining was too high" and "lack of time, scheduling issues" were noted as the two main barriers to participation.

For the 51 students who indicated having not been involved in any OA during their 4 college years, they chose evening parties ($n$ = 20; 39.22%), themed educational activities ($n$ = 19; 37.25%), professional experiences ($n$ = 19; 37.25%), culture and art competition activities ($n$ = 16; 31.37%), and volunteer activities ($n$ = 14; 27.45%) as the top five OA they considered they intended to participate in. Adaptive difficulties assistance activities ($n$ = 4; 7.84%) were ranked as the last OA they planned to attend (see Table 6). Additionally, "to gain experiences that make me competitive in the job market" and "to provide entertainment" were selected by participants as the two main incentives that could have motivated uninvolved students to participate in OA, and "lack of motivation" and "lack the knowledge about the opportunities" were noted as the two main barriers to participation.

**Table 7**

*Descriptive Statistics of Types of Out-of-Class Activities*

| Activity | Uninvolved students intend to participate ($n$ = 51) | | Involved students participated ($n$ = 232) | |
|---|---|---|---|---|
| | *N* | % | *N* | % |
| Themed educational activities | 19 | 37.25 | 128 | 55.17 |
| Party and league education activities for college students | 13 | 25.49 | 99 | 42.67 |
| Evening party | 20 | 39.22 | 150 | 64.66 |
| Culture and art competition activities | 16 | 31.37 | 93 | 40.09 |
| Culture and art team | 12 | 54.90 | 64 | 27.59 |
| Culture and art publicity activities | 9 | 17.64 | 50 | 21.55 |
| Daily management activities | 12 | 23.53 | 122 | 52.59 |
| Financial difficulty assistance activities | 11 | 21.57 | 35 | 15.09 |
| Psychological assistance activities | 10 | 19.61 | 26 | 11.21 |
| Learning assistance activities | 8 | 15.69 | 50 | 21.55 |
| Adaptive difficulties assistance activities | 4 | 7.8 | 72 | 31.03 |
| Job assistance activities | 7 | 13.73 | 48 | 20.69 |
| Academic guidance activities | 7 | 13.73 | 45 | 19.4 |
| Academic activities | 7 | 13.73 | 43 | 18.53 |
| Scientific research training activities | 7 | 13.73 | 22 | 9.48 |
| Science and technology competition | 8 | 15.69 | 57 | 24.57 |
| Entrepreneurship education activities | 6 | 11.76 | 43 | 18.53 |
| Campus social practice activities | 8 | 15.69 | 56 | 24.14 |
| Campus training activities | 9 | 17.65 | 141 | 60.78 |
| Off-campus social practice | 8 | 15.69 | 77 | 33.19 |
| International experience | 11 | 21.57 | 12 | 5.17 |
| Professional experiences | 19 | 37.25 | 95 | 40.95 |
| Volunteer activities | 14 | 27.45 | 97 | 41.81 |
| Student clubs | 9 | 17.65 | 102 | 43.97 |
| Physical activities | 11 | 21.57 | 69 | 29.74 |
| Mental health activities | 10 | 19.61 | 29 | 12.5 |

## Results of Research Questions

There were four research questions in this study. This paragraph describes the data results for each of the research questions. Research Question 1 is composed of two subquestions. The first subquestion is to examine the difference between the levels of involvement and positive and negative outcomes variables. The second subquestion is to examine the difference between the levels of involvement and the affective engagement variable. Research Question 2 examines the correlation between affective engagement and positive and negative outcomes. Research Questions 3 and 4 are descriptive questions, which respectively describe the factors that promote and prevent students' participation in OA.

### Research Question 1: Nature of Perceptions

Research Question 1 in this study was: What is the nature of engineering students' perception of the outcomes of out-of-class activities (OA)? I examined how levels of involvement relate to outcomes and how they relate to affective engagement.

#### *Research Question 1a: Levels of Involvement Related to Outcomes*

To examine students' perceptions of the outcomes of OA, RQ1a was "How do levels of involvement in OA relate to positive and negative outcomes?" As mentioned previously, levels of involvement were the independent variables that included these four specific factors: active involvement degree, hours, numbers, and types of OA, which are nominal variables with two groups or more than two independent groups. The dependent variables were continuous (i.e., positive and negative outcomes). An independent-samples *t* test, a one-way ANOVA, Spearman correlation, and effect size were used to answer this question. According to Pallant (2013), the purpose of the independent-samples *t* test is to examine the equality of means from two different groups of participants. The purpose of a one-way ANOVA is to compare the means of two or

more groups on one dependent variable to see if the group means are significantly different from each other (Urdan, 2016). Moreover, effect size is used to determine whether the difference in the means is practically significant. According to Cohen (1988), effect size reflects the magnitude of difference between groups, and, unlike the significance test, is not affected by sample size. And Cohen's *d* can be interpreted with .2 considered a small effect size, .5 a medium effect size, and .8 large effect size.

**Active Involvement Degree as an Independent Variable.** The active involvement degree variable was based on 232 participants' responses to Question 13, which asked, "How actively have you participated in the OA you selected?" The responses included four options: not active at all (*n* = 11; 4.7%; scored as 1), minimally active (*n* = 84; 36.2%; scored as 2), moderately active (*n* = 93; 40.1%; scored as 3), and highly active (*n* = 44; 19%; scored as 4), with the mean score of 2.73 (which corresponds to a response between minimally and moderately active) and Std. Deviation of .820 (see Table 8).

**Table 8**

*Frequency of Active Involvement Degree Variable*

| Variables | Frequency | % |
|---|---|---|
| Not active at all | 11 | 4.7 |
| Minimally active | 84 | 36.2 |
| Moderately active | 93 | 40.1 |
| Highly active | 44 | 19.0 |
| Total | 232 | 100.0 |

To make the data description clearer, I grouped the active involvement degree variable into two groups. To accomplish this, I combined responses to create groups of not active or minimally active (*n* = 95; 40.9%) and moderately or highly active (*n* = 137; 59.1%), based on their responses to Question 13. An independent-samples *t* test and effect size were conducted to

investigate the differences in active involvement degree on positive and negative outcomes. Results of these tests are presented in Table 9.

**Table 9**

*Independent-Samples t Tests Results and Effect Sizes for Outcomes and Degree of Active Involvement*

| Variables | Active Involvement Degree | | Levene's Test for Equality of Variances | | *t* test for Equality of Means | | | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|
| | Not active or minimally active (*N* = 95) | Moderately or highly active (*N* = 137) | | | | | | |
| | M ± SD | M ± SD | *F* | Sig. | *t* | *df* | Sig. (2-tailed) | |
| Positive outcome | 55.83 ± 9.01 | 62.66 ± 8.53 | 9.158 | .003 | -5.804 | 195.091 | .000 | .78 |
| Negative outcome | 22.18 ± 5.58 | 20.67 ± 6.40 | 1.797 | .181 | 1.857 | 230 | .065 | .25 |

As shown in Table 9, the analysis produced a significant *t* value ($t = -5.804$; $p < .001$), which indicates that positive outcomes are significant for the active involvement degree sample. The magnitude of the difference in means was medium to large (Cohen's $d = .78$). An examination of the means revealed that students who were not actively involved or minimally actively engaged in OA ($M = 55.83$) would be significantly lower than those who were moderately or highly actively involved in OA ($M = 62.66$). However, there was no difference between the different active involvement degree samples for the negative outcomes ($p > 0.05$).

**Hours as an Independent Variable.** The involved hours variable is based on 232 participants' responses to Question 14, which was "How many hours in a week have you participated in OA you selected." This item included five response choices, and participants

responded as follows: 1–3 hours (*n* = 81; 34.9%; scored as 1), 4–6 hours (*n* = 73; 31.5%; scored as 2), 7–9 hours (*n* = 39; 16.8%; scored as 3), 10–12 hours (n = 21; 9.1%; scored as 4), and above 12 hours (*n* = 18; 7.8%; scored as 5). Results of this item are presented in Table 10. The mean score was a response of 2.23 (which corresponds to a response between 4–6 hours and 7–9 hours) and std. deviation of 1.237. The median score was a 2 (i.e., 4–6 hours), and the mode score was a 1 (i.e., 1–3 hours).

**Table 10**

*Frequency of Weekly Participation in OA*

| Variables | Frequency | % |
|---|---|---|
| 1–3 hours | 81 | 34.9 |
| 4–6 hours | 73 | 31.5 |
| 7–9 hours | 39 | 16.8 |
| 10–12 hours | 21 | 9.1 |
| 12+ hours | 18 | 7.8 |
| Total | 232 | 100.0 |

Also, I conducted the split files and grouped the involved hours variable in two groups by SPSS version 25 to make the data description clearer. The involved hours variable was based on Question 14, and divided into two proportional groups of less (i.e., 1–6 hours; *n* = 154; 66.4%) and more (i.e., 6 or more hours; *n* = 78; 33.7%) hours spent on OA. Mean scores for positive and negative outcomes were evaluated for these groups of hourly involvement. As shown in Table 11, the mean score for positive outcomes was higher for the group of students who were involved for 6 or more hours weekly than it was for students who were involved 1–6 hours per week (64.23 and 57.66, respectively). In contrast, the results for negative outcomes were relatively similar across the two levels of hours of involvement.

**Table 11**

*Independent-Samples t Tests Results and Effect Sizes for Outcomes and Hours*

| Variables | Hours | | Levene's Test for Equality of Variances | | *t* test for Equality of Means | | | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|
| | 1–6 hours (*N* = 154) | 6 or more hours (*N* = 78) | | | | | | |
| | *M* ± *SD* | *M* ± *SD* | *F* | Sig. | *t* | *df* | Sig. (2-tailed) | |
| Positive outcome | 57.66 ± 9.06 | 64.23 ± 8.34 | 6.510 | .011 | -5.507 | 166.461 | .000 | .75 |
| Negative outcome | 21.81 ± 5.75 | 20.27 ± 6.69 | 2.397 | .123 | 1.817 | 230 | .071 | .25 |

I used an independent-samples *t* test and effect size to investigate the difference of hours students spent participating in the OA on positive and negative outcomes (see Table 11). Involved hours showed a .01 level of significance ($t = -5.507$, $p = .000$) for positive outcomes and specific comparative differences. Students who spent 1–6 hours in OA ($M = 57.66$) had significantly fewer positive outcomes than those who spent six or more hours in OA ($M = 64.23$). The magnitude of the difference in means was medium to large (Cohen's $d = .78$). Not only were the statistical differences significant, but the actual differences in mean scores were large. However, there is no difference between the different involved hours' samples for the negative outcomes ($p > .05$).

**Number of Out-of-Class Activities in Which Students Were Involved as an Independent Variable.** The number of OA in which students were involved variable is based on 232 participants' responses to Question 12, which was "Which of the following OA have you participated in during the four years in college?" This item included 26 types of OA and was a

multiple choice question. I conducted the split files and grouped the numbers of OA in which students involved variable in three groups by SPSS version 25 to make the data description clearer. The numbers of OA in which students involved variable was based on participants' responses of question 12, and divided into three proportional groups of low activities (i.e., 1 or 2 OA; *n* = 29; 12.5%), medium activities (i.e., 3 to 12 OA; *n* = 158; 68.1%) , and high activities (i.e., 13 or more OA; *n* = 45; 19.4%). Results of this item are presented in Table 12 and Table 13. The mean score was a response of 2.07 (which corresponds to a response between low activities and high activities) and standard deviation of .562.

**Table 12**

*Frequency of the Numbers of OA in Which Students Were Involved*

| Variables | Frequency | Percentage |
|---|---|---|
| Low activities (1 or 2) | 29 | 12.5 |
| Medium activities (3 to 12) | 158 | 68.1 |
| High activities (13 or more) | 45 | 19.4 |
| Total | 232 | 100.0 |

For comparing the means of the positive and negative outcomes score among three proportional groups of the numbers of OA in which students were involved (including low activities group, medium activities group, and high activities group), a one-way ANOVA and effect size were used. According to Pallant (2013), eta squared is one of the most commonly used effect-size measurements provided in the ANOVA results. Guidelines for interpreting this value are .01 = small effect, .06 = moderate effect, and .14 = large effect (Cohen, 1988).

**Table 13**

*ANOVA Results of Outcomes Based on Numbers of OA in Which Students Were Involved and Eta Squared Effect Sizes*

| Variables | Numbers of OA in which students were involved: Low activities ($N$ = 29) $M \pm SD$ | Medium activities ($N$ = 158) $M \pm SD$ | High activities (N = 45) $M \pm SD$ | | Sum of squares | *df* | Mean square | *F* | Sig. | $\eta^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Positive Outcome | 60.66 ± 8.54 | 58.63 ± 9.56 | 63.69 ± 8.03 | Between Groups | 915.953 | 2 | 457.976 | 5.453* | .005 | .045 |
| | | | | Within Groups | 19232.905 | 229 | 83.986 | | | |
| | | | | Total | 20148.858 | 231 | | | | |
| Negative Outcome | 25.48 ± 7.98 | 25.48 ± 7.98 | 20.60 ± 5.25 | Between Groups | 583.426 | 2 | 291.713 | 8.298* | .000 | .068 |
| | | | | Within Groups | 8050.225 | 229 | 35.154 | | | |
| | | | | Total | 8633.651 | 231 | | | | |

As shown in Table 13, the number of OA in which students participated was significantly ($p < .01$) related to differences in positive and negative outcomes. The ANOVA analysis confirms the number of OA in which students were involved was related to a significant difference in the number of positive outcomes students reported ($F = 5.453$; $p = .005$) and distinct comparative differences. The number of OA in which students were involved also showed significant differences in the number of negative outcomes reported by students ($F = 8.298$; $p = .000$). The effect size, calculated using eta squared, was .045. This means despite reaching statistical significance, the actual differences in mean scores of the groups for positive outcomes were small to medium. The differences in mean scores of the groups for negative outcomes was moderate. The effect size, calculated using eta squared, was .068.

Different post-hoc tests can be used to determine which groups within an ANOVA had individually significant differences between them. Two of the most commonly used post-hoc tests are Tukey's honestly significant difference (HSD) and the Scheffe test.

As shown in Table 14, post-hoc comparisons using the Tukey's HSD test indicated the mean scores of positive outcomes for students who participated in high numbers (i.e., 13 or more) of OA ($M$ = 63.69, $SD$ = 8.03) was significantly higher than the mean score of those who participated in medium numbers (i.e., 3 to 12; $M$ = 58.63, $SD$ = 9.56). In contrast, the group of students who reported low numbers of activities did not have significantly different positive outcomes from those who reported a medium number of activities. When reporting negative outcomes, the results of Tukey's HSD revealed significantly more negative outcomes reported by students who reported engaging in a low number of activities, as compared to their peers who participated in either a medium or high number of activities. An examination of the means (see Table 13) provides further insight into these trends. For example, students who participated in low numbers of OA ($M$ = 25.48, $SD$ = 7.98) reported more negative outcomes than both the medium OA group ($M$ = 20.72, $SD$ = 5.67) and the high OA group ($M$ = 20.60, $SD$ = 5.25).

**Table 14**

*Post Hoc Tests (Tukey's HSD) Results for Numbers of OA and Outcomes*

| | (I) total number of activities | (J) total number of activities | Mean difference (I-J) | Std. error | Sig. | 95% CI |
|---|---|---|---|---|---|---|
| Positive outcome | Low activities | Medium activities | 2.02226 | 1.85139 | 0.52 | [-2.3453, 6.3898] |
| | | High activities | -3.03372 | 2.1823 | 0.348 | [-8.1819, 2.1145] |
| | Medium activities | Low activities | -2.02226 | 1.85139 | 0.52 | [-6.3898, 2.3453] |
| | | High activities | -5.05598* | 1.54852 | 0.004 | [-8.709, -1.4029] |
| | High activities | Low activities | 3.03372 | 2.1823 | 0.348 | [-2.1145, 8.1819] |
| | | Medium activities | 5.05598* | 1.54852 | 0.004 | [1.4029, 8.709] |
| Negative outcome | Low activities | Medium activities | 4.76757* | 1.19779 | 0 | [1.9419, 7.5932] |
| | | High activities | 4.88276* | 1.41188 | 0.002 | [1.5521, 8.2135] |
| | Medium activities | Low activities | -4.76757* | 1.19779 | 0 | [-7.5932, -1.9419] |
| | | High activities | 0.11519 | 1.00184 | 0.993 | [-2.2482, 2.4786] |
| | High activities | Low activities | -4.88276* | 1.41188 | 0.002 | [-8.2135, -1.5521] |
| | | Medium activities | -0.11519 | 1.00184 | 0.993 | [-2.4786, 2.2482] |

**Types of Out-of-Class Activities in Which Students Were Involved as an Independent Variable.** I conducted Spearman correlations to examine the relationships between types of OA and positive and negative outcomes. As the correlation coefficients presented in Table 15 reveal, some types of OA in which students were involved (i.e., culture and art publicity activities, daily management activities, adaptive difficulties assistance activities, academic guidance activities, academic activities, entrepreneurship education activities, and physical activities) were positively and significantly related to positive outcomes (correlation coefficients were .136, .140, .172, .151, .201, .143, .170, $p < .05$, respectively). Students who engaged in these types of OA gained more positive outcomes than their peers who were

involved in other types of OA. In addition, negative outcomes were negatively and significantly related to daily management activities ($r$ = -.149; $p$ < .05) and campus training activities ($r$ = -.155; $p$ < .05).

**Table 15**

*Correlations Between Types of OA in Which Students Were Involved and Positive and Negative Outcomes (Spearman's Rho)*

| Types of OA | Positive outcomes | Negative outcomes |
|---|---|---|
| Themed educational activities | -.006 | .016 |
| Party and league education activities for college students | .095 | -.107 |
| Evening party | .061 | -.124 |
| Culture and art competition activities | .127 | -.036 |
| Culture and art team | .057 | -.080 |
| Culture and art publicity activities | **.136*** | -.031 |
| Daily management activities | **.140*** | **-.149*** |
| Financial difficulty assistance activities | .117 | -.056 |
| Psychological assistance activities | .103 | .040 |
| Learning assistance activities | .084 | -.037 |
| Adaptive difficulties assistance activities | **.172**** | -.068 |
| Job assistance activities | .052 | .031 |
| Academic guidance activities | **.151*** | -.004 |
| Academic activities | **.201**** | .011 |
| Scientific research training activities | .098 | -.083 |
| Science and technology competition | .075 | -.048 |
| Entrepreneurship education activities | **.143*** | .035 |
| Campus social practice activities | .007 | .005 |
| Campus training activities | .010 | **-.155*** |
| Off-campus social practice | .049 | -.036 |
| International experience | .019 | .041 |
| Professional experiences | .046 | -.088 |
| Volunteer activities | .123 | -.106 |
| Student clubs | .044 | -.041 |
| Physical activities | **.170**** | -.029 |
| Mental health activities | .018 | .027 |

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

### *Research Question 1b: Levels of Involvement Related to Affective Engagement*

To examine students' perceptions of affective engagement, RQ1b was "How do levels of involvement in OA relate to affective engagement?" For this research question, involvement levels were the independent variables that included these four specific factors: active involvement degree, hours, numbers, and types of OA. The dependent variable was a continuous variable (i.e., affective engagement). The affective engagement subscale was based on Question 6 consisting of 23 items and six factors, which uses a Likert scale with a score of 1 referring to "strongly disagree" and 4 referring to "strongly agree" (see Table 16). The affective engagement variable was based on total score of the 283 participants, with the mean score of 69.14 and standard deviation of 10.25. The maximum score was 92, and the minimum score was 32. An independent-samples *t* test, a one-way ANOVA, Spearman correlation, and effect size were used to answer this question.

**Table 16**

*Students' Response Rate of Affective Engagement Subscale (Question 6)*

| Question 6 items | *N* | Strongly Disagree | | Disagree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|
| | | *n* | % | *n* | % | *n* | % | *n* | % |
| Q6-1. Overall, I am happy with the major I've chosen. | 283 | 13 | 4.59 | 40 | 14.13 | 165 | 58.3 | 65 | 22.97 |
| Q6-2. Overall, I am happy with the major I've chosen. | 283 | 17 | 6.01 | 54 | 19.08 | 133 | 47 | 79 | 27.92 |
| Q6-3. I am enthusiastic about my major. | 283 | 14 | 4.95 | 56 | 19.79 | 146 | 51.59 | 67 | 23.67 |
| Q6-4. I think I will be very happy to spend the rest of my career in my current academic discipline. | 283 | 14 | 4.95 | 55 | 19.43 | 141 | 49.82 | 73 | 25.8 |
| Q6-5. My major is interesting to me. | 283 | 11 | 3.89 | 67 | 23.67 | 139 | 49.12 | 66 | 23.32 |
| Q6-6. I do not feel like "part of the family" in my academic discipline. | 283 | 45 | 15.9 | 118 | 41.7 | 85 | 30.04 | 35 | 12.37 |
| Q6-7. I do not feel "emotionally attached" to my academic discipline. | 283 | 47 | 16.61 | 136 | 48.06 | 71 | 25.09 | 29 | 10.25 |
| Q6-8. I do not feel a strong sense of "belonging" to my academic discipline. | 283 | 46 | 16.25 | 110 | 38.87 | 93 | 32.86 | 34 | 12.01 |
| Q6-9. Success in my major at school is very valuable to me. | 283 | 7 | 2.47 | 30 | 10.6 | 175 | 61.84 | 71 | 25.09 |
| Q6-10. It matters to me how well I do in my major at school. | 283 | 7 | 2.47 | 33 | 11.66 | 177 | 62.54 | 66 | 23.32 |
| Q6-11. Being good at my major is an important part of who I am. | 283 | 6 | 2.12 | 28 | 9.89 | 170 | 60.07 | 79 | 27.92 |
| Q6-12. I excel at identifying opportunities. | 283 | 5 | 1.77 | 64 | 22.61 | 155 | 54.77 | 59 | 20.85 |
| Q6-13. If I see something I don't like, I fix it. | 283 | 5 | 1.77 | 43 | 15.19 | 171 | 60.42 | 64 | 22.61 |

| *Students' Response Rate of Affective Engagement Subscale (Question 6)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Q6-14. If I believe in an idea, no obstacle will prevent me from making it happen. | 283 | 9 | 3.18 | 74 | 26.15 | 143 | 50.53 | 57 | 20.14 |
| Q6-15. I love being a champion for my ideas, even against others' opposition. | 283 | 8 | 2.83 | 58 | 20.49 | 163 | 57.6 | 54 | 19.08 |
| Q6-16. I am constantly on the lookout for new ways to improve my life. | 283 | 6 | 2.12 | 21 | 7.42 | 178 | 62.9 | 78 | 27.56 |
| Q6-17. I discuss academic issues with peers. | 283 | 6 | 2.12 | 20 | 7.07 | 183 | 64.66 | 74 | 26.15 |
| Q6-18. I discuss career issues with peers. | 283 | 9 | 3.18 | 15 | 5.3 | 177 | 62.54 | 82 | 28.98 |
| Q6-19. I discuss social issues with peers. | 283 | 5 | 1.77 | 16 | 5.65 | 183 | 64.66 | 79 | 27.92 |
| Q6-20. I discuss cultural issues with peers. | 283 | 6 | 2.12 | 22 | 7.77 | 183 | 64.66 | 72 | 25.44 |
| Q6-21. The instructors in my major respect me. | 283 | 6 | 2.12 | 12 | 4.24 | 183 | 64.66 | 82 | 28.98 |
| Q6-22. I am satisfied with the faculty in my major. | 283 | 10 | 3.53 | 14 | 4.95 | 174 | 61.48 | 85 | 30.04 |
| Q6-23. I am treated with as much respect by faculty as other students in my major. | 283 | 6 | 2.12 | 26 | 9.19 | 167 | 59.01 | 84 | 29.68 |

**Active Involvement Degree as an Independent Variable.** The active involvement degree variable was based on 232 participants' responses to Question 13, which asked "How actively have you participated in the OA you selected?" The responses included four options: not active at all ($n$ = 11; 4.7%; scored as 1), minimally active ($n$ = 84; 36.2%; scored as 2), moderately active ($n$ = 93; 40.1%; scored as 3), and highly active ($n$ = 44; 19%; scored as 4), with the mean score of 2.73 (which corresponds to a response between minimally and moderately active) and std. deviation of .820.

As described for Q1a, to make the data description clearer, I combined responses to create two groups of not active or minimally active ($n$ = 95; 40.9%) and moderately or highly active ($n$ = 137; 59.1%), based on their responses to Question 13. An independent-samples $t$ test and effect size were conducted to investigate the differences in active involvement degree on affective engagement. Results of these tests are presented in Table 17.

**Table 17**

*Independent-Samples t Tests Results and Effect Sizes for Affective Engagement and Degree of Active Involvement*

| Variables | Active involvement degree | | Levene's Test for Equality of Variances | | *t* test for equality of means | | | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|
| | Not active or minimally active | Moderately or highly active | | | | | | |
| | (*N* = 95) | (*N* = 137) | | | | | | |
| | *M* ± *SD* | *M* ± *SD* | *F* | Sig. | *t* | *df* | Sig. (2-tailed) | |
| Affective engagement | 65.99 ± 9.55 | 71.76 ± 10.12 | 3.632 | .058 | -4.369 | 230 | .000 | .59 |

The analysis produced a significant $t$ value ($t$ = -4.369; $P$ < .001), which indicates that the degree of involvement in OA was related to significantly different affective engagement scores. The magnitude of the difference in means was medium to large (Cohen's $d$ = .59). An examination of the means revealed that students who were not actively involved or minimally actively engaged in OA ($M$ = 65.99) reported significantly lower levels of affective engagement than those who were moderately or highly actively involved in OA ($M$ = 71.76).

**Hours as an Independent Variable.** The involved hours variable is based on 232 participants' responses to Question 14, which was "How many hours in a week have you participated in OA you selected." This item included five response choices, and participants

responded as follows: 1–3 hours (*n* = 81; 34.9%; scored as 1), 4–6 hours (*n* = 73; 31.5%; scored as 2), 7–9 hours (*n* = 39; 16.8%; scored as 3), 10–12 hours (n = 21; 9.1%; scored as 4), and above 12 hours (*n* = 18; 7.8%; scored as 5). Results of this item are presented in Table 10. The mean score was a response of 2.23 (which corresponds to a response between 4–6 hours and 7–9 hours) and standard deviation of 1.24. The median score was a 2 (i.e., 4–6 hours), and the mode score was a 1 (i.e., 1–3 hours). I used an independent *t* test and effect size to investigate the differences of hours spent participating in the OA on affective engagement (see Table 18). As described for Q1a, the involved hours variable was divided into two proportional groups of less (i.e., 1–6 hours) and more (i.e., 6 or more hours) hours spent on OA.

**Table 18**

*Independent-Samples t Tests Results and Effect Sizes for Affective Engagement and Hours*

| Variables | Hours weekly spent on OA | | Levene's Test for Equality of Variances | | *t* test for Equality of Means | | | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|
| | 1–6 hours | 6 or more hours | | | | | | |
| | (*N* = 154) | (*N* = 78) | | | | | | |
| | *M* ± *SD* | *M* ± *SD* | *F* | Sig. | *t* | *df* | Sig. (2-tailed) | |
| Affective engagement | 67.71 ± 9.86 | 72.73 ± 10.31 | 3.072 | .081 | -3.609 | 230 | .000 | .50 |

Involved hours showed a significant (*t* = -3.609; *p* = .000) difference in reported levels of affective engagement and specific comparative differences. Students who spent fewer hours (i.e., 1 to 6 hours) in OA (*M* = 67.71) reported significantly lower levels of affective engagement than those who spent more hours (i.e., 6 or more hours) in OA (*M* = 72.73). The magnitude of the difference in means was medium (Cohen's *d* = .50).

**Number of Out-of-Class Activities in Which Students Were Involved as an Independent Variable.** The number of OA in which students were involved variable is based on 232 participants' responses to Question 12, which was "Which of the following OA have you participated in during the four years in college?" This item included 26 types of OA and was a multiple-choice question. I conducted the split files and grouped the number of OA in which students were involved variable in three groups to make the data description clearer. The number of OA in which students were involved variable was divided into three proportional groups of low activities (i.e., 1 or 2 OA; $n = 29$; 12.5%), medium activities (i.e., 3 to 12 OA; $n = 158$; 68.1%), and high activities (i.e., 13 or more OA; $n = 45$; 19.4%; see Table 12).

**Table 19**

*ANOVA Results of Affective Engagement based on Numbers of OA in Which Students Were Involved and Eta Squared Effect Size*

| Variables | Numbers of OA in which students were involved | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Low activities ($N = 29$) $M \pm SD$ | Medium activities ($N = 158$) $M \pm SD$ | High activities ($N = 45$) $M \pm SD$ | | Sum of squares | *df* | Mean square | *F* | Sig. | $\eta^2$ |
| Affective engagement | 68.48 ± 7.98 | 69.09 ± 10.69 | 71.04 ± 10.08 | Between groups | 160.789 | 2 | 80.394 | .760 | .469 | .007 |
| | | | | Within groups | 24208.728 | 229 | 105.715 | | | |
| | | | | Total | 24369.517 | 231 | | | | |

I conducted a one-way ANOVA and effect size to investigate the differences between affective engagement among samples of the number of OA in which students were involved. Table 19 shows that affective engagement ($F = .760$, $p > .05$) was not significantly impacted by

the reported number of OA in which students were involved. The magnitude of the differences in the means was very small (eta squared = .007).

**Types of Out-of-Class Activities in Which Students Were Involved as an Independent Variable.** I conducted Spearman correlations to examine the relationships between the types of OA and affective engagement. As the correlation coefficients presented (see Table 20), affective engagement was significantly and positively related to adaptive difficulties assistance activities and academic guidance activities (r=.163 and .139, $p < .05$). Students who participated in these two types of OA reported higher affective engagement than their peers who were involved in other types of OA.

**Table 20**

*Correlation between Types of OA in Which Students Were Involved and Affective Engagement (Spearman's Rho)*

| Types of OA in which students were involved | Affective engagement |
|---|---|
| Themed educational activities | -0.038 |
| Party and league education activities for college students | 0.070 |
| Evening party | -0.036 |
| Culture and art competition activities | 0.068 |
| Culture and art team | -0.055 |
| Culture and art publicity activities | 0.002 |
| Daily management activities | 0.104 |
| Financial difficulty assistance activities | 0.091 |
| Psychological assistance activities | 0.059 |
| Learning assistance activities | 0.099 |
| Adaptive difficulties assistance activities | **0.163*** |
| Job assistance activities | 0.035 |
| Academic guidance activities | **0.139*** |
| Academic activities | 0.123 |
| Scientific research training activities | 0.118 |
| Science and technology competition | 0.122 |
| Entrepreneurship education activities | 0.123 |
| Campus social practice activities | -0.054 |
| Campus training activities | -0.007 |
| Off-campus social practice | 0.012 |
| International experience | 0.019 |
| Professional experiences | 0.009 |
| Volunteer activities | 0.108 |
| Student clubs | 0.020 |
| Physical activities | 0.116 |
| Mental health activities | 0.003 |

*Note.* **. Correlation is significant at the 0.01 level (2-tailed). *.Correlation is significant at the 0.05 level (2-tailed).

**Research Question 2: Correlation Between Outcomes and Affective Engagement**

To examine the correlation between outcomes students perceived from OA involvement and their affective engagement, RQ2 was, "To what extent is the level of affective engagement in OA related to engineering students' outcomes?" I conducted the Pearson correlation analysis to study the correlation between outcomes and affective engagement. Results of the correlation analysis are presented in Table 21.

**Table 21**

*Correlation Results for Positive/Negative Outcomes and Affective Engagement*

| | Positive outcome | Negative outcome |
|---|---|---|
| Positive outcomes | 1 | |
| Negative outcomes | .107 | 1 |
| Affective engagement | .768** | -.053 |

Correlation results reported that the correlation between the affective engagement and positive outcomes was quite strong ($r = .768$; $p < .01$), which can explain 59% of the variance in affective engagement by knowing the positive outcomes.

**Research Question 3: Incentives for Students' OA Involvement**

To analyze the reasons that would promote students' involvement in OA, RQ3 was "What do engineering students perceive as the incentives for OA involvement?" That is a descriptive question, and therefore there is no hypothesis. For this research question, participants ($n = 283$) include 232 students who participated in any OA and 51 students who did not participate in any OA during their four years in college. Therefore, the following data description of incentives for OA involvement can be divided into two parts: students who have not participated in OA and students who have participated in OA. Table 22 is a set of descriptive

statistics for incentives for OA involvement of uninvolved students.

The data indicated that 51 students had not been involved in any OA during the four years in college. Approximately 98% of participants agreed or strongly agreed that "to gain experiences that make me competitive in the job market" could prompt them to participate in OA. The mean for this reason is 3.39, which is the highest score among all reasons. The reasons "to provide entertainment" and "to try something new" were ranked as the second and third factors influencing uninvolved students' OA involvement choice. The factor least reported as a potential reason to become involved in OA for uninvolved students was "because of my parents' influence" ($M = 2.94$). These reasons are uninvolved students' perceptions of what would have motivated them to get involved.

**Table 22**

*Reported Reasons for Engaging in OA of Uninvolved Students*

| Reasons | *N* | *M* | *SD* | Strongly Disagree | | Disagree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | % | N | % | N | % | N | % |
| Q10.7. To gain experiences that make me competitive in the job market. | 51 | 3.39 | 0.53 | 0 | 0 | 1 | 2.0 | 29 | 56.9 | 21 | 41.2 |
| Q10.6. To fulfill my personal interests. | 51 | 3.29 | 0.61 | 0 | 0 | 4 | 7.8 | 28 | 54.9 | 19 | 37.3 |
| Q10.8. To provide entertainment. | 51 | 3.24 | 0.51 | 0 | 0 | 2 | 3.9 | 35 | 68.6 | 14 | 27.5 |
| Q10.10. To try something new. | 51 | 3.20 | 0.57 | 0 | 0 | 4 | 7.8 | 33 | 68.6 | 14 | 27.5 |
| Q10.11. Because I had the time. | 51 | 3.20 | 0.60 | 0 | 0 | 5 | 9.8 | 31 | 60.8 | 15 | 29.4 |
| Q10.14. To relieve stress. | 51 | 3.14 | 0.69 | 2 | 3.9 | 3 | 5.9 | 32 | 62.7 | 14 | 27.5 |
| Q10.1.Because I could afford the costs /expenses. | 51 | 3.12 | 0.65 | 1 | 2.0 | 5 | 9.8 | 32 | 62.7 | 13 | 25.5 |
| Q10.12. Because I agree with the goals of the organization. | 51 | 3.12 | 0.65 | 1 | 2.0 | 5 | 9.8 | 32 | 62.7 | 13 | 25.5 |
| Q10.3. To be on par with other students in terms of involvement in activities. | 51 | 3.10 | 0.64 | 1 | 2.0 | 5 | 9.8 | 33 | 64.7 | 12 | 23.5 |
| Q10.2. Because I was provided information concerning the activities. | 51 | 3.08 | 0.69 | 1 | 2.0 | 7 | 13.7 | 30 | 58.8 | 13 | 25.5 |
| Q10.4. To create positive impact on campus/community. | 51 | 3.08 | 0.60 | 0 | 0 | 7 | 13.7 | 33 | 64.7 | 11 | 21.6 |
| Q10.5. To follow encouragement from an advisor or faculty member. | 51 | 3.08 | 0.66 | 1 | 2.0 | 6 | 11.8 | 32 | 62.7 | 12 | 23.5 |
| Q10.13. To break down barriers of any kind (i.e., religion, race, gender, sexual orientation). | 51 | 3.04 | 0.69 | 1 | 2.0 | 8 | 15.7 | 30 | 58.8 | 12 | 23.5 |
| Q10.9. Because of my parents influence. | 51 | 2.94 | 0.73 | 2 | 3.9 | 9 | 17.6 | 30 | 58.8 | 10 | 19.6 |

Table 23 includes descriptive statistics for incentives for OA involvement of involved students. There were 232 participants who participated in OA during their four years in college. The most commonly endorsed reason why involved students reported engaging in OA was "to try something new." Over 97% of participants agreed or strongly agreed with this reason ($M$ = 3.18). The second reported reason for engaging in OA for involved participants was "to fulfill my personal interests" ($n$ = 216; 93.11%). Moreover, there are three main factors, including "because I was provided information concerning the activities," "to provide entertainment," "because I agree with the goals of the organization" ($n$ = 213; 91.82%), which ranked as the third main factor. The least endorsed reason to participate in OA for involved students was "because of my parents' influence," which had a mean score of 2.64.

**Table 23**

*Reported Reasons for Engaging in OA of Involved Students*

| Reasons | N | M | SD | Strongly Disagree | | Disagree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | % | N | % | N | % | N | % |
| Q18.10. To try something new. | 232 | 3.18 | 0.5 | 3 | 1.29 | 3 | 1.29 | 176 | 75.86 | 50 | 21.55 |
| Q18.6. To fulfill my personal interests. | 232 | 3.16 | 0.58 | 4 | 1.72 | 12 | 5.1 | 160 | 68.97 | 56 | 24.14 |
| Q18.7. To gain experiences that make me competitive in the job market. | 232 | 3.12 | 0.62 | 5 | 2.16 | 18 | 7.76 | 154 | 66.38 | 55 | 23.71 |
| Q18.12. Because I agree with the goals of the organization. | 232 | 3.09 | 0.60 | 6 | 2.59 | 14 | 6.03 | 166 | 71.55 | 46 | 19.83 |
| Q18.3. To be on par with other students in terms of involvement in activities. | 232 | 3.08 | 0.52 | 12 | 5.17 | 56 | 24.14 | 126 | 54.31 | 38 | 16.38 |
| Q18.4. To create positive impact on campus/community | 232 | 3.05 | 0.60 | 6 | 2.59 | 18 | 7.76 | 166 | 71.55 | 42 | 18.1 |
| Q18.2. Because I was provided information concerning the activities. | 232 | 3.04 | 0.55 | 6 | 2.59 | 13 | 5.6 | 179 | 77.16 | 34 | 14.66 |
| Q18.8. To provide entertainment. | 232 | 3.03 | 0.61 | 6 | 2.59 | 13 | 5.6 | 179 | 77.16 | 34 | 14.66 |
| Q18.11. Because I had the time. | 232 | 3.02 | 0.59 | 6 | 2.59 | 13 | 5.6 | 179 | 77.16 | 34 | 14.66 |
| Q18.5. To follow encouragement from an adviser or faculty member. | 232 | 2.91 | 0.65 | 7 | 3.02 | 39 | 16.81 | 154 | 66.38 | 32 | 13.79 |
| Q18.14. To relieve stress. | 232 | 2.85 | 0.71 | 11 | 4.74 | 46 | 19.83 | 142 | 61.21 | 33 | 14.22 |
| Q18.13. To break down barriers of any kind. | 232 | 2.82 | 0.76 | 12 | 5.17 | 56 | 24.14 | 126 | 54.31 | 38 | 16.38 |
| Q18.1.Because I could afford the costs/expenses. | 232 | 2.81 | 0.70 | 10 | 4.31 | 51 | 21.98 | 144 | 62.07 | 27 | 11.64 |
| Q18.9. Because of my parents influence | 232 | 2.64 | 0.73 | 10 | 4.31 | 51 | 21.98 | 144 | 62.07 | 27 | 11.64 |

**Research Question 4: Barriers for Students' OA Involvement**

To analyze the reasons that would prevent students' involvement in OA, RQ4 was "What do engineering students perceive as the barriers to OA involvement?" This question is descriptive, therefore there is no hypothesis. As described in Question 3, the data on barriers for OA involvement can be divided into two parts: students who have not participated in OA (i.e., uninvolved students; see Table 24) and students who have participated in OA (i.e., involved students; see Table 25). Table 24 contains descriptive statistics for barriers for OA involvement of uninvolved students; There were 51 students who had not been involved in any OA during their years in college. The most important barrier reported was a "lack of motivation" ($n$ = 43; 84.4%), with a mean score of 3.10 and over 84% of students agreeing or strongly agreeing that this was a barrier to involvement in OA. The reason "lack the knowledge about the opportunities" ($n$ = 42; 82.4% reporting agree or strongly agree) ranked as the second most endorsed barrier. Besides, the reasons "cost," "introverted personality," and "possibility of negative impact" ($n$ = 40; 78.5% reporting agree or strongly agree) ranked as the third most endorsed barriers influencing uninvolved students' OA involvement choice. The least endorsed barriers to involvement for uninvolved students were "gender issues" ($n$ = 31; 60.8% agree or strongly agree), with a mean score is 2.71, and "personal matters prevent me" ($n$ = 29; 56.9% agree or strongly agree).

**Table 24**

*Reporting Barriers for Engaging in OA of Uninvolved Students*

| Reasons | N | M | SD | Strongly Disagree | | Disagree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | % | N | % | N | % | N | % |
| Q11.8. Lack of motivation | 51 | 3.10 | 0.70 | 1 | 2.0 | 7 | 13.7 | 29 | 56.9 | 14 | 27.5 |
| Q11.10. Lack the knowledge about the opportunities | 51 | 3.10 | 0.67 | 0 | 0 | 9 | 17.6 | 28 | 54.9 | 14 | 27.5 |
| Q11.15. Social inertia | 51 | 3.02 | 0.76 | 1 | 2.0 | 11 | 21.6 | 25 | 49 | 14 | 27.5 |
| Q11.1. Cost (time and money) of joining was too high | 51 | 3.00 | 0.83 | 3 | 5.9 | 8 | 15.7 | 26 | 51 | 14 | 27.5 |
| Q11.3. Don't contribute to what I want to learn | 51 | 3.00 | 0.78 | 2 | 3.9 | 9 | 17.6 | 27 | 52.9 | 13 | 25.5 |
| Q11.12. Limit to number of participants; a competitive process to join | 51 | 3.00 | 0.85 | 3 | 5.9 | 9 | 17.6 | 24 | 47.1 | 15 | 29.4 |
| Q11.7. Introverted personality | 51 | 2.98 | 0.86 | 4 | 7.8 | 7 | 13.7 | 26 | 51 | 14 | 27.5 |
| Q11.9. Lack of time, scheduling issue | 51 | 2.94 | 0.86 | 3 | 5.9 | 11 | 21.6 | 23 | 45.1 | 14 | 27.5 |
| Q11.11. Lengthy, difficult membership process | 51 | 2.94 | 0.81 | 3 | 5.9 | 9 | 17.6 | 27 | 52.9 | 12 | 23.5 |
| Q11.13. possibility of negative impact | 51 | 2.94 | 0.79 | 3 | 5.9 | 8 | 15.7 | 29 | 56.9 | 11 | 21.6 |
| Q11.14. Race/ethnicity issues | 51 | 2.88 | 0.84 | 3 | 5.9 | 12 | 23.5 | 24 | 47.1 | 12 | 23.5 |
| Q11.6. I am not a "joiner" | 51 | 2.82 | 0.74 | 2 | 3.9 | 13 | 25.5 | 28 | 54.9 | 8 | 15.7 |
| Q11.16. Family matters prevent me | 51 | 2.80 | 0.85 | 3 | 5.9 | 15 | 29.4 | 22 | 43.1 | 11 | 21.6 |
| Q11.2. Didn't feel supported by faculty advisor | 51 | 2.75 | 0.82 | 3 | 5.9 | 16 | 31.4 | 23 | 45.1 | 11 | 21.6 |
| Q11.4. Personal matters prevent me | 51 | 2.73 | 0.96 | 5 | 9.8 | 17 | 33.3 | 16 | 31.4 | 13 | 25.5 |
| Q11.5. Gender issue | 51 | 2.71 | 0.81 | 3 | 5.9 | 17 | 33.3 | 23 | 45.1 | 8 | 15.7 |

Table 25 shows 232 students participated in OA during their 4 years in college. Among these students, the most important barrier reported was the “cost (time and money) of joining was too high” (*n* = 143; 61.64%), with a mean score of 2.69 and over 61% of students agreeing

or strongly agreeing this was a barrier to involvement in OA. The reasons "don't contribute to what I want to learn" ($n$ = 127; 54.74% reporting agree or strongly agree), "lack of time, scheduling issue," and "limit to number of participants; a competitive process to join" ($n$ = 127; 54.75% reporting agree or strongly agree) ranked as the second highest barriers influencing students' OA involvement choice. The reason of "lack of motivation" ($n$ = 110; 47.42% reporting agree or strongly agree) was the third most endorsed factor. The least endorsed barrier to involvement for involved students was "family matters prevent me" ($n$ = 55; 23.71% agree or strongly agree), with a mean score is 2.08. This barrier was consistent with the least endorsed reasons to participate in OA, both among uninvolved students and involved students.

**Table 25**

Reported Barriers for Engaging in OA of Involved Students

| Reasons | N | M | SD | Strongly Disagree | | Disagree | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | % | N | % | N | % | N | % |
| Q19.1. Cost (time and money) of joining was too high | 232 | 2.69 | 0.77 | 14 | 6.03 | 75 | 32.33 | 113 | 48.71 | 30 | 12.93 |
| Q19.3. Don't contribute to what I want to learn | 232 | 2.58 | 0.76 | 16 | 6.9 | 89 | 38.36 | 104 | 44.83 | 23 | 9.91 |
| Q19.9. Lack of time, scheduling issue | 232 | 2.53 | 0.74 | 20 | 8.62 | 85 | 36.64 | 112 | 48.28 | 15 | 6.47 |
| Q19.10. Lack the knowledge about the opportunities | 232 | 2.52 | 0.75 | 21 | 9.05 | 85 | 36.64 | 111 | 47.84 | 15 | 6.47 |
| Q19.12. Limit to number of participants; a competitive process to join | 232 | 2.49 | 0.76 | 16 | 6.9 | 89 | 38.36 | 104 | 44.83 | 23 | 9.91 |
| Q19.8. Lack of motivation | 232 | 2.42 | 0.80 | 29 | 12.5 | 93 | 40.09 | 93 | 40.09 | 17 | 7.33 |
| Q19.13. Possibility of negative impact | 232 | 2.41 | 0.78 | 27 | 11.64 | 97 | 41.81 | 93 | 40.09 | 15 | 6.47 |
| Q19.7. Introverted personality | 232 | 2.39 | 0.79 | 30 | 12.93 | 96 | 41.38 | 91 | 39.22 | 15 | 6.47 |
| Q19.15. Social inertia | 232 | 2.39 | 0.76 | 30 | 12.93 | 96 | 41.38 | 91 | 39.22 | 15 | 6.47 |
| Q19.2.Didn't feel supported by faculty advisor | 232 | 2.35 | 0.75 | 23 | 9.91 | 119 | 51.29 | 75 | 32.33 | 15 | 6.47 |
| Q19.11. Lengthy, difficult membership process | 232 | 2.34 | 0.79 | 29 | 12.5 | 113 | 48.71 | 73 | 31.47 | 17 | 7.33 |
| Q19.4. Personal matters prevent me | 232 | 2.30 | 0.87 | 42 | 18.1 | 99 | 42.67 | 70 | 30.17 | 21 | 9.05 |
| Q19.6. I am not a "joiner" | 232 | 2.29 | 0.82 | 35 | 15.09 | 112 | 48.28 | 67 | 28.88 | 18 | 7.76 |
| Q19.14. Race/ethnicity issues | 232 | 2.23 | 0.76 | 34 | 14.66 | 122 | 52.59 | 64 | 27.59 | 12 | 5.17 |
| Q19.5. Gender issue | 232 | 2.16 | 0.75 | 39 | 16.81 | 128 | 55.17 | 55 | 23.71 | 10 | 4.31 |
| Q19.16. Family matters prevent me | 232 | 2.08 | 0.73 | 45 | 19.4 | 132 | 56.9 | 47 | 20.26 | 8 | 3.45 |

## Summary

This chapter provided information on the findings of the engineering students' levels of OA involvement related to their perceived outcomes and affective engagement. A convenience sample was used, and there were a total of 283 participants. Descriptive statistics were used to report findings of incentives for and barriers to engineering students' participation in OA. The next chapter will summarize and discuss findings, present the strengths and limitations of this study, and provide future directions and implications for the field.

# CHAPTER 5

# DISCUSSION

The purpose of this chapter is to review the research questions, discuss the methodology used to report findings, and summarize and discuss current practices for engineering undergraduates' out-of-class activities (OA) involvement. Study strengths, implications for the field, limitations, and future directions of study will be presented.

## Research Questions

The purpose of this study was to investigate the primary characteristics of engineering college students' involvement in OA at one private college in China through the use of the translated and culturally adapted Chinese version of the PosSE Survey (PosSES 2.1). This study was an examination of the relationships between levels of involvement (i.e., active involvement degree, hours, numbers, types of OA in which students were involved) and both positive and negative outcomes and affective engagement. In this study, I also explored the correlation between the affective engagement and positive and negative outcomes engineering undergraduates obtained. Additionally, with this research, I aimed to identify students' OA engagement and disengagement factors that would help engineering stakeholders and educators revise pathways or mechanisms and allow policymakers and student affairs professionals to design and carry out much more efficient and targeted OA. Only seniors who majored in engineering at one private college in Shanghai were included in the sample. Data for the study were collected via a 19-item anonymous online survey of 283 participants. The research questions for the study included the following:

**Research Question 1**

What is the nature of engineering students' perceptions of the outcomes of out-of-class activities (OA)?

***Research Question 1a***

How do levels of involvement in OA relate to positive and negative outcomes?

***Research Question 1b***

How do levels of involvement in OA relate to affective engagement?

**Research Question 2**

To what extent is the level of affective engagement in OA related to engineering students' outcomes?

**Research Question 3**

What do engineering students perceive as the incentives for OA involvement?

**Research Question 4**

What do engineering students perceive as the barriers to OA involvement?

## Methodology Review

I used a survey to gather descriptive statistics to provide information about the research questions. The survey (PosSES 2.1 Chinese version) consisted of 19 items. After securing the Institutional Review Board of Chapman University's approval and permission from the research setting's director of the student affair and the dean of the college of engineering, I recruited participants from one medium-sized Chinese private college in Shanghai, specifically targeting seniors who majored in engineering. I posted a link to the survey on an online program called *Wen Juan Xing*, which is widely used in China, and sent the link to participants via the platforms

*WeChat* and *Dingding* (i.e., two popular Chinese social media apps) with the help of class counselors. A total of 313 surveys were collected, and 283 surveys were fully completed.

## Summary and Discussion of Findings

### Research Question 1

Research Question 1 asked about engineering students' levels of involvement related to their perceptions of the outcomes of OA and affective engagement. The levels of involvement included active involvement degree, hours, numbers, and types of OA in which students were involved. As discussed in Chapter 2, students devote energy and effort to different activities linked to a range of measurable outcomes (e.g., Astin, 1984; Kuh et al., 2011; Quaye et al., 2015). In addition, student participation (i.e., behavioral engagement) and identification (i.e., affective engagement) interact to impact the likelihood of academic success and desirable outcomes (Finn & Zimmer, 2012). Two subresearch questions examined the difference between this area.

#### *Research Question 1a*

The first subquestion examined the difference between levels of involvement and engineering students' perceptions of positive and negative outcomes. Data results showed all levels of involvement (active involvement degree, hours, numbers, and types of OA) have a significant influence on positive outcomes. Only the number of OA in which students were involved has a significant influence on negative outcomes. Furthermore, there was no difference between the different degrees of active involvement and hours samples for the negative outcomes. Results of four specific factors of the levels of involvement were summarized and discussed as follows.

**Active Involvement Degree of Out-of-Class Activities.** In general, among the 232 participants who reported they participated in OA during the 4 college years, 59.1% of engineering students ($n$ = 137) reported a moderate or high degree of participation in the OA they selected, while about 40% of engineering students ($n$ = 95) reported they were not active or only minimally active in the OA they selected. However, findings reflected the unoptimistic fact that although over 50% of participants reported they moderately or highly engaged in OA, there were still 51 students who reported they did not participate in any OA during the 4 college years, and 95 students reported their participation levels as not active or only minimally active. In addition, the sample of this study was senior students, who had had the most time to engage in all OA available to them and had the highest level of OA involvement (W. Wang, 2017). Thus, findings reflect the general lack of enthusiasm and interest for engineering undergraduates to participate in OA, consistent with the previous literature (e.g., Hao & Wang, 2018; W. Li, 2011; G. Wang, 2002).

Results indicated the higher the active involvement degree in OA, the more positive outcomes engineering students would gain, consistent with the literature. Some researchers (Finn & Zimmer, 2012; Fredricks et al., 2004; M. Hu, 2015) have proved a link between the participation behavior and the intensity of students' activities in and out of the classroom that can promote both in-class and out-of-class engagement. Additionally, incentive factors and barriers should be considered as predicted variables influencing students' active degree of OA involvement, further discussed in Research Questions 3 and 4.

**Weekly Participation Hours in Out-of-Class Activities.** Among the 232 participants, approximately 66% of students reported they spent 1–6 hours per week on OA, and 33.7% of participants spent 6 hours or more per week on OA. Results were consistent with factors that led

engineering majors to be less active in OA, such as inflexible schedules (Simmons, Ye, et al., 2018). Some researchers (e.g., Baker, 2008; Bao & Du, 2016; Chesbrough, 2011; Sun & Ding, 2010) found the time devoted to OA varied in gender, grades, majors, types of university, and economic conditions.

Results showed there was no difference for the negative outcomes. The findings are in agreement with Y. He and Dai's (2014) findings which showed OA participation had no significant negative impact on students' academic performance. Moreover, results showed students who spent more hours in OA had significantly more positive outcomes than those who spent fewer hours. Although findings indicated students who spent more hours in OA had significantly more positive outcomes than those who spent fewer hours, some researchers argued there are upper limits for students' involvement in OA and the effects of those forms of involvement on student development have diminishing marginal rates (e.g., Foreman & Retallick, 2013; Rubin et al., 2002). Therefore, findings of this research further suggest engineering students identify the importance of the quality of participation in OA under their heavy academic pressure and limited schedule.

**Numbers of Out-of-Class Activities.** Data results showed the number of OA in which students participated was significantly related to differences in positive and negative outcomes. Tukey's HSD tests further reported the mean scores of positive outcomes for students who participated in high numbers (i.e., 13 or more) of OA were significantly higher than the mean score of those who participated in medium numbers (i.e., 3 to 12). In contrast, the group of students who reported low numbers of activities (i.e., 1 or 2) reported more negative outcomes than the medium OA group and the high OA group. Importantly, these results indicated the number of OA in which students participated must be more than two to make a difference for

improvement. Also, future research is worth further study to explore the appropriate range of numbers of OA in which students were involved to improve the effectiveness of out-of-class participation. For example, as Foreman and Retallick's (2013) found, the optimum number of clubs or organizations in which students should be involved is three or four.

**Types of OA in Which Students Were Involved.** Of the 26 specific activity types listed, results of the Spearman correlation tests showed seven types of OA (culture and art publicity activities, daily management activities, adaptive difficulties assistance activities, academic guidance activities, academic activities, entrepreneurship education activities, and physical activities) were significantly related to positive outcomes. In contrast, two OA (daily management activities, campus training activities) were significantly related to negative outcomes.

Seven types of OA significantly related to positive outcomes, including personal development, social engagement, leadership skills, intellectual development, business, and management skills consistent with other researchers' findings (e.g., Foreman & Retallick, 2013; McClellan, 2013; M. Yang & Chau, 2011). In particular, participation in adaptive difficulties assistance activities and academic activities was positively correlated with almost all positive outcomes, which confirmed the importance of creating a seamless learning environment (Kuh et al., 2011) and the current Chinese higher education's educational concept of combining the first classroom (i.e., in-class learning) and the second classroom (i.e., out-of-class experience). Moreover, students' self-reported results shown campus training activities and daily management activities were significantly correlated with negative outcomes, including academic timeline extended, decreased academic engagement, damaged interpersonal relationships, decreased social engagement, and declined personal health. The findings further confirmed

engineering students have a heavy workload, which is one of the primary barriers to their low OA participation. More detailed information about OA types and related positive outcomes and negative outcomes are shown in Appendix D.

Additionally, seven types of OA with significant correlations were not consistent with the top five OA in which involved students participated (evening parties, campus training activities, themed educational activities, daily management activities, and student clubs). Two of the most engaged OA (evening parties and student clubs) are probably extracurricular activities. In contrast, the other three activities, campus training activities, themed educational activities, and daily management activities, are generally set with specific training themes and connect directly to some academic credits. The findings reflected engineering undergraduates' choice of OA tends to be entertaining and utilitarian, consistent with the literature (e.g., Dong, 2012; W. Li, 2011; G. Wang, 2002).

The OA significantly related to positive outcomes were mainly co-curricular activities and curricular activities, including cultural and art publicity activities, daily management activities, adaptive difficulties assistance activities, academic guidance activities, academic activities, entrepreneurship education activities, and physical activities. However, engineering students' reported participation rates in these seven OA, except daily management activities were less than 30%. The findings indicated there is still a gap for improvement in the engineering undergraduates' OA involvement. As discussed in Chapter 2, engineering students faced the challenges, including the difficulty of the coursework in their major and lack of soft skills for employment (e.g., Dong, 2012; Hao & Wang, 2018; Z. Wang, 2019). Engineering undergraduates also generally neglect interpersonal communication, physical activities, and activities closely aligned with the humanities (W. Li, 2011; Simmons, Van Mullekom, &

Ohland, 2018). Therefore, implications from these findings and suggestions for colleges and universities, educators and policymakers, and engineering students are included in this chapter's implications for the field section.

***Research Question 1b***

The second subquestion was to examine the difference between levels of involvement and affective engagement. Data results showed levels of involvement (i.e., active involvement degree, hours, and types of OA) have significant differences in engineering students' affective engagement. Only the number of OA in which students were involved has no difference for affective engagement. Results of four specific factors of the levels of involvement were summarized and discussed as follows.

**Active Involvement Degree of Out-of-Class Activities.** The degree of involvement in OA was related to significantly different affective engagement scores. The results indicated the higher the active involvement degree in OA, the more affective engagement engineering students would involve, consistent with the literature. Researchers (e.g., Finn & Zimmer, 2012; Kong, 2000; S. Li, 2013; Simmons et al., 2019) suggested students who actively participate in educational activities will enhance their feelings of acceptance and valuing of school, which are direct evidence of affective engagement. The findings further support the idea that affective engagement provides a driving force for students' educational experience and interacts with these behaviors along with the school years (Finn, 1989,1993; Fredricks et al., 2004; Kong, 2000; Newmann et al., 1992).

**Weekly Participation Hours in Out-of-Class Activities.** Students' weekly involved hours were related to a significant difference in reported levels of affective engagement. Participants who spent more hours (i.e., 6 or more hours) had significantly higher affective

engagement than those who spent fewer hours (i.e., 1 to 6 hours) in OA. It is probable, therefore, that students who invest more time in OA are more likely to experience emotional responses toward school or others, including interest, valuing of school, feelings of acceptance and belonging (Finn & Zimmer, 2012; M. Hu, 2015; S. Li, 2013) and have more opportunities to build positive reciprocal relationships with teachers and peers.

**Numbers of Out-of-Class Activities.** Affective engagement was not significantly impacted by the reported numbers of OA in which students were involved. These findings confirm one of the assumptions of Astin's (1984) involvement theory that involvement has qualitative (e.g., amount of focus or depth) and quantitative (e.g., time spent) characteristics. Thus, students' participation in OA should focus more on the quality of engagement than the blind accumulation of quantity. In addition to helping engineering college students identify the key factors in choosing OA in their limited spare time, this finding can also alleviate to some extent engineering students' engagement barriers, such as heavy workloads and inflexible schedules.

**Types of OA in Which Students Were Involved.** Two types of OA (adaptive difficulties assistance activities and academic guidance activities) were significantly related to affective engagement. A possible explanation for this might be the affective engagement subscale consisting of 23 items and six factors including (a) major satisfaction, (b) academic discipline belonging, (c) major valuing, (d) achievement striving, (e) peer interaction, and (f) positive faculty relationship was consistent with the nature and content of these two OA. Adaptive difficulties assistance activities are mainly carried out by class counselors and seniors, such as "ice breaker" activities and entrance education class meeting to strengthen the team's cohesion and better adapt to the campus environment and study life. The primary forms of

academic guidance activities include learning experience exchange seminars and academic reports, whose primary purpose is to expand the learning content and improve major-related learning quality with the help of faculties and peers. Therefore, findings of this research indicated affective factors should be considered when formulating OA to improve the OA participation rate. As previous researchers (e.g., Finn & Zimmer, 2012; Fredrickson & Losada, 2005; Waugh & Fredrickson, 2006) pointed out, positive emotions carry multiple, interrelated benefits, including widening attention, predicting resilience to adversity, happiness, and psychological growth (Fredrickson & Losada, 2005), while less emotionally engaged with the school will reduce students' OA engagement resulting in learning difficulties and abnormal interactions with faculties and peers (Finn & Zimmer, 2012). More implications of these findings and suggestions are included in this chapter's implication for this field section.

### Research Question 2

Research Question 2 examined the correlation between affective engagement levels and the positive and negative outcomes engineering students perceived from OA involvement. Results reported the correlation between affective engagement and positive outcomes was quite strong, explaining 59% of the variance in positive outcomes by knowing the affective engagement level. There was not a significant correlation between affective engagement and negative outcomes. Importantly, this finding is consistent with those of other studies (e.g., Finn, 1989; Fredricks et al., 2004; Kong, 2000; Marra et al., 2012; Newmann et al., 1992) and suggests affective engagement plays a prominent role in students' ability to engage with out-of-class involvement and influences students' determination to succeed in school and enhance personal development. Moreover, when assessing and evaluating engineering student

engagement, considering emotional participation provides a new insight for researchers to explore who is going to have desired outcomes with those out-of-class experiences.

**Research Question 3**

Research Question 3 was a descriptive question to analyze the reasons for promoting engineering students' OA involvement. Results showed the incentives for OA for involved students were different from those who did not participate in OA during their 4 college years. These findings can help educators and policymakers understand the factors that promote the out-of-class participation of engineering students and better design useful OA.

Data results showed the most endorsed reasons for those engineering students who reported they never participated in any OA focused on the role of OA, such as their intention to gain experiences that make them competitive in the job market and provide entertainment. These reasons are uninvolved students' perceptions of what would have motivated them to get involved. In contrast, the main reasons for involved students' OA participation were diversified. In addition to the OA functionality, they were provided information concerning the OA and agreed with the goal setting. These findings reflected involved students had a deeper understanding of OA involvement and the importance of affective engagement components in enhancing their engagement ability. Additionally, there are several similar factors reported by both uninvolved and involved students, including to "try something new," "fulfill my interests," "provide entertainment," and "because I had the time." These factors revealed the features of engineering students' OA choice tend to be utilitarian and entertaining, in accordance with previous literature (e.g., Dong, 2012; W. Li, 2011; G. Wang, 2002). Also, these findings help colleges and universities' educators and engineering stakeholders better understand how to get uninvolved students involved.

**Research Question 4**

Research Question 4 was a descriptive question to analyze the factors for preventing engineering students' OA involvement. Data results showed students involved in OA reported significant differences in the factors preventing their out-of-class involvement compared to uninvolved students. For those uninvolved students who have not participated in any OA during their 4 college years, their perceptions on the most endorsed barriers would prevent them from participating in OA were "lack of motivation," "lack the knowledge about the opportunities," "cost (time and money) of joining was too high," "introverted personality," and "possibility of negative impact." Undoubtedly, students who lack interest and enthusiasm in OA find it difficult to learn basic engagement behaviors and fail to develop positive attitudes that perpetuate their out-of-class engagement. Therefore, results further confirmed the importance of valuing emotional reactions in out-of-class involvement. Moreover, findings reflected the traditional publicity effect of OA is not ideal and needs to be revised. The traditional publicity of OA is mainly through posters and the notice of class counselors in the Chinese private colleges, which requires students to understand and obtain information actively.

For those involved students who have participated in some OA during their 4 college years, the significant barrier was scheduling issues, consistent with previous literature (e.g., Dong, 2012; Hao & Wang, 2018; G. Wang, 2002). Unlike uninvolved students, another reason involved students cited as preventing them from taking part in extracurricular activities was that the OA does not contribute to what they want to learn, implying they pay attention to the role and significance of curricular activities. Results help researchers and policymakers better understand the link between extracurricular and curricular activities.

Furthermore, it was encouraging to note participants reported barriers related to gender, regional differences, family, faculty, and peer relationships ranked at the bottom of the list for both students' groups. Although these results differ from some researchers' (W. Wang, 2017; J. Zhang et al., 2006) findings that the factors influenced motivation of engineering students for engaging in and out of the classroom was mainly from their parents, and most students adopt a passive study attitude, they are consistent with those researchers' (e.g., Bao & Du, 2016; Ross, 2009) findings that the relationship between peers and faculty was a requisite for improving engagement and deep learning. Moreover, a possible explanation for these findings might be the campus's cultural environment where the research study is located, and the establishment of faculty-student and peer relationships is excellent and fair.

## Study Strengths

One strength of this study is it provides timely and relevant information regarding the practices of engineering undergraduate-based out-of-class involvement. An overview of the literature in the Chinese higher education context from educators and researchers (e.g., S. Hu & Xie, 2009; S. Li, 2018; Qin, 2011; Tian & Huang, 2001; G. Yang & Zhang, 2018) suggests recent studies mainly discussed extracurricular activities as a whole linked with the strategies of carrying out and managing extracurricular activities while only a few pieces of research offered an in-depth analysis of different types of OA associated with its functions on the growth of college students' core competitiveness. On the whole, most theoretical studies of student out-of-class engagement are from the west, and existing empirical studies on student engagement (e.g., Bao & Du, 2016; W. Wang, 2017) only use the Chinese version of the National Survey of Student Engagement (NSSE-China) to study the relationship between student participation and learning outcomes (Luo et al., 2009). Measuring of engineering

students' OA are limited in current Chinese instrument. Thus, a strength of this research study is its use of the PosSE survey that measures different facets of engineering students' OA involvement. Data from this study also provided information for engineering undergraduates, engineering stakeholders, and student affairs professionals about the current practices, concerns, and areas of an identified need to revise pathways or mechanisms that influence students' development and improve students' out-of-class involvement.

Another strength of this study was its in-depth examination of the relationship between affective engagement related to engineering students' OA involvement and outcomes. The findings confirmed affective engagement provides a driving force for engineering students' educational experience and interacts with these behaviors throughout the school years. Therefore, results provide new insight for educators and policymakers to analyze the reasons for problematic out-of-class involvement that could help them design meaningful OA, and to create new approaches to mitigate the crisis of engineering undergraduates' low retention rate and persistence.

The third strength of this study is the research basis and perspective were international. First, the theoretical basis of this study included the research results and robust theoretical framework of college students' out-of-class participation in the field of higher education in the United States and the comparison of the research status of college students' OA in China, which made this study forward looking and guiding. Second, the survey tool (PosSE survey) is comprehensive in content and representative in the original field. In particular, the cultural adaptation and translation process of the questionnaire deepened the researchers' attention and thinking on the research content's accuracy and difference. Without using this method, it would

have been challenging to gather information, discuss results, and provide important implications for the field.

## Implications for the Field

The results of this research study not only provide information to fill a gap in the literature, but the results also provide suggestions and recommendations to consider for colleges and universities, educators and policymakers, and engineering undergraduates. These suggestions are presented in this section of this chapter.

### Implications for Colleges and Universities

Research findings confirmed out-of-class involvement allows students to associate knowledge with practice, which is beneficial for their academic achievement and personal development. However, engineering students' reported results showed a significant gap in the participation rate between most engaged types of OA and the seven types of OA significantly related to positive outcomes. These findings indicate colleges and universities must figure out the gap between the orientation of these OA and students' expectations to achieve the goal of cultivating well-rounded students. In specific, I suggest colleges and universities can provide the following resources and services:

#### *Clarify the Role and Significance of OA*

Colleges and universities need to clarify the role and significance of OA when formulating college students' training programs and objectives. Data results of this study showed engineering students' reported schedule issues, unclear OA contributions, and lack of motivation were the most endorsed barriers to their OA participation. It would be helpful to provide more explicit OA handbooks that describe each OA program, setting goals, and information, which are similar to course handbooks by academic year according to the training

program' and college's student development goals and plans. Explicit OA training programs and goals can help educators and policymakers clearly formulate guiding strategies for designing and carrying out activities. Also, clear OA handbooks enable college students to reasonably choose OA and allocate participation hours according to their needs so as to effectively solve the important factors that hinder the development of OA. For example, like academic guidance activities (e.g., learning experience exchange seminar, academic reports, teaching assistant) and academic activities (e.g., lectures, academic salons, exhibitions of scientific and technological works), if colleges and universities provide a theme plan and provide information at the beginning of the semester, it will be useful and helpful for students to make reasonable choices and arrangements of their after-class time.

***Strengthen the Selection and Training Mechanisms***

Colleges and universities should strengthen the selection and training of the person in charge of OA. Specifically, it is prudent that colleges and universities provide multiple training opportunities, recruit professional OA guidance teachers, and develop a team of student OA leaders. As in Chinese colleges and universities, the team of class counselors is in charge of students' daily life, class management, and organization and coordination of all those things, they have limited time and capacity to guide all types of OA with high professional requirements. Additionally, the research results indicated daily management activities are significantly related to positive and negative outcomes. Thus, carrying out a comprehensive set of training, selection, assessment, and management mechanisms is essential for building a quality team of student leaders. If professional guidance teams can be assigned to each type of crucial OA, the quality of participation in OA will be improved, and educational outcomes will be achieved.

***Integrate Available Resources***

First, colleges and universities should clarify the requirements of cross-departmental cooperation and cross-disciplinary communication and interaction to achieve a seamless learning environment (Kuh et al., 2011) that could break professional barriers (e.g., engineering/humanities divide). The findings of this study indicated seven types of OA related to positive outcomes are mainly co-curricular activities, employment-related activities, and physical exercise-related activities. These OA require cooperation between different departments, such as the department of student affairs, the department of academic affairs, and the employment office.

Second, college and university leaders need to actively cooperate with those at relevant institutions outside the school to make up for low participation rates caused by a lack of resources to narrow the difference between the talent training objectives and social needs. Because data results showed the types of OA with the lowest participation rates were international experience ($n$ = 12; 5.17%), scientific research training activities ($n$ = 22; 9.48%), psychological assistance activities ($n$ = 26; 11.21%), mental health activities ($n$ = 29; 12.5%), and financial difficulty assistance activities ($n$ = 35; 15.09%). One reason for this finding is private colleges in China have fewer supported resources for these types of OA, such as international summer camp programs, psychology-related activities, and advisers. Another reason is engineering college students have a biased perception of participation in OA, which leads to a lower level of involvement in the OA with certain professional requirements. Therefore, making full use of and integrating available resources in colleges and universities are good strategies that will enhance the development of OA and meet the requirements for

cultivating contemporary college students with an international perspective, professional application ability, and psychological health (MOE, 2018b).

## Implications for Educators and Policymakers

The findings of this study are useful to inform the training in the incentives for and barriers to participation in OA for different majors that might help them better target OA offerings, advertising, and designing of co-curricular programs. Therefore, researchers should specifically explore the reasons for low engagement rates and figure out what barriers can be removed to allow for these OA. Also, educators and policymakers should have a better understanding of each category of OA and give full consideration to the characteristics, diversity, and complexity of contemporary college students as they develop action plans for reaching student development outcomes. There are some specific suggestions and recommendations for educators and policymakers as follows:

### *Pay Attention to the Quality of Participation in OA*

Educators and policymakers should pay more attention to the quality of extracurricular participation rather than blindly emphasizing the numbers and hours in which students were involved when evaluating students' out-of-class engagement. This research study's data results on levels of involvement and outcomes further reflected that although the numbers and hours in which students were involved significantly related to positive outcomes, the appropriate numbers, hours, and types of OA involvement are the key factors. This further suggests policymakers should consider the characteristics of different class years, different majors, and higher education training goals to reasonably formulate targeted OA. For example, guidance activities can be added in the 1st college year to enhance the adaptability of college students, academic guidance activities can be added in the 2nd and 3rd college years to consolidate

students' learning and major belonging, and career guidance activities can be added in the 4th college year to enhance employment competitiveness and undergraduates' satisfaction of the college. Classifying and grading OA's setting can help students realize the pertinence of carrying out extracurricular activities and reasonably guide them to make clear choices in limited time and energy.

***Understand the Importance of Affective Engagement***

It is important for educators and policymakers to fully consider the components of affective engagement when designing the out-of-class activities' action plans to remove the barriers for disengaged students and help them get involved. Data results of this study indicated affective engagement plays a prominent role in students' ability to engage with out-of-class involvement and influences students' determination to succeed in school and enhance personal development. In addition, students reported reasons for promoting their participation in OA included several factors related to affective engagement, such as goals setting for OA, fulfill their interest, being provided encouragement from an adviser or faculty member. Therefore, educators and policymakers should make full use of resources to the development of guidance-related OA, such as orientation education activities, adaptive difficulties assistance activities, and academic guidance activities. Resources also include professional advisors of OA, specific promotional materials, and variety of lectures.

Especially in Chinese private colleges, because there is a team of class counselors responsible for guiding students' college study and life, counselors should spend more time and energy to identify and help these students who have difficulty adapting and engaging in college learning and life. Thus, colleges and universities' educators and policymakers need to consider further clarify the role of counselors, specifically regarding OA. For example, counselors can

make full use of class meetings, lectures, dormitory inspection, and other forms of work to establish a good relationship with students, listen to students' difficulties, and provide students with access to all kinds of information. If counselors build very strong relationships with students, they are better suited to recommend OA in which students would participate. Also, students might be more likely to participate in an OA if they were told about it by a counselor they knew and trusted. Furthermore, counselors could maybe use their intimate knowledge of students to advocate with administration for funding for the most appropriate OA. These approaches can be effective in helping disengaged students who may enter college without adequate cognitive or social skills and who have difficulty learning basic engagement behaviors to build trusting relationships with faculty/peers and develop a sense of belonging of college, and thus increase motivation and gradually develop positive emotions that perpetuate their participation in and out of the class. Additionally, it is worth noting that my recommendations are based on findings from this research study, which was limited to one private college in China, and therefore, colleges and universities, in general, need to judge the applicability of these suggestions to their own campuses.

***Improve How OA Are Publicized***

Policymakers must change and improve the way OA are publicized to help students obtain relevant information more effectively. Students reported "lack of the knowledge about the opportunities" as one of the most significant barriers to participating in OA. There are several ways educators and policymakers can improve their communication about OA. One is to use influential and attractive publicity platforms (e.g., students' favorite network software or application platform) instead of traditional single publicity notice, such as posters, oral notification by class counselors. The second is to develop a list of OA according to the academic

year training plan for college students. As discussed earlier, clear OA handbooks would enable college students to reasonably choose OA and allocate participation hours according to their needs. Thirdly, publicize the achievements of OA through multiple channels (e.g., new media, exhibition boards, and commendation conferences). Visualizing the honors, achievements, and outcomes gained by students participating in OA can help students understand outcomes linked with OA and enhance their motivation. For example, educators and policymakers can select some colleges students who took an active part in OA in college publicize their stories, including their levels of involvement in OA, learning outcomes, competition awards, and employment situation, which are helpful for peers to reference and learn from each other. These practices can help educators and students improve perceptions of OA and determine its contribution to student development.

**Implications for Engineering Undergraduates**

According to the policy issued by MOE (2018a, 2018b), colleges and universities in China are required to engage more than 50% of engineering undergraduates participating in the innovation and entrepreneurship relevant OA and should pay attention to train modern engineers with the concept of benefiting humankind and sustainable development. However, data results of this study showed that engineering students' participation rate in seven types of OA (culture and art publicity activities, daily management activities, adaptive difficulties assistance activities, academic guidance activities, entrepreneurship education activities, and physical activities) that are significantly related to positive outcomes was less than 30%. Furthermore, engineering students reported their choice of OA tends to be entertaining and utilitarian. Therefore, I suggest that engineering students need to make the following changes to improve their out-of-class involvement and further develop themselves.

***Change the Perceptions of the Out-of-Class Engagement***

Engineering students should break through their cognitive biases and misconceptions about out-of-class engagement and understand that society needs engineers to be equipped with professional knowledge, soft skills, and interpersonal communication skills. Results of this study showed that different levels of OA involvement were significantly related to desired outcomes and affective engagement. The higher the quality of their participation, the more development in terms of competencies, independence, and clarity of purpose students obtained. These findings further confirmed that OA involvement was an effective pathway for engineering students to learn basic engagement behaviors, make a good connection with learning outcomes, and build relationships with peers and faculties. Also, this process helps engineering students explore the relationships between their interests, values, abilities, and make up their engineering/humanities divide.

Additionally, by comparing the results of factors affecting extracurricular participation reported by involved students and uninvolved students in RQ3 and RQ4, involved students had a better understanding of OA involvement and the importance of relevant components of affective engagement to enhance their engagement ability. In other words, in addition to efforts and improvements made by colleges and universities' educators and policymakers on OA, if engineering students could consider OA are effective pathways for personal development and worth their time, then their enthusiasm and interest will be increased. Also, data from this study showed that students who were more actively involved in OA reported significantly more positive outcomes and affective engagement than their peers. As discussed, affective engagement is beneficial for a number of reasons, including persistence with difficult majors like engineering, and a sense of belonging and valuing educational experience (Finn & Zimmer,

2012; Simmons, Ye, et al., 2018). Therefore, to gain better understanding of the reasons for and outcomes from OA involvement, engineering students are more likely to maintain a greater belonging to the engineering field, to experience increased growth in professional and professional skills, and even to pursue a graduate degree.

### *Take the Initiative to Get Information About OA*

Engineering students reported that lack of information about OA and lack of motivation prevented them from participating in OA. I strongly suggest engineering students take the initiative to acquire ways of and information to participate in OA and have a more comprehensive understanding of the functions and significance of different types of OA. As previously discussed, the learning resources provided by the colleges and universities and various kinds of training platforms for student development are of no educational significance if they lack students' interest and acceptance. Thus, engineering students can consider those with reputable and high-quality OA under their limited time and energy to shorten the path and time to reach their goals. Similarly, they can also ask faculty or senior peers for advice on which activities would be useful for them.

## Limitations

The limitations of this study are mostly related to the methodology. Through the survey, I only gathered responses from engineering seniors at one private college in China. As the sample was convenient, it might not result in generalizability. Besides, all participants were majoring in engineering; the overall findings are valid for this group as a whole but may not apply to any individual student or other specific groups of students, particularly from other majors.

Another limitation is that this study relied on student self-reporting to analyze statistically significant aspects of OA. The use of self-reports often leads respondents to bias the outcomes or influence factors of participation in various OA, whether positive or negative. In other words, students' perceptions may be distorted by their inability to accurately identify the true source of specific outcomes. Moreover, although surveys allow researchers to gather information quickly and effectively from many participants, the data do not provide researchers with specific information about how or why certain outcomes are selected for their participation in any type of OA or not.

The third limitation is that the questionnaire has been processed by translation and cultural adaptation. Although I have conducted a complete translation process and tested the reliability and validity of the data, the questionnaire's content is still dominated by the American cultural background, which may have affected the experience of Chinese students in completing the questionnaire to some extent.

## Future Directions of Study

First, future research might consider complex and diverse dimensions of examining the undergraduates' out-of-class involvement. Although findings of this study allow educators and policymakers in Chinese higher education to gain a baseline understanding of the engineering undergraduates' levels of involvement, their incentives for and barriers to participation, and their perceived associated outcomes gained from participation in OA, the data do not provide explicit information about how or why certain outcomes are selected for their participation in any type of OA. Therefore, another methodology, qualitative investigations, such as interviews or focus groups, would allow the researcher to understand in-depth aspects of engineering students' characteristics of out-of-class engagement. Moreover, college students in majors other than

engineering should be studied in the future to determine what are the differences in students' OA involvement between and among students from different academic disciplines. For example, a future study investigating humanities major students and comparing the results difference between engineering and humanities students would be very interesting. Similarly, this study only captures the primary characteristics of engineering college students' OA involvement at one private college in China. The researcher can also conduct the research at different kinds of colleges and universities. Researchers may have the opportunity to gather information on whether there are significant differences or similarities in the perception and outcomes of participation in OA among students at different levels of colleges and universities. This information would enable researchers to identify the characteristics and influencing factors of participation in OA at a discipline, college, or even regional level.

Second, the perspective of future research on college students' out-of-class involvement should be broader, which will help policymakers to identify the appropriate OA mechanism that suits the characteristics of Chinese higher education. There are at least three areas researchers could explore in future research. The first area is the short- and long-term benefits for college students from out-of-class involvement in China. For example, existing studies examined the short-term impact of student experience in college. It would be interesting to explore what about following up with students who ultimately switched out of engineering. For example, did they participate in fewer OA and/or feel less affectively engaged? Or did that change after switching majors? Moreover, how out-of-class experiences affect students' development, especially students' career success after college, has received increasing attention in recent years. The second area is why affective engagement impacts students' out-of-class involvement and their persistence, learning outcomes, and workforce entry. Future studies are needed to measure

affective engagement and specific types of OA in-depth. For example, what type of activities foster it and what the long- and short-term benefits might be for a student in China overall, and at different types of universities and across different majors. The third area is what mechanisms and resources are needed to improve the effectiveness of undergraduates' out-of-class participation. Without understanding the influence mechanism, it is difficult to implement successful co-curricular or extracurricular programs in a different context or setting. For example, online platforms and network resources enter the field of higher education. It might be a new insight for researchers to examine and explore whether the OA carried out by using network resources will bring new changes and improvements to the out-of-class engagement and student success.

## Summary

This study was conducted to capture the primary characteristics of Chinese engineering undergraduates' OA involvement and attempted to fill a gap in the literature on engineering undergraduates' out-of-class engagement in China. Overall, findings indicated over 80% of participants reported they participated in OA during their 4 college years. However, the levels of their out-of-class involvement are not ideal. About 40% of participants reported they were not actively or only minimally actively participated in OA, and 51 participants even had not participated in any type of OA during their 4 college years. In addition, engineering students reported their most engaged types of OA were not consistent with the seven types of OA (culture and art publicity activities, daily management activities, adaptive difficulties assistance activities, academic guidance activities, entrepreneurship education activities, and physical activities) that are significantly related to positive outcomes. The reported participation rate in these seven types of OA was less than 30%. Undoubtedly, there is still a gap for improvement in

Chinese engineering undergraduates' out-of-class involvement. Furthermore, active involvement degree and hours weekly spent on OA have significant differences in positive outcomes and affective engagement. In contrast, the numbers of OA in which students were involved have significant differences in negative outcomes. These findings confirmed the importance of participation in OA and indicated paying attention to the quality of OA involvement other than quantity was essential for colleges and universities, educators and policymakers, and engineering undergraduates.

Additionally, understanding the role of affective engagement related to levels of involvement and outcomes engineering students perceived is essential for the development of out-of-class engagement. Based on findings of this study, incentives for and barriers to engineering students' participation in OA help educators and policymakers to determine useful guidance and effective action plans to improve the out-of-class engagement rate. On the basis of summarizing the summary of findings, this chapter provided detailed implications for colleges and universities, educators and policymakers, and engineering students.

The current study using the PosSE Survey measures different facets of engineering students' OA involvement, contributing to Chinese engineering college students' development through out-of-class involvement, and making affective engagement a significant contributor to student engagement measures in engineering education. Future researchers should consider exploring more complex dimensions and broaden research perspective in this area.

# REFERENCES


Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel, 25*(4), 297–308. https://psycnet.apa.org/record/1985-18630-001

Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel, 40*(5), 518–529. https://psycnet.apa.org/record/1999-01418-006

Baker, C. N. (2008). Under-represented college students and extracurricular involvement: The effects of various student organizations on academic performance. *Social Psychology of Education, 11*(3), 273–298. https://doi.org/10.1007/s11218-007-9050-y

Bao, W., & Du, Q. (2016). Influence of multiple extracurricular involvement on student development. *Education Research Monthly, 2*, 98–106. https://en.cnki.com.cn/Article_en/CJFDTotal-YANG201602015.htm

Beck, C. T., Bernal, H., & Froman, R. D. (2003). Methods to document semantic equivalence of a translated scale. *Research in Nursing & Health, 26*(1), 64–73. https://doi.org/10.1002/nur.10066

Behr, D., Braun, M., & Dorer, B. (2016). Measurement instruments in cross-national surveys (Version 2.0). *GESIS Survey Guidelines*. https://www.ssoar.info/ssoar/handle/document/56381

Bloom, B. S. (1956). *The taxonomy of educational objectives: Cognitive domain.* David McKay.

Burt, B. A., Carpenter, D. D., Holsapple, M. A., Finelli, C. J., Bielby, R. M., Sutkus, J. A., & Harding, T. S. (2013). Out-of-classroom experiences: Bridging the disconnect between the classroom, the engineering workforce, and ethical development. *International Journal of Engineering Education*, *29*(3), 714–725. https://works.bepress.com/brian_burt/3/

Campbell, S. M., & Nutt, C. L. (2008). Academic advising in the new global century: Supporting student engagement and learning outcomes achievement. *Peer Review, 10*(1), 4–5. https://www.aacu.org/publications-research/periodicals/academic-advising-new-global-century-supporting-student-engagement

Carini, R. M., Kuh, G. D., & Klein, S. P. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education*, *47*, 1–32. https://doi.org/10.1007/s11162-005-8150-9

Carter, D. F., Ro, H. K., Alcott, B., & Lattuca, L. R. (2016). Co-curricular connections: The role of undergraduate research experiences in promoting engineering students' communication, teamwork, and leadership skills. *Research in Higher Education, 57*(3), 363–393. https://doi.org/10.1007/s11162-015-9386-7

Cha, E. S., Kim, K. H., & Erlen, J. A. (2007). Translation of scales in cross-cultural research: Issues and techniques. *Journal of Advanced Nursing, 58*(4), 386–395. https://doi.org/10.1111/j.1365-2648.2007.04242.x

Chai, H. (2010). Research on reliability and validity of inspection procedure in questionnaire design. *World Science and Technology Research and Development. 32*(4), 548–550. https://doi.org/10.16507/j.issn.1006-6055.2010.04.001

Chesbrough, R. D. (2011). College students and service: A mixed methods exploration of motivations, choices, and learning outcomes. *Journal of College Student Development, 52*(6), 687–705. https://doi.org/10.1353/csd.2011.0071

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin,* 3–7. https://eric.ed.gov/?id=ED282491

Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Lawrence Erlbaum Associates.

Connell, J. P. (1990). *Context, self, and action: A motivational analysis of self-system processes across the life-span*. University of Chicago Press.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. Gunnar & L. A. Sroufe (Eds.), *Minnesota symposium on child psychology* (Vol. 23). University of Chicago Press.

Cui, A. (2010). The influence of extracurricular activities on the improvement of college students' quality. *Vocational Technology, 2*, 70. https://doi.org/10.19552/j.cnki.issn1672-0601.2010.02.056

Deng, Z. (2010). A brief analysis of "after 90" college students "Internet addiction." *Internet Fortune, 18*, 177–178. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WLCF201018138&DbName=CJFQ2010

DeVellis, R. F. (2016). *Scale development: Theory and applications (Vol. 26)*. SAGE Publications.

Dong, Y. (2012). Investigation and research on college students' extracurricular life in multi-campus science and engineering colleges. *Journal of Yichun College, 34*(11), 136–141. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=YCSB201211032&DbName=CJFQ2012

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (Grit–S). *Journal of Personality Assessment, 91*(2), 166–174. https://doi.org/10.1080/00223890802634290

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59*(2)*,* 117–142. https://doi.org/10.3102/00346543059002117

Finn, J. D. (1993). *School engagement and students at risk* (NCES Report 93-470). U.S. Department of Education, National Center for Education Statistics. https://nces.edu.gov/pubs93/93470a.pdf

Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97–131). Springer.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*(3), 286–299. https://doi.org/10.1037/1040-3590.7.3.286

Foreman, E. A., & Retallick, M. S. (2013). Using involvement theory to examine the relationship between undergraduate participation in extracurricular activities and leadership development. *Journal of Leadership Education*, *12*(2), 56–73. https://lib.dr.iastate.edu/ageds_pubs/14

Foubert, J. D., & Grainger, L. U. (2006). Effects of involvement in clubs and organizations on the psychosocial development of first-year and senior college students. *Journal of Student Affairs Research and Practice, 43*(1), 166–182. https://doi.org/10.2202/1949-6605.1576

Fowler, F. J., Jr. (2013). *Survey research methods.* SAGE Publications.

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. https://doi.org/10.3102/00346543074001059

Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *The American Psychologist*, *60*(7), 678–686. https://doi.org/10.1037/0003-066X.60.7.678

Furlong, M. J., Whipple, A. D., Jean, G. S., Simental, J., Soliz, A., & Punthuna, S. (2003). Multiple contexts of school engagement: Moving toward a unifying framework for education research and practice. *The California School Psychologist, 8*(1)*,* 99–114. https://doi.org/10.1007/BF03340899

Gan, L. (2014). *Research on educational practice in colleges and universities* [Doctoral dissertation, Wuhan University]. http://kns.cnki.net/kns/detail/detail.aspx?FileName=1014249704.nh&DbName=CDFD2018

Garyfallos, G., Karastergiou, A., Adamopoulou, A., Moutzoukis, C., Alagiozidou, E., Mala, D., & Garyfallos, A. (1991). The Greek version of the General Health Questionnaire: Accuracy of translation and validity. *Acta Psychiatrica Scandinavica, 84*(4), 371–378. https://doi.org/10.1111/j.1600-0447.1991.tb03162.x

Gibbs, B. G., Erickson, L. D., Dufur, M. J., & Miles, A. (2015). Extracurricular associations and college enrollment. *Social Science Research, 50*, 367–381. https://doi.org/10.1016/j.ssresearch.2014.08.013

Gjersing, L., Caplehorn, J. R., & Clausen, T. (2010). Cross-cultural adaptation of research instruments: Language, setting, time and statistical considerations. *BMC Medical Research Methodology, 10*(13), 1–10. https://doi.org/10.1186/1471-2288-10-13

Groves, R. M., Fowler, F. J., Jr., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology* (2nd ed.). John Wiley & Sons.

Guan, X., Ma, M., & Li, Z. (2018). The enlightenment of the current situation of college students' extracurricular activities on the development of the second classroom in colleges and universities. *Cultural and Educational Information*, *13*, 215–216. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WJZZ201813098&DbName=CJFQ2018

Guo, D., Guo, D., & Wang, W. (2017). How to make "soft skills" the "hard equipment" for the employment of engineering college students – from the perspective of the curriculum reform of general education. *China University Students Career Guide, 4*, 52–57. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JIUY201704019&DbName=CJFQ2017

Hao, J., & Wang, M. (2018). The difficulties and paths of cultivating core qualities of engineering college students. *Education Modernization, 5*(1), 213–214, 217. https://doi.org/ 10.16541/j.cnki.2095-8420.2018.01.075

Harkness, J. (2003). Questionnaire translation. *In J. Harkness, F. J. R. van de Vijver, & P. Ph. Mohler (Eds.), Cross-cultural survey methods.* 35–56. Wiley & Sons.

Harkness, J. A., Villar, A., & Edwards, B. (2010). Translation, adaptation, and design. *Survey methods in multinational, multiregional, and multicultural contexts,* 115–140. https://doi.org/10.1002/9780470609927.ch7

He, X., & Chen, X. (2008). Study on the influence of students' learning engagement on their learning interest. *Global Education*, *3,* 46–51. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WGJN200803010&DbName=CJFQ2008

He, Y., & Dai, T. (2014). Research on the correlation between the first classroom and the second classroom of engineering college students. *The Guide of Science & Education*, *6*, 31–33. https://doi.org/10.16400/j.cnki.kjdks.2014.06.111

Hilton, A., & Skrutkowski, M. (2002). Translating instruments into other languages: Development and testing processes: *Cancer Nursing, 25*(1), 1–7. https://doi.org/10.1097/00002820-200202000-00001

Hsieh, P. L., Cholowski, K., & FitzGerald, M. (2005). Obesity: translation and testing of a survey instrument for use in Taiwan. *Journal of clinical nursing*, *14*(7), 830 – 844. https://doi.org/10.1111/j.1365-2702.2005.01127.x

Hu, M. (2015). *Research on model of student engagement and its application in online learning.* [Doctoral dissertation, Central China Normal University]. https://kns.cnki.net/kcms/detail/detail.aspx?FileName=1016038139.nh&DbName=CDFD2016

Hu, S., & Kuh, G. D. (2002). Being (dis)engaged in educationally purposeful activities: The influences of student and institutional characteristics. *Research in Higher Education*, *43*(5), 555–575. https://doi.org/10.1023/A:1020114231387

Hu, S., & Xie, Y. (2009). New thinking on social practice type of college students. *The Party Building and Ideological Education in Schools*, *2*, 14–17, http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XXDJ200902006&DbName=CJFQ2009

Inkelas, K. K., Vogt, K. E., Longerbeam, S. D., Owen, J., & Johnson, D. (2006). Measuring outcomes of living-learning programs: Examining college environments and student learning and development. *The Journal of General Education, 55(1)*, 40–76. https://doi.org/10.1353/jge.2006.0017

Kantrowitz, T. M. (2005). *Development and construct validation of a measure of soft skills performance* [Doctoral dissertation, Georgia Institute of Technology]. http://hdl.handle.net/1853/6861

Keen, C., & Hall, K. (2009). Engaging with difference matters: Longitudinal student outcomes of co-curricular service-learning programs. *Journal of Higher Education, 80*(1), 59–79. https://doi.org/10.1080/00221546.2009.11772130

Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American Journal of Health-System Pharmacy, 65*(23), 2276–2284. https://doi.org/10.2146/ajhp070364

Kong, Q. (2000). The concept and structure of "student involvement." *Global Education, 2,* 72–76. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WGJN200002016&DbName=CJFQ2000

Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). *Taxonomy of educational objectives: Affective domain.* David McKay.

Kristen, R., & Li, K. (2008). The applications of student development theories practice introduction to U.S. student development theories. *Journal of Higher Education, 29*(3), 19–27. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=HIGH200803004&DbName=CJFQ2008

Kuh, G. D. (1993). In their own words: What students learn outside the classroom. *American Educational Research Journal, 30*(2), 277–304. https://doi.org/10.3102/00028312030002277

Kuh, G. D. (2003). What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change: The Magazine of Higher Education, 35*(2), 24–32. https://doi.org/10.1080/00091380309604090

Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2011). *Student success in college: Creating conditions that matter.* John Wiley & Sons.

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches.* Guilford Publications.

Li, C., & Xin, L. (2008). Research on the evaluation method of the reliability and validity of the questionnaire. *Chinese Journal of Health Statistics, 25*(5), 541–544. https://doi.org/10.3969/j.issn.1002-3674.2008.05.034

Li, F. (2009). Give play to the role of extracurricular activities to promote quality education for college students. *China Economist, 2009*(7), 92–93. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JJSS200907052&DbName=CJFQ2009

Li, L. (2010). The effect of college students' extracurricular activities on the development of creative personality. *Scientific and Technological Innovation*, *1*, 175, 245. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=HLKX201001167&DbName=CJFQ2010

Li, N., & Ren, X. (2013). A review of foreign student involvement and related theories. *Shanghai Research on Education, 12*, 22–26. https://doi.org/10.16194/j.cnki.31-1059/g4.2013.12.008

Li, S. (2013). "Emotional engagement" to promote "cognitive engagement" – An effective way to improve the legal basis in-class participation of secondary vocational students. *New Curriculum Research, 5,* 119–121. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XKCT201305055&DbName=CJFQ2013

Li, S. (2018). Problems existing in the activities of private college students and countermeasures. *Think Tank Era, 27*, 82–83. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=ZKSD201827050&DbName=CJFQ2018

Li, W. (2011). Analysis and reflection on the current situation of college students' extracurricular life. *Journal of Shanxi University of Technology, 29*(3), 81–84. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=HZSF201103017&DbName=CJFQ2011

Li, W. (2013). A review of the important literature on college students' social practice in recent ten years. *Pioneering with Science & Technology Monthly*, *26*(4), 102–104. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=KJCK201304043&DbName=CJFQ2013

Lin, L. (2008). The research of "talent training mode" in colleges and universities. *Journal of Sichuan Normal University, 35*(4), 110–117. http://doi.org/10.3969/j.issn.1000-5315.2008.04.017

Liu, W., Zang, Y., & Lou, F. (2010). Quality assurance of translation in nursing research. *Journal of Nursing Science, 25*(6), 80–82. https://doi.org/10.3870/hlxzz.2010.06.080

Luo, Y., Ross, H., & Cen, Y. (2009). Higher education measurement in the context of globalization – The development of NSSE-CHINA: Cultural adaptation, reliability and validity. *Fudan Education Forum, 7*(5), 12–18. https://doi/org/10.13397/j.cnki.fef.2009.05.008

Maneesriwongul, W., & Dixon, J. K. (2004). Instrument translation process: A methods review. *Journal of Advanced Nursing, 48*(2), 175–186. https://doi.org/10.1111/j.1365-2648.2004.03185.x

Marra, R. M., Rodgers, K. A., Shen, D., & Bogue, B. (2012). Leaving engineering: A multi‐year single institution study. *Journal of Engineering Education*, *101*(1), 6–27. https://doi.org/10.1002/j.2168-9830.2012.tb00039.x

Massoni, E. (2011). Positive effects of extra curricular activities on students. *Essai*, *9*(27), 84–87. https://dc.cod.edu/essai/vol9/iss1/27

McClellan, J. L. (2013). Contributing to the development of student leadership through academic advising. *Journal of Leadership Education*, *12*(1), 207–233. https://doi.org/10.12806/V12/I1/207

Ministry of Education, Peoples Republic of China. (2010). *National medium-term and long-term educational reform and development program (2010-2020)*. http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201008/t20100802_93704.html

Ministry of Education, Peoples Republic of China. (2018a). *Opinions on the implementation of the Communist Youth League's the second classroom 'transcript' system in higher education.* http://www.moe.gov.cn/jyb_sjzl/s6008/

Ministry of Education, Peoples Republic of China. (2018b). *Opinions on accelerating the development of new engineering, implementing excellent engineer education, and training plan 2.0*. http://www.moe.gov.cn/srcsite/A08/moe_742/s3860/201810/t20181017_351890.html

Ministry of Education, Peoples Republic of China. (2018c). *Educational statistics in 2018.* http://www.moe.gov.cn/s78/A03/moe_560/jytjsj_2018/qg/201908/t20190812_394287.html

Nesheim, B. E., Guentzel, M. J., Kellogg, A. H., McDonald, W. M., Wells, C. A., & Whitt, E. J. (2007). Outcomes for students of student affairs-academic affairs partnership programs. *Journal of College Student Development*, *48*(4), 435–454. http://doi.org/10.1353/csd.2007.0041

Newmann, F., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 11–39). Teachers College Press.

Newmann, F. M. (1992). *Student engagement and achievement in American secondary schools.* Teachers Colleges Press.

Pallant, J. (2013). *SPSS survival manual.* McGraw-Hill Education.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. Jossey-Bass Publishers.

Peng, Q., & Xie, X. (2011). Rethink the relation between the second classroom and the first classroom. *The Party Building and Ideological Education in Schools, 14*, 45–46. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XXDJ201114021&DbName=CJFQ2011

Pike, G. R., Kuh, G. D., & McCormick, A. C. (2011). An investigation of the contingent relationships between learning community participation and student engagement. *Research in Higher Education*, *52*(3), 300–322. https://doi.org/10.1007/s11162-010-9192-1

Qin, Y. (2011). SWOT analysis and countermeasures of college students' extracurricular activities. *Journal of Yan'an Vocational & Technical College*, *25*(1), 41–45. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=YAXB201101016&DbName=CJFQ2011

Quaye, S. J., Harper, S. R., & Pendakur, S. L. (2015). *Student engagement in higher education: Theoretical perspectives and practical approaches for diverse populations* (2nd ed.). Routledge.

Ross, C. (2009). *Engagement for learning: What matters to students, what motivates them and how can institutional support services foster student engagement?* [Conference presentation]. Biennial Conference of the Australia and New Zealand Student Services Association, Brisbane, Australia.

Rubin, R. S., Bommer, W. H., & Baldwin, T. T. (2002). Using extracurricular activity as an indicator of interpersonal skill: Prudent evaluation or recruiting malpractice? *Human Resource Management, 41*(4), 441–454. https://doi.org/10.1002/hrm.10053

Seymour, E., Hunter, A. B., Laursen, S. L., & DeAntoni, T. (2004). Establishing the benefits of research experiences for undergraduates in the sciences: first findings from a three-year study. *Science Education, 88*(4), 493–534. https://doi.org/10.1002/sce.10131

Shen, H. (2012). Attention should be paid to the study of college students' extracurricular activities. *Education for Chinese After-School(Theory)*, *16*, 47. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XWLL201216033&DbName=CJFQ2012

Shulman, L. S. (2002). Making differences: A table of learning. *Change: The Magazine of Higher Learning*, *34*(6), 36–44. https://doi.org/10.1080/00091380209605567

Simmons, D., Tendhar, C., Yu, R., Vance, E., & Amelink, C. (2015). Developing the postsecondary student engagement survey (PosSES) to measure undergraduate engineering students' out-of-class involvement. *2015 ASEE Annual Conference and Exposition Proceedings*, 26.506.1–26.506.17. https://doi.org/10.18260/p.23845

Simmons, D. R., Collins, G. D. Y., Adams, S. G., & Martin, J. P. (2014, June). *Non-curricular activities help African-American students and alumni develop engineer of 2020 traits: A quantitative look* [Paper presentation]. 2014 ASEE Annual Conference & Exposition, Indianapolis, IN, United States.

Simmons, D. R., Creamer, E. G., & Yu, R. (2017). Involvement in out-of-class activities: A mixed research synthesis examining outcomes with a focus on engineering students. *Journal of STEM Education: Innovations and Research*, *18*(2), 10–16. https://eric.ed.gov/?id=EJ1149414

Simmons, D. R., Hunsu, N. J., & Adesope, O. O. (2019). *Enabling multidimensional measurement of student engagement in engineering learning environments.* [Unpublished manuscript]. Department of Civil and Coastal Engineering, Herbert Wertheim College of Engineering.

Simmons, D. R., Van Mullekom, J., & Ohland, M. W. (2018). The popularity and intensity of engineering undergraduate out-of-class activities. *Journal of Engineering Education, 107*(4), 611–635. https://doi.org/10.1002/jee.20235

Simmons, D. R., Ye, Y., Hunsu, N. J., & Adesope, O. O. (2017). Development of a survey to explore out-of-class engagement of engineering students. *The International journal of engineering education, 33*(4), 1213–1221.

Simmons, D. R., Ye, Y., Ohland, M. W., & Garahan, K. (2018). Understanding students' incentives for and barriers to out-of-class participation: profile of civil engineering student engagement. *Journal of Professional Issues in Engineering Education and Practice, 144*(2). https://doi.org/10.1061/(ASCE)EI.1943-5541.0000353

Sousa, V. D., & Rojjanasrirat, W. (2011). Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: A clear and user-friendly guideline: Validation of instruments or scales. *Journal of Evaluation in Clinical Practice, 17*(2), 268–274. https://doi.org/10.1111/j.1365-2753.2010.01434.x

Strauss, L. C., & Terenzini, P. T. (2007). The effects of students' in-and out-of-class experiences on their analytical and group skills: A study of engineering education. *Research in Higher Education*, *48*(8), 967–992. https://doi.org/10.1007/s11162-007-9057-4

Stuart, M., Lido, C., Morgan, J., Solomon, L., & May, S. (2011). The impact of engagement with extracurricular activities on the student experience and graduate outcomes for widening participation populations. *Active Learning in Higher Education*, *12*(3), 203–215. https://doi.org/10.1177/1469787411415081

Sun, N., & Ding, X. (2010). A study on the appropriateness of college students' extracurricular participation. *University Education Science*, *6*, 53–61. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JXGJ201006014&DbName=CJFQ2010

Tan, M., Huang, M., & Qin, Y. (2009). After the development of university science and engineering students four kinds of ability training research. *Journal of Hezhou University, 25*(4), 119–122. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WZGZ200904031&DbName=CJFQ2009

Terrell, S. R. (2015). *Writing a proposal for your dissertation: Guidelines and examples.* Guilford Publications.

Tian, X., & Huang, X. (2001). On extracurricular activities of college students. *Journal of Hubei University of Science and Technology*, *5,* 119–120. http://doi.org/10.16751/j.cnki.hbkj.2001.05.049

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition.* University of Chicago Press.

Tinto, V. (2000). Linking learning and leaving: Exploring the role of the college classroom in student departure. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 81–94). Vanderbilt University Press.

Tutt, B. R., & McCarthy, S. (2006). Assessing learning outside the classroom. *Assessment Update, 18*(2), 1–2. https://eric.ed.gov/?id=EJ791129

Urdan, T. C. (2016). *Statistics in plain English.* Taylor & Francis.

Wang, C., Li, Y., & Wen, H. (1999). The main problems and countermeasures of current quality training of engineering students. *Higher Education Forum*, *1,* 21–24. http://doi:CNKI:SUN:GGJY.0.1999-01-004

Wang, G. (2002). Analysis on the status and causes of science and engineering college students' after-school life. *Journal of Guangxi Youth Leaders College, 2,* 40–41. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=GXQL200202017&DbName=CJFQ2002

Wang, K. (2005). *Translation and translation process: theory and practice.* Foreign Language Teaching and Research Press, Beijing.

Wang, W. (2017). Analysis of college students' extracurricular activity enthusiasm and related factors – based on the investigation and analysis of Ocean University of China. *Shanghai Journal of Educational Evaluation, 6*(4)*,* 42–46. https://doi.org/10.13794/j.cnki.shjee.2017.0059

Wang, Z. (2019). Research on the dilemma and countermeasures of the humanistic quality education of science and engineering college students in the new media era. *University Education, 8,* 154–156. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=DXJY201908049&DbName=CJFQ2019

Waugh, C. E., & Fredrickson, B. L. (2006). Nice to know you: Positive emotions, self–other overlap, and complex understanding in the formation of a new relationship. *The Journal of Positive Psychology*, *1*(2), 93–106. https://doi.org/10.1080/17439760500510569

Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., & Erikson, P. (2005). Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: Report of the ISPOR task force for translation and cultural adaptation. *Value in Health, 8*(2), 94–104. https://doi.org/10.1111/j.1524-4733.2005.04054.x

Wu, B., & Wang, W. (2012). The construction and implementation of extracurricular practice activity system based on application-oriented undergraduate talent cultivation. *China University Teaching*, *5*, 68–70. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JXCY201205021&DbName=CJFQ2012

Wu, Q., & Jiang, H. (2017). Problems and countermeasures in university students' volunteer service – based on the investigation of four universities in Beijing. *Journal of China Women's University, 29*(4), 113–117. https://doi.org/10.13277/j.cnki.jcwu.2017.04.016

Wu, X. (2016). On the extracurricular training of college students at home and abroad. *The Party Building and Ideological Education in Schools*, *2*, 94–95. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XXDJ201602042&DbName=CJFQ2016

Yan, M. (2006). The present situation and countermeasures of the second classroom activities in colleges and universities in China. *Journal of Zhejiang Gongshang University*, *1*, 81–85. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=ZJZF200601014&DbName=CJFQ2006

Yang, G. (2016a). *Extracurricular training*. China Social Sciences Press.

Yang, G. (2016b). On the construction of "Shuang Gui Bing Xing" talent training mode. *The Party Building and Ideological Education in Schools*, *2*, 50–51. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XXDJ201602022&DbName=CJFQ2016

Yang, G., & Zhang, L. (2018). Analysis of extracurricular training system, path and guarantee mechanism. *The Party Building and Ideological Education in Schools, 2018*(4), 74–76. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=XXDJ201804029&DbName=CJFQ2018

Yang, M., & Chau, A. W. L. (2011). Social involvement and development as a response to the campus student culture. *Asia Pacific Education Review*, *12*(3), 393–402. http://doi.org/10.1007/s12564-011-9149-x

Yang, X. (2007). The role of educational measurement in educational evaluation. *Global Education, 36* (11), 15–25. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=WGJN200711002&DbName=CJFQ2007

Yu, X. (2017). Study on the operation mode of the second class report card system of communist youth league of colleges and universities. *Journal of Taiyuan Urban Vocational College, 4*, 85–86. https://doi.org/10.16227/j.cnki.tycs.2017.0311

Zeng, J., Song, D., & Gao, S. (2017). Research process, focus and prospect of the second classroom of college students -- based on the literature review of CNKI from 1999 to 2016. *Chongqing Higher Education Research, 5*(6), 119–127. https://doi.org/10.15998/j.cnki.issn1673-8012.2017.06.014

Zhang, J., Wei, X., & Cui, R. (2006). Investigation on the study attitude of engineering college students and analysis of its influencing factors. *Journal of Technology College Education, 25*(2), 67–70. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JCGS200602026&DbName=CJFQ2006

Zhang, M. (2012). *Project management of college students' extracurricular activities*. http://www.xsyu.edu.cn/

Zhao, J. (2015). A brief analysis of the cultivation system of the second classroom for college students in Chinese and American universities—taking SYSU and IUPUI as examples. *The Science Education Article Collects*, *7*, 30–31, 48. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=KJWH201507016&DbName=CJFQ2015

Zheng, H. (2016). On the reform of extracurricular activities for college students. *Human Resource Development*, *6*, 86–88. https://doi.org/10.19424/j.cnki.41-1372/d.2016.06.063

Zhu, H. (2010). The influence mechanism of college students' participation and growth-analysis of ten years' development data of college students in Beijing. *Tsinghua Journal of Education*, *31*(6), 35-43. https://doi.org/10.14138/j.1001-4519.2010.06.006

Zhuang, H. (2007). On the guidance and management of extracurricular activities for college students. *Journal of Hunan University of Science and Technology*, *12*, 115–116. http://kns.cnki.net/kcms/detail/detail.aspx?FileName=JMLK200712043&DbName=CJFQ2007

Zimmerman-Oster, K., & Burkhardt, J. C. (1999). Leadership in the making: A comprehensive examination of the impact of leadership development programs on students. *Journal of Leadership Studies*, *6*(3–4), 50–66. https://doi:10.1177/107179199900600304

# APPENDICES

## Appendix A

### The Postsecondary Student Engagement Survey

(PosSES 2.1), Chinese Version

## 大学生课外活动参与度调查（PosSES 2.1 中文版）

大学生课外活动参与度调查问卷是一项由 19 个问题组成的态度型问卷，旨在调查学生在大学期间参与的课外活动现状。问卷主要测量四个方面：1）不同的课外活动参与度（注：活动类型、参与积极程度、时间、数量）；2）大学生的情感投入；3）促进大学生参与课外活动的因素；4）阻碍大学生参与课外活动的因素。

Q1：你的年龄是

_____

Q2:你的性别是?

◎ 男

◎ 女

Q3:你就读于哪个年级?

◎ 大一

◎ 大二

◎ 大三

◎ 大四

Q4：你就读的专业是?

◎ 计算机科学与技术专业

◎ 网络工程专业

◎ 电子信息工程专业

◎ 通信工程专业

◎ 汽车服务工程专业

◎ 机械设计与制造自动化专业

◎ 机械电子工程专业

Q5: 你是否从其他的专业转入现读专业?

◎ 否

◎ 是的，从其他理工科专业转入现读专业

◎ 是的，从其他文科专业转入现读专业

Q6: 请选择你对以下陈述的同意程度。你是否同意以下陈述?

| | |
|---|---|
| Q6-1. 总体来说，我对选择的专业是满意的。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-2. 我不打算从现在的专业转去其他专业。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-3.我对自己的专业很有热情。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-4. 我愿意选择与目前就读的专业领域相关的职业。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-5. 我对我的专业很感兴趣。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-6. 我不觉得自己属于工科学术圈“大家庭”中的一份子。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-7. 我对我的学科无法投入感情。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-8. 我的学科并没有给我一种归属感。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-9. 在所读专业上取得的成功（成绩/成果）对我来说是非常宝贵的。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-10. 我在所读专业的表现如何对我很重要。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-11. 擅长于自己的专业是证明自己很重要的一部分。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-12. 我擅长发现机会。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-13. 如果我看到不喜欢的东西，我会修正它。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-14. 如果我相信一个想法，没有任何障碍会阻止我实现它。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-15. 即使面对别人的反对，我也坚持自己的想法。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-16. 我一直在寻找新的方法来改善我的生活。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| Q6-17. 我会和同学讨论学习问题。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-18. 我会和同学讨论职业。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-19. 我会和同学讨论社会问题（例：新闻热点、社会事件等）。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-20. 我会和同学讨论文化问题 (例：人文知识、历史等)。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-21. 专业老师们很尊重地对待我。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-22. 我对我的专业的老师是满意的。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q6-23. 老师是一视同仁地对待我和本专业的其他学生。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

Q7：你目前的累计绩点（GPA）是多少?
◎ 绩点<1.0 ◎ 1.0=<绩点<2.0 ◎ 2.0=<绩点<3.0 ◎ 3.0=<绩点<=4.0

Q8：在大学四年中，你参加过课外活动吗?
◎ 参加过 （跳转至第二部分）
◎ 没有 （跳转至第一部分）
对第 8 题选择“没有”的同学，系统将自动跳转至问卷的“第一部分”，请继续回答问题；选择“参加过”的同学将自动跳转至问卷的“第二部分”，请继续回答问题。

*第一部分*
Q9：你**打算**参加下列哪项课外活动?【多项选择】

| 活动类型 | 例子 |
|---|---|
| ◎1. **主题教育活动** | 例：学风建设月主题教育、考风考纪主题教育、安全消防主题教育等。 |
| ◎2. **党团组织活动** | 例：“不忘初心、牢记使命”主题学习会、民主生活会、中级、高级党课学习等。 |
| **3. 文化艺术活动** | |
| ◎ 3.1 文艺晚会 | 例：迎新晚会、元旦晚会、草坪音乐节等 |
| ◎ 3.2 文化艺术比赛活动 | 例：“十佳歌手”比赛、“金话筒”主持人大赛、“经典阅读”比赛、辩论赛、书画比赛等。 |
| ◎ 3.3 文化团队活动 | 例：大学生艺术团、管弦乐团、记者团、文学社、舞龙队、舞狮队等。 |
| ◎ 3.4 文化阵地活动 | 例：运用微信公众号、学院网站等宣传阵地开展的如微视频制作、优秀文化作品评比展示等活 |

| | |
|---|---|
| | 动。 |
| ◎4. 日常管理活动 | 例：各类学生自治队伍自我管理的活动。如班干部参与班内组织的奖助学金评选、院级干部开展的纪律检查活动、校级干部开展的班助理、学生会等管理活动。 |
| 5. 困难帮扶活动 | |
| ◎ 5.1 经济困难帮扶 | 例：“冬季送温暖”资助育人座谈、资助育人征文评比等资助育人类活动。 |
| ◎ 5.2 心理问题帮扶 | 例：天华心理大讲堂、心理咨询等。 |
| ◎ 5.3 学习困难帮扶 | 例：党员结对辅导等活动。 |
| ◎ 5.4 适应困难帮扶 | 例：“破冰”活动、新生入学教育、班会等活动。 |
| ◎ 5.5 就业困难帮扶 | 例：校园招聘会、就业指导讲座等。 |
| ◎ 6.学业指导活动 | 例：学习经验交流会、学术报告讲座、助教等活动。 |
| 7.科技创新活动 | |
| ◎ 7.1 学术交流活动 | 例：与科技创新相关的报告、讲座、学术沙龙、科技作品展览等。 |
| ◎ 7.2 科研训练活动 | 例:大学生科研训练计划SRTP（Student Research Training Program)、大学生在导师的指导下申报项目并完成研究等。 |
| ◎ 7.3 科技竞赛活动 | 例：“挑战杯”全国大学生课外学术科技作品竞赛、OM、大学生数学建模大赛、应用技术大赛等。 |
| ◎ 8. 创业教育活动 | 例：“互联网+”大学生创新创业大赛、大学生创业俱乐部、创新创业培训等。 |
| 9. 社会实践活动 | |
| ◎ 9.1 校内社会实践活动 | 例：勤工俭学等。 |
| ◎ 9.2 校内实习实训活动 | 例：金工实习、实训等。 |
| ◎ 9.3 校外社会实践活动 | 例：寒暑假社会调研、支教、社会服务等。 |
| ◎ 9.4 国际交流经验 | 例：寒暑期国际夏令营等。 |
| ◎ 9.5 实习体验 | 例：实习生、校企合作实习等。 |
| ◎10. 志愿者活动 | 例：“迎新生”志愿者、无偿献血、地铁站公益等服务。 |
| ◎11. 学生社团活动 | 例：各类社团组织的活动。 |
| 12.健康教育活动 | |
| ◎ 12.1 体育锻炼活动 | 例：体育类（包括球类、田径类等）竞赛、运动会等。 |
| ◎ 12.2 心理健康活动 | 例：“5.25”心理健康月系列讲座等。 |

Q10: 你认为下列原因会在多大程度上**促使**你参与课外活动?

| | |
|---|---|
| Q10-1. 因为我承担得起活动所需费用 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-2. 因为我获得了关于活动的相关信息介绍 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-3. 在参与活动方面与其他同学拥有一样的机会 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-4. 可以为校园带来积极的影响 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-5. 获得辅导员或其他老师的鼓励 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-6. 满足个人兴趣 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-7. 可以获得使我具备就业竞争力的经验/经历 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-8. 提供休闲娱乐 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-9. 因为受到父母（意见）的影响 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-10. 为了尝试新事物 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-11. 因为有充足的课余时间。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-12. 因为我认同活动设置的目标 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-13. 为了打破以下形式的障碍（注：地域、性别、宗教、民族） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q10-14. 为了释放压力 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

Q11:你认为下列原因会在多大程度上**阻碍**你参与课外活动?

| | |
|---|---|
| Q11-1. 参与活动的成本（时间和金钱）过高 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-2. 没有感受到老师的支持/鼓励 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-3. 对我想要学习的东西没有帮助 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-4.个人原因阻碍了我（例：怀孕、结婚、养育孩子等） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-5. 性别原因（例：与异性/ | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| 同性互动感到尴尬) | |
| Q11-6. 我不是一个“参与者”（例：个人目标高于集体目标，更注重个人成就) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-7. 性格内向 （例：注重内在的想法和感受) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-8.缺乏动力（例：我不想参与，对活动不感兴趣) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-9. 时间不足 (例：所读专业课业量大导致) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-10. 不了解参加活动的途径（例：缺少关于课外活动的信息获取) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-11. 成为会员（例：社团）的过程漫长而艰难。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-12. 受到参与人数的限制；需要通过竞选/竞争才能参与。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-13. 负面影响的可能性。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-14. 地域问题（注：由于地域原因感到没有融入集体，让我觉得不舒服/不受欢迎) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-15. 社交惯性/惰性（注：我已经参加了其它活动，懒于更换) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q11-16. 家庭问题阻碍了我（例：家庭义务阻碍我参与，等等) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

第二部分：

Q12:你在大学四年中，参与过以下哪些课外活动？【多项选择】

| 活动类型 | 例子 |
|---|---|
| ◎1. **主题教育活动** | 例：学风建设月主题教育、考风考纪主题教育、安全消防主题教育等。 |
| ◎2. **党团组织活动** | 例：“不忘初心、牢记使命”主题学习会、民主生活会、中级、高级党课学习等。 |
| **3. 文化艺术活动** | |
| ◎ 3.1 文艺晚会 | 例：迎新晚会、元旦晚会、草坪音乐节等 |
| ◎ 3.2 文化艺术比赛活动 | 例：“十佳歌手”比赛、“金话筒”主持人大赛、“经 |

| | |
|---|---|
| | 典阅读”比赛、辩论赛、书画比赛等。 |
| ◎ 3.3 文化团队活动 | 例：大学生艺术团、管弦乐团、记者团、文学社、舞龙队、舞狮队等。 |
| ◎ 3.4 文化阵地活动 | 例：运用微信公众号、学院网站等宣传阵地开展的如微视频制作、优秀文化作品评比展示等活动。 |
| **◎4. 日常管理活动** | 例：各类学生自治队伍自我管理的活动。如班干部参与班内组织的奖助学金评选、院级干部开展的纪律检查活动、校级干部开展的班助理、学生会等管理活动。 |
| **5. 困难帮扶活动** | |
| ◎ 5.1 经济困难帮扶 | 例：“冬季送温暖”资助育人座谈、资助育人征文评比等资助育人类活动。 |
| ◎ 5.2 心理问题帮扶 | 例：天华心理大讲堂、心理咨询等。 |
| ◎ 5.3 学习困难帮扶 | 例：党员结对辅导等活动。 |
| ◎ 5.4 适应困难帮扶 | 例：“破冰”活动、新生入学教育、班会等活动。 |
| ◎ 5.5 就业困难帮扶 | 例：校园招聘会、就业指导讲座等。 |
| ◎ 6.**学业指导活动** | 例：学习经验交流会、学术报告讲座、助教等活动。 |
| **7.科技创新活动** | |
| ◎ 7.1 学术交流活动 | 例：与科技创新相关的报告、讲座、学术沙龙、科技作品展览等。 |
| ◎ 7.2 科研训练活动 | 例：大学生科研训练计划 SRTP (Student Research Training Program)、大学生在导师的指导下申报项目并完成研究等。 |
| ◎ 7.3 科技竞赛活动 | 例：“挑战杯”全国大学生课外学术科技作品竞赛、OM、大学生数学建模大赛、应用技术大赛等。 |
| **◎ 8. 创业教育活动** | 例：“互联网+”大学生创新创业大赛、大学生创业俱乐部、创新创业培训等。 |
| **9. 社会实践活动** | |
| ◎ 9.1 校内社会实践活动 | 例：勤工俭学等。 |
| ◎ 9.2 校内实习实训活动 | 例：金工实习、实训等。 |
| ◎ 9.3 校外社会实践活动 | 例：寒暑假社会调研、支教、社会服务等。 |
| ◎ 9.4 国际交流经验 | 例：寒暑期国际夏令营等。 |
| ◎ 9.5 实习体验 | 例：实习生、校企合作实习等。 |
| ◎10. **志愿者活动** | 例：“迎新生”志愿者、无偿献血、地铁站公益等服务。 |
| ◎11. **学生社团活动** | 例：各类社团组织的活动。 |
| **12.健康教育活动** | |
| ◎ 12.1 体育锻炼活动 | 例：体育类（包括球类、田径类等）竞赛、运动会等。 |
| ◎ 12.2 心理健康活动 | 例：“5.25”心理健康月系列讲座等。 |

Q13. 你在多大程度上积极参与了你所选择的课外活动？[单选题]
◎ 不是很积极
◎ 还算积极
◎ 比较积极
◎ 特别积极

Q14. 总体来说，你每周有多少小时参加你选择的活动?[单选题]
◎ 1-3 小时
◎ 4-6 小时
◎ 7-9 小时
◎ 10-12 小时
◎ 12 小时以上

Q15. 你是否在当前/以前的学期因为参加课外活动而获得了课程学分？
◎ 是
◎ 否

Q16. 你是否在当前/以前的学期因为参加课外活动而获得了报酬？
◎ 是
◎ 否

Q17：你在多大程度上同意，从参与课外活动中你有了以下收获？

| | |
|---|---|
| Q17-1. 个人发展 (例：自信、自我认同发展、时间管理能力等) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-2. 社会参与/社交能力 (例：在不同的环境中应对同学/老师、校园融入都游刃有余。) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-3. 沟通技巧/能力 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-4. 大学满意度 （例：专业满意度、教师满意度等) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-5. 领导能力 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-6. 大学归属感 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-7. 变得独立 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-8. 适应力和应变能力(例：快速学习新事物的能力，应对变化的世界的能力，以及将知识应用于新问题和新环境的能力) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-9. 智力发展(例：解决问题的能力，分析能力，批判性思维 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| 能力) | |
| Q17-10. 专业能力提升 (例:专业技能；在日常实践中运用沟通、知识、技术技能、情感、价值观和反思；具备理论与实践相结合的能力) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-11. 道德标准的提升 (例：关于道德或道德原则；是非观；符合正确的行为或实践准则，特别是行业标准) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-12. 社会发展认知的提升 (例：对社会问题的认识，待人处世公平公正) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-13. 公民意识提升 (例：通过服务学习、社区服务、志愿服务等途径) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-14. 学术投入能力(例：为学习付出努力；主动学习；与同学和教师的互动) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-15. 实践能力 (例：巧妙地计划、组合和运用的能力;发现问题并找到解决办法的能力；创造发明东西等的技能) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-16. 创造力 (例：跳出思维定势;能够以新的方式感知世界;在看似不相关的现象之间建立联系，并产生解决方案。创造力包括两个过程：思考，然后生产) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-17. 跨文化意识 (例：能够运用知识、技能和影响/动机有效地适应不同的文化；与来自不同国家/民族/地域的人交往) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-18 全球化能力 (例:获得深入的知识和对国际问题的理解;欣赏和与来自不同语言和文化背景的人一起学习和工作的能力) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-19. 商业和管理技能(例:能够理解人、事、物的关系并做出决策;理解科技技术与现代社会 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| 的经济和社会基础之间的相互依存关系等) | |
| Q17-20. 课余时间被（活动）占用而减少 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-21. 日程计划被（活动）占用而缺少灵活性 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-22. （因参与课外活动）增加了开支 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-23. 延误学业时间 (例:因为参加了留学，合作，实习等实践活动延误了毕业时间等) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-24. 学术参与度降低(例：我表现出的注意力、好奇心、兴趣、乐观和热情降低) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-25. 降低了学习绩点 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-26. 损坏了人际关系 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-27. 个人健康情况下降 (例：身体健康；心理健康) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-28. 社会发展认知受到负面影响(例：迈入大学的社会转变，不易接受陌生人) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-29. 降低了社会参与度 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q17-30. 个人成长受到负面影响（例：薄弱的决策力） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

Q18:你认为下列原因会在多大程度上**促使**你参与课外活动?

| | |
|---|---|
| Q18-1. 因为我承担得起活动所需费用 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-2. 因为我获得了关于活动的相关信息介绍 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-3. 在参与活动方面与其他同学拥有一样的机会 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-4. 可以为校园带来积极的影响 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-5. 获得辅导员或其他老师的鼓励 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| Q18-6. 满足个人兴趣 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-7. 可以获得使我具备就业竞争力的经验/经历 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-8. 提供休闲娱乐。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-9. 因为受到父母（意见）的影响 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-10. 为了尝试新事物 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-11. 因为有充足的课余时间。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-12. 因为我认同活动设置的目标 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-13. 为了打破以下形式的障碍（注：地域、性别、宗教、民族） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q18-14. 为了释放压力 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

Q19:你认为下列原因会在多大程度上**阻碍**你参与课外活动?

| | |
|---|---|
| Q19-1. 参与活动的成本（时间和金钱）过高 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-2. 没有感受到老师的支持/鼓励 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-3. 对我想要学习的东西没有帮助 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-4.个人原因阻碍了我（例：怀孕、结婚、养育孩子等） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-5. 性别原因（例：与异性/同性互动感到尴尬） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-6. 我不是一个“参与者”（例：个人目标高于集体目标，更注重个人成就） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-7. 性格内向 （例：注重内在的想法和感受） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-8.缺乏动力（例：我不想参与，对活动不感兴趣） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-9. 时间不足（例：所读专业课业量大导致） | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-10. 不了解参加活动的途径（例：缺少关于课外活动的信息 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

| | |
|---|---|
| 获取) | |
| Q19-11. 成为会员（例：社团）的过程漫长而艰难。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-12. 受到参与人数的限制；需要通过竞选/竞争才能参与。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-13. 负面影响的可能性。 | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-14. 地域问题（注：由于地域原因感到没有融入集体，让我觉得不舒服/不受欢迎) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-15. 社交惯性/惰性（注：我已经参加了其它活动，懒于更换) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |
| Q19-16. 家庭问题阻碍了我（例：家庭义务阻碍我参与，等等) | ◎ 非常不同意 ◎ 不同意 ◎ 同意 ◎ 非常同意 |

## Appendix B

## The Postsecondary Student Engagement Survey (PosSES 2.1)

## English Version

The PosSES 2.1 questionnaire composed of 19 questions, which aims to create a clear profile of engineering college students' out-of-class activities involvement. The instrument mainly measures four aspects: 1) different levels of out-of-class activities involvement (i.e., types of OA, active involvement degree, number, and hours of OA involvement); 2) affective engagement; 3) factors that promote college students' OA involvement; 4) factors that prevent college students' OA involvement.

Q1: What is your age?

_____

Q2: What gender do you most identify with?
◎ Man
◎ Woman

Q3: What year in college are you?
◎ First year
◎ Sophomore
◎ Junior
◎ Senior

Q4: What is your major?
◎ Computer Science and Technology
◎ Network Engineering
◎ Electronic and Information Engineering
◎ Communication Engineering
◎ Automotive Service Engineering
◎ Mechanical Design, Manufacturing and Automation
◎ Mechanical and Electronic Engineering

Q5: Did you switch to your current major from another one?
◎ No
◎ Yes, from a STEM major
◎ Yes, from a non-STEM major

Q6: Please indicate the extent to which you agree with the following statements.

Q6-1. Overall, I am happy with the major I've chosen.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-2. I don't intend to change from my current major to another major.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-3. I am enthusiastic about my major.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-4. I think I will be very happy to spend the rest of my career in my current academic discipline.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-5. My major is interesting to me.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-6. I do not feel like “part of the family” in my academic discipline.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-7. I do not feel “emotionally attached” to my academic discipline.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-8. I do not feel a strong sense of “belonging” to my academic discipline.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-9. Success in my major at school is very valuable to me.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-10. It matters to me how well I do in my major at school.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-11. Being good at my major is an important part of who I am.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-12. I excel at identifying opportunities.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-13. If I see something I don't like, I fix it.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-14. If I believe in an idea, no obstacle will prevent me from making it happen.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-15. I love being a champion for my ideas, even against others' opposition.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-16. I am constantly on the lookout for new ways to improve my life.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-17. I discuss academic issues with peers.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-18. I discuss career issues with peers.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-19. I discuss social issues with peers.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-20. I discuss cultural issues with peers.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-21. The instructors in my major respect me.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-22. I am satisfied with the faculty in my major.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q6-23. I am treated with as much respect by faculty as other students in my major.
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q7. Referring to your college GPA, what was your cumulative GPA at the end of this semester?
◎ GPA<1.0

◎ 1.0=<GPA<2.0
◎ 2.0=<GPA<3.0
◎ 3.0=<GPA<=4.0

Q 8: Have you been involved in any out-of-classroom activity during the four years in college?
◎ Yes
◎ No
*For student who answered "No" to Q8, they are going to answer the following questions in section I*; and **for student who answered "Yes" to Q8, they are going to answer the questions in section II.**

*Section I:*
Q9: Which of the following out-of-classroom activities do you intend to participate in? [Multiple choice]

| Activity | Examples (i.e., take the OAs in Chinese colleges as examples) |
|---|---|
| ◎1. Themed educational activities. | Educational activities on the theme of learning habits, integrity test, fire safety, and so on. |
| ◎2. Party and league education activities for college students. | Party lecture;<br>Thematic educational study seminar. |
| 3. Culture and art activities. | |
| ◎ 3.1 Evening party. | New year party; Lawn music festival. |
| ◎ 3.2 Culture and art competition activities. | "Top 10 singers" competition; "Golden microphone" host competition; "Classic reading" speech contest; debate competition; painting and calligraphy competition. |
| ◎ 3.3 Culture and art team. | Student art troupe; student orchestra; student press corps; student dragon dance team. |
| ◎ 3.4 Culture and art publicity activities. | Micro-video production, culture works evaluation and display via Wechat, Douyin, and college websites. |
| ◎4. Daily management activities. | Self-management activities of all kinds of autonomous student teams (e.g., student union, peer mentors, student leaders). |
| 5. Difficulty assistance activities | |
| ◎ 5.1 Financial difficulty assistance activities. | "Send warmth in winter" sponsored education seminar. |
| ◎ 5.2 Psychological assistance activities. | "Psychology lecture hall" lectures; psychological counseling activities. |

| | |
|---|---|
| ◎ 5.3 Learning assistance activities. | "Party members pair up;" "One hour for a learning dormitory." |
| ◎ 5.4 Adaptive difficulties assistance activities. | "Breaking the ice" activity; entrance education class meeting. |
| ◎ 5.5 Job assistance activities. | Campus job fair; career guidance lectures. |
| ◎ 6. Academic guidance activities. | Learning experience exchange seminar; academic report; teaching assistant. |
| 7. Scientific and technological innovation activities | |
| ◎ 7.1 Academic activities | Scientific and technological innovation-related reports, lectures, academic salons; exhibitions of scientific and technological works. |
| ◎ 7.2 Scientific research training activities | Student Research Training Program (SRTP); Completed while an undergraduate student and usually under direction of a faculty member |
| ◎ 7.3 Science and technology competition. | “Challenge Cup" national college students extracurricular academic science and technology works competition; OM; college students mathematical modeling competition; application technology competition. |
| ◎ 8. Entrepreneurship education activities. | “Internet plus” college students' innovation and entrepreneurship competition; entrepreneurship club; innovation and entrepreneurship training. |
| 9. Social practice activities. | |
| ◎ 9.1 Campus social practice activities. | Work-study. |
| ◎ 9.2 Campus training activities. | Metalworking practice. |
| ◎ 9.3 Off-campus social practice. | Social research in winter and summer vacation; social services. |
| ◎ 9.4 International experience. | International summer camps; study abroad. |
| ◎ 9.5 Professional experiences | Internship; co-op; practicum. |
| ◎10. Volunteer activities. | "Welcome Freshman" volunteers; unpaid blood donation; subway station public welfare services. |
| ◎11. Student clubs | Activities organized by various student clubs. |
| 12. Health education activities. | |
| ◎ 12.1 Physical activities. | Sports (e.g., football, basketball, track and field events); sports competition. |
| ◎ 12.2 Mental health activities. | “5.25” mental health month series activities. |

Q10: To what extent do you agree the following reasons could prompt you to participate in out-of-classroom activities?

Q10-1. Because I could afford the costs/expenses
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-2. Because I was provided information concerning the activities
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-3. To be on par with other students in terms of involvement in activities
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-4. To create positive impact on campus/community
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-5. To follow encouragement from an advisor or faculty member
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-6. To fulfill my personal interests
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-7. To gain experiences that make me competitive in the job market
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-8. To provide entertainment
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-9. Because of my parents influence
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-10. To try something new
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-11. Because I had the time
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-12. Because I agree with the goals of the organization
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-13. To break down barriers of any kind (i.e., religion, race, Gender, sexual orientation)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q10-14. To relieve stress

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11: To what extent do you agree the following reasons could prevent you from participating in out-of-classroom activities?

Q11-1. Cost (time and money) of joining was too high

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-2. Didn't feel supported by faculty advisor

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-3. Don't contribute to what I want to learn

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-4. Personal matters prevent me (i.e., I became pregnant, I am married, I have children, etc.)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-5. Gender issue (i.e., awkward interactions between sexes)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-6. I am not a "joiner" (i.e., value personal goals above that of the group, emphasis on personal achievement)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-7. Introverted personality (i.e., focus on internal thoughts, feelings)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-8. Lack of motivation (i.e., I do not want to join, not interesting to me)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-9. Lack of time, scheduling issue (i.e., great workload of the current major)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-10. Lack the knowledge about the opportunities (i.e., lack the information of the out of class activities)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-11. Lengthy, difficult membership process

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-12. Limit to number of participants; a competitive process to join

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-13. Possibility of negative impact

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-14. Race/ethnicity issues (i.e., not feeling welcomed; seemed like non-inclusive environment)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-15. Social inertia (i.e., I joined something else and it became too hard to leave after joining)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q11-16. Family matters prevent me (e.g. my family obligations prevent me from joining, etc.)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

**Section II:**

Q12. Which of the following out-of-classroom activities have you participated in during the four years in college? [Multiple choice]

| Activity | Examples (i.e., take the OAs in Chinese colleges as examples) |
|---|---|
| ◎1. Themed educational activities. | Educational activities on the theme of learning habits, integrity test, fire safety, and so on. |
| ◎2. Party and league education activities for college students. | Party lecture;<br>Thematic educational study seminar. |
| 3. Culture and art activities. | |
| ◎ 3.1 Evening party. | New year party; Lawn music festival. |
| ◎ 3.2 Culture and art competition activities. | "Top 10 singers" competition; "Golden microphone" host competition; "Classic reading" speech contest; debate competition; painting and calligraphy competition. |

| | |
|---|---|
| ◎ 3.3 Culture and art team. | Student art troupe; student orchestra; student press corps; student dragon dance team. |
| ◎ 3.4 Culture and art publicity activities. | Micro-video production, culture works evaluation and display via Wechat, Douyin, and college websites. |
| ◎4. Daily management activities. | Self-management activities of all kinds of autonomous student teams (e.g., student union, peer mentors, student leaders). |
| 5. Difficulty assistance activities | |
| ◎ 5.1 Financial difficulty assistance activities. | "Send warmth in winter" sponsored education seminar. |
| ◎ 5.2 Psychological assistance activities. | "Psychology lecture hall" lectures; psychological counseling activities. |
| ◎ 5.3 Learning assistance activities. | "Party members pair up;" "One hour for a learning dormitory." |
| ◎ 5.4 Adaptive difficulties assistance activities. | "Breaking the ice" activity; entrance education class meeting. |
| ◎ 5.5 Job assistance activities. | Campus job fair; career guidance lectures. |
| ◎ 6. Academic guidance activities. | Learning experience exchange seminar; academic report; teaching assistant. |
| 7. Scientific and technological innovation activities | |
| ◎ 7.1 Academic activities | Scientific and technological innovation-related reports, lectures, academic salons; exhibitions of scientific and technological works. |
| ◎ 7.2 Scientific research training activities | Student Research Training Program (SRTP); Completed while an undergraduate student and usually under direction of a faculty member |
| ◎ 7.3 Science and technology competition. | “Challenge Cup" national college students extracurricular academic science and technology works competition; OM; college students mathematical modeling competition; application technology competition. |
| ◎ 8. Entrepreneurship education activities. | “Internet plus” college students' innovation and entrepreneurship competition; entrepreneurship club; innovation and entrepreneurship training. |
| 9. Social practice activities. | |
| ◎ 9.1 Campus social practice activities. | Work-study. |
| ◎ 9.2 Campus training activities. | Metalworking practice. |

| | |
|---|---|
| ◎ 9.3 Off-campus social practice. | Social research in winter and summer vacation; social services. |
| ◎ 9.4 International experience. | International summer camps; study abroad. |
| ◎ 9.5 Professional experiences | Internship; co-op; practicum. |
| ◎10. Volunteer activities. | "Welcome Freshman" volunteers; unpaid blood donation; subway station public welfare services. |
| ◎11. Student clubs | Activities organized by various student clubs. |
| 12. Health education activities. | |
| ◎ 12.1 Physical activities. | Sports (e.g., football, basketball, track and field events); sports competition. |
| ◎ 12.2 Mental health activities. | “5.25” mental health month series activities. |

Q13. How actively have you participated in the activities you selected?
◎ Not at all active
◎ Minimally active
◎ Moderately active
◎ Highly Active

Q14. Overall, how many hours in a week have you participated in the activities you selected?
◎ 1-3 hours
◎ 4-6 hours
◎ 7-9 hours
◎ 10-12 hours
◎ 12+ hours

Q15. Did you get course credit for participating in any out-of-classroom activity in the current/previous semesters?
◎ Yes
◎ No

Q16. Did you get paid for participating in any out-of-classroom activity in the current/previous semesters?
◎ Yes
◎ No

Q17: To what extent do you agree that you gained the following outcomes from your involvement?

Q17-1. Personal development (e.g., Self-confidence, identity development, time management skills)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-2. Social engagement (e.g., Comfort in various environments and with various persons, campus involvement, and student chapters)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-3. Communication skills

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-4. Satisfaction with college experience (e.g., Satisfaction with the major, satisfaction with the advising quality)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-5. Leadership skills

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-6. Sense of belonging to college

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-7. Opportunity to be independent

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-8. Resilience and flexibility (e.g., Ability to learn new things quickly, deal with changing world and apply knowledge to new problems and new contexts)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-9. Intellectual development (e.g., Problem solving skills, analytical skills, critical thinking skills)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-10. Professional development (e.g., Professional skills; use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice; able to integrate theory and practice)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-11. Ethical Standards (e.g., Pertaining to or dealing with morals or the principles of morality; pertaining to right and wrong in conduct; being in accordance with the rules or standards for right conduct or practice, especially the standards of a profession)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-12. Social development (e.g., Awareness of social issues, treat each other fairly, and civic activism)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-13. Civic development (e.g., Working to make a difference within a community; development gained through service learning, community service, and voluntarism)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-14. Academic engagement (e.g., Academic effort, active and collaborative learning, and interaction with peers and faculty)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-15. Practical ingenuity/inventiveness (e.g., Skill in planning, combining, and adapting in a clever way; manner in which one identifies problems and finds solutions; skill or cleverness that allows someone to solve problems, invent things, etc.)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-16. Creativity (e.g., Thinking outside the box, art, invention, innovation; ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing. In you have ideas, but don't act on them, you are imaginative but not creative)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-17. Cross-cultural awareness (e.g., Knowledge, skills, and affect/motivation that enable individuals to adapt effectively with different cultures; promoting racial understanding; socializing with people from different racial/ethnic groups)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-18. Global competence (e.g., Acquisition of in-depth knowledge and understanding of international issues, and appreciation of and ability to learn and work with people from diverse linguistic and cultural backgrounds)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-19. Business and management skills (e.g., Able to understand and make physical, human, and political decisions; interdependence between technology and the economic and social foundations of modern society)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-20. Free time was reduced
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-21. Schedule was less flexible
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-22. Increased expense
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-23. Academic timeline extended (e.g., Extended time to graduate, i.e., because participating in study abroad, co-op, internship which add to graduate timeline)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-24. Decreased academic engagement (e.g., The degree of attention, curiosity, interest, optimism, and passion that I showed lowered)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-25. Decreased my GPA in college
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-26. Damaged interpersonal relationships
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-27. Declined personal health (e.g., Physical health, mental health)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-28. Social development negatively impacted (e.g., Social transition to the college, less open to new people)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-29. Decreased social engagement
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q17-30. Personal development negatively impacted (e.g., Poor decision making skills)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18. To what extent do you agree the following reasons could prompt you to participate in out-of-classroom activities?

Q18-1. Because I could afford the costs/expenses
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-2. Because I was provided information concerning the activities
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-3. To be on par with other students in terms of involvement in activities
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-4. To create positive impact on campus/community
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-5. To follow encouragement from an advisor or faculty member
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-6. To fulfill my personal interests
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-7. To gain experiences that makes me competitive in the job market
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-8. To provide entertainment
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-9. Because of my parents influence
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-10. To try something new
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-11. Because I had the time
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-12. Because I agree with the goals of the organization
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-13. To break down barriers of any kind (i.e., religion, race, Gender, sexual orientation)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q18-14. To relieve stress
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19: To what extent do you agree the following reasons could prevent you from participating in out-of-classroom activities?

Q19-1. Cost (time and money) of joining was too high
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-2. Didn't feel supported by faculty advisor
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-3. Don't contribute to what I want to learn
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-4. Personal matters prevent me (i.e., I became pregnant, I am married, I have children, etc.)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-5. Gender issue (i.e., awkward interactions between sexes)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-6. I am not a "joiner" (i.e., value personal goals above that of the group, emphasis on personal achievement)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-7. Introverted personality (i.e., focus on internal thoughts, feelings)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-8. Lack of motivation (i.e., I do not want to join, not interesting to me)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-9. Lack of time, scheduling issue (i.e., great workload of the current major)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-10. Lack the knowledge about the opportunities (i.e., lack the information of the out of class activities)
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-11. Lengthy, difficult membership process
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-12. Limit to number of participants; a competitive process to join
◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-13. Possibility of negative impact

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-14. Race/ethnicity issues (i.e., not feeling welcomed; seemed like non-inclusive environment)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-15. Social inertia (i.e., I joined something else and it became too hard to leave after joining)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

Q19-16. Family matters prevent me (e.g. my family obligations prevent me from joining, etc.)

◎ Strongly Disagree ◎ Disagree ◎ Agree ◎ Strongly Agree

## Appendix C

## The Outcomes by Types of Out-of-Class Activities (Literature Review)

| Categories | Activity | Positive Outcomes | Neutral Outcomes | Negative Outcomes | Authors/Year |
|---|---|---|---|---|---|
| Co-curricular Activities | Undergraduate Research (UR) | Communication Skills | Teamwork Skills; leadership skills | | (Carter et al., 2016) |
| | UR | Personal/Professional Gains | 4% responses were ambivalent assessments | 4% responses were Negative. | (Seymour et al., 2004) |
| | LEAD Program | Learning Outcomes | | | (Tutt & McCarthy, 2006) |
| | Partnership programs | Acclimation to the institution; Student learning; Academic and career decisions; Student persistence. | | | (Nesheim et al., 2007) |
| | Living-learning programs | Intellectual abilities; Growth in cognitive development; Self-confidence; Appreciation of diversity; Satisfaction and sense of belonging. | Knowledge abilities; Growth in cognitive complexity; Growth in personal philosophy; Interpersonal self-confidence | | (Inkelas et al., 2006) |
| | Service-Learning Programs. | Academic, civic, and personal outcomes | | | (Keen & Hall, 2009) |

| Categories | Activity | Positive Outcomes | Neutral Outcomes | Negative Outcomes | Authors/Year |
|---|---|---|---|---|---|
| | Extracurricular Organizations; Competitive Teams; The Greek system | Leadership development | | | (Foreman & Retallick, 2013) |
| | Student Organizations | Academic performance | | GPA | (Baker, 2008) |
| | Clubs; Student organizations | Educational involvement; Career planning; Lifestyle planning; Lifestyle management; Cultural participation; Academic autonomy; Establishing and clarifying purpose. | Interpersonal relationships | | (Foubert & Grainger, 2006) |
| Extracurricular Activities | Voluntary Service | Learning outcomes; Cognitive development; Skill development; Identity development. | | | (Chesbrough, 2011) |
| | Fraternities/sororities ; Clubs/organization; Sports team | Interpersonal skills; Communication skills; Decision-making; Teamwork skills. | Initiative | | (Rubin et al., 2002) |

| Categories | Activity | Positive Outcomes | Neutral Outcomes | Negative Outcomes | Authors/Year |
|---|---|---|---|---|---|
| Cocurricular & Extracurricular Activities | Internship; Cooperative education experience; Study abroad; Engineering design competition; Student Chapter of a professional society or association; Employment. | Analytical Skills; Group Skills | | | (Strauss & Terenzini, 2007) |
| | Art and Sports Activities; Skills training activities; Academic activities; Service; Innovation and entrepreneurship Activities Others | Practical ability; Supplement and expand the classroom teaching. | | | (He & Dai, 2014) |

| Categories | Activity | Positive Outcomes | Neutral Outcomes | Negative Outcomes | Authors/Year |
|---|---|---|---|---|---|
| Co-curricular & Extracurricular Activities | Ideological and political education activity;<br>Academic and research activity;<br>Club activity;<br>Recreational and sport activity;<br>Internship. | Professional Knowledge<br>Core competence<br>Citizenship Awareness | Professional knowledge (Cultural and sports activities and internship) | Professional knowledge;<br>(Ideological and political activities ).<br>Civic consciousness (Internship) | (Bao & Du, 2016) |
| Curricular & Extracurricular Activities | Self-study;<br>Lectures;<br>Club activities;<br>Social services;<br>Sports and cultural activities;<br>Speech and debate competitions. | Cognitive ability;<br>Interpersonal Skills;<br>Contemporary social consciousness;<br>The physical and mental health. | | | (Sun & Ding, 2010) |

| Categories | Activity | Positive Outcomes | Neutral Outcomes | Negative Outcomes | Authors/Year |
|---|---|---|---|---|---|
| Out-of-Class Activities (OAs) | All types OAs | Practical ability;<br>Academic ability;<br>Non-academic ability training (e.g., teamwork, communication, critical thinking, environmental awareness, etc.) | | | (Wu & Wang, 2012) |
| | All types OAs | Persistence;<br>Learning outcomes;<br>Workforce entry;<br>Development of technical and professional competencies;<br>Academic and career outcome. | | Increase expenses;<br>Reduce free time;<br>Extending the academic deadline. | (Simmons et al., 2018) |

# Appendix D

## Correlation Results for Positive/Negative Outcomes and Types of OA

| | 1 | 2 | 3 | | | | 4 | 5 | | | | | 6 | 7 | | | 8 | 9 | | | | | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q12_1:Themed educational activities | Q12_2:Party and league education activities for college students. | Q12_3.1: Evening party. | Q12_3.2: Culture and art competition activites | Q12_3.3: Culture and art team. | Q12_3.4: Culture and art publicity activites. | Q12_4:Daily management activities | Q12_5.1: Financial difficulty assistance activities. | Q12_5.2: Psychological assistance activities. | Q12_5.3: Learning assistance activities. | Q12_5.4: Adaptive difficulties assistance activities. | Q12_5.5: Job assistance activities. | Q12_6: Academic guidance activiites. | Q12_7.1: Academic activities. | Q12_7.2:Scientific research training activities. | Q12_7.3: Science and technology competition. | Q12_8:Entrepreneurship education activities. | Q12_9.1: Campus social practice activities | Q12_9.2: Campus training activities. | Q12_9.3: Off-campus social practice. | Q12_9.4: International experience | Q12_9.5: Professional experience. | Q12_10:Volunteer activities | Q12_11: Student clubs | Q12_12.1: Physical activities | Q12_12.2: Mental health activities |
| Q17-1. Personal development | -0.066 | 0.068 | -0.005 | 0.102 | -0.045 | 0.109 | .140* | 0.049 | 0.055 | 0.109 | .194** | 0.118 | .151* | .180** | 0.105 | 0.112 | 0.106 | 0.032 | 0.068 | 0.083 | 0.013 | 0.052 | .133* | 0.044 | 0.128 | 0.016 |
| Q17-2. social engagement | -0.077 | 0.006 | 0.042 | 0.071 | 0.023 | 0.099 | .177** | 0.082 | 0.071 | 0.028 | .182** | 0.037 | 0.106 | .154* | 0.099 | 0.118 | 0.097 | 0.021 | 0.042 | 0.068 | 0.041 | .138* | 0.116 | 0.069 | .148* | -0.014 |
| Q17-3. communication skills | -0.074 | 0.021 | 0.035 | 0.084 | 0.044 | 0.070 | .154* | 0.014 | 0.062 | 0.053 | .164* | 0.045 | 0.128 | 0.121 | 0.019 | 0.088 | .139* | 0.028 | 0.065 | 0.070 | -0.026 | 0.091 | 0.112 | 0.067 | 0.116 | -0.039 |
| Q17-4. satisfaction with college experience | -0.050 | 0.029 | -0.023 | 0.065 | 0.050 | 0.126 | 0.125 | 0.074 | 0.058 | 0.076 | 0.128 | 0.080 | 0.122 | .181** | 0.119 | 0.094 | .145* | 0.113 | -0.011 | 0.074 | 0.029 | -0.008 | 0.088 | 0.053 | .133* | -0.013 |
| Q17-5. leadership skills | 0.020 | 0.105 | 0.051 | 0.126 | .129* | 0.079 | .224** | 0.076 | 0.102 | .191** | .186** | 0.099 | .172** | .178** | 0.004 | 0.097 | .178** | 0.022 | 0.060 | 0.094 | 0.030 | -0.024 | .188** | 0.128 | .221** | 0.012 |
| Q17-6. sense of belonging to college | -0.049 | 0.041 | -0.008 | 0.063 | 0.018 | 0.090 | 0.080 | 0.091 | 0.056 | 0.041 | 0.080 | 0.044 | 0.084 | .140* | 0.069 | -0.034 | 0.019 | 0.030 | 0.003 | 0.029 | -0.033 | -0.036 | 0.058 | 0.010 | .158* | -0.033 |
| Q17-7. opportunity to be independent | -0.012 | 0.044 | -0.045 | 0.126 | 0.068 | 0.078 | .171** | 0.038 | 0.069 | 0.096 | .131* | 0.088 | .159* | .189** | 0.072 | 0.047 | 0.057 | 0.034 | 0.093 | 0.095 | 0.007 | 0.103 | 0.096 | 0.063 | 0.096 | -0.017 |
| Q17-8. resilience and flexibility | -0.044 | 0.032 | -0.019 | 0.100 | 0.043 | 0.127 | .159* | 0.095 | 0.089 | .145* | .221** | 0.045 | .155* | .186** | 0.120 | 0.091 | 0.128 | 0.044 | 0.076 | 0.070 | 0.004 | 0.077 | .146* | 0.051 | .137* | 0.023 |
| Q17-9. intellectual development | -0.074 | -0.036 | -0.004 | 0.086 | -0.016 | 0.060 | .153* | .140* | 0.096 | 0.079 | .195** | 0.048 | .135* | .202** | .145* | 0.091 | .144* | -0.012 | 0.064 | 0.017 | 0.039 | 0.128 | 0.123 | 0.079 | .155* | 0.058 |
| Q17-10. professional development | -0.057 | 0.007 | -0.031 | 0.051 | -0.006 | 0.012 | 0.092 | 0.060 | 0.123 | 0.067 | .153* | 0.018 | 0.102 | .167* | 0.122 | 0.063 | .148* | -0.021 | 0.005 | 0.091 | 0.042 | 0.092 | 0.088 | 0.046 | .162* | 0.062 |
| Q17-11. ethical standards | -0.032 | 0.057 | 0.040 | 0.084 | 0.014 | 0.085 | .152* | 0.080 | 0.098 | .137* | .197** | 0.003 | 0.101 | .182** | 0.094 | 0.081 | 0.108 | 0.051 | .146* | 0.107 | 0.009 | 0.123 | .148* | 0.065 | .144* | -0.003 |
| Q17-12. social development | -0.031 | 0.047 | 0.036 | 0.113 | 0.025 | 0.044 | 0.124 | 0.117 | .131* | 0.081 | .191** | 0.016 | 0.066 | .211** | 0.086 | 0.052 | .134* | 0.056 | .142* | 0.107 | 0.016 | .152* | .145* | 0.082 | .138* | 0.043 |
| Q17-13. civic development | -0.030 | 0.028 | 0.033 | 0.059 | -0.001 | 0.078 | .204** | 0.040 | 0.104 | 0.113 | .151* | -0.005 | .152* | .180** | 0.055 | 0.037 | 0.124 | 0.040 | 0.070 | 0.104 | 0.031 | 0.113 | .181** | 0.035 | .161* | 0.000 |
| Q17-14. academic engagement | -0.052 | -0.056 | -0.037 | 0.104 | -0.054 | 0.063 | 0.077 | .153* | 0.085 | 0.027 | .154* | 0.032 | .133* | .216** | .154* | .147* | 0.122 | 0.030 | -0.034 | 0.063 | 0.048 | 0.115 | 0.081 | 0.012 | .162* | 0.006 |
| Q17-15. practical ingenuity/inventiveness | -0.090 | -0.003 | 0.063 | 0.078 | -0.007 | 0.024 | .191** | 0.069 | 0.097 | 0.100 | .151* | 0.013 | 0.103 | .192** | 0.125 | .143* | .152* | -0.034 | 0.010 | 0.050 | 0.023 | 0.056 | 0.128 | 0.066 | 0.129 | -0.015 |
| Q17-16. creativity | -0.061 | -0.006 | 0.028 | 0.105 | 0.001 | 0.081 | 0.126 | 0.122 | .198** | 0.100 | .149* | -0.009 | 0.079 | .148* | .176** | 0.057 | .168* | -0.013 | -0.014 | 0.034 | 0.040 | .131* | 0.094 | 0.050 | .142* | 0.083 |
| Q17-17. cross-cultural awareness | -0.050 | 0.029 | 0.006 | 0.093 | 0.019 | 0.076 | .139* | 0.074 | 0.125 | 0.126 | 0.112 | -0.040 | .139* | .145* | .143* | 0.094 | 0.109 | -0.001 | 0.003 | 0.045 | 0.029 | 0.034 | 0.116 | -0.017 | .164* | 0.071 |
| Q17-18. global competence | -0.029 | -0.007 | 0.036 | 0.065 | 0.006 | 0.100 | 0.042 | 0.075 | .158* | 0.084 | 0.114 | 0.021 | 0.092 | .163* | 0.108 | 0.043 | 0.112 | -0.002 | 0.015 | -0.033 | 0.070 | 0.023 | 0.048 | 0.030 | .147* | 0.088 |
| Q17-19. business and management skills | 0.062 | 0.060 | -0.019 | 0.088 | -0.011 | 0.118 | .155* | 0.116 | .131* | 0.118 | .136* | 0.053 | .140* | .177** | 0.002 | 0.019 | .159* | 0.067 | 0.050 | 0.033 | 0.032 | 0.047 | .142* | 0.074 | .166* | 0.064 |
| Q17-20. free time was reduced | 0.035 | 0.034 | -0.005 | .133* | 0.007 | -0.011 | 0.009 | -0.009 | 0.053 | 0.124 | 0.080 | 0.074 | 0.102 | 0.093 | -0.125 | 0.011 | 0.093 | -0.007 | 0.035 | 0.042 | 0.040 | 0.039 | 0.048 | 0.001 | 0.067 | 0.019 |
| Q17-21. schedule was less flexible | -0.022 | -0.028 | -0.023 | 0.097 | 0.013 | -0.054 | -0.090 | 0.008 | 0.018 | 0.122 | 0.048 | 0.124 | 0.035 | .209** | -0.038 | 0.071 | 0.108 | -0.091 | -0.052 | 0.065 | 0.025 | 0.028 | 0.017 | 0.068 | 0.079 | 0.025 |
| Q17-22. increased expense | 0.019 | -0.034 | -0.045 | 0.102 | -0.045 | -0.004 | -0.057 | -0.006 | 0.041 | 0.090 | 0.073 | 0.065 | -0.023 | 0.119 | -0.067 | 0.064 | 0.105 | 0.020 | -0.058 | 0.053 | 0.067 | 0.045 | 0.045 | 0.048 | 0.021 | -0.004 |
| Q17-23. academic timeline extended | 0.006 | -0.073 | -0.111 | -0.020 | -0.050 | 0.052 | -.133* | 0.036 | 0.082 | -0.039 | -0.029 | 0.031 | -0.002 | 0.002 | -0.082 | -0.026 | 0.043 | 0.076 | -.180** | -0.083 | 0.002 | -0.034 | -0.081 | 0.008 | -0.023 | 0.055 |
| Q17-24. decreased academic engagement | -0.011 | -.186** | -0.108 | 0.002 | -0.031 | -0.073 | -.203** | 0.029 | 0.026 | -0.073 | -0.034 | 0.029 | -0.042 | 0.051 | -0.064 | -0.045 | 0.037 | -0.015 | -0.122 | -0.109 | -0.012 | -0.073 | -0.090 | -0.028 | -0.011 | 0.044 |
| Q17-25. decreased my GPA in college | 0.063 | -0.087 | -0.058 | -0.023 | -0.054 | 0.022 | -0.082 | -0.052 | -0.015 | -0.067 | -0.042 | -0.022 | -0.037 | -0.052 | -.160* | -.138* | -0.020 | 0.004 | -.179** | -0.069 | -0.038 | -0.098 | -0.098 | -0.063 | -0.041 | 0.002 |
| Q17-26. damaged interpersonal relationships | 0.034 | -0.099 | -.153* | -0.080 | -0.057 | -0.104 | -0.094 | -0.084 | 0.011 | -.149* | -.141* | -0.047 | -0.082 | -0.022 | -0.098 | -.179** | -0.038 | -0.023 | -.219** | -0.070 | -0.008 | -0.078 | -.138* | -0.072 | -0.091 | 0.032 |
| Q17-27. declined personal health | -0.019 | -.156* | -.182** | -0.121 | -0.115 | -0.080 | -.135* | -.138* | -0.043 | -0.123 | -0.112 | -0.038 | -0.082 | -0.008 | -0.105 | -0.118 | -0.038 | -0.023 | -.213** | -0.099 | 0.049 | -0.074 | -.180** | -0.109 | -0.113 | -0.024 |
| Q17-28. social development negatively impacted | 0.001 | -0.114 | -0.126 | -0.107 | -0.095 | -0.054 | -0.088 | -0.091 | -0.015 | -0.083 | -0.100 | -0.041 | -0.044 | -0.031 | -0.061 | -0.103 | -0.031 | -0.048 | -.166* | -0.043 | 0.043 | -.155* | -.153* | -0.088 | -0.076 | -0.048 |
| Q17-29. decreased social engagement | 0.031 | -.143* | -0.103 | -0.075 | -0.049 | -0.078 | -0.104 | -0.086 | 0.007 | -0.093 | -0.081 | -0.052 | -0.025 | -0.043 | -0.058 | -.167* | 0.003 | -0.043 | -.167* | -0.089 | -0.010 | -.134* | -0.121 | -0.045 | -0.032 | 0.009 |
| Q17-30. personal development negatively impacted | 0.021 | -.130* | -0.116 | -.136* | -0.097 | -0.105 | -0.122 | -0.090 | -0.004 | -.147* | -.149* | -0.052 | -0.042 | -0.030 | -0.068 | -.134* | -0.001 | -0.042 | -.203** | -0.082 | -0.004 | -0.110 | -.178** | -0.081 | -0.091 | -0.035 |