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Taiwan student engagement model: Conceptual framework and overview of psychometric properties

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Abstract

The US's National Survey of Student Engagement (NSSE) have long shown that students' engagement such as the level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment, have all contributed to the desired outcomes in college. In Taiwan, a national dataset called the Freshman-Junior Student Survey (FJSS); wherein 49,609 students were surveyed, was used to gather information regarding students' learning experiences. Using the NSSE as a model, this paper details the quantitative analysis of the FJSS with the aim of developing a Taiwan student engagement model (TSEM). Results show that the TSEM both contains conceptual factors derived from the NSSE and contextual issues that are only found in Taiwan. Lastly, the psychometric properties of the TSEM were validated using the confirmatory factor analysis.

Keywords: student engagement; school involvement; quantitative study; confirmatory factor analysis; Taiwan; national database

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1. Introduction

As the maturation of the age of knowledge economy approaches, a major challenge for higher education is to provide broad access while sustaining or improving the quality of education. However, the drive towards massification of higher education has caused the average qualification for academics in many countries to decline (Altbach, Reisberg, & Rumbley, 2009). To alleviate this problem, numerous researches regarding the concept of students' school engagement have emerged (Kuh, 2009). Student engagement has been used to describe what college students are doing. Countless research has mentioned that students undergoing educationally purposeful activities are the single best predictor of academic and personal development (Astin, 1993; Kuh, 2001b; Pascarella & Terenzini, 2005). Educationally purposeful activities are practices that encourage student engagement and foster learning (Chickering & Reisser, 1993). Chickering and Gamson (1987) mentioned in the "Seven Principles for Good Practice in Undergraduate Education" various practices that leads to high levels of student engagement. Such principles include student-faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning.

In Taiwan, higher education institutions have experienced transformation along the lines of decentralization and marketization (Mok, 2000). The revision of the University Act in 1994 prompted the restructuring of state owned HEIs into independent legal entities (Mok, 2006), thereby reducing the control of the Ministry of Education (MOE) over higher education institutions (HEIs), thus making campus operations more flexible. In the following years, Taiwan's government, acknowledging that the state alone can never satisfy the pressing demand for higher education, decided to revise its education ordinances and create room for the expansion of private higher education (Mok, 2000, 2005). This sparked a growth in the number of HEIs over the decades. Currently, the number of HEIs has increased dramatically from 7 in 1950 to 164 in 2008, among which are 100 universities, 49 colleges, and 15 junior colleges (MOE, 2008). However, the recent increased in numbers of higher education institutions has also brought forth issues in academic quality and educational outcomes. More so, the national census have mentioned that the volume of Taiwanese students is expected to decrease dramatically within the next decade (AFP, 2009). Hence, HEIs in Taiwan are currently being pressure to outperform each other. This problem has led the academe to shift its focus towards the quality of education, since only the schools who are effective are the ones that will be able to survive the upcoming problem of the decade.

This quantitative study details an empirical analysis of the dataset; the Taiwan's Higher Education Students Survey; or more commonly referred to as the Freshman Junior Student Survey (FJSS). More specifically, an analysis of the FJSS with regards to the five effective educational practices and three specific gains as pointed out by the National Survey of Student Engagement (NSSE) of the US. Since, the FJSS aims to provide a comprehensive and holistic outlook of how Taiwanese students learn. Hence, the main goal of this study is to develop a Taiwan Student Engagement Model (TSEM) and test its' psychometric properties. The study is able to contribute to the general Taiwanese public by means of reiterating the importance of achieving quality education through effective student engagement. The TSEM also provides the potential of contributing to the persistent improvement of students' learning. In essence, provide the ways on how students can be motivated academically and devote more effort in educationally purposeful activities. Lastly, in a globalizing age, in order to become globally competitive, it is quite important to determine whether our students are really learning or not. Hence, a clear outlook of how students learn by means of the TSEM, shall aid in both the development and improvement

of higher education policies, as well as to provide useful research information for the Taiwanese higher education academic community.

2. Perspectives and Theoretical Framework

2.1 What is Student Engagement?

For the past two decades, the concept of student engagement has been recognized as one of the major factors contributing to desirable collegiate outcomes (Kuh, 2009; Zhao & Kuh, 2004). However, the definition and the method used in measuring student engagement vary from studies to studies (Dunleavy & Milton, 2009; Fredricks, Blumenfeld, & Paris, 2004). The term *engagement* can be defined as involvement or commitment (engagement, 2010). Consequently, *student engagement* can be defined as student involvement or student commitment. Similarly, Astin (1985) theory of student involvement noted that students learn by the concept of being involved. Beyond this definition, student engagement is also said to be multidimensional by nature (Ainley, 1993; Martin & Dowson, 2009). Such multidimensional nature of student engagement have slowly shaped the concept into both a strategy for improving educational achievement and as an independently valuable outcome of schooling (Dunleavy & Milton, 2009).

Student engagement is frequently seen as a cure for the contemporary students' notion of school as boring or as a mere grade game (Burkett, 2002; Pope, 2002). Student engagement is also used to described students' willingness to participate in routine school activities, such as attending class, submitting school work, and following class instructions (Chapman, 2003a, 2003b). Some researchers considered student engagement to include students' participation in lesson and curriculum planning, classroom management, and other pedagogical involved tasks (Keedy & Drmacich, 1991). Other studies even defined engagement in terms of interest, effort, motivation, time-on-task; the time student spent on a particular learning task (Bulger, Mayer, Almeroth, & Blau, 2008). More recent concept of student engagement has placed much interest in the influence of school context, more specifically in the relationships between campus climate and students' experience of engagement (Dunleavy & Milton, 2009).

A basic understanding of student engagement is that students' activity, involvement, and efforts in their learning tasks is related to their academic achievement. Krause and Coates (2008) mentioned that student engagement is the quality of effort students devote to educationally purposeful activities that directly contribute to desirable educational outcomes. In other words student engagement is the degree and quality, to which learners are engaged with their educational activities, which are positively linked to a host of desired outcomes, including high grades, student satisfaction, and perseverance (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). In essence, the more students spend quality time and study a subject, the more they will know about it. Similarly, the more students interacts academically with faculties, the deeper they tend to understand what they are actually learning (Kuh, 2009).

2.2 Dimensions of Student Engagement

As mentioned before, student engagement is multidimensional by nature (Ainley, 1993; Martin & Dowson, 2009). The multidimensional nature of student engagement is actually reflected in the research literature (Fredricks et al., 2004). These dimensions vary differently depending on the approaches used in studying student engagement. Majority of the studies in the literature focuses on either a single or a combination of these dimensions. Most studies differentiate student engagement by their types, such as: Social engagement, Academic engagement, and Intellectual engagement (Dunleavy & Milton, 2009). Furthermore, many researchers also differentiate student engagement in terms of the different ways of understanding how students engage, such as: Behavioral engagement, Emotional engagement, and Cognitive engagement (Dunleavy & Milton, 2009; Fredricks et al., 2004).

2.2.1 Social engagement

The National Research Council (2003) of the US noted that *social engagement* is the combination of the students' sense of belongingness at school, their feeling of connectedness and acceptance with classmates and peers, quality interaction with faculties, and their overall acknowledgement of the concept of schooling. Since, most researchers concluded that students who are disaffected (disengaged or the lack of engagement), tends to be bored, depressed, or even angry during class (Chapman, 2003a). Similarly, disengaged students are said to be withdrawn from their peers, while some even exhibits rebellious behavior and go up against their teachers and other faculties (Skinner & Belmont, 1993). In essence, students who feels socially isolated and fails to see the goals of schooling are more likely to not to function effectively (Hu & Kuh, 2002; National Research Council, 2003).

2.2.2 Academic and intellectual engagement

Academic engagement is said to include the psychological investments and efforts toward learning, the mastery of skills and crafts, and the participation in the different knowledge developing tasks (Newmann, 1992). In academic engagement, it is important to determine and understand what motivates students to participate in the required tasks in order to achieve school success (Newmann & Associates, 1996). While *intellectual engagement* is said to be the serious emotional and cognitive investment in learning (Dunleavy & Milton, 2009). Since, the most motivated and resilient students are said to be not the ones who think they have a lot of fixed or innate intelligence, but actually those who believe that their abilities can be developed through their effort and learning (Dweck, 2007, p. 6). In essence, in order to learn, what students both wants and needs are learning environments that are designed for deep intellectual engagement through which they can experience learning.

2.2.3 Behavioral and emotional engagement

Looking into the different ways how student engage, the concept of *behavioral engagement* comes from the notion of participation (Fredricks et al., 2004). Such participations in academic and social or co-curricular activities, active attendance, assignments and homework completion, are all considered crucial for achieving positive academic outcomes (Dunleavy & Milton, 2009; Fullarton, 2002; Kuh, 2008b; Willms, 2003). Behavioral engagement also encompasses the students' ability to follow rules and directions adhering to classroom norms, as well as coming to class on time and avoiding unnecessary negative behaviors (Finn & Rock, 1997). *Emotional engagement* is the combination of the students' sense of belongingness, feeling of competence, and motivation towards the concept of schooling (Dunleavy & Milton, 2009; Willms, 2003). It is also said to include the positive and negative reactions towards peers, teachers, administrators, and the school itself, these factors are all said to contribute to the students' willingness to participate (Fredricks et al., 2004).

2.2.4 Cognitive engagement

Cognitive engagement draws from the idea of investment (Fredricks et al., 2004). Studies mentioned that cognitive engagement consists of psychological investment in learning (Connell & Wellborn, 1991). Some also mentioned that cognitive engagement is a desire to go beyond the minimum school requirements; a preference for challenge (Kuh, 2009; Newmann, Wehlage, & Lamborn, 1992). This is actually derived from Weiner's (1979, 1985) attribution theory, which mentioned that academic motivation in terms of task difficulty (or having the opportunity of a challenge) is one of the determining factors in the effort a student will expend on that activity. Since learning goals are set by the students themselves, therefore students seeking to improve their competence are likely to seek challenges and they tend to respond to failure by increasing their effort (Elliott & Dweck, 1988). Such efforts could be further classified as the students' *volition*; the psychological control processes that protect concentration and directed effort in the face of personal and/or environmental distractions, and so aid learning and performance (Corno, 1993, p. 16), which is said to be the underlying factor in going beyond the requirements in cognitive engagements (Fredricks et al., 2004).

2.3 Indicators of Student Engagement

Student engagement has been used to describe what college students are doing. Countless research has mentioned that students undergoing educationally purposeful activities are the single best predictor of academic and personal development (Astin, 1993; Kuh, 2001a; Pascarella & Terenzini, 2005). Educationally purposeful activities are practices that encourage student engagement and foster learning (Chickering & Reisser, 1993). Chickering and Gamson (1987) mentioned in the "Seven Principles for Good Practice in Undergraduate Education" various practices that leads to high levels of student engagement. Such principles include student-faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning.

Some researchers mentioned that school climate or atmosphere such as the having an ethic of caring and supporting relationships, sense of respect, fairness, trust, and a strong disciplinary climate, are some of the factors that supports effective student engagement (Dunleavy & Milton, 2009). Similarly, the notion of *academic press*; high expectations for academic success, are supportive learning environments that promote competence and control (Lee, Bryk, & Smith, 1993). In essence, students who are engaged show sustained behavioral involvement in learning activities accompanied by a positive emotional tone (Skinner & Belmont, 1993). More importantly, students that are engaged select tasks at the limit of their competencies, initiate action when given the opportunity, and shows positive emotions including enthusiasm, optimism, curiosity, and interest (Kuh et al., 2008; Skinner & Belmont, 1993). In sum, student engagement is seen to comprise of various indicators such as active and collaborative learning, participation in challenging academic activities, formative communication with academic staff, involvement in enriching educational experiences, and feeling legitimated and supported by university learning communities (Coates, 2007, p. 122).

In the NSSE of the US, since its inception in 2000, more than one million randomly selected students from 1,100 different four-year colleges and universities have participated in the collection of information regarding effective educational practices (National Survey of Student Engagement, 2006). With its goal of providing data to colleges and universities to use, in order to improve its undergraduate education, inform state accountability and accreditation efforts, and facilitate national and sector benchmarking efforts, among others, NSSE has become the leading authority on enhancing student success, improving undergraduate education, and promoting collegiate quality. Currently, NSSE has been highly quoted in researchers and is adapted in countries such as Canada, Australia, and many others (National Survey of Student Engagement, 2010). In the conceptual framework of NSSE, Kuh (2009) mentioned that there are five key clusters of activities that are linked to desired outcomes in education. These are level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment. These indicators or benchmarks are well supported with not only the findings of the NSSE, but are also noted in findings of various student engagement studies (Coates, 2007; Dunleavy & Milton, 2009).

2.3.1 Level of academic challenge

Level of academic challenge is the concept derived from Weiner's (1979, 1985) attribution theory, which mentioned that academic motivation in terms of task difficulty (or having the opportunity of a challenge) is one of the determining factors in the effort a student will expend on that activity. Similarly, challenging intellectual and creative work are both said to be central to student learning and collegiate quality (National Survey of Student Engagement, 2006). Since, colleges and universities promote high levels of student achievement by emphasizing the importance of academic effort, therefore students who are motivated to take the challenge and/or try something new, ultimately leads to deep learning; a combination of emotion, cognition and the development of social and intellectual learning capacities (K. Evans, Gerlach, & Kelner, 2007, p. 199). It is said that when students are intellectually engaged, they experience serious emotional and cognitive investment in learning. Similar to what Friesen (2008, p. 9) describes as an absorbing, creatively energizing focus requiring contemplation, interpretation, understanding, meaning-making and critique which results in a deep, personal

commitment to explore and investigate an idea, issue, problem or question for a sustained period of time.

2.3.2 Active and collaborative learning (ACL)

Active and collaborative learning recognizes that learning is collaborative and social. Active learning states that students learn more when they are intensely involved in their education (National Survey of Student Engagement, 2006). In general, active learning involves any instructional method that engages student in the learning process, and requires students to perform meaningful learning activities and think about what they are doing (Prince, 2004). Chickering and Gamson (1987) described active learning as the process of talking, writing, relating to and reflecting on what is being learned, rather than passively receiving information. In essence, core components of active learning are student activity and engagement in the learning process.

On the other hand, collaborative learning is defined as any instructional method in which students work together in small groups toward a common goal (Prince, 2004). As the notion of working with others often increases involvement in learning, similarly, sharing one's own ideas and responding to others' reactions sharpens thinking and deepens understanding (Chickering & Gamson, 1987, p. 2). Some have suggested that collaborative learning encompasses cooperative learning; the association of persons for a common benefit (Cooperation, 2010), or simply put is the process of working together to accomplish shared goals. College students nowadays are primarily involved in their studies and classroom activities; however, involvement in co-curricular activities (e.g. student clubs and organizations) is also quite common. In a study involving the quality of student involvement in a group of college educational psychology students, findings suggest that overall quality of experience was greater during cooperative learning. Benefits occurred specifically for thinking on task, student engagement, perceptions of task importance, and optimal levels of challenge and skill (Peterson & Miller, 2004).

2.3.3 Student-faculty interaction (SFI)

Student-faculty interaction is the quality communication between student and faculty. Studies have shown that when students interact with faculty inside and outside the classroom, students tend to learn firsthand information and/or knowledge (National Survey of Student Engagement, 2006). The transformation of learning environments into places of effective teaching and deep learning requires new ways of looking at the roles of teachers (Dunleavy & Milton, 2009). Hence, NSSE noted that teachers should be role models, mentors, and guides for continuous, life-long learning behavior of the students. In addition, studies have shown that when students experience a sense of belongingness offered to them by adults (teachers and academic staffs), these eventually leads to the acceptance of the concept of schooling (Hu & Kuh, 2002; National Research Council, 2003).

2.3.4 Enriching educational experiences (EEE)

Enriching educational experiences encompasses learning opportunities both inside and outside the classroom. Besides the more common co-curricular activities found inside the school, some other enriching experiences includes opportunity to learn from and in a culturally diverse atmosphere, technology enhanced learning, internship experiences, and community service opportunity (National Survey of Student Engagement, 2006). Co-curricular activity is defined as the activities being outside of, but usually complementing the regular curriculum (cocurricular, 2010). Sometimes also known as extra-curricular activities; such activities are either required or voluntary depending upon the institution's requirement. In a study in Taiwan, it is mentioned that extra-curricular clubs do actually foster the development of students' leadership skills and language skills (T. C. Hsu, 2011). In Singapore, co-curricular activities are sanctioned by their Ministry of Education, because such activities are believed to be a means of enhancing the students' social interaction, leadership, healthy recreation, self-discipline, and self-confidence (Teo, 2000). In addition, in higher education levels co-curricular activities participation may even translate into academic points.

2.3.5 Supportive campus environment (SCE)

Supportive campus environment indicates that students perform better and are more satisfied at institutions that are committed to their success and cultivate positive working and social relations among different groups on campus (National Survey of Student Engagement, 2006). In a broader sense, a group or a community is the result of interaction and deliberation by people brought together by similar interests and common goals (Rovai, 2002). In a Finnish study of students' study paths, it is also mentioned that an accommodating school community itself positively contributed to the development of desirable student engagement (Määttä & Uusiautti, 2011). In essence, when students feel involved and develop relationships with other members of the learning community, ultimately, this will increase their levels of satisfaction and the likelihood of both finishing and succeeding in school.

In Taiwan, several studies involving college students have also pointed out that students learn more by becoming more involved (Chang, 1990; Huang & Chang, 2004; Lin, 1990). For years researchers have mentioned that student involvement in educationally purposeful activities (such as co-curricular activities) have found to have positively contributed to the students' educational performance (Astin, 1984/1999; Kuh, 1995, 2008a). Astin (1984/1999) proposed the *student involvement theory*, which indicate that the amount of physical and psychological energy that the student devotes to the academic experience or rather the amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program. However, it is apparent that many students do not know or understand that the impact of university on them is largely determined by their quality of effort and level of involvement in both academic and non-academic activities (including co-curricular activities) (Ethington & Polizzi, 1996; Pascarella & Terenzini, 1991). In sum, for students' growth to take place, students need to actively engage in their environment. In a way, the effectiveness of any educational policy, practice, or program is directly related to the capacity of that policy, practice, or program to increase student engagement.

3. Research methodology

3.1 Research design

The study was design as a quantitative research, wherein the intended variables and factors are measurable or otherwise quantifiable. A powerful research form, emerging in part from the positivist tradition, a quantitative research therefore aims to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population (Cohen, Manion, & Morrison, 2007). In addition, this quantitative study is design as a descriptive research, wherein the subjects are usually measured once and with the goal of establishing associations between variables. For an accurate estimate of the relationship between variables, a descriptive study usually needs a sample of hundreds or even thousands of subjects. The estimate of the relationship is less likely to be biased if the study has a high participation rate in a sample selected randomly from a population. Furthermore, quantitative research employs statistical analysis to order its sample results and yield predictions of the future behavior of a similar sample group. In essence, quantitative research is undertaken by means of forming a hypothesis, gathering data, which is then ordered and analyzed. Lastly, the conclusion will be determined whether the initial hypothesis is supported by the evidence (data) or not.

3.2 Research instruments

3.2.1 National Survey of Student Engagement (NSSE)

Since its inception in 2000, more than one million randomly selected students from 1,100 different four-year colleges and universities have participated in the collection of information regarding highly effective educational practices (National Survey of Student Engagement, 2006). Currently, NSSE has been highly quoted in researchers and is adapted in countries such as Canada, Australia, and many others (National Survey of Student

Engagement, 2010). In the conceptual framework of NSSE, Kuh (2009) mentioned that there are five key clusters of activities that are linked to desired outcomes in education. These are level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment. These indicators or benchmarks are well supported with not only the findings of the NSSE, but are also noted in findings of various student engagement studies (Coates, 2007; Dunleavy & Milton, 2009).

The NSSE questionnaire collects information in five categories (Kuh, 2009):

- First, it asks students questions about their *participation in dozens of educationally purposeful activities*, such as interacting with faculty and peers, the amount of time they spend studying or participating in co-curricular or other activities, including work on or off the campus. Seniors report whether they took advantage of such learning opportunities as being part of a learning community, working with a faculty member on a research project, internships, community service, and study abroad. First-year students indicate whether they have done or plan to do these things.

- A second set of questions asks students about *what the institution requires of them*, such as the amount of reading and writing students did during the current school year and the nature of their examinations and coursework.

- A third set of questions asks students about their *perceptions of features of the college environment* that are associated with achievement, satisfaction, and persistence including the extent to which the institution offers the support students need to succeed academically and the quality of relations among various groups on campus such as faculty and students.

- In the fourth set, students provide *information about their background*, including age, gender, race/ethnicity, living situation, educational status, and major field.

- Lastly, students estimate their *educational and personal growth* since starting college in the areas of general knowledge; intellectual skills; written and oral communication skills; personal, social, and ethical development; and vocational preparation. *(For more details, please see http://nsse.iub.edu/)*

3.2.2 Freshman Junior Student Survey (FJSS)

The Taiwan Integrated Postsecondary Education Database (TIPED) is a project sponsored by the Taiwan's National Science Council (NSC) and MOE. TIPED was established to administer and gather a comprehensive database with regards to the higher education of Taiwan. The database is separated into three areas namely: institution-based information, student-based data, and staff-based information. More specifically, the database includes data such as the major characteristics and status of colleges and universities, funding, campus environment, equipment and resources, curriculum, campus culture, faculty and staff quality, students' characteristics and their learning behavior, students' performance in various levels and disciplines, and the students' subsequent development after graduation (Taiwan Integrated Postsecondary Education Database, 2010). Data gathered are used to form educational indicators, which can aid and assist the government in making decisions, assist institutional evaluation for self-improvement, determines the growth and development of students, and help improve the quality of higher education research.

Within the TIPED, a dataset called the Taiwan's Higher Education Students Survey; or more commonly referred to as the Freshman Junior Student Survey (FJSS) was used to gather information from junior college students within the 2003, 2005, and 2007 academic years. The FJSS is separated into seven parts, namely: academic experiences, educational expenditures, academic lifestyle, future plans, school satisfaction, self-evaluation, and background demography (Center for Educational Research and Evaluation, 2010; Peng, 2006a, 2006b).

- The *academic experiences* section includes the different learning processes of the students. Data

gathered includes the various teaching methodology, assessment methods, and curriculum designs the students are exposed to. Additional information regarding their community participation, course satisfaction, and course attendance are also noted.

- The *educational expenditure* section mostly deals with how the students pay for their education. Information gathered includes the students' source of tuition and living allowances, scholarship status, and work situations.
- The *academic lifestyles* section includes information regarding the students' learning styles. Data gathered are frequency of activities related to learning and status of peer interactions.
- The *future plan* section deals with the students' learning goals and future expectations.
- The *school satisfaction* section deals with the students' contentment regarding the various school related issues, such as course programs, faculty, and many others.
- The *self-evaluation* section deals with the students' perception of their own cognitive and emotional status.
- Lastly, the *background demography* section includes the different personal information of the students to differentiate the nominal data on participants' backgrounds and relevant personal details with the other scales (Weisberg, Kronsnick, & Bowen, 1996). *(For more details, please see http://www.cher.ntnu.edu.tw/)*

3.3 Research participants

This study utilizes data coming from the 2005 FJSS. The FJSS utilizes a stratified random sampling method. Sampling and assignment of research participants are part of the research process that are critical to the success and accuracy of the research (Drew, Hardman, & Hosp, 2008). Researchers mentioned that errors during this phase plague investigators in many disciplines and can easily corrupt the worth of the entire study (Creswell, 2005; Flick, Steinke, & Kardoff, 2004). Hence, careful selection of participants is always a must in social science studies. Stratified sampling involves dividing the population into homogeneous groups, wherein each group contains subjects with similar characteristics (Cohen et al., 2007). In addition, Stratified sampling is also a method of random sampling. In essence, in a stratified sample the sampling frame is divided into non-overlapping groups or strata, such as geographical locations, age-groups, genders. A sample is then taken from each stratum, and when this sample is a simple random sample it is referred to as stratified random sampling (Hunt & Tyrrell, 2004).

The FJSS was gathered within the 2003, 2005, and 2007 academic years. Currently only the 2003 and 2005 data are available. A stratified random sampling method was used with the different steps involved are as such (Taiwan Integrated Postsecondary Education Database, 2010):

1. The actual number of students enrolled in the different types of HEIs was taken into account as the population.
2. The HEIs were separated into different types according to their classifications, such as typical university, technical and vocational university, junior colleges, and normal colleges, with a sampling ratio of 1/4 or 25% from each of the following types of HEIs.
3. Within each type of HEIs, random samplings were taken from students of different course programs relative to the size of the HEIs were the students are enrolled in. In addition, a minimum of 30 students per course programs were decided to ensure the representativeness of the sample.
4. Students with physical disabilities, disadvantages, or with ethnicity belonging to the aboriginal tribes

of Taiwan were removed from the sample.

5. Within each HEI a minimum of 100 students were sample and included in the FJSS.

Table 1 shows the stratified random sampling size together with the actual number of respondents of the 2003 and 2005 FJSS. For the current study, only the data coming from the 2005 school year shall be utilized. The table also shows the rate of return of the survey questionnaire to be around an average of 65% for the two years, which is considered to be good (Punch, 2003; Shaughnessy, Zechmeister, & Zechmeister, 2003). In essence, response rates are very important when the study's purpose is to measure effects or make generalizations to a larger population. While, table 2 shows the background of the 2005 respondents with a sample size of 49,609 students.

Table 1

THESS stratified random sampling size and number of respondents

School year	HEIs	Population	Sample size	Respondents	Rate of return (%)
2003	140	164,725	48,899	30,272	61.9
2005	156	174,277	49,609	26,307	67.8

Source. Taiwan Integrated Postsecondary Education Database (Peng, 2006a, 2006b). (http://www.cher.ntnu.edu.tw)

Table 2

Background of the 2005 participants (N=49,609)

Factors	Items	*n*	%
Gender	Male	23670	47.71
	Female	25939	52.29
General school type	Public university	10082	20.32
	Public technical	4613	9.30
	Private university	17194	34.66
	Private technical	17720	35.72
School type	Public regular university	9743	19.64
	Public regular college	339	0.68
	Public technical university	2808	5.66
	Public vocational college	1512	3.05
	Public junior college	293	0.59
	Private regular university	15514	31.27
	Private regular college	1680	3.39
	Private technical university	7252	14.62
	Private vocational college	9007	18.16
	Private junior college	1461	2.95

4. Results and Discussions

The objective of this study is to analyze the NSSE constructs amidst the FJSS with a final goal of developing a TSEM. More specifically within the following five effective educational benchmark practices and

three educational outcome gains as proposed by Kuh (2009), namely: level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment; general education gains, personal social gains, and practical competence gain. (For a graphical perspective of the research goal, please refer to figure 1)

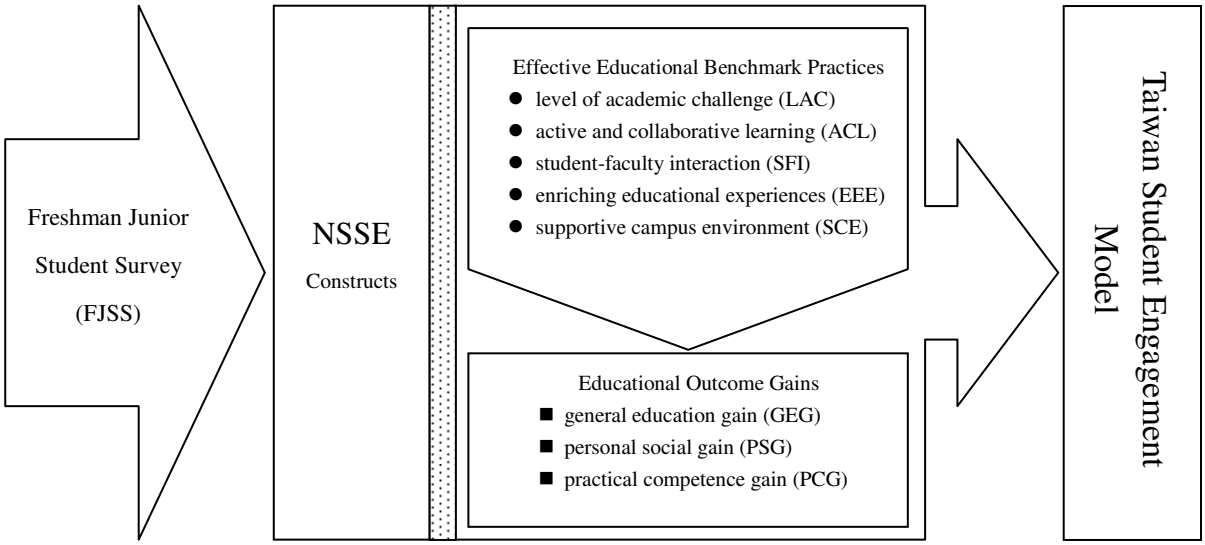

Figure 1. The formation of the Taiwan Student Engagement Model

4.1 Taiwan Student Engagement Constructs

To develop the TSEM, FJSS items were compared with the NSSE constructs. Items from the five educational benchmark practices from NSSE such as: level of academic challenge (**LAC**), active and collaborative learning (**ACL**), student-faculty interaction (**SFI**), enriching educational experiences (**EEE**), and supportive campus environment (**SCE**), and the three educational outcome gains from the NSSE, such as: general education gains (**GEG**), personal social gains (**PSG**), and practical competence gain (**PCG**), were compared. In addition, FJSS items that are comparable to the NSSE constructs were also included. Such local items that are similar in essence to the NSSE of the US and should be included in the Taiwan student engagement constructs in order to better capture the contextual meaning of student engagement. Items such as **EEE_8_T** (*In my college years, I took professional certification examinations*) and **EEE_9_T** (*In my college years, I planned to take the national civil service examination*), which stated the importance of certification and civil service examination, have long been part of the career path of most college students in Taiwan. For students who wanted to work for the government and earn a secure living, taking the civil service examination would be their best choice of landing one.

Furthermore, while for students who opt for business related occupations, securing both international and local certifications (Language, Information Technology, and many other types of certification) would be the best choice of action. In addition, educational outcome gains such as **PCG_5_T** (*Leadership skills*), **PCG_6_T** (*English language listening and speaking ability*), **PCG_7_T** (*English language reading ability*), **PCG_8_T** (*Expand your knowledge and vision*), and **PCG_9_T** (*Establish and expand your social network*), which stated items such as leadership skills, language skills, widen perspective, and social interactive skills, are all considered to be of skills that are relevant for a the college graduates of today. Since, in Taiwan English is already being highly regarded as the de-facto language in the areas of banking, commerce, trade, research, technology, and tourism (Tsai, 1998). Furthermore, as Taiwan engages more centrally as a player in the global economic stage (Mok, 2005; Zaharia & Gilbert, 2005), the trend of using English as a medium of instruction has becomes an increasingly important element for the education of Taiwan students. (For more details, please see table 2)

Table 2

Psychometric properties of Taiwan student engagement constructs

Factors	Code	Items	*N*	Min.	Max.	*M*	*SD*	Alpha
ACL	ACL_1	During class, teachers use the teacher/student interactive learning approach (questioning and discussion)	26394	1	4	3.01	0.72	0.695
	ACL_2	During class, teachers uses student grouping for their discussion and presentation	26392	1	4	3.15	0.78	
	ACL_3	During reports, teachers allow students to select and compile their own research topic	26391	1	4	2.88	0.82	
EEE	EEE_2_1	Discuss national, societal, political, and other related issues with classmates, friends, and family	25357	1	4	2.36	0.78	0.539
	EEE_2_2	Discuss personal ideas, values, religion, emotional, and other related issues with classmates, friends, and family	25360	1	4	2.73	0.83	
	EEE_3	In my college years, I accomplished a research project	25264	1	5	1.84	0.80	
	EEE_4	In my college years, I planned to study abroad	25272	1	5	1.46	0.70	
	EEE_5	In my college years, I planned to take up graduate studies in Taiwan	25256	1	5	1.81	0.77	
	EEE_6	In group work, I was able to work smoothly with others	25167	1	4	2.95	0.71	
	EEE_7	I join activities of other ethnic groups	25170	1	4	2.18	0.80	
	EEE_8_**T**	In my college years, I took professional certification examinations	25248	1	5	1.97	0.79	
	EEE_9_**T**	In my college years, I planned to take the national civil service examination	25256	1	5	1.60	0.70	
LAC	LAC_1	In my department, courses emphasizes good memory, such as memorizing book contents and/or experimental procedures	26388	1	4	2.76	0.84	0.629
	LAC_2	In my department, courses emphasizes good analytical skills, such as analysis of complex problems and in-depth conceptual analysis	26395	1	4	2.92	0.80	
	LAC_3	In my department, courses emphasizes generalization and integration, such as integration of various concepts and explanation of theoretical formulation	26394	1	4	2.92	0.82	
	LAC_4	In my department, courses emphasizes evaluation and opinions, such as evaluation of the data analysis and appropriateness of the research methodology of a report	26394	1	4	2.75	0.84	
	LAC_5	In my department, courses emphasizes applications, such as theoretical applications and conceptual approach in solving existing and/or new problems	26393	1	4	2.90	0.84	
	LAC_6	I will review before going to class	25875	1	4	2.08	0.68	
	LAC_7	I spent time on reviewing, preparing, and/or finishing my school work (this includes spending time surfing the internet for information)	24872	0	24	2.75	2.48	
SCE	SCE_1_1	I am able to find a good friend	25292	1	4	3.08	0.69	0.861
	SCE_1_2	I am able to find a friend who studies with me	25291	1	4	2.97	0.70	
	SCE_1_3	I am able to ask for my classmates help	25291	1	4	3.17	0.62	
	SCE_1_4	I am able to find a friend that can go with me and join various different kind of activities	25289	1	4	3.08	0.67	
	SCE_2_1	I take initiative in consulting teachers regarding my difficulties in life and studies	25289	1	4	2.49	0.78	
	SCE_2_2	I will tell my inner thinking and feelings to my teacher	25288	1	4	2.07	0.80	
	SCE_3_1	When I need help in my studies, the school academic personnel always provides me with appropriate assistance	25278	1	4	2.35	0.79	
	SCE_3_2	When I need help in my daily life, the school student affairs personnel always provides me with appropriate assistance	25282	1	4	2.30	0.78	
	SCE_3_3	When I need help, the department staff always provides me with appropriate assistance	25281	1	4	2.52	0.79	
	SCE_3_4	Generally speaking, the school academic personnel possess a warm and friendly attitude	25281	1	4	2.53	0.76	
	SCE_3_5	Generally speaking, the school student affairs personnel possess a warm and friendly attitude	25279	1	4	2.54	0.75	
	SCE_3_6	Generally speaking, the department administrative staff possess a warm and friendly attitude	25282	1	4	2.52	0.79	

Table 2 continue…

Psychometric properties of Taiwan student engagement constructs

Factors	Code	Items	*N*	Min.	Max.	*M*	*SD*	Alpha
SFI	SFI_1	Teachers teaching style is to guide students in actual application, experimentation, and research	26392	1	4	2.58	0.85	0.586
	SFI_2	Teachers provide me with appropriate assistance	25290	1	4	2.75	0.69	
	SFI_3	Teachers take initiative in taking care of students	25288	1	4	2.63	0.75	
	SFI_4	In times of learning difficulties, I know where to look for information or to whom I can consult with	25176	1	4	2.89	0.64	
GEG	GEG_1	Oral speaking	25177	1	5	2.93	0.94	0.770
	GEG_2	Language expression (including written)	25172	1	5	2.85	0.92	
	GEG_3	Interpersonal skills (communication, cooperation/ability to work with others)	25174	1	5	3.23	0.86	
PCG	PCG_1	Mathematical logic skills	25172	1	5	2.63	1.05	0.685
	PCG_2	Information technology skills	25171	1	5	2.71	0.96	
	PCG_3	Gain professional expertise	25169	1	4	3.25	0.73	
	PCG_4	Gain individual competitiveness	25171	1	4	3.23	0.76	
	PCG_5_**T**	Leadership skills	25175	1	5	2.90	0.91	
	PCG_6_**T**	English language listening and speaking ability	25175	1	5	2.37	0.96	
	PCG_7_**T**	English language reading ability	25173	1	5	2.49	0.95	
	PCG_8_**T**	Expand your knowledge and vision	25170	1	4	3.35	0.69	
	PCG_9_**T**	Establish and expand your social network	25166	1	4	3.29	0.72	
PSG	PSG_1	One of the function of university education is to expand my knowledge of life	25169	1	4	3.30	0.71	0.866
	PSG_2	One of the function of university education is to enhance my own self-understanding	25167	1	4	3.29	0.73	
	PSG_3	One of the function of university education is to enhanced my understanding of the evolving changes in the society	25164	1	4	3.23	0.74	

Note: Codes with a **T** are local (Taiwan) contextual items in the FJSS deemed related with the student engagement construct of the NSSE. *Z value* was used to established normality within items of varying scale. **ACL**: Active and Collaborative Learning, **EEE**: Enriching Education Experiences, **LAC**: Level of Academic Challenge, **SCE**: Supportive Campus Environment, **SFI**: Student Faculty Interaction, **GEG**: General Education Gains, **PCG**: Practical Competence Gains, and **PSG**: Personal Social Gains.

Besides such issues, many have also mentioned that having good communication skills are regarded as an indispensable asset, which without it the goal of communication cannot be realized (S. Evans & Green, 2001; Skehan, 1998; Widdowson, 1978). In medical care, ineffective communication, rather than the lack of skill, prevents doctors from relaying to their patients that their best interests is to provide the best care for them (Deveugele et al., 2005; Fallowfield & Jenkins, 1999; Fallowfield et al., 2002). Similarly, teachers who can communicate well with students can inspire them to learn and participate more in class (Noels, Clément, & Pelletier, 1999). Hence, good communication skills have become a must in college graduates (Coldstream, 1997), and likewise considered as a prerequisite for a lot of occupations.

In the educational setting, the emphasis on the need for higher education institutions to further commit in the leadership skills development of students, have also brought pressure to school administrators (Dimmock, 2000; Harris & Lambert, 2003). In addition, within the age of globalization and internationalization, collaboration and cooperation among students of diverse cultural background are also strongly encouraged (Barnett, Basom, Yerkes, & Norris, 2000). In Taiwan, the development of both leadership and communication skills in students are seen as an important core competencies (Wu, Chen, & Lin, 2004; Yen, Chen, Leea, & Koh, 2003), hence

inclusion of such developmental program in the curricula should be encouraged (J. F. Hsu & Gregory, 1995). In essence, for today's student, having a good English communication skills and leadership capacity before graduation is seen as vital component in their future careers, hence, in order to more accurately depict Taiwan students student engagement, the addition of such items in the TSEM is deemed important.

In addition, Table 3 shows the items in the NSSE, which are ***not*** found in the FJSS. Since these items are included in the NSSE of the US, which already has a decade of empirical data to give grounds for its validity in the student engagement constructs. Hence, analysis of these variables not which are not found in the FJSS shall be of the utmost importance. However, the current study did not include such analysis and as such shall be left as a future research goal.

Table 3

NSSE constructs not available in the FJSS

Factors	Items
Active and collaborative Learning (ACL)	Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)
	Worked with classmates outside of class to prepare class assignments
	Tutored or taught other students (paid or voluntary)
	Participated in a community-based project (e.g., service learning) as part of a regular course
Enriching Education Experiences (EEE)	Practicum, internship, field experience, co-op experience, or clinical assignment
	Community service or volunteer work
	Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment
	Foreign language coursework
	Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)
Level of Academic Challenge (LAC)	Number of assigned textbooks, books, or book-length packs of course readings
	Spending significant amounts of time studying and on academic work
	Worked harder than you thought you could to meet an instructor's standards or expectations
Supportive Campus Environment (SCE)	Providing the support you need to help you succeed academically
	Helping you cope with your non- academic responsibilities (work, family, etc.)
	Providing the support you need to thrive socially
Student Faculty Interaction (SFI)	Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)
	Received prompt written or oral feedback from faculty on your academic performance
	Talked about career plans with a faculty member or advisor
General Education Gains (GEG)	Acquiring a broad general education
Practical Competence Gains (PCG)	Working effectively with others
	Thinking critically and analytically
Personal Social Gains (PSG)	Contributing to the welfare of your community
	Voting in local, state, or national elections
	Learning effectively on your own

4.2 Standardization of the data

Besides forming the Taiwan student engagement constructs, data coming from the FJSS should also be standardized. This was achieved by computing for the Z-Scores of the items to standardize the items with 5 and 4 Likert (1932) scales. Since the FJSS is made up of items from both 5 and 4 points Likert (1932) scales, therefore, in order to analyze items with different rating scales within the same factor, Z-Scores of each of the items shall be computed. In circumstances such as the above mentioned researchers have to compare scores derived from rating scales with different numbers of response categories, researchers may wish to establish a basis for continuity to enable comparisons to be made between the items (Colman, Norris, & Preston, 1997). In essence, Z-Score is a common statistical way of standardizing data so a comparison can take place. Various descriptive statistics were then computed by means of the Statistical Package for Social Sciences (SPSS) software. (For more details on the Mean and Standard Deviation of the TSEM, please see table 2)

4.3 Item reliability

Reliability is a prerequisite for validity. Reliability is synonymous to dependability, consistency, and replicability over time, over instruments and over groups of respondents (Cohen et al., 2007). In essence, for research to be reliable it must demonstrate that if it were to be carried out on a similar group of respondents in a similar context, then similar results would be found. In this study, after the items of the different factors are selected, Cronbach's Alphas (1951) will be calculated using the SPSS to examine the internal consistency reliabilities of all variables. Selection of the items on each factor will be scrutinize and the combination of items with the largest α will be retain (as a rule α should be greater than 0.45) (Carmines & Zeller, 1991; Nunnally, 1970). Reliability of the five educational benchmarks and three educational gains are computed to have values ranging from 0.586 (lowest) to 0.866 (highest), which are considered to be quite acceptable (Carmines & Zeller, 1991; Nunnally, 1970). (For more details on the reliability, please see table 2)

4.4 Correlation analysis

The Pearson Product Moment Correlation Coefficient or more common known as Pearson's correlation or Pearson's r, is the most widely used measure of correlation or association (Cohen et al., 2007). The product moment part of the name comes from the way in which it is calculated, by summing up the products of the deviations of the scores from the mean. Correlation is a measure of the strength of relationship between at least two continuous variables. The value for a Pearson's can fall between 0.00 (no correlation) and 1.00 (perfect correlation). Other factors such as group size will determine if the correlation is significant. Generally, by using the software SPSS, correlations above 0.80 are considered as pretty high (Borg, 1963).

Table 4

Correlation analysis of the factors

Factors	LAC	ACL	SFI	EEE	SCE	GEG	PCG	PSG
LAC	1							
ACL	0.276(**)	1						
SFI	0.275(**)	0.454(**)	1					
EEE	0.252(**)	0.182(**)	0.212(**)	1				
SCE	0.224(**)	0.328(**)	0.581(**)	0.213(**)	1			
GEG	0.131(**)	0.260(**)	0.177(**)	0.279(**)	0.196(**)	1		
PCG	0.221(**)	0.189(**)	0.206(**)	0.287(**)	0.217(**)	0.470(**)	1	
PSG	0.194(**)	0.177(**)	0.173(**)	0.142(**)	0.174(**)	0.158(**)	0.584(**)	1

Note. **p<0.01. Standardized values where used in the correlation analysis.

Table 4 shows the results of the correlation analysis between the five educational benchmarks practices and three educational outcome gains. The results indicate that the factors are significantly correlated with each other. These means that an increasing value of the five educational benchmarks practices contributes to the positive increase of the three educational outcome gains. In essence, the five educational benchmarks practices of the NSSE can also be used as an indicator of effective practices that leads to positive outcomes.

4.5 Factor analysis

Factor analysis is a method of grouping together variables (or items) which have something in common. It is a process which enables the researcher to take a set of variables and reduce them to a smaller number of underlying factors which account for as many variables as possible (Cohen et al., 2007). Factor analysis actually detects structures and commonalities in the relationships between variables. Therefore, factor analysis enables researchers to identify where different variables are in fact addressing the same underlying concepts.

Factor analysis can take two main forms: exploratory factor analysis and confirmatory factor analysis. For this study, the exploratory factor analysis or more particularly the *principal components analysis* shall be use to explore previously unknown groupings of variables, and to seek underlying patters, clustering, and groups. The factors are then rotated to keep together those variables that are closely interrelated and kept apart those variables that not closely related to each other (Cohen et al., 2007). For this study, factors are distinguish more clearly from one factor to another after they (the items) had undergone the *Extraction Sums of Squared Loadings* and then rotated through the *varimax rotation* with *Kaiser Normalization* method using SPSS. In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy will be computed and the value should be greater than 0.8; stating a good factor analysis. While the Barlett's test of sphericity should be significant, that is, its associated probability is less than 0.05. Hence, determine the appropriateness of the factor analysis (Cattell, 1952).

Table 5

Results of factor analysis

Factors	Sub-factors	Items	Factor Loadings	Eigenvalues	Explained Variance	α
ACL		ACL_2	0.82	1.91	38.139	0.695
		ACL_1	0.76			
		ACL_3	0.76			
EEE	Future academic plans	EEE_9_**T**	0.73	2.15	20.03	0.539
		EEE_8_**T**	0.65			
		EEE_4	0.62			
		EEE_5	0.60			
		EEE_3	0.49			
	Knowledge exchange	EEE_2_2	0.82	1.32	14.23	
		EEE_2_1	0.82			
	Multi-culture	EEE_6	0.89	1.02	10.36	
		EEE_7	0.44			
	Academic freedom	EEE_1	0.86	1.00	10.36	

Table 5 continue…

Results of factor analysis

Factors	Sub-factors	Items	Factor Loadings	Eigenvalues	Explained Variance	α
LAC	Academic challenge	LAC_3	0.84	2.54	35.41	0.629
		LAC_4	0.80			
		LAC_5	0.77			
		LAC_2	0.74			
	Preparation	LAC_7	0.77	1.12	16.58	
		LAC_6	0.74			
	Memorization	LAC_1	0.97	1.02	14.91	
SCE	School administrators	SCE_3_5	0.89	4.92	34.18	0.861
		SCE_3_4	0.88			
		SCE_3_6	0.84			
		SCE_3_3	0.76			
		SCE_3_2	0.75			
		SCE_3_1	0.75			
	Peer collaboration	SCE_1_3	0.84	2.37	22.75	
		SCE_1_4	0.82			
		SCE_1_1	0.80			
		SCE_1_2	0.79			
	Faculty	SCE_2_2	0.87	1.28	14.52	
		SCE_2_1	0.85			
SFI	Professional interaction	SFI_2	0.88	1.89	47.236	0.586
		SFI_3	0.86			
		SFI_1	0.48			
		SFI_4	0.39			
GEG		GEG_1	0.88	2.06	68.61	0.770
		GEG_3	0.80			
		GEG_2	0.80			
PCG	Professional growth	PCG_8_**T**	0.88	2.86	31.74	0.685
		PCG_3	0.85			
		PCG_4	0.83			
		PCG_9_**T**	0.79			
	English language ability	PCG_6_**T**	0.94	2.18	20.96	
		PCG_7_**T**	0.93			
	Technology and Leadership	PCG_2	0.85	1.33	18.18	
		PCG_1	0.85			
		PCG_5_**T**	0.41			
PSG		PSG_2	0.91	2.67	78.901	0.866
		PSG_1	0.89			
		PSG_3	0.87			

Note: Codes with a **T** are local (Taiwan) contextual items in the FJSS deemed related with the student engagement construct of the NSSE. *Z value* was used to established normality within items of varying scale. **ACL**: Active and Collaborative Learning, **EEE**: Enriching Education Experiences, **LAC**: Level of Academic Challenge, **SCE**: Supportive Campus Environment, **SFI**: Student Faculty Interaction, **GEG**: General Education Gains, **PCG**: Practical Competence Gains, and **PSG**: Personal Social Gains.

5. Conclusions

The primary aim of this study is to develop a Taiwan Student Engagement Model (TSEM) based on the FJSS. Using the constructs of the NSSE, FJSS items are selected and grouped together under the five educational benchmark practices and three educational outcome gains factors. In addition, local contextual items are also included to further define the uniqueness of the TSEM. Results have shown that certain kind of activities do help students develop their general, cognitive, and social skills. This study also helps point out the various value adding activities that the students can participate, more so, engaged in non-threatening and motivational activities tailored for learning. Provide a means of early intervention in the promotion of the persistent engagement in educationally sound activities. In essence, provide a picture on how Taiwan students should learn to engage with be made available based on an empirically proven framework of student engagement.

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