Developing student's accounting competencies using Astin's I-E-O model: An identification of key educational inputs based on Indonesian student perspectives

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ABSTRACT *This paper discusses a model for developing Students' Accounting Competencies (SAC) using Astin's Input-Environment-Outcome (I-E-O) model. SAC based on AICPA core competency is considered important due to business and environment changes. Student Motivation, Student Previous Achievement, Student Demographic Characteristics, Learning Facilities, and Comfort of Class Size are educational inputs. Student Engagement and SAC are proxies for Environment and Outcome respectively. Empirically, the aforementioned educational inputs except Student Demographic Characteristics are important inputs for improving SAC. Student Engagement effectively mediates the influence of inputs on SAC. The I-E-O model is appropriate for analysing relationships among a single input, Student Engagement, and SAC. This model becomes less powerful for analysing simultaneous relationships among multiple inputs, Student Engagement, and SAC. Future research on using other assessments for gauging SAC, identifying other significant inputs, identifying the impact of real class size on Student Engagement and SAC, and developing Student Engagement for accounting courses are required.*

KEY WORDS: Astin's I-E-O Model, Student engagement, AICPA core competencies, accounting education.

Introduction

To harmonise accounting practices with international standards and to catch up with international standards of practice, the Indonesian Institute of Accountants (IAI) has been converging Indonesian Accounting Standards (SAK) with International Financial Reporting Standards (IFRS) that would be fully implemented by 2012 (Halim, 2010). This also means that all business entities operating in Indonesia have to follow international accounting standards of practice. Moreover, Foreign Direct Investment (FDI) to Indonesia also tends to increase every year indicated by the jump of FDI in the country from US$ 706 million in 1990 to US$ 10.8 billion by 2009 (BKPM, 2009). The number of FDI could increase in the future, since the government also provides various alluring facilities to international investments (BKPM, 2006) to boost local economy growth (Choong et al.,

2010). To secure sustainable FDI to Indonesia and to implement new accounting standards successfully, the country requires sufficient numbers of accountants with international competencies and skills.

In view of the aforementioned background, accounting education has to adapt to international standards. As contended by Needles (2010), the adoption of IFRS will have a great impact on business and accounting education. Despite some challenges, the adoption of IFRS provides businesses with some advantages i.e. better access to global capital markets, easier global comparability, easy cross border listing, better quality of financial reporting and elimination of multiple reporting (Jain, 2011). To ensure accounting graduates have sufficient IFRS understanding and competencies, universities should adjust their accounting curriculum, teaching-learning process, and so forth to the IFRS context (Mintz, 2009). Likewise, Mohamed and Lashine (2003) contends that universities should provide the necessary skills to bridge accounting graduate acquired skills with global market requirements and expectations. Therefore, improving students' accounting competencies and skills in Indonesian universities becomes pivotal.

Accounting competency frameworks have been identified by previous studies in some countries i.e. Australia (Kavanagh and Drennan, 2008, Hancock et al., 2009), United States of America (Wolcot, 2006), and Indonesia (Irianto, 2010, Mula, 2007). Even though, frameworks were developed in different countries, skills and competencies they identified have almost the same mainstream. Moreover, AICPA core competency (Wolcot, 2006) have been empirically employed as a competency framework in an American university (McVay et al., 2008) as well as in an Indonesian university (Mula, 2007). Therefore, the study uses AICPA core competencies to measure students' accounting competencies.

In Indonesian context, high school graduates prefer state universities rather than private universities. This causes the applicants to state universities become high and tend to increase every year. Therefore, state universities will utilise every single seat in their classrooms. Some educational inputs such as class size, university supports, and applicant selection become important issues. On the other hand, state universities are obliged to equip their accounting graduates with adequate knowledge, competencies, and skills.

In view of the above, a model for developing Students' Accounting Competencies (SAC) based on AICPA core competencies in an Indonesian university context becomes

important. In addition, the study employs Astin's Input-Environment-Outcome (I-E-O) model as an underpinning theory.

Literature Review

Developing students' accounting competencies in a university needs a more comprehensive approach that includes inputs, environment/process, and outcome. The I-E-O model developed by Astin (1993) based on his research in higher education as an appropriate analysis framework. Inputs are personal qualities students bring initially to an educational program, while environment refers to students' actual experiences during an educational program, and outcome is talent that lecturers are trying to develop in their educational programs (Astin, 1993). System Theory developed by Bertalanffy (1968) also has similar elements i.e. Input, Process, and Output (Becket and Brookes, 2006, Bushnell, 1990, Heylighen, 1998, Nearon, 2002, Slack et al., 2004). System Theory is a general theory, but the theory is applicable to education (Slack et al., 2004, Cromwell and Scileppi, 1995, Kessel et al., 1971). The theory contends that inputs influence processes and processes, in turn, determine outputs (Slack et al., 2004). Moreover, Biggs (1989) proposes the 3-P Model of Learning that consists of three main elements i.e. presage, process, and product. Presage refers to student context and teaching context, process is the interaction between students and teaching context that is measured by approaches to learning, and product is desirable learning outcome. This model is similar to I-E-O model, since presage has association with both process and product. Process (approach to learning), in turn, has association with product.

Other possible models for improving Students' Accounting Competency are Ramsden's Model Learning (RML) and Biggs' Alignment Model (BAM). RML contends that learning outcomes (Outcome) are affected by approach to learning employed by students (Approach). Approach to learning is classified into four subscales i.e. Deep Motive, Deep Strategy, Surface Motive, and Surface Strategy (Biggs et al., 2001). Approach is determined by perception of task requirements (PTR). Moreover, PTR are influenced by Orientation to Studying (OTS) and Context of Learning (COL). Lastly, OTR is affected by Previous Educational Experience (PEE) and COL. In comparison, Biggs' Alignment Model (BAM) posits that clear learning objectives are developed first. The next steps are to develop curriculum, teaching methods and assessments tasks that are aligned to those objectives (Mladenovic, 2000).

The study employs I-E-O model (Astin, 1993) with several reasons. (1) The I-E-O model was exclusively developed based on the context of higher education, (2) Involvement Theory (Astin, 1987, Astin, 1999) is one of theoretical foundations for building Student Engagement Survey, (3) Despite its simplicity, I-E-O model, the study could cover some parts of System Theory (Bertalanffy, 1968, Slack et al., 2004) and the 3-P Model of Learning (Biggs, 1989).

Figure 1 shows the relationships among the three components of I-E-O model. The model contends that outcomes in terms of student development are determined by both inputs and learning environments; at the same time inputs also influence outcomes. The model also suggests that the environment could function as a mediator. Moreover, Astin (1993) explain that the relationship between environment and student outcomes cannot be understood without taking into account student inputs. Likewise, 3-P Model of Learning also consider the association between presage and product (Biggs, 1989). In addition, System Theory does not consider relationships between inputs and outputs (Slack et al., 2004).

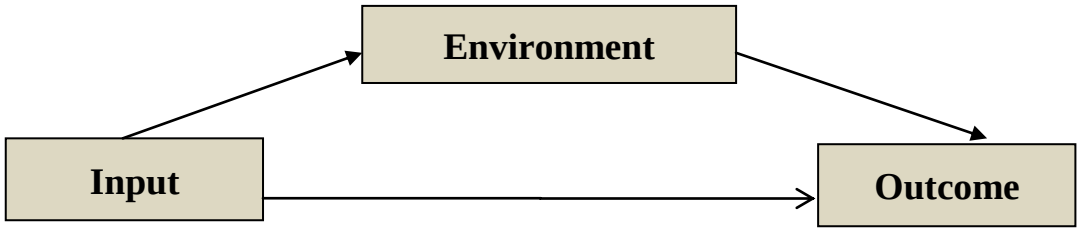

Figure 1: I-E-O Model

Source: Astin (1993)

In relation to environment, the study uses Student Engagement (SE) (AUSSE, 2010a, NSSE, 2009) as a proxy for environment, whilst outcome is measured by AICPA core competency gained by students from a university education. The study identifies some key educational inputs that may affect environment and outcome.

Several researchers have employed the I-E-O model. Kelly (1996) tried to identify relationships between inputs, environment, and student persistence. The study found the relationship between input and environment to be statistically significant. Likewise, the relationship between environment and student persistence is also significant. However, other research using I-E-O model provides a different result. Norwani (2005) conducted a study to identify relationships among inputs, environment, and learning outcomes in terms

of Cumulative Grade Point Average (CGPA) and competency development. She found that the biggest predictor of student CGPA was student inputs, while competency development was mainly influenced by environment factors. Likewise, Thurmond et al. (2002) employed the I-E-O model to scrutinise relationships between student satisfaction, web-based environments, and student characteristics. The results show that student satisfaction was influenced by web-based environment. Unfortunately, they could not find a correlation between student characteristics and student satisfaction; thus the influence of student characteristics on web-based environment was found to be insignificant.

A student, as the most important input, will be transformed into an output through a transforming process (environment) in a university. A student has certain characteristics, the quality of which can affect processes and outputs (achievements). In this case, Hattie (2003) propositioned that student characteristics account for about 50% of the variance in achievement. Student characteristics are academic, demographic, need and expectation, and interests (Mizikaci, 2006). These characteristics fall into three classification i.e. psychological, academic, and demographic. In view of the above, this study employs Student Motivation (SM), Student Previous Academic Achievement (SPA), and Student Demographic Characteristics (SDC) as proxies for psychological, academic, and demographic variables respectively. In comparison, Biggs (1989) contends that student context (presage) consists of four main dimensions i.e. (1) abilities, (2) prior knowledge and pre-entry biases, (3) preferred ways of learning, (4) values, expectations, motivation.

Student Motivation (SM)

To measure Student Motivation, this study employs Expectancy Theory (ET). As Vroom, cited in Geiger and Cooper (1996), explained motivation to act is a combination of the perceived attractiveness of future outcomes and the likelihood that one's action will lead to these outcomes. ET also contends that motivational force for behaviour, action, or task is a function of three distinct perceptions i.e. expectancy, instrumentality, and valence (Chiang et al., 2008). Previous studies show that ET is an effective measure of student motivation to attain student achievements (Campbell et al., 2003, Geiger and Cooper, 1996, Geiger and Cooper, 1995, Geiger et al., 1998, Harrel et al., 1985, Tyagi, 1985, Yining and Hoshower, 1998). In comparison, the Reflections on Learning Inventory (RoLI©) is designed to measure variation in students' engagement of learning (Meyer, 2004). This

instrument is found to be effective for gauging students' conceptions and motivation to learn introductory accounting (Lucas and Meyer, 2004, Lucas and Meyer, 2005).

The relationship between SM and SE is causal, meaning that SM will influence SE. Student motivation and effort coupled with the learning climate impact engagement (Heller et al., 2010). More specifically, Walker et al. (2006) contended that an important outcome of increased motivation is cognitive engagement in learning tasks. Students lacking motivation and connectedness, have a higher potential to deteriorate into despondency and disengagement from the university community (Krause, 2005).

To measure SM, the study adapted valid and reliable questionnaires developed by Chiang and Jang (2008). Adaptations have been made to ensure all questionnaire items are in line with the context of Indonesian students. The questionnaire consists of five factors i.e. expectancy, extrinsic instrumentality, intrinsic instrumentality, extrinsic valence, and intrinsic valence.

In addition, motivation has an important role in determining both Student Engagement and student achievement. Consequently, Student Motivation measured by Expectancy Theory may be useful in predicting Student Engagement (SE), and Students' Accounting Competencies (SAC).

Student Previous Achievement (SPA)

Research on the impact of grades at high school on Students' Accounting Competency (SAC) seems to be limited. Previous studies show that previous grades at high school were predictors of academic performance (Credé and Kuncel, 2008, Astin, 1993). As previously mentioned, Biggs (1989) also contends that prior knowledge is a part of presage. More specifically, previous academic achievement was the strongest predictor of accounting student performance (Duff, 2004). Agronow (2008) identified that pre-college academic demographic has a correlation with student GPA 0.508. In other words, r^2 is 0.26 or 26% of GPA variation is explained by pre-college academic demographic.

To identify the influence of SPA on Student Engagement, this study considers the following propositions. The first proposition was contended by Alvermann (2001) that the level of Student Engagement is the mediating factor through which classroom instruction influences student outcomes. The second proposition was asserted by researchers from University of Victoria, Canada that Student Engagement can be a good proxy for overall educational quality (2006). These propositions imply that SPA could affect Student

Engagement. Research study conducted at the University of California, Berkeley found pre-college academic success correlates significantly with academic engagement (Agronow, 2008). In summary, previous academic achievements may correlate significantly with SAC and Student Engagement.

Demographic Characteristics

The study considers Age and Gender as demographic characteristics. Previous studies show that Age correlates negatively with learning outcomes (Strayhorn, 2008). The relationship between Age and SE is elusive, since Age is positively correlated with SE factors i.e. faculty-student interaction and active learning, but Age is negatively correlated with peer interaction (Strayhorn, 2008).

With regard to the relationship between Gender and learning outcomes, female students tend to have higher outcomes than their counterparts (Strayhorn, 2008, AUSSE, 2010b). Male students tend to be more engaged in academic challenge and interaction with staff. Female students were reported to be more engaged in work integrated learning (AUSSE, 2010b). As comparison, Kinzie et al. (2007) found that in an American university setting, female students are more likely to be more engaged in academic challenge activities than their counterparts. Moreover, they found that the differences in engagement in active and collaborative learning, student-faculty interaction, experience in diversity, and supportive campus environment between male and female students are minor in magnitude. In other words, Age and Gender may correlate with Student Engagement and SAC.

Learning Facilities and Class Size

The function of Learning Facilities is important to enhance productivity of teaching and learning (Boyce cited in Herring III and Bryans, 2001). More specifically, academic supports in the forms of libraries, laboratories, and computers impact on the quality of students (Dolan et al., 1985). Good education facilities may not guarantee good outputs from an education system, but poor facilities certainly affect the quality of outputs from an education system (Mohamed and Lashine, 2003). More importantly, the use of technology also improves student achievement and engagement (Chen et al., 2010). Therefore, Learning Facilities could provide positive impacts on both Student Engagement and SAC.

Class size is also considered important in determining the quality of teaching and learning. Small size classes enable greater interaction between lecturers and students, since a lecturer could provide greater support to each individual student. Big class sizes, in contrast, limit students' ability to interactions with lecturers and other students. Cotten and Wilson (2006) emphasised that education institutions should provide a physical space ... such as smaller class size ... to create substantive engagement between student and teacher.

With regard to the relationship between class size and student achievement almost all academics are in support of the proposition that class size correlates negatively with students' achievements. All types of students can learn better in smaller classes (Konstantopoulos, 2007). Therefore, in small classes students scored significantly higher on their final exams than did students in large classes (Murdoch and Guy, 2002). Class size correlates negatively with students' grades (Johnson, 2010, Kokkelenberg et al., 2008). Other research found that class size had a negative logarithmic relationship to grades (Dillon and Kokkelenberg, 2002). In addition, according to the visibility principle, students in small classes will be highly engaged in learning (Finn et al., 2003). The study uses Comfort of Class Size (CCS) as a proxy for class size. In view of this, if a student feels comfortable with the class size, he or she is more likely to have more engagement and better achievements. Therefore, the study concludes that CCS significantly correlates with Student Engagement and SAC.

Student Engagement

Students learn by becoming involved in an academic experience both physically and psychologically (Astin, 1987, Astin, 1999). A student with high involvement tends to have more contact/commitment to the university environment. In contrast, a student with lower involvement is more likely to have lower contact/commitment with the university environment. This Involvement Theory is one of the theories used as the foundation for developing a Student Engagement survey.

Student Engagement has six factors i.e. Academic Challenge, Active Learning, Student-Staff Interaction, Enriching Educational Experience, Supportive Learning Environment, and Work Integrated Learning (AUSSE, 2010b). The Student Engagement survey has been adopted by universities in many countries for improvement and benchmarking purposes.

The influence of SE on learning outcomes is significant as contended by Harper and Quaye (2008) that educationally purposeful engagement produces gains, benefits, and outcomes in terms of cognitive skills, practical competence skill, moral and ethical development, grade point average, and so forth. Kuh et al. (2008) concluded that SE in purposeful activities correlates positively with student grades between the first and second year of college. Likewise, Student Engagement is considered as an important predictor of student achievement (Handelsman et al., 2005). Therefore, Institutional Planning and Analysis, University of Victoria, Canada (2006) concluded that SE can be a good proxy for overall educational quality. In summary, Student Engagement may provide positive impacts on Students' Accounting Competencies.

Students' Accounting Competency

The American Institute for Public Accountant (AICPA) created a set of competencies that graduates should have grouped as functional, personal, and broad-business perspectives (Wolcot, 2006, Foster et al., 2002, Mula, 2007). There are 20 areas of competencies that students have to master to graduate from an accounting program. Functional competency, personal competency, and broad-business perspective competency cover six, seven, and seven competency areas respectively.

AICPA defines each domain as follows: functional competencies focus on specific capabilities used by accountants; personal competencies relate to interpersonal skills; and broad-business perspective competencies deal with today's accounting environment (Bolt-Lee and Foster, 2003). The following table provides more detailed competencies based on the AICPA core competency framework.

Table 1: AICPA core competency Areas

Functional Competency	Personal Competency	Broad-business Perspective Competency
Decision Modelling	Professional Demeanour	Strategic/Critical Thinking
Risk Analysis	Problem Solving & Decision Making	Industry/Sector Perspective
Measurement	Interaction	International/Global Perspective
Reporting	Leadership	Resource Management
Research	Communication	Legal/regulatory Perspective
Leveraging Technology	Project Management	Marketing/Client Focus
	Leveraging Technology	Leveraging Technology

Sources: Wolcot (2006) and Mula (2007)

Since AICPA core competencies have been broadly used to measure accounting graduate competencies (Beard, 2007, DeLaune, 2004, McVay et al., 2008, Mula, 2007), this study employs these three-dimensions of competency as learning outputs of accounting programs in Indonesian universities. To measure students' accounting competencies, the study uses competency indicators developed by Wolcot (2006) based on AICPA three-dimensions of competency. These indicators were developed based on the setting of American universities. This study also take advantages of AICPA core competency indicators used by Mula (2007) to ensure that all indicators are applicable in the setting of Indonesian universities.

Hypotheses Development

Based on I-E-O model, inputs correlate with environments (Astin, 1993). Therefore, student Motivation as an educational input correlates with environment as measured by Student Engagement (Walker et al., 2006, Krause, 2005, Heller et al., 2010). Pre-college academic success correlates significantly with academic engagement (Agronow, 2008). Age correlates with faculty-student Interaction, active learning and peer interaction (Strayhorn, 2008). In addition, correlations between Gender and Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Experience in Diversity, and Supportive Campus are significant (Kinzie et al., 2007). These findings lead to the following hypothesis:

H1: Student Motivation, Student Previous Achievement, Student Age, and Gender correlate with Student Engagement.

ET is effective to measure student motivation in attaining student achievements (Campbell et al., 2003, Geiger and Cooper, 1996, Geiger and Cooper, 1995, Geiger et al., 1998, Harrel et al., 1985, Tyagi, 1985, Yining and Hoshower, 1998). Previous grades were predictors of academic performance (Duff, 2004, Astin, 1993, Credé and Kuncel, 2008, Agronow, 2008). Age correlates with learning outcomes (Strayhorn, 2008). Female students have higher achievement than male students (Strayhorn, 2008, AUSSE, 2010b). The above findings lead to the following hypothesis:

H2: Student Motivation, Student Previous Achievement, Student Age, and Gender correlate with Students' Accounting Competency.

Learning facilities enhance productivity of teaching and learning (Boyce cited in Herring III and Bryans, 2001). Academic support impacts the quality of students (Dolan et al., 1985). In smaller classes, students can learn better than in larger classes (Konstantopoulos, 2007). Students in small size classes will be highly engaged in learning (Finn et al., 2003). The study uses Comfort of Class Size (CCS) to measure Class Size.

H3: Learning Facilities and CCS correlate with Student Engagement

Learning facilities affect the quality of learning outputs (Mohamed and Lashine, 2003). The use of technology also improves student achievements (Chen et al., 2010). Class size negatively affects student achievements (Murdoch and Guy, 2002, Johnson, 2010, Kokkelenberg et al., 2008). This leads to the following hypothesis:

H4: Learning Facilities and CCS correlate with Students' Accounting Competency.

SE as a proxy for environment correlates with learning outcomes (Harper and Quaye, 2008, Kuh et al., 2008); Student Engagement impacts student achievements (Handelsman et al., 2005). These findings lead to the following hypothesis:

H5: Student Engagement correlates with Students' Accounting Competency.

Method

The population for the study is all final-year students at state universities in Indonesia, approximately 7,500 students. Multi-stage sampling was employed. The first stage was to randomly select universities based on accreditation level and location. The second stage was to recruit students from sampled universities. There are eight state universities were sampled with 411 students completing questionnaires.

Validity (corrected item-total correlation) and reliability (Cronbach's alpha) were used to test newly and partially developed questionnaires (SAC, LF, CCS). Some items of SAC questionnaires were adopted from the work of McVay (2008). The test found that all items are considered valid and reliable. The validity and reliability tests for Student Motivation (Chiang and Jang, 2008, Chiang et al., 2008) and Student Engagement questionnaires (AUSSE, 2010a) were not undertaken, since the questionnaires have been

tested previously. In addition, the study excludes Working-Integrated Learning (WIL) due to a different context in Indonesian universities.

SAC measured using self-assessment competency technique. Even though, this technique is considered effective (Hansson, 2001), this technique could be affected by negative or apathetic attitudes (Kavanagh and Drennan, 2008). Therefore, research on SAC using other assessment techniques such as test and observation is required to provide richer perspectives on measuring SAC.

The study undertook Correlation, Regression, and Path Analyses to test relationships among inputs, SE, and SAC. Sobel and Aroian (Preacher and Hayes, 2004, Preacher and Leonardelli, 2010) were used to test mediation effect. In this case, the study tested Student Engagement as a mediator between inputs and outputs. To test relationships among Inputs, Student Engagement, and SAC based on Astin's I-E-O Model, the study also considered the framework developed by Preacher and Leaonardelli (2010). The framework contends that Independent Variable (IV) should have positive impact on both Mediator (M) (a) and Dependent Variable (DV) (c') and at the same time M also should positively affect DV (b). The influence of IV on DV shrinks after the analysis includes an M and an input in the same model (Figure 2).

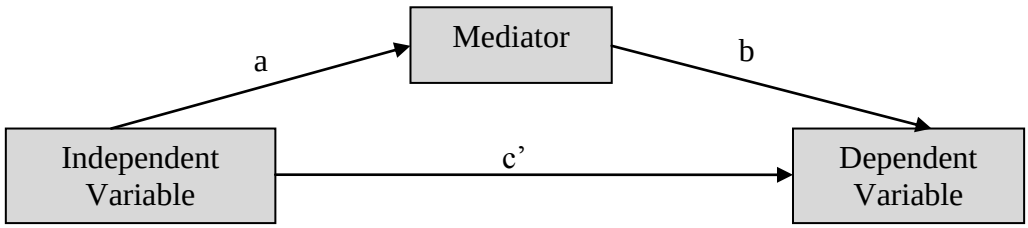

Figure 2: Model for Testing Mediating Effect

Source: Preacher and Leonardelli (2010)

As previously mentioned, the study also employs Path Analysis to identify relationships among multiple educational inputs with SE and SAC. To check the fit of the model being tested, SEM analysis provides a technique, Goodness of Fit, by calculating some indices i.e. Chi Square Statistic (CMIN), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness Fit Index (AGFI), NFI, and Data Normality Test (Byrne, 2001, Ghozali, 2007). The study also considers multicollinearity less than 0.4 (Grewal et al., 2004).

Results

Correlation analysis shows that Student Motivation (SM), Student Previous Achievement (SPA), Student Age, Learning Facilities (LF), and Comfort of Class Size (CCS) correlate significantly with Student Engagement (SE) (Table 2). However, Student Gender does not correlate with SE. Moreover, Student Gender and Student Engagement are negatively correlated. Therefore, the study cannot undertake further analysis to identify mediation effects between these demographic inputs (Student Age and Gender), and SE, as well as SAC.

Table 2: Correlations between Inputs and Student Engagement

No	Inputs	Student Engagement (SE)
1	Student Motivation (SM)	0.322**
2	Student Previous Achievement (SPA)	0.235**
3	Student Age	-0.149**
4	Student Gender[1]	0.069
5	Learning Facilities (LF)	0.457**
6	Comfort of Class Size (CCS)	0.213**

**Correlation significant at 0.01 at the level (2 tailed)
[1]Male 1; Female 0

Correlation analysis also provides results that SM, SPA, LF, and CCS significantly correlate with SAC. Even though the correlation between CCS and SAC is significant at the 0.01 level, this correlation is considered small in magnitude (0.113). Student Age and Student Gender do not correlate with SAC (Table 3). Lastly, SE, as a proxy for environment, correlates significantly with SAC (Table 3). The correlation between SE and SAC is considered moderate in magnitude (0.456) or 21% of SAC variations are explained by variations in SE.

Table 3: Correlations between Inputs and Students' Accounting Competency

No	Inputs	Students' Accounting Competency (SAC)
1	SM	0.215**
2	SPA	0.138**
3	Student Age	-0.095
4	Student Gender[1]	-0.009
5	LF	0.335**
6	CCS	0.113**
7	SE	0.456**

**Correlation significant at 0.01 at the level (2 tailed)
[1]Male 1; Female 0

The study undertook regression analyses to identify the influence of Inputs on SE, and SAC, as well as the influence of SE on SAC. Multiple-regression analysis is used to identify the impact of an input on SAC after the inclusion of the mediator. Figure 3 shows relationships among SM, SE, and SAC. SM significantly impacts SE (t_1=6.897, p=0.000) and SE, which in turn significantly affects SAC (t_2=10.363, p=0.000). Likewise, SM also significantly affects SAC (t_3=4.456 p=0.000). Multiple-regression analysis shows that the impact of SM on SAC shrinks after the inclusion of SE in the model (t_4=0.456 p=0.102). This shrinkage is a sign that SE is a mediator between SM and SAC.

To check the mediation effect, the study employed the Sobel and Aroian tests. The results from the Sobel test show a test statistic of 5.535 with p-value 3e-8. The Aroian test also provides similar results, a test statistic of 5.515 with p-value 4e-8. Both results show that Student Engagement is a mediator between SM and SAC.

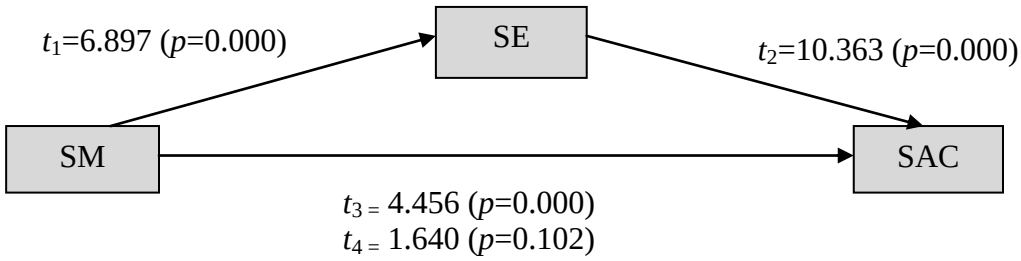

Figure 3: SM-SE-SAC Relationship Using Astin's I-E-O Model

The study undertook the same analysis to identify relationships of other inputs with SE as well as SAC. Regression analyses also show that SPA, LF, and CCS are considered

important inputs for building SAC. These inputs significantly affect SE and SAC, and at the same time, SE also affects SAC. The impact of each input also shrinks upon the inclusion of SE as a mediator. Moreover, Sobel and Aroian tests also provide results that SE mediates SPA, LF, and CCS with SAC. In addition, SE is also a good proxy for measuring environment, indicated by the significant influence of SE on SAC (Table 4).

Table 4: Relationships among Inputs, SE, and SAC and Mediating Effect Tests

Input	t_1	t_2	t_3	t_4	t_{Sobel}	t_{Aroian}
SM	6.897 (p=0.000)	10.363 (p=0.000)	4.456 (p=0.000)	1.640 (p=0.102)	5.535 (p=3e-8)	5.515 (p=4e-8)
SPA	4.895 (p=0.000)	10.363 (p=0.000)	2.821 (p=0.005)	0.721 (p=0.471)	4.426 (p=0.000)	4.409 (p=0.000)
LF	10.380 (p=0.000)	10.363 (p=0.000)	7.191 (p=0.000)	3.276 (p=0.000)	7.334 (p=0.000)	7.317 (p=0.000)
CCS	4.419 (p=0.000)	10.363 (p=0.000)	2.310 (p=0.021)	0.375 (p=0.708)	4.065 (p=0.000)	4.049 (p=0.000)

t_1: the impact of input on SE
t_2: the impact of SE on SAC
t_3: the impact of input on SAC
t_4: the impact of input on SAC after the inclusion of SE in the analysis

The above analyses show relationships among a single input, SE, and SAC. The study undertakes further analysis using Path Analysis to analyse relationships among multiple inputs (SM, SPA, LF, and CCS), SE, and SAC simultaneously. The results show that SM, SPA, CCS, and LF significantly affect SE and at the same time SE also influences SAC. Despite its magnitude, the effect of CCS on SE is significant (0.093, p=0.029) (Table 5).

Table 5: Regression Weight and Estimate for Input-SE-SAC Model

	Regression Weight				Standardised Regression Weight
	Estimate	S.E.	C.R.	P	
SE ← LF	1.016	0.119	8.549	***	0.371
SE ← CCS	0.414	0.189	2.186	0.029	0.093
SE ← SPA	3.454	0.938	3.681	***	0.154
SE ← SM	19.409	3.690	5.259	***	0.224
ICAG ←LF	0.295	0.090	3.284	0.001	0.160
ICAG ←SE	0.257	0.033	7.852	***	0.383

*** $p \leq 0.001$

Based on Astin's I-E-O model, inputs should have significant relationships with outputs (SAC). Even though, correlation and regression analyses support the I-E-O model, Path Analysis provides a different snapshot that only LF has a significant impact on SAC. Based on Path Analysis SM, SPA, and CCS do not have significant impact on SAC. Nevertheless, these inputs are considered important for building SAC, since they have an indirect causal influence on SAC. Figure 4 also shows that covariance among exogenous variables (SM, SPA, CCS, and LF) is quite small (less than 0.4). This covariance may weaken the impact of each exogenous variable on SAC.

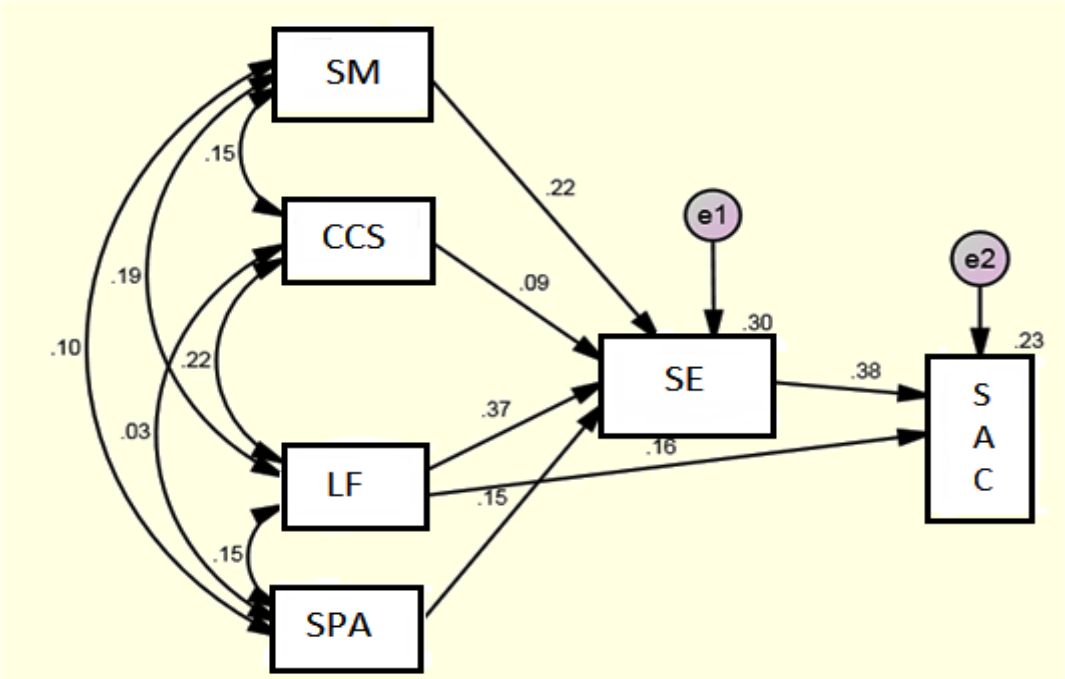

Figure 4: Inputs-SE-SAC Model

Table 6 shows Goodness of Fit for Input-SE-SAC Model Using Path Analysis. The table shows that CMIN has an insignificant coefficient meaning that actual and predicted matrices are not statistically different. Moreover, the table also shows that other tests (GFI, AGFI, RMSEA, and NFI) provide signs that the model has a good fit. In addition, covariance among exogenous variables are considered fit (smaller than 0.4).

Table 6: Goodness of Fit

No	Goodness of Fit	Coefficient	Standard	Remark
1	CMIN	2.593 (p= 0.459)	Insignificant	Fit
2	GFI	0.998	More than 0.9	Fit
3	AGFI	0.985	More than 0.9	Fit
4	RMSEA	0.000	Less than 0.08	Fit
5	NFI	0.992	More than 0.9	Fit

Discussion

Student Motivation plays an important role in determining Student Engagement (SE) as indicated by their significant relationship. Previous studies reported that SM measured by ET has a significant effect on SE (Walker et al., 2006, Krause, 2005, Heller et al., 2010). Correlation and regression analyses show that SM also affects Students' Accounting Competency (SAC) measured by AICPA core competencies. At the same time, SE also significantly influences SAC. Previous findings show that SE affects student achievements (Handelsman et al., 2005, Harper and Quaye, 2008, Kuh et al., 2008, UVic, 2006). Even though, the correlation between SE and SPA is moderate (0.456), the influence of SE on SAC is approximately 21%. The influence of SE may increase if the study employs Student Engagement that is specifically designed for accounting courses. The use other underpinning theories such as the 3-P Model of Learning (Biggs, 1989), Ramsden's Model of Learning (Mladenovic, 2000), and Biggs' Alignment Model (Biggs, 1989) may provide different model for improving SAC.

The study provides results that SM measured by ET also determine SAC among accounting students. In other words, ET is effective to measure SM in attaining accounting competencies. This finding supports previous studies that ET determines student achievements (Campbell et al., 2003, Geiger and Cooper, 1996, Geiger and Cooper, 1995, Geiger et al., 1998, Harrel et al., 1985, Tyagi, 1985, Yining and Hoshower, 1998). Therefore, though ET scales developed by Chiang (2008) were intended to measure motivation of hotel employees. They are applicable for gauging student motivation, indicated by significant effect of ET in predicting student achievements. Thus, SM is considered an important input in determining SE and SAC.

The finding that Student Previous Achievement (SPA) significantly affects SE is in line with a proposition contended by Alvermann (2001) that SE is a mediator through

which classroom instruction influences student outcomes. More specifically, previous academic achievement correlates significantly with Academic Engagement (Agronow, 2008). Likewise, SPA also significantly affects SAC supporting previous studies that SPA affect student achievements (Astin, 1993, Credé and Kuncel, 2008, Duff, 2004, Agronow, 2008). In other words, SPA is an important input that determines SAC.

Student Demographic Characteristics (SDC) in terms of Age plays a minor role in determining SE. The study found that the correlation between Student Age and SE is negative. A previous study by Strayhorn (2008) also found that Student Age inconsistently correlates with SE. Moreover, Student Age is not significantly correlated with SAC. In view of this, Strayhorn (2008) found that Student Age and learning outcomes are negatively correlated.

Student Gender does not correlate with SE and SAC. This finding is also inconsistent with previous studies that female students tend to have better achievements, (Strayhorn, 2008, AUSSE, 2010b), and are more engagement in work-integrated learning (AUSSE, 2010b) as well as being more engaged in Academic Challenge (Kinzie et al., 2007) than their counterparts. The study concludes that SDC in terms of Age and Gender is not an important input for building SAC.

Learning Facilities (LF) significantly affects SE and SAC. These findings support previous studies that LF enhances student learning and student achievements (Chen et al., 2010, Herring III and Bryans, 2001, Dolan et al., 1985, Mohamed and Lashine, 2003). Moreover, the impact of LF on SE is considered moderate (0.457) meaning that 21% of SE variation is explained by availability of LF at the respective university. In addition, LF and SAC are significantly associated (0.335) or 11% of SAC variation is explained by variation in LF. Therefore, the study concludes that LF is an important input for building SAC.

Despite its magnitude, CCS significantly affects SE. This finding supports previous studies that Class Size affects SE (Cotten and Wilson, 2006, Finn et al., 2003). Even though, the study uses CCS as a proxy of Class Size instead of number of students in each class, the study found that CCS also significantly influences SAC. This finding is in line with previous studies that Class Size impacts student achievement (Kokkelenberg et al., 2008, Konstantopoulos, 2007, Murdoch and Guy, 2002, Johnson, 2010).

The previous analyses show that SM, SPA, LF, and CCS significantly affect SE and SE, in turn, affect SAC. Based on mediating effect tests, SE could function as a

mediator that mediates the above inputs with SAC. Likewise, SE could be a good proxy for overall education quality (UVic, 2006). SE also produces gains, benefits, and outcomes (Harper and Quaye, 2008). Therefore, SE is considered important for measuring learning environments in universities. Unfortunately, the SE survey has yet been implemented among Indonesian universities for development and benchmarking purposes.

Separate correlation and regression analyses (a single input, SE, and SAC) show that Astin's I-E-O model is quite applicable for developing SAC at a university level. Since key inputs (SM, SPA, LF, and CCS) significantly impact both SE and SAC. At the same time SE also impacts SAC. Nevertheless, simultaneous analysis by including the above key inputs provides results that the effects of key inputs on SAC become smaller. In this case, it is only LF significantly impacts SAC. Therefore, System Theory consisting of Input, Process, and Output (Becket and Brookes, 2006, Bushnell, 1990, Heylighen, 1998, Nearon, 2002) which does not require relationship between input and output may be more appropriate for simultaneous analysis.

The study measures SAC using self-assessment technique that could be affected by negative and apathetic behaviour (Kavanagh and Drennan, 2008). Even though, self assessment of competencies is effective (Hansson, 2001). Assessing SAC using other types of assessment is required.

Conclusions

From the analyses and discussion above, the study draws the following conclusions.

- Based on I-E-O framework, Student Motivation (SM) measured by Expectancy Theory (ET), Student Previous Achievement (SPA) in term of average grades earned from previous schooling, Comfort of Class Size (CCS), and Learning Facilities (LF) as educational inputs, significantly affect Student Engagement (SE) as a proxy for educational process. SE, in turn, also affects Students' Accounting Competencies (SAC). At the same time the above inputs also significantly impact SAC.
- SM, SPA, CCS, and LF are important inputs for building SAC while Student Age has minimal association with SE and insignificantly correlates with SAC. Student Gender does not correlate with both SE and SAC.

- Student Engagement (SE) is quite a powerful proxy for gauging environment (transforming process) in a university. SE also effectively functions as a mediator that mediates educational inputs with SAC.
- I-E-O is an appropriate model for building SAC in Indonesian universities by performing analyses (correlation and regression) for an individual input, SE, and SAC. The model becomes less powerful if the analysis includes multiple inputs, SE, and SAC simultaneously.

In conclusion, Indonesian universities should pay attention to student motivation, student previous achievement, learning facilities, and class size are important inputs for improving students' accounting competencies. In addition, Student Engagement as a proxy for Environment (Process) is considered effective for improving Students' Accounting Competencies in Indonesian universities.

Limitation and Future Research

- The study employs self-assessment technique to measure SAC. Even though, questionnaires used to assess SAC are also statistically valid and reliable; we have to be careful to interpret accounting competencies data collected using self-assessment technique. In addition, CCS was also measured based on students' perspective, thus CCS may not reflect real class size.
- The study uses self-assessment to measure SAC; future research should use other types of assessment e.g. tests to measure Students' Accounting Competencies. Moreover, CCS is a proxy of class size; future research should examine the influence of real class size on SE as well as Student Achievement. The study employs limited educational inputs; a future study should focus on identifying other significant educational inputs.
- SE used by the study is a generalisation of student engagement; developing a specific student engagement measure for accounting course is necessary to provide more reliable measure for the teaching-learning process of accounting courses. Employing the 3-P Model of Learning or Ramsden's Model of Learning for improving SAC are required, since the process of this model emphasises in mental activities (Approach to Learning).

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