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Student Engagement, Academic Motivation, School Climate: A Structural Equation Model on Academic Self-Efficacy in State Colleges and Universities in Region XI

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***Abstract*—** The main objective of this study was to determine the most suitable model for academic self-efficacy, which is impacted by various factors such as student engagement, academic motivation, and the social climate of state colleges and universities in Region XI. The study aimed to identify how these factors interrelate and influence academic self-efficacy, an essential aspect of a student's academic performance and overall success in their academic pursuits. Even so, there is a limited amount of research on how these factors affect each other and how they affect academic self-efficacy right away. To get an answer to this research topic, this study used a method known as descriptive correlation, which is based on structural equation modeling (SEM). A total of 700 college students were selected using stratified proportionate sampling. The results showed that student engagement, academic motivation, school climate, and academic self-efficacy were very high. All latent exogenous factors were also shown to have a strong link with academic self-efficacy. Structural Model 3, which depicted the casual relationship between student engagement and school climate and college students' academic self-efficacy, was the best-fitting and most parsimonious model. Future studies can investigate the most reliable predictors of academic self-efficacy for different groups and dimensions, including factors that were not significant in the current model.

***Keywords*—** student engagement, academic motivation, social climate, academic self-efficacy, Philippines.

INTRODUCTION

Several factors lead to academic self-efficacy problems. Students who show a higher level express more negative emotions and perceive themselves with less academic self-efficacy. Anxiety levels increase when faced with stressful circumstances (like a pandemic or confinement) and life-changing events (like illness or the death of a loved one from COVID-19). It influences the perception of academic self-efficacy (Arrebola et al., 2020). The inaccessibility causes by instructors' or peers' help (Yates et al., 2021). In addition, these mainly happen to the teaching-learning process wherein it never finds mechanisms to boost the student's confidence and sense of academic potential. In this situation, teachers must look after their students, especially in the early stages, and there is a need to evaluate teachers' quality and effectiveness (Hussain, 2022).

Academic self-efficacy influences overall academic achievements and outcomes. In the context of the educational process, it is one of the most essential aspects in determining the level of success attained by students (Cahyani & Winata, 2020). Students' education and their ability to thrive in online learning are both impacted by their level of academic self-efficacy simultaneously. Meanwhile, the amount of academic self-efficacy that produces individual belief (conviction) is insufficient; as a result, they cannot perform optimally on an academic assignment or achieve a specific educational goal (Saefudin et al., 2021). Education providers and management should do a lot to improve students' academic self-efficacy by involving teachers and educational settings in creating a supportive academic environment. Throughout their time spent learning online, students should experience lower levels of burnout by taking advantage of educational innovations (Rohmani & Andriani, 2021).Self-efficacy was a good predictor of all kinds of engagement in education, including cognitive, emotional, behavioral, and proactive engagement (Sokmen, 2021).

Some students have low self-efficacy and are prone to being unmotivated in school. Students' success can be linked to confidence in their academic skills outside the classroom. In addition, there is a considerable connection between academic self-efficacy and academic motivation. In this case, schools must consider

the factors that affect how motivated students are to improve their academic performance through strategic planning and policy development. (Yapo et al., 2021)

One way to develop self-efficacy for struggling students is through the school's climate. School connection and academic self-efficacy attitudes positively and significantly affect academic achievement. If they feel connected to school and secure in their abilities, both male and female high school learners succeed (Zeinalipour (2022). Effective metacognitive learning techniques help students organize their studies better, track and evaluate their learning and knowledge, take responsibility, find and solve problems, and work hard to learn deeply. Students' sense of self-efficacy can be hurt by stressful and competitive environments. For this reason, teachers in medical schools should try to create supportive and calm learning environments, give students appropriate and positive feedback, create interactive classrooms, and encourage students to work together rather than compete with each other in class discussions (Hayat et al., 2020).

The study on student engagement, academic motivation, and school climate influenced by academic self-efficacy is conducted in a foreign setting. No study had been conducted exploring the relationship of the abovementioned variables in the Davao Region, explicitly exploring student engagement, academic motivation, and school climate as influenced by academic self-efficacy. Hence, on this premise, the researcher wishes to discover the rationale behind these problems that may contribute to planning effective programs that will help the teachers develop more effective strategies and approaches in school and guide the students toward their accountability, confidence, and success.

Research Objectives

This study determined the best-fit model for Region XI state college and university students. It also assesses student engagement, academic motivation, school climate, academic self-efficacy, and relationships.

Hypotheses of the Study

This study tests two hypotheses at the 0.05 level: there is no best-fit model that predicts academic self-efficacy, and there is no significant association between student engagement, student academic motivation, and school climate.

Theoretical Framework

One theory, two supporting theories, and one statement underpin the study: Ryan and Deci's (2000) Self-Determination Theory says that students will do well in social and academic tasks if their needs for relatedness, competence, and autonomy are met. This approach defines engagement as teachers caring about their students and providing emotional support. Hussain et al. (2021) explained how self-efficacy gives people the confidence to overcome obstacles to their goals. Academic self-efficacy helps students achieve their ambitions.

Albert Bandura's Social Cognitive Theory significantly links academic motivation with self-efficacy. People's motivation, contentment, and sense of accomplishment are built on self-confidence. This is because individuals are less likely to act or persevere in facing challenges if they do not feel their efforts may lead to the desired results. Kind (2019) explained that understanding what drives students to succeed academically is critical for educators, as it has a direct bearing on students' accomplishments. Students who lose may struggle with learning problems and lose academic self-efficacy (Sanaie et al., 2019).

In addition, Bronfenbrenner's Ecological Systems Theory SVSC links academic motivation to school climate and self-efficacy (Systems View of School Climate). It talks about the standard and culture of a school based on the patterns of how students, parents, and staff members perceive school life, which reflects norms, objectives, values, interpersonal connections, instructional strategies, and institutional structures. It also highlighted the significance of student motivation in achieving academic self-efficacy or success by recognizing how a student's psychological requirements and the school setting. Mansor et.al.,(2021) elaborated that a positive school climate reflects the attitudes and feelings of community members toward the school's environment. When creating an atmosphere beneficial for teaching and learning, the school climate has significantly impacted the individual level within the school and the teachers, in particular.

On the other hand, academic self-efficacy helps pupils handle difficult academic work and the pressures of school (Allari et al., 2020). Jian found in 2012 that academic self-efficacy and motivation have a big and positive effect on how engaged students are in the long run.. Academic motivation also increased students' long-term engagement. Academic self-efficacy and student

sustainability were mediated by learning agility. Learning agility mediates academic motivation and long-term student engagement. Sustainable engagement also improves academic performance.

Conceptual Framework

This section presents hypothesized models for determining the best-fit model for the academic self-efficacy of college students in state colleges and universities in Region XI. This section explains how to measure the relationship between each pair of the following variables: student engagement and academic self-efficacy; student academic motivation and academic self-efficacy; and school climate and academic self-efficacy.

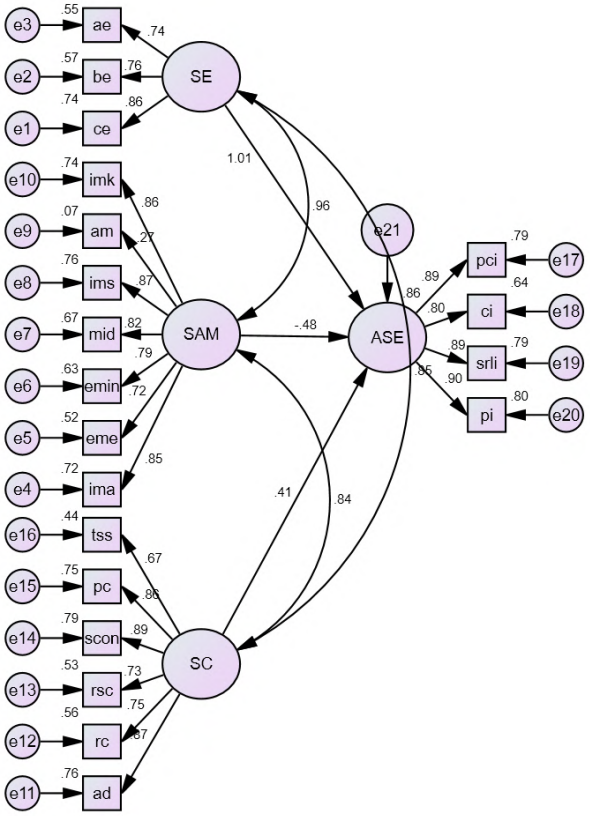

Figure 1. *Hypothesized Model*

Legend:

ae –Affective Engagement
be – Behavioral Engagement
ce – Cognitive Engagement
SE – Student Engagement
imk – IMK (Knowledge)
ima – IMA (Accomplishment)
ims – IMS (Stimulation)
emid – EMID (Identified Regulation)
emin – EMIN (Introjected Regulation)
eme – EME (Extrinsic Regulation)
am – AM (Amotivation)
SAM – Student Academic Motivation
tss – Teacher Support at the School
pc – Peer Connectedness
sc – School Connectedness
ad – Affirming Diversity
rc – Rule Clarity
rsc – Reporting Seeking Help
SC – School Climate
pci – Perceived Control Items
ci – Competence Items
pi – Persistence Items
srli – Self-Regulated Learning Items
ASE – Academic Self-Efficacy

Significance of the Study

The study's findings will affect future practice, research, and policy. If their perceived levels of academic motivation, engagement, and social climate are considered, college students may add more to what is known about academic self-efficacy. This research on academic self-efficacy helps students understand global perspectives, find new ways to improve their academic self-efficacy, and find quick solutions when needed. This will eventually clear up the confusing situations

that come up in the regular running of a school. This research will also help us learn more about how learners feel about their ability to do well in school, how engaged students are, and how the school climate is in a business setting. This study will help school administrators realize that student growth improves schools and communities. These will help instructors improve emotionally and professionally. The result of the study will motivate parents to support their children's education because it's the foundation for success. They trust their great instructors to care for their children. This study can be used as a starting point and secondary data for future scholars.

METHOD

This section describes the research method and procedures used in this study, including the research design, subject, instrument, data collection, statistical treatment, ethical considerations, and other information and data treatment sources.

Research Design

This research was quantitative-correlational. This quantitative method summarizes data, describes correlations between variables, supports conclusions, and draws inferences from samples about the population using statistical analysis. (McNabb, 2012). According to Creswell (2012), descriptive research is used to study contemporary events. The population or phenomenon is described using data. The descriptive research approach was suited for this study since it will explain academic self-efficacy among college students in Region XI state colleges/universities.

This study employed the prediction design of correlational research. According to Creswell (2012), the correlational design lets researchers anticipate and explain how two variables link. In correlational research designs, the statistical correlation test examines how strongly two or more variables are connected. By discovering one or more predictor variables and criterion (outcome) variables, the prediction type of a correlational design predicts an outcome or a criterion. This study examined how student engagement, academic motivation, and school climate affected academic self-efficacy in Region XI state colleges and universities using a correlational methodology. Structural equation modeling was utilized to identify college students' academic self-efficacy predictors using the correlational research design prediction type.

The researcher employed the structural equation model to allow intricate interactions between independent factors and dependent variables. It is a statistical analysis of many variables. (exogenous and endogenous). Bag (2015) clearly said that it aims to explain varied relationships. Like multiple regression equations, this approach explores the interrelationship structure in a sequence of equations. These equations show links between analytical constructs. Constructs are hidden variables. It tests whether the evidence supports a theoretical model, frequently a set of interactions between components. SEM confirms rather than explores. (Salkind, 2010).

With this in mind, Structural Equation Modeling is better suited for the use of the focal points for a four variables study in this research to make a model on student efficacy and determine the degrees of correlation between the independent variables: student engagement, student academic motivation, school climate, and the dependent variable, academic self-efficacy of students.

Research Locale

The study was conducted in the colleges/universities in Region X1, Philippines, in School Year 2022-2023, namely: schools in Davao Oriental, Davao del Norte, Panabo City, Island Garden of Samal, Davao del Sur, Davao de Oro, and Davao City. The Davao region, also known as Region XI, is one of the Philippine regions found in the island of Mindanao's southernmost part.

Population and Sample

The respondents of this study were 700 students of the state colleges and universities in Region XI. The inclusion criteria of my research were the following: the respondents were college students: Respondents might be single, married, or widowed; male or female; and of any age. This analysis excluded college students not formally enrolled in 2022–2023. This survey eliminated irregular, shiftee, and transferring students from specified institutions or colleges. To safeguard privacy, respondents participated anonymously and voluntarily. Before engaging in the research, respondents were informed of any misunderstandings. Respondents' contributions to knowledge were respected.

Since study participation was voluntary, the investigator told respondents that they might withdraw a research project at any moment without penalty or loss of rewards (per general requirements for informed consent). The researcher chose responders scientifically. The

researcher listed all schools in the region. Sample random will determine the number of schools in each province using the rule of thumb for structural equation modeling, which is 700 respondents.

The study's 652 respondents were inflated to 700 from Region XI schools. Rao Soft (2004) calculated it. The approach guaranteed that this sample's response would match the populations with a 99 percent confidence interval (allowing a 5 percent error). This sample size was distributed according to demographic strata using proportionate stratified random sampling (PPS). This strategy provided better population subgroup representation and statistical accuracy than random sampling. 700 Region XI college students provided this study's data. (Davao Region). 167 of the 700 respondents were from Davao Oriental, 166 from Davao de Oro, 166 from Davao del Norte, 106 from Davao City, 56 from Davao Sur, and 39 from Davao Occidental. The six provinces of Region XI were proportionately sampled for this study.

Research Instrument

The researcher's mentor commented on the flow before inviting specialists to check the questionnaire. After expert verification, 50 respondents were pilot-tested for consistency using Cronbach's alpha. Cronbach's alpha for student involvement was 0.902, academic motivation was 0.909, school atmosphere was 0.955, and academic self-efficacy was 0.968. All alpha values above 0.9 indicate substantial dependability and consistency. These results showed that questionnaire questions might assess concepts.

The researcher used a survey questionnaire from four instruments: Student engagement, student academic motivation, school climate, and student academic efficacy. The researcher modified the questions to match the data and the student's responses.

Student Engagement. The survey was adopted by Lam et al. (2014). This instrument will measure student engagement in affective, behavioral, and cognitive domains. To aid the statistical interpretation, the participants all answered the 27 items. Each item is rated on a scale from 1-5. In rating, the level of student engagement, the following scale, and the descriptive level was followed.

The participants were asked to respond to the 27 items in answering the survey questionnaire. Each item was ratedonascalefrom1-5. In rating student engagement, the following scale and descriptive level were followed.

Range	Descriptive Level	Interpretation
4.20 –5.00	Very High	This means that student engagement is always manifested.
3.40 –4.19	High	This means that student engagement is sometimes manifested.
2.60 –3.39	Moderate	This means that student engagement is observed occasionally
1.80 –2.59	Low	This means that the engagement behaviors observed in rare.
1.0 –1.79	Very Low	This means that the engagement behavior is is never manifested.

Student Academic Motivation. The modified questionnaire was adopted from Vallerand et al. (1992). This instrument will be designed to measure student engagement in three domains: Striving for excellence, desire to learn, and personal incentives. The respondents will respond to the 28 items to aid the statistical interpretation.

Each item is rated on a scale from 1-5. In placing the level of student academic motivation, the following scale and descriptive level were followed. The participants were asked to respond to the 28 items in answering the survey questionnaire. Each item was rated on a scale from 1-5. In rating the level of student academic motivation, the following scale and descriptive level were followed.

Range	Descriptive Level	Interpretation
4.20 –5.00	Very High	This means that academic motivation is always manifested.
3.40 –4.19	High	This means that academic motivation is sometimes manifested.
2.60 –3.39	Moderate	This means that academic motivation is observed occasionally.

1.80 –2.59	Low	This means that the academic motivation behavioris observed on rare occasion.
1.0 –1.79	Very Low	This means that the academic motivation behavior is is never manifested.

School Climate. The modified questionnaire was adopted from Aldridge, J. & Ala'I, K. (2013). This instrument measured student engagement in six domains: teacher support, peer connectedness, school connectedness, affirming adversity, rule clarity, and reporting and seeking help. To aid the statistical interpretation, the participants will answer responses to the 48 items. Each item is rated on a scale from1-5. In rating the level of school effectiveness, the following scale and descriptive level were followed.

The participants were asked to respond to the 48 items in answering the survey questionnaire. Each item was rated on a scale from 1-5. In rating, the level of student engagement, the following scale, and the descriptive level was followed.

Range	Descriptive Level	Interpretation
4.20 –5.00	Very High	This means that the school climate is always manifested.
3.40 –4.19	High	This means that the school climate is sometimes manifested.
2.60 –3.39	Moderate	This means that the school climate is observed occasionally.
1.80 –2.59	Low	This means that the school climate is observed on rare occasions.
1.0 –1.79	Very Low	This means that the school climate is never manifested.

Academic Self-Efficacy. The modified questionnaire was adopted by Dullas (2018). This instrument will be designed to measure student efficacy in six domains, namely: perceived control, competence, persistence, and self–regulated learning. To aid the statistical interpretation, the participants will respond to the 44 items. Each item is rated onascalefrom1-5. In rating the level of student efficacy, the following scale and descriptive level were followed. The respondents were asked to respond to the 44 items in answering the survey questionnaire. Each item was rated on a scale from 1-5. In rating, the level of student engagement, the following scale, and the descriptive level were followed.

Range	Descriptive Level	Interpretation
4.20 –5.00	Very High	This means that academic efficacy is always manifested.
3.40 –4.19	High	This means that academic efficacy is sometimes manifested.
2.60 –3.39	Moderate	This means that academic efficacy is observed occasionally.
1.80 –2.59	Low	This means that the academic efficacybehavioris observed on rare occasion.
1.0 –1.79	Very Low	This means that academic efficacy behavior is is never manifested.

Goodness of Fit Standard Criterion Statistics for Structural Models

Chi-square	large value
Pvalue	>0.05
Chi-Square/Degrees of Freedom (CMIN/DF)	<5
Normative Fit Index	>0.95
Comparative Fit Index	>0.95
Goodness of Fit Index	>0.95
Tucker-Lewis Index	>0.95
Root Mean Square Error of Approximation (RMSEA)	<0.05
P-close	>0.50

Data Gathering Procedure

Study data is collected using several methods. The University of Mindanao, Ethics Review Committee, obtained consent to conduct the study as the first step in the procedure. After the suggested outline was approved, five experts were consulted to validate the questionnaire. Following the outline defense and questionnaire validation, the manuscript underwent

changes following the comments and recommendations of the panel.

The corrected manuscript and any necessary attachments, such as the UMERC forms and validated questionnaires, were delivered to the University of Mindanao Ethics Research Committee (UMERC). Following the comments and suggestions offered during the initial review, the document was submitted to UMERC a second and third times. The researcher received UMERC Protocol number UMERC-2022-173. After that, the researcher wrote letters individually to each respondent, duly signed by the dean of the professional schools and the adviser, requesting their consent. The researcher asked for assistance in distributing the questionnaires to the respondents throughout the study and retrieving the returned questionnaire.

In addition, the questionnaire underwent pilot testing to ascertain the participants' grasp of the questions and the length of time it took them to respond. The survey itself was carried out. The researcher allowed five weeks to distribute and retrieve the questionnaire to account for the study's extensive geographic scope. Thus, the collection of data was finished. Progressive data administration, retrieval, collection, and tabulation. Data gathering was done. In this instance, screening was conducted to reduce any outliers during the study. Seven hundred questionnaires were delivered throughout Region XI and collected, tabulated, and analyzed.

At all times, the collection of all data for this study was safeguarded to keep their confidence, especially when the data was transferred from one location to another. It is always guaranteed that the information will be kept apart from any further personal evidence for the investigation. The researcher tallied and saved the survey data in an excel file, which was forwarded via email to the statistician for statistical analysis. Finally, data analysis and interpretation depend on the research goals. The Region XI structural equation model of academic self-efficacy was determined using descriptive data, including frequency, mean, and default deviation.

Statistical Tools

Mean, Pearson product moment correlation, multiple regression, and structural equation modeling analyzed the data. The mean was used to represent student engagement, academic motivation, school atmosphere, and academic self-efficacy in Region XI state colleges and universities. Correlation was employed to ascertain the relationship between the student engagement, academic motivation, school climate and academic self-efficacy, multiple regression was used to identify important determinants of academic self-efficacy, and structural equation modeling was used to evaluate the three hypothesized models and choose the best-fit model. To evaluate the goodness of fit of the hypothesized models, the following indices will be considered: Chi-square/degrees of freedom (/df) should be 0<2 with a value of p-value >0.5, Goodness of Fit Index (GFI) should be >.95, Normed Fit Index (NFI) should be >.95, Tucker-Lewis Index (TLI) should be >.95, and Comparative Fit Index (CFI) should be >.95, Root Mean Square Error of Approximation (RMSEA),<0.05, and P of close Fit (PCLOSE).

RESULT AND DISCUSSIONS

The data acquired from the study's findings are presented in this chapter as part of the overall report. This part displays the correlation between student engagement, academic motivation, social climate, and student efficacy. It also portrays the variables that best predict student efficacy. This part also presents the different structural models of student efficacy.

All descriptive tables have standard deviations below 1.00, which Wittink and Bayer say is normal for five-point Likert scales. (1994). This shows the research respondents' consistency.

Table 1: *Significance on the Relationship between Levels of Student Engagement and Academic Self-Efficacy*

Student Engagement	**Academic Self-Efficacy**				
	Perceived Control Items	Competence Items	Persistence Items	Self-Regulated Learning Items	Overall
Affective Engagement	.574* (0.000)	.444* (0.000)	.587* (0.000)	.580* (0.000)	.597* (0.000)
Behavioral Engagement	.633* (0.000)	.674* (0.000)	.623* (0.000)	.599* (0.000)	.703* (0.000)

Cognitive Engagement	.695* (0.000)	.577* (0.000)	.691* (0.000)	.674* (0.000)	.724* (0.000)
Overall	.738* (0.000)	.664* (0.000)	.736* (0.000)	.717* (0.000)	.786* (0.000)

*Significant at 0.05 significance level.

The Table 5 is depicted the result of the correlation between student engagement and academic self-efficacy. Findings showed an overall r- value of 0.786 and less than a p-value of 0.05. This means a significant relationship existed between student engagement and academic self-efficacy. Therefore, the null hypothesis of no relationship was rejected.

Moreover, it was observed that cognitive engagement has the highest level of significant relationship towards academic self-efficacy, which reveals the highest correlation coefficient of 0.724 among the behavioral engagement with an r-value of 0.703 and affective engagement with an r-value of 0.597.

This is supported by Sokman (2021) study that self-efficacy positively predicted cognitive, emotional, behavioral, and agentic engagement. It is evident that there are positive links between academic achievement and students' confidence that they could get the grades they wanted and study correctly (Wolverton et al., 2020). It is also suggesting that a well-organized classroom can boost students' academic motivation. A planned and fair classroom climate boosts students' learning self-efficacy. It shows how vital a positive classroom climate is for engaging and teaching students (Wang et al., (2020).

Fredricks et al. (2019) elaborated that student engagement has three interconnected proportions: emotional, cognitive, and behavioral. Among these are the student's positive or negative attitude toward class or school, relationships with peers and teachers, and sense of belonging to their academic institution.

Table 2. *Significance on the Relationship between Levels of Student Academic Motivation and Academic Self-Efficacy*

Student Academic Motivation	**Academic Self-Efficacy**				
	Perceived Control Items	Competence Items	Persistence Items	Self-Regulated Learning Items	Overall
IMK (Knowledge)	.641* (0.000)	.511* (0.000)	.631* (0.000)	.657* (0.000)	.667* (0.000)
IMA (Accomplishment)	.659* (0.000)	.508* (0.000)	.649* (0.000)	.659* (0.000)	.676* (0.000)
IMS (Stimulation)	.677* (0.000)	.569* (0.000)	.676* (0.000)	.660* (0.000)	.709* (0.000)
EMID (Identified Regulation)	.580* (0.000)	.369* (0.000)	.570* (0.000)	.573* (0.000)	.568* (0.000)
EMIN (Introjected Regulation)	.652* (0.000)	.503* (0.000)	.572* (0.000)	.573* (0.000)	.631* (0.000)
EME (Extrinsic Regulation)	.576* (0.000)	.371* (0.000)	.520* (0.000)	.534* (0.000)	.544* (0.000)
AM (Amotivation)	.355* (0.000)	.558* (0.000)	.305* (0.000)	.298* (0.000)	.434* (0.000)
Overall	.758* (0.000)	.685* (0.000)	.710* (0.000)	.714* (0.000)	.791* (0.000)

*Significant at 0.05 significance level.

Exhibited in Table no. 6 are the data on the relationship between levels of academic motivation and academic self-efficacy. The overall r-value obtained from the said measures was .791 with a p-value of less than 0.05 or significant. The result was significant, and the null hypothesis of no significance was rejected.

Furthermore, it was observed that the knowledge, accomplishment, stimulation, identified regulation, introjected regulation, extrinsic regulation, and amotivation as indicators of academic motivation when correlated to perceived control items, the overall r-value was 0.758 with p>0.05; hence, significant. When the indicators of academic motivation were correlated to competence items was 0.685 with p>0.05; hence, significant. As the indicators of academic motivation were correlated to persistence items, the overall r-value was 0.710 with p>0.05 hence, significant. Finally, as the indicators of academic motivation were correlated to self-regulate learning items, the overall r-value was 0.714 with p>0.05 hence, significant. All the probability values indicated correlations.

Findings of Campos & Madrigal (2020) asserted that the high levels of self-efficacy and academic motivation of learners show that they have the competencies and abilities to complete and perform specific tasks. Students need to be effective and motivated to be determined to do their schoolwork. High levels of self-efficacy and self-determination are good indicators of school success. But things like social support, rewards, and incentives for doing a certain task or getting a certain result can make the behavior from the outside help them reach their goal. Also, the relationship between self-efficacy and academic motivation greatly affects how well and confidently students can do schoolwork. In this area, parents and teachers play important roles in developing and improving the skills and desires needed for holistic transformation.

Table 3. *Significance on the Relationship between Levels of School Climate and Academic Self Efficacy*

School Climate	**Academic Self-Efficacy**				
	Perceived Control Items	Competence Items	Persistence Items	Self-Regulated Learning Items	Overall
Teacher Support at the School	.569* (0.000)	.598* (0.000)	.535* (0.000)	.521* (0.000)	.619* (0.000)
Peer Connectedness	.678* (0.000)	.566* (0.000)	.637* (0.000)	.662* (0.000)	.698* (0.000)
School Connectedness	.682* (0.000)	.515* (0.000)	.647* (0.000)	.682* (0.000)	.690* (0.000)
Affirming Diversity	.696* (0.000)	.606* (0.000)	.683* (0.000)	.665* (0.000)	.729* (0.000)
Rule Clarity	.603* (0.000)	.355* (0.000)	.581* (0.000)	.596* (0.000)	.577* (0.000)
Reporting and Seeking Help	.649* (0.000)	.634* (0.000)	.611* (0.000)	.586* (0.000)	.688* (0.000)
Overall	.778* (0.000)	.673* (0.000)	.741* (0.000)	.741* (0.000)	.807* (0.000)

*Significant at 0.05 significance level.

Displayed in table no. 7 are the data on the results on the significance of the relationship between levels of school climate and academic self-efficacy. The overall r-value attained by the aforesaid measures was 0.807 with a p-value, 0.05 rejecting the null hypothesis of no significant relationship.

Considering the measured-latent relationship, affirming diversity has the highest level of significant relationship towards academic self-efficacy as it reveals the highest correlation coefficient of 0.729. On the other hand, peer connectedness, school connectedness, reporting and seeking help, and teacher support at the school reveal a value of 0.698,0.690, 0.688, 0.619, and 0.577, with all p-values less than 0.05, respectively. This implies that all the measured variables of identity orientation have significant relationships with the measured variables of latent academic self-efficacy.

In like manner, when all indicators of academic self-efficacy were correlated singularly with all indicators of school climate showed significant relationships with one another. A perceived control item reveals the highest coefficient of 0.778.

Structural Model Testing

This part exhibits the interrelationship among the variables included in this study. Based on the literature

and theories, student engagement, academic motivation, and school climate were considered critical variables influencing academic self–efficacy. Structural models were created to examine their connection. The hypothesized model, 1 in Figure 1, failed; hence, other models were tried to find the most excellent match. The models and their implications for understanding exogenous variable effects on endogenous variables are also discussed.

Test of Hypothesized Model 1. Hypothesized Model 1 depicts the casual relationships of student engagement, academic motivation, and social climate toward the students' academic self-efficacy. Appended in Table 8, the goodness of fit of the model was examined using the following indices: Chi-square/Degrees of Freedom (CMIN/DF), Root Mean Square of Error Approximation (RMSEA), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), Comparative Fix Index (CFI), and Goodness of Fit Index (GFI). The criterion for each index that indicates a good fit is also shown in Table 9. The results indicate a poor fit of the model to the data, as reflected by CMIN/DF = 7. 955.With its p-value= .000, NFI = .860, CFI = .875, GFI = .736, RMSEA = .118 with a P-close .000, all of which do not fall within each criterion.

The influence between latent variables and between measured and latent variables are projected to exhibit regression weights, as indicated in Table 10. Among the 24 paths, only ASE and SE, SAM, and ASE path have a P-value of .001 and 0.085, respectively.

It means that student engagement and academic motivation do not significantly predict academic self-efficacy.

However, considering the other parts having the p-values of less than 0.01 indicate they are predictors of the variable they predicted. It can be further observed that student engagement has the highest value among the three latent exogenous (Beta = 1.0 and $p < 0.01$).

Figure 2 displays structural model 1 in terms of standard solutions. As shown in the model, the amount of variance explained by the combined influence of student engagement, academic motivation, and social climate on academic self-efficacy is 85.7 % (Table no. 9). It can be noted that the among three latent exogenous variables, student engagement has the highest beta equal to 1.0, followed by school climate (beta- 0.41) and academic motivation having the weakest beta of - .481. This means that student engagement has the highest influence on latent academic self-efficacy, while academic motivation has a negligible impact, as reflected as having the lowest beta value.

Moreover, the latent variables, signified by an oval, have a divergent R2 variation on their respective observed variables, characterized by a rectangular figure. In particular, observed variables CE have the highest R2 value of .74, followed by BE with an R2 value of .57 compared to .55 of AE towards its latent variable academic self-efficacy. This means that 74% and 57% of student engagement can be explained by both CE and BE, while only 55% by AE. However, IMS of academic motivation has the highest R2 value of .76, which means 76% of latent SAM could be described by IMS. SCON and PCI have the highest R2 values of .79 and .79 towards latent AD and ASE, respectively.

The effect of latent-to-latent variables and between measured and latent variables were estimated to produce regression weights, as appended in Table 11.

The result shows that only the path from academic motivation to academic self–efficacy in the model is not significant since the p-value is .0.85, which is greater than 0.05. This means that this does not significantly predict academic self-efficacy.

On the other hand, the exogenous variables of student engagement and school climate significantly predict the endogenous variables, academic self-efficacy ($p<0.05$).

It can also be seen that all measured variables of student engagement and school climate highly represent it where all betas values are greater than .70 and p- values are less than 0.05.

Student academic motivation and academic self-efficacy also found to be well-represented by their factors with beta values greater than .60 and p-values are less than 0.05.

However, two factors of student academic motivation displayed higher variations: stimulation obtained a beta value of .87, and knowledge had a .86 beta value.

This means that between stimulation and knowledge of students, 87% and 86% of the latter explain the overall academic motivation of students.

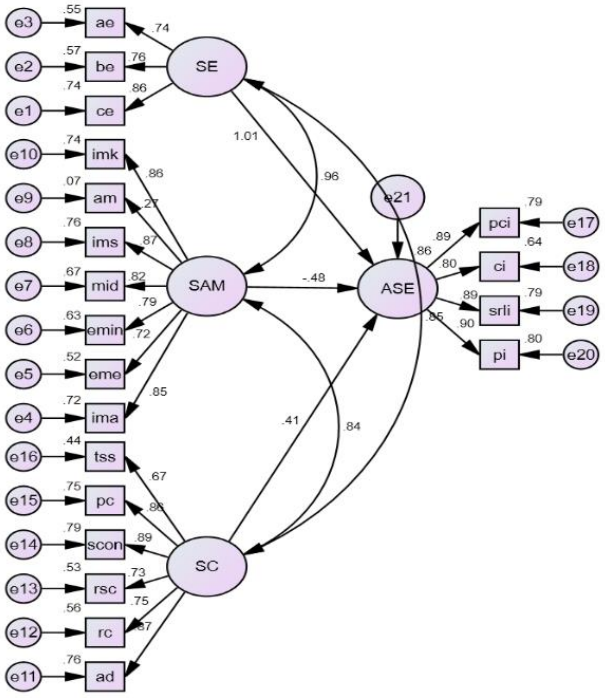

Figure 2. *Structural Equation Model 1 in Standardized Solution*

Legend:
ae –Affective Engagement
be – Behavioral Engagement
ce – Cognitive Engagement
SE – Student Engagement
imk – IMK (Knowledge)
ima – IMA (Accomplishment)
ims – IMS (Stimulation)
emid – EMID (Identified Regulation)
emin – EMIN (Introjected Regulation)
eme – EME (Extrinsic Regulation)
am – AM (Amotivation)
SAM – Student Academic Motivation
tss – Teacher Support at the School
pc – Peer Connectedness
sc – School Connectedness
ad – Affirming Diversity
rc – Rule Clarity
rsc – Reporting Seeking Help
SC – School Climate
pci – Perceived Control Items
ci – Competence Items
pi – Persistence Items
srli – Self-Regulated Learning Items
ASE – Academic Self-Efficacy

Test of Hypothesized Model 2. Appended in Table no. 12 is the goodness of fit measures of Model 2. Similar to Hypothesized Model 1, the results revealed that the fit indices were all not within the acceptable range, indicating a poor fit of the model. The results as reflected by CMIN/DF = 6.404, GF! = .878, CFI = .937, NFI = .927, TLI = .919, RMSEA = .104, and P-Close = 0.000, all of which do not fall within each criterion. Depicted in Figure 3 is the structural model of standardized solutions.

The influence between latent variables and between measured and latent variables are projected to exhibit regression weight, as appended in Table 13. Among the 17 paths, only the student engagement and academic self-efficacy path has a P-value of 0.152, which means that academic motivation does not significantly predict efficacy. However, considering the other paths having p-values of less than 0.01 indicate that they are a predictor of the variable they predicted. It can be further observed that among the three latent exogenous, student engagement is the strongest predictor of academic self-efficacy, having the highest Beta value (Beta = 1 and $p<0.01$).

As illustrated in the model, 87.2% of the variation in organizational commitment can be attributed to the combined influence of teacher self-efficacy and identity orientation. It can be noted that among the two latent exogenous variables, student engagement has the highest beta, equal to 1.31, as compared to school climate, with a beta equal to 0.43. This means that

student engagement has a higher influence on latent academic self-efficacy than school climate.

In addition, the latent variables, implied by an oval, have a divergent R2 variation in their respective observed variables, characterized by a rectangular figure. In particular, on student engagement, students observed CE has the highest R2 value of .74, followed by BE R2 value of .58 compared to .54 of AE towards its latent variable, student engagement. This means that 74% and 58% of student engagement can be explained by both CE and BE, while only 54% by AE. However, IMK of the latent variable has the highest R2 value of 0.76, which means 76% of latent SAM could be described by IMK. Finally, PI has the highest R2 value of 0.81 toward latent ASE.

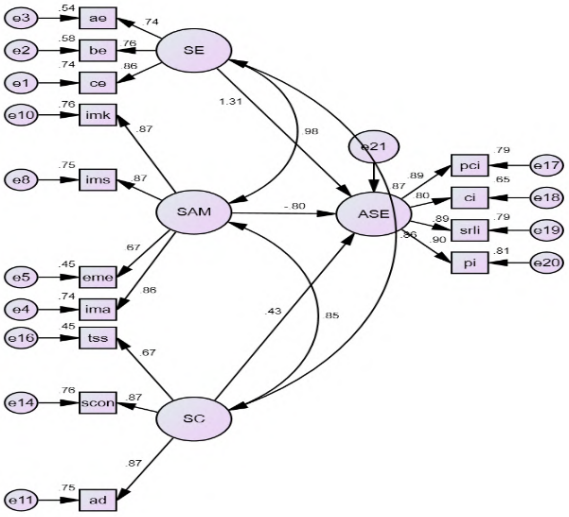

Figure 3. *Structural Equation Model 2 in Standardized Solution*

Test of Hypothesized Model 3

Appended in Table 15 is the goodness of fit measures of Model no. 3. Similar to Hypothesized Model 2, the results revealed that the fit indices were all not within the acceptable range, indicating a poor data fit of the model.

The results as reflected by CMIN/DF = 1.296, GFI = .991, CFI = .999, NFI = .994, TLI =0.895, RMSEA = 0.24, and P-Close = 0.000, all of which do not fall within each criterion. Depicted in Figure 4 is the structural model 3 in terms of standardized solutions.

Appended in Table 16 displays the squared multiple correlations of model 3, as shown in Figure 4. As shown in the model, the amount of variance explained by the combined influence of student engagement and academic motivation on academic self-efficacy is 93.7% (Table no. 15).

It can be noted that among latent exogenous variables, student engagement has the highest beta equal to 1.54 as compared to school climate having the weakest beta of -8.7. This means that student engagement has the highest influence on latent academic self-efficacy, while academic motivation has a negligible impact, as reflected in having the lowest beta value.

The influence between latent variables and between measured and latent variables are projected to exhibit regression weights, as indicated in Table 16. The results show that student academic motivation and school climate to academic self-efficacy in the model is insignificant since the p-value of academic motivation, 0.542, and school climate, 0.597, are greater than .05.

This means it does not significantly predict academic self-efficacy. On the other hand, exogenous latent variables of student engagement significantly predict the endogenous variable, academic self-efficacy ($p<0.05$).

Furthermore, the latent variables, signified by an oval, have a divergent R^2 variation on their respective observed variables, characterized by a rectangular figure. In particular, on student engagement, observed variables CE have a higher R^2 value of 0.74 compared to AE with an R^2 value of .51 towards its latent variable, student engagement.

This means that 74% of student engagement can be explained by the observed variable CE while only 51% by AE. On the other hand, AD of latent school climate has the highest R^2 value, 0.75, which means 75% of latent SC could be described by AD. Finally, PCI has the highest value of .78 towards the latent variable ASE.

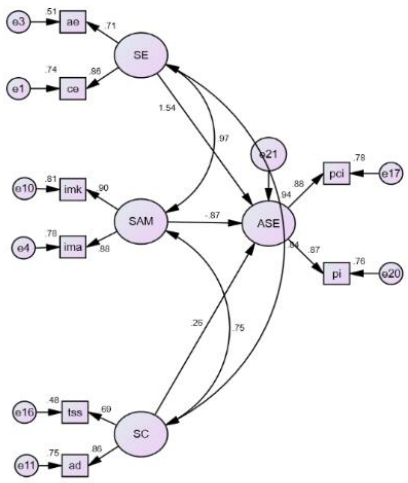

Figure 4. *Structural Equation Model 3 in Standardized Solution*

Summary of the Fitness Testing of Hypothesized Models

The model sketch in Figure 1 requires some alterations to suit the data and answer the research question on the best-fit model. This study has three models. Table 17 summarizes these structural models' goodness of fit.

In determining the best-fit model, all the indices included must fall within acceptable ranges. Chi-square/Degrees of Freedom (CMIN/ DF) should be between 0 and 2, with its corresponding p-value greater than 0.05. The Root Mean Square of Error Approximation (RMSEA) value must be less than 005 as the Normed Fit Index (NFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and Goodness of Fit Index (GFI) must be greater than 0.95.

As a result of having a poor fit Model 1, it was decided to do the SEM analysis separately for student engagement and student academic motivation towards academic self-efficacy. This model considers the correlation between student engagement and academic motivation and their direct causal relationship to academic self-efficacy.

This model is found to be non-fitting to the data as indicated by CMIN/DF = 7.955 with its p-value = .000, NFI = .860, TLI = .855, CFI = .875, GFI = .736, RMSEA= .118 with P-close = 0.000. All of which do not fall within the respective criterion. This indicates a poor fit of the data to the model.

Table 4: *Summary of Goodness of Fit Measures of the Three Structural Equation Models*

Model	CMIN/DF 0<value<2	P-Value > .05	NFI > .95	TLI > .95	CFI > .95	GFI > .95	RMSEA < .05	P-Close > .05
1	7.955	.000	.860	.855	.875	.736	.118	.000
2	6.404	.000	.927	.919	.937	.878	.104	.000
3	1.296	.200	.994	.997	.999	.991	.024	.928

Similarly, as a result of having fit Model 2, it was decided to have some modifications by doing the SEM analysis separately for student engagement and school climate towards academic self-efficacy. This model is found to be non-fitting to the data as indicated by CMIN/DF = 6.404 with its p-value = .000, NFI= .927, TLI= .919. CFI =.937, GFI=878, RMSEA .104 = with P-close = 0.000, all of which did not fall within the acceptance range of the respective criterion.

Finally, the 3rd structural model (final mode) portrays a modification of Model 3, retaining only the two sub-constructs with the highest beta values of student engagement, namely: CE (Beta = .86) and AE (Beta = 0.71), while retaining two sub-construct of academic self-efficacy, PCI (Beta = .88) and PI = (.871). Model 3 considers the correlation between student engagement and school climate and its direct causal relationship to academic self-efficacy. As shown in table no. 17, Model 3 fits well with the data required in each criterion and therefore serves as the best-fit model for the academic self-efficacy of the students.

The model clearly displays the importance of student engagement and social climate with its two constructs – cognitive and affective student engagement as a major predictor of academic self-efficacy described by perceived control and competence item. Thus, the finding suggests that the academic self-efficacy of the student is best anchored on the student engagement defined by its sub-construct: affective and cognitive engagement, and school climate as supported by the two sub-construct: affirming adversity and teacher support at the school.

This is supported by the study of (Sugden et al., 2021) that higher levels of engagement with online learning tend to lead to better grades. Creating a high-

engagement online learning environment that works well requires showing the exact steps of engagement Dewan et al., (2019). Skipping class and disobeying the rules are markers of low behavioral engagement, as are lousy behavior and involvement in educational processes and activities (King, 2020).

This research aligns with Fredricks et al. (2019) that student engagement has three interconnected proportions: emotional, cognitive, and behavioral engagement. These include the student's class or school attitude, interactions with classmates and professors, and belonging to an academic institution.

On the other hand, the value of this positive relationship creates an environment at school that improves pleasant connections, contributes to, supports, and enhances learning. Students feel safe in such an environment in social, emotional, and physical matters, and such a setting promotes social ideals (Durnal & Filiz, 2019). It has been found that self-efficacy levels have a significant and beneficial impact on school climate and student involvement and that school climate plays a mediating role in the relationship between self-efficacy levels and student involvement Türkoğlu (2022).

CONCLUSIONS

In consideration of the results of the research, the following inferences may be made. Results indicated that the level of student engagement, academic motivation, school climate, and academic self–efficacy are all very high, which connotes that college students always observe these variables. Student engagement, academic motivation, and social climate positively correlate to students' academic self-efficacy. Furthermore, the combination of student engagement, academic motivation, and social climate significantly influenced the academic self-efficacy of college students. In addition, the null hypothesis, which stated that no best fit model predicts academic self-efficacy of college students in state colleges and universities in region 11 was rejected.

Structural model 3 is the best-fit model. This indicates that the academic self-efficacy of students with two sub-constructs from the original four, namely: perceived control and competence item, are best anchored on strong evidence of student engagement as supported by the two sub-constructs, namely: affective and cognitive engagement and school climate teacher support at the school and affirming diversity.

This supports the Social Cognitive Theory of Albert Bandura which elaborated that self-efficacy beliefs affect nearly every aspect of people's lives and this includes how productively people think, how self-debilitating they are, and whether they are pessimistic or optimistic. It also has how well people motivate themselves and perseveres in the face of adversity.

RECOMMENDATIONS:

Based on the findings of the study, the following recommendations are proposed: By understanding the relationships of student engagement, academic motivation, and school climate to the academic self-efficacy of the students, the schools must continue to develop more intrinsic and extrinsic programs and activities to help students improve their self-efficacy with their academic performance or outcome. The school administrators and college president should formulate effective strategies and practices that develop students' academic self-efficacy. They should assist teachers in identifying and targeting their schools' individual needs to impact student efficacy, especially achievement. Teachers should maintain regular office hours that accommodate students with different scheduling needs, but they should also be available to schedule individual sessions outside of these hours whenever possible. Some students may require additional assistance to improve their understanding and confidence in the material. Studies along these lines might be carried out to establish the factors that are the most reliable predictors of academic self-efficacy for various groups and dimensions, including those indicators that did not exhibit significance in the model that was found to be the best fit.

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