Students' need satisfaction: Relationship with psychological and cognitive engagement

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Abstract

This study explores what motivates students to engage with their learning by examining key factors like autonomy (the ability to make their own choices), competence (feeling capable and skilled), and relatedness (feeling connected to others). Using Confirmatory Factor Analysis (CFA), we found that these needs, along with support from teachers, peers, and family, play a significant role in how students experience their education. Drawing from Self-Determination Theory, this research highlights the importance of understanding the unique challenges and motivations of Filipino university students, a group that has been underrepresented in global studies. Findings reveal that students generally feel moderately satisfied with their autonomy, competence, and relatedness. They see their instructors, peers, and the university as supportive, fostering a sense of belonging. While their emotional (psychological) engagement is moderate, their intellectual (cognitive) engagement is notably strong. These results show that when students feel supported and their needs are met, they are more likely to invest effort and stay motivated in their studies. To enhance student engagement, teachers can focus on creating meaningful, relevant learning opportunities that build stronger connections to the school community and help students see the value in their studies and career goals. However, this study has some limitations, such as relying on self-reported data and focusing on a single university. Future research should expand to other institutions, include more voices like family and mentors, and explore how culture shapes students' motivation and engagement over time.

Keywords: autonomy, competence, non-observable engagements, relatedness, self-determination theory

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1. Introduction

Results of investigation (Niemiec & Ryan, 2009; Church et al., 2013) suggested the importance in the contentment of the needs in autonomy, relatedness and competence on a person's welfare and numerous positive outcomes at a global as well as national level. This is because a satisfied person feels more intrinsically motivated (Niemiec & Ryan, 2009; Zhang et al., 2011), confident; and the apprehensions reduced which led to an increased school engagement resulting to improved performance (Jang et al., 2009). Findings of the research of Mack et al. (2011) and Zhang et al. (2011) showed that contentment in autonomy (sense of preference), competence (feeling of efficiency) and belonging (perceived caring relationships) were associated with successful outcomes of volleyball players (e.g., wins, stress free). Jõesaar et al. (2011) hold that students can attain their best in carrying out activities in a peer-supportive atmosphere, because they are inherently encouraged. In the Philippine context, satisfaction in competence, autonomy, and relatedness of university students predict the development of their well-being and continued improvement (Dagupto, 2015; Mesurado, Salanga, & Mateo, 2016) with relatedness as the best predictor (Mesurado et al., 2016). Results could be explained by the fact that happiness is a feeling of having the choice in making decisions, of competency in doing things, and being cared for which affects learner's interest and willingness in doing a task (Dagupto, 2015; King et al., 2015).

Meanwhile, motivation is an important pre-requisite of and a needed element for engagement in learning tasks. The construct is dependent on the satisfaction of the three fundamental needs (Niemiec & Ryan, 2009; Kusurkar et al., 2011). Motivation mirrors a student's energetic partaking in school's activity, or a learning task as manifested in his/her reflections, ideas, dispositions and actions (Lewis et al., 2011). The more a student is engaged in school activities, the more motivated, interested, and determined to continue what he/she has started, despite whatever challenges he/she encounters. Participating in university activities improves educational accomplishment and enhances the learning gains of students. According to Datu and Valdez (2016), Filipino students that advocate hope, confidence, resilience, and self-worth are motivated to actively partake in various classroom tasks and feel good in doing academic activities.

1.1 Basic Psychological Need Satisfaction

Humans are characterized by basic psychological needs (autonomy, relatedness, and competence) that work as a central nutrient stimulating the integration process that leads to success and well-being across culture (Chen et al., 2015). Satisfaction with each of these needs is vital for the optimum functioning and well-being, regardless of differences in motives. In contrast, dissatisfaction with these needs would result in maladjustment, defensiveness, and ill-being (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013).

The need for autonomy is the sense of preference and accountability for their own behavior (Bartholomew et al., 2011; Chen et al., 2015); competence is the need to be effective in accomplishing certain result and attaining it in the most proficient way; while relatedness as the strength of one's link to others within a context (Wang & Holcombe, 2010; Reeve, 2012). Students' need for autonomy is met when they feel like having a choice and when they are intrinsically motivated; their need for competence is satisfied when they experience the classroom as ideal in structure and feel like they can achieve desired ends, and their need for relatedness is more likely to occur in classrooms where mentors and peers build a compassionate and supportive environment (Niemiec & Ryan, 2009).

A corpus of studies explored how autonomy, competence, and relatedness impact Filipino university students' motivation, and its psychometric properties. Villena and Dee (2020) found that autonomy scored lower than the other two needs (competence and relatedness), which the authors attributed to cultural nuances. In the Philippines, students might be less accustomed to autonomy-driven educational environments due to traditional values

emphasizing respect for authority and family. Relatedness emerged as a highly influential need, consistent with the Filipino cultural value of *pakikipagkapwa* (community spirit and solidarity). Filipino students highly valued their sense of belonging and connection with peers and teachers. Laroza and Ramos (2023) emphasized the importance of cultural factors in implementing self-determination theory in the Philippine Education. While autonomy, competence, and relatedness are all crucial for motivation, relatedness and competence hold particular importance in the Philippine setting. Schools can enhance engagement by fostering an inclusive and supportive environment, where students feel connected and valued. Additionally, promoting competence through skill-building and positive reinforcement can boost both motivation and resilience, preparing students for academic challenges.

1.2 Cognitive and Psychological Engagement

In contrast to behavioral and academic engagements which show signs that are readily observed, cognitive and psychological or affective engagement are internal, less-easily noticeable that need student's own report for precise measurement, such as effort to learn and quality of understanding (Smiley & Anderson, 2011; Fredricks & McColskey, 2012). Cognitive engagement in the classroom is a situation in which learners give in a lot of struggles to fully comprehend a topic and persevere studying for a period (Rotgans & Schmidt, 2011). Its indicators cover perceptions and attitude of expertise, eagerness and determination in doing task-oriented goals (e.g., performance, mastery) focusing on specific learning strategies and tools (e.g., remembering, assignment preparation, and self-evaluation) (Betts et al., 2010). According to Smiley and Anderson (2011) cognitively engaged learners are those that manifest behaviors of mastery in academic work, in contrast to rote memorization and rituals, although rote memorization and rituals are perceived to help them.

Meanwhile, psychological or affective engagement signifies feelings and perceptions of connectedness to the school or to the group (e.g., academic department, school organization, and class organization); attachment to the teachers, peers, and family members; and benefits and value of education, significance of school, and support in assisting students reach their goals (Betts et al., 2010). Connectedness to the school, and attachment to mentors, peers and family members is collectively regarded as "relatedness," while benefits of education, significance of school, and support to students is collectively regarded as "valuing" (Finn & Zimmer, 2012).

1.3 Psychological Need Satisfaction and Psychological (Affective) and Cognitive Engagements

Empirically, the link concerning need contentment and engagement (cognitive and psychological) has been observed. Two groups of authors (Niemiec & Ryan, 2009; Wang & Holcombe, 2010) reported that supported psychological needs lead to active engagement and better learning outcomes, otherwise, the consequence is disengagement and poor learning outcomes. That is, if children's psychological needs are met, their engagement (more-observed and less-observed) in school activities (curricular and extra-curricular) increases. This is because behaviors that are inherently rewarding, exciting and pleasing are indicators of intrinsic motivation and in turn said behaviors are linked with a sense of impulsiveness and choice (Deci & Ryan, 2012). For this reason, activities done in need supportive environments facilitate motivated behavior which in turn enhances engagement (Vansteenkiste & Ryan, 2013). As Axelson and Flick (2010) puts it, engagement is a by-product of a need supportive learning environment.

According to Berti and his colleagues (2010), adolescent students' relation with peers is connected to the level of their sociability, ability, self-worth, sentiments, worries, and depression. The way the people in school handle the students (relatedness) affects their psychological engagement (absorption, dedication and vigor) in school (Berti et al., 2010; Timms et al., 2018) and on student's Grade Point Average (GPA) (and the attainment of their chosen career (Grier-Reed et al., 2012). Meanwhile, excellent teacher-support for volition, mastery in doing things, and connectedness corresponds to high level of students' autonomous motivation (Maulana et al., 2016). Parallel to this view, autonomous students with supportive teachers and peers are more engaged in their learning and become more adjusted in school, (Van Ryzin, Gravely, & Roseth, 2009). Likewise, the more a student feels that

he has the preference (autonomy) in obtaining knowledge on a topic, the more probably he become self-determined and cognitively engaged, suggesting that autonomy in learning occupies a substantial role in students' situational cognitive engagement (Rotgans & Schmidt, 2011).

In the Philippine context, the studies of Santos and Luna (2019) and Hernandez and Jacinto (2021) revolved on non-observable engagements of Filipino students. The study by Santos and Luna (2019) applied the Student Engagement Instrument (SEI) to Filipino high school students in Metro Manila to assess levels of cognitive and affective engagement. Findings indicated that Filipino students' engagement was strongly influenced by positive relationships with teachers and peers, as well as by future aspirations. High scores in teacher-student relationships correlated with students feeling more motivated and engaged in their learning. Additionally, students with clearer academic and career goals showed higher cognitive engagement, emphasizing the importance of guidance and support in nurturing both short- and long-term educational goals. In Hernandez and Jacinto's (2021) study, the Student Engagement Instrument (SEI) was adapted for use in Philippine higher education. The researchers found that Filipino college students highly valued teacher-student connections and supportive learning environments, which enhanced their engagement. The SEI was shown to be effective but needed slight modifications to better capture Filipino students' emphasis on relationships and future aspirations. These findings suggest that for higher education students in the Philippines, engagement can be significantly enhanced by supportive, relational interactions and clear academic pathways.

The Philippines is a country that is extremely impacted by the western beliefs but is still grounded on its oriental culture, hence, it is unclear if college students' academic engagement (psychological and cognitive) varies as a function of their perceived importance of the needs. Moreover, several of the studies as regards the fulfillment of the universal needs and school engagement were conducted in the western countries but few in Asia (Maulana et al., 2016), specifically in the Philippines. Hence, it is within this gap that the author reports the investigation on the relationship between psychological needs satisfaction on the three domains (autonomy, competence, and relatedness) and cognitive and psychological engagements of Filipino university students.

1.4 Study Framework

The study is attached to the Self-Determination Theory (SDT) with emphasis on the Basic Psychological Need Theory (BPNT) and the self-system theory derived from SDT. SDT and BPNT supports the fundamental needs of man to be autonomous, competent, and connected to others (Deci & Ryan, 2012). When these needs are fulfilled, a person becomes intrinsically motivated and highly engaged resulting in better performance and well-being, whereas deprivation leads to disengagement and ill being (Ryan, & Deci, 2009). The self-system model of motivational growth hypothesized that engagement is receptive to circumstantial characteristics and is optimized when individuals recognize that the environment encourages the progress of said needs, particularly the need for connectedness to other people (Skinner & Ptizer, 2012). That is, if schools offer learners with chances to achieve these fundamental needs, their engagement (cognitively and emotionally) creates a situation where they can easily deal with obstacles and beneficially re-engage with encouraging and challenging academic undertakings. From these desired coping experiences eventually, the result is the progress of a sustainable long-term motivational mentality and skills that could be felt by the students as self-fulfilling and self-owned. From SDT's description of motivation parallel exists linking psychological need contentment and motivation (particularly intrinsic) leading to fruitful attitude that is innately gratifying and the engagement aspect of commitment where people derive a feeling of pride and contentment from their labor (Ryan & Deci, 2009). The theories cited can shed light on the linked concerning behavior and engagement of university students.

With these in mind, the researcher viewed the study in the same context. Using the SDT perspective, it is hoped that when students' psychological needs are fulfilled, their intrinsic motivation increases which makes them move into action (cognitively and psychologically), as illustrated in Figure 1. In the present work, the researcher expected need satisfaction to influence the less-observable engagement (psychological and cognitive) of students as put forth in SDT. The needs satisfaction and less-observable engagement relationship is promoted as

bidirectional, such that need satisfaction may lead to active involvement, or thwarted psychological needs may direct disengagement. Meanwhile, engagement may persuade the contentment of the basic needs.
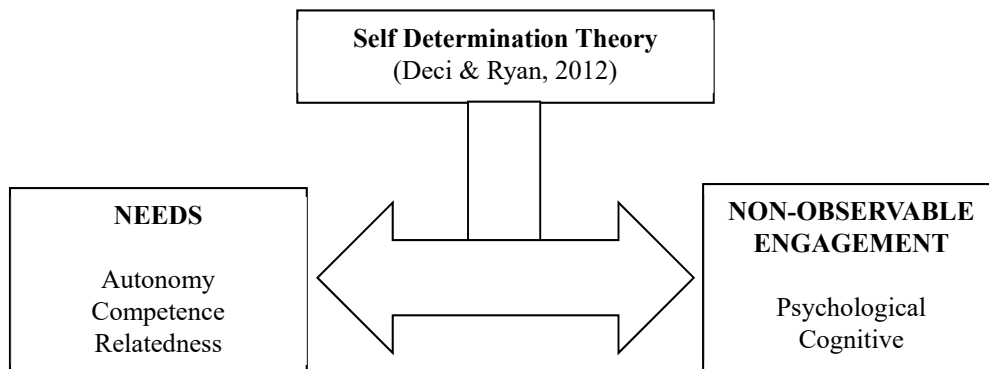

Figure 1. Study framework established using the SDT principle.

2. Methodology

2.1 Research Design

The descriptive correlational design guided all processes in the study. Descriptive design was used to discover the levels of perceived needs satisfaction of students and their perception towards their extent of engagement (psychological and cognitive). Meanwhile, the study was a correlational research design as it investigated the significance of the relationship of the students' needs satisfaction and their engagement in the psychological and cognitive aspects. Self-report assessment was employed because such are the most practical and convenient to conduct in classroom situations (Fredricks & McColskey, 2012).

2.2 Participants and Sampling Procedure

The participants were sourced through proportional stratified random sampling. Respondents included eight hundred fifty (850) randomly selected students representing proportionately all degree programs offered in Visayas State University Tolosa, Leyte, Philippines. The respondents were informed about the purpose of the study and the method to be undertaken to collect the data. They were assured that their names will not be mentioned in the output, instead, a code is provided to each name to maintain anonymity.

2.3 Instruments

Basic Needs Satisfaction in General Scales (BNSG-S) utilized in the study of Johnston and Finney (2010) was utilized to quantify the respondent's gratification of the three elements of the universal needs. The instrument comprised 21 items (autonomy, 7 items; competence, 6 items; and relatedness, 8 items). BNSG-S has been proven to be valid and consistent as shown in prior research (Johnston & Finney, 2010; Jenkins-Guarnieri, Vaughan, & Wright, 2015). Respondents' answers portrayed the magnitude of acceptance on the items, scaled from 1 (not at all true), 2 to 4 (somewhat true), and 5 to 7 (very true). Some of the items were: "People I know tell me I am good at what I do" (competency), "People I interact with daily tend to take my feelings into consideration" (autonomy), and "People are generally pretty friendly towards me" (relatedness).

Student Engagement Instrument (SEI) was utilized to investigate learner's active partaking. The instrument was originally developed by Appleton and was used and validated by other researchers (Betts et al., 2010; Grier-Reed et al., 2012). SEI comprised 35 items (19 items for psychological and 16 items for cognitive). Under the

psychological (affective) domain, the areas measured were teacher-student relationships (TSR, 9 items), peer support at school (PSS, 6 items) and family support for learning (FSL, 4 items); whereas, under the cognitive engagement, the subtypes were control and relevance of schoolwork (CRSW, 9 items) future aspirations and goals (FS, 5 items), and intrinsic motivation (IM, 2 items). Certain words in the items were replaced to fit the comprehension of the respondents (e.g. teachers to instructors, school to university). Negatively worded items were reverse-coded, and items in each scale were averaged.

Participant's responses were obtained using a 5-point scale from strongly disagree (1) to strongly agree (5), where high scores designate a low involvement. SEI has internal consistency reliability for each subscale ranging from 0.78 to 0.85 (Grier-Reed et al., 2012). Examples of the items include "Most instructors at my university are interested in me as a person, not just as a student" (TSR), "Other students here like me the way I am" (PSS), "When I have problems at the university my family/guardian(s) are willing to help me" (FSL), "Most of what is important to know you learn in the university", (CRSW), "Going to the university after high school is important" (FS), and "I'll learn, but only if my family/guardian(s) give me a reward" (IM).

2.4 Data Collection and Data Analysis

All participants filled out the BNSG-S and SEI instruments during regular classes. The researcher personally handed over the questionnaires and helped the respondents with questions on the wording of any of the items. Further, the researcher made sure that ethical issues (e.g., voluntary consent of the participants, confidentiality of the results) while conducting the study were observed.

To analyze the relationships of these variables, a Confirmatory Factor Analysis (CFA) was utilized using Jamovi 2.6.13 to provide compelling construct-related evidence regarding the factor structure of a measure. Furthermore, CFA is the ideal tool to analyze these data as it enables a rigorous, theory-driven approach to validate the hypothesized factor structures, ensuring that the constructs measured are reliable and distinct, and that the model accurately reflects the relationships within the data. This tool also provides for a test of fit of observed data of a given factor structure. As shown in Table 1, CFA uses various fit indices such as Chi-square (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

Table 1

Summary table of fit indices and standards (Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2015)

Index	Ideal Value	Interpretation
CFI	≥ 0.90 (acceptable); ≥ 0.95 (good)	Compares model fit to a null model
TLI	≥ 0.90 (acceptable); ≥ 0.95 (good)	Adjusts for model complexity, penalizes overfitting
RMSEA	< 0.05 (close fit); < 0.08 (reasonable fit)	Measures error of approximation, includes confidence interval
SRMR	< 0.08 (good fit)	Reflects average residual discrepancy between observed and predicted values

For composite reliability of factors/subtypes, Raykov's rho (ω) was calculated using Margono's (2013) equation for composite score reliability, with a value of 0.700 and above considered acceptable (Hair et al., 2010; Raykov, 2016).

$$\omega = \frac{\left(\sum_{i=1}^{i} \lambda_i\right)^2}{\left(\sum_{i=1}^{i} \lambda_i\right)^2 + \left(\sum_{i=1}^{i} 1 - \lambda_i^2\right)} \qquad \text{(eq. 1)}$$

where ω is the construct reliability coefficient, and λ_i is the standardized factor loading.

3. Results and Discussion

A total of 850 Filipino university students participated in this study, with a mean age of 20.03 ± 2.46. Most participants came from the teacher education programs ($\sum$=402; 47.29%), followed by the criminology program

(n = 285; 33.53%) dominated the study. In terms of year level, most participants are 3rd year students (296; 34.82%), followed by the 4th year students (218; 25.65%). The socio-demographic characteristics of the participants are shown in Table 2.

Table 2

Socio-demographic characteristics of participants (n = 850).

Variables	Mean ± SD	Frequency (%)
Age (years)	20.03 ± 2.46	
Gender		
Male		404 (47.53%)
Female		431 (50.71%)
LGBTQIA+		12 (1.41%)
Prefer not to say		3 (0.35%)
Degree Programs		
BS Fisheries		90 (10.59%)
BS Marine Biology		43 (5.06%)
B Elementary Education		181 (21.29%)
B Secondary Education Science		145 (17.06%)
B Secondary Education Mathematics		39 (4.59%)
B Physical Education		37 (4.35%)
BS Criminology		285 (33.53%)
BS Industrial Security Management		30 (3.53%)
Year Level		
1st Year		107 (12.59%)
2nd Year		213 (25.06%)
3rd Year		296 (34.82%)
4th Year		218 (25.65%)
5th Year		13 (1.53%)
6th Year		3 (0.35%)

3.1 Students' Extent of Needs Satisfaction

The results of the confirmatory factor analysis (CFA) provide a robust interpretation of the various constructs Autonomy, Competence, and Relatedness within the Self-Determination Theory (SDT) framework, as originally hypothesized by Deci and Ryan (1985). Each construct was tested to confirm its validity and reliability as a latent factor, with numerous items connected with each construct to confirm acceptable representation.

Table 3 depicts the results from the CFA and composite reliability analysis of the Basic Needs Satisfaction General Scale (BNSG-S). Items A1 to A6 loaded significantly onto the autonomy factor/construct, with standardized estimates between 0.294 and 0.670, showing that these items adequately capture the construct. Such findings support previous research that autonomy is a critical dimension of motivation, associated with feelings of volition and control over one's actions (Deci & Ryan, 2000). However, item A7 demonstrated a near-zero and non-significant loading (-0.00752, p = 0.928), suggesting it may not represent autonomy effectively. This aligns with Hair et al. (2019) who recommend removing items with low loadings as they may introduce noise rather than useful information. For the competence subtype, items C1 to C4 showed adequate factor loadings, with values ranging from 0.587 to 0.864, reflecting their capacity to measure perceived competence accurately. As highlighted by White (1959), it involves the need for effectiveness and accomplishment, essential for sustaining motivation. On the other hand, item C5 and C6 had low, non-significant loadings (-0.0330 and 0.0984) implying that these items may be fewer effective indicators of competence. These findings could suggest that these items do not align well with participant's perceptions of competence, potentially due to item ambiguity or overlap with other constructs. In terms of relatedness subtype, the factor had strong loadings for most items, particularly R1, R2, R4, R5, and R8, with loadings from 0.682 to 0.895. These results support the idea that relatedness – a feeling connected and supported by others – is a vital component of motivation and well-being (Baumeister & Leary, 1995). Contrastingly, R6 and R7 had minimal, non-significant factor loadings, suggesting these items do not align well with the relatedness construct. Kline (2015) argues that poorly fitting items should be reviewed or revised for

clarity as they may dilute the construct's intended meaning.

Apart from the factor-item loadings, significant covariances between constructs/factors suggest strong interconnections among them, which is consistent with the Self-Determination Theory (SDT). Autonomy and Competence (1.018) and between Competence and Relatedness (1.116) indicate these factors often co-occur, enhancing motivation and well-being. Vallerand (1997) supports this by demonstrating that fulfilling these psychological needs collectively fosters intrinsic motivation and positive educational outcomes. These factor-to-factor relationships underscore SDT's claim that autonomy, competence, and relatedness work synergistically to support engagement and psychological health, especially in educational settings.

Generally, the composite reliability (Raykov's rho) coefficients of autonomy (0.711), competence (0.717), and relatedness (0.766) constructs in the needs satisfaction model demonstrate above the cutoff value of >0.700 as shown in Table 3. This indicates that the BNSG-S has good internal construct reliability (Hair et al., 2010; Raykov, 2016).

Table 3

Results of CFA and composite reliability analysis of the Basic Needs Satisfaction General Scale (BNSG-S)

Factor	Items	Factor Loading	ω
Autonomy	A1: I feel like I am free to decide for myself how to live my life.	0.62754	0.711
	A2: I feel pressured in my life.	0.29439	
	A3: I generally feel free to express my ideas and opinions.	0.65060	
	A4: In my daily life, I frequently have to do what I am told.	0.56885	
	A5: People I interact with on a daily basis tend to take my feelings into consideration.	0.67032	
	A6: I feel like I can pretty much be myself in my daily situations.	0.66154	
	A7: There is not much opportunity for me to decide for myself how to do things in my daily life.	-0.00752	
Competence	C1: Often, I do not feel very competent.	0.79657	0.717
	C2: People I know tell me I am good at what I do.	0.58714	
	C3: I have been able to learn interesting new skills recently.	0.86486	
	C4: Most days I feel a sense of accomplishment from what I do.	0.74859	
	C5: In my life, I do not get much of a chance to show how capable I am.	-0.03304	
	C6: I often do not feel very capable.	0.09837	
Relatedness	R1: I really like the people I interact with.	0.68225	0.766
	R2: I get along with people I come into contact with.	0.74088	
	R3: I pretty much keep to myself and don't have a lot of social contacts.	0.16691	
	R4: I consider the people I regularly interact with to be my friends.	0.81741	
	R5: People in my life care about me.	0.89546	
	R6: People in my life care about me.	-0.00146	
	R7: The people I interact with regularly do not seem to like me much.	0.01285	
	R8: People are generally pretty friendly towards me.	0.71657	

In the confirmatory factor analysis, the overall goodness of fit model was evaluated using several fit indices, as indicated in Table 1, to assess the degree to which the hypothesized model aligns with the observed data. The chi-square statistic ($\chi^2 = 254$, df = 186, $p < .001$) was significant suggesting that the model does not impeccably fit the data. However, Bentler and Bonett (1980) pointed out that chi-square is highly sensitive to sample size and often yields significant results in large samples, making it less useful as a standalone indicator. Other fit indices, such as CFI (0.924), TLI (0.914), SRMR (0.0315), and RMSEA (0.0207), suggested that the factor model strongly represents the structure of motivational constructs. One of the few practical implications of these findings is fostering intrinsic motivation by enhancing autonomy, competence, and relatedness in educational environments (Ryan & Deci, 2000). Schools and teachers could create supportive contexts and activities by offering students options (autonomy), providing positive criticisms (competence), and encouraging collaborative activities (relatedness).

Table 4

Calculated fit indices using CFA of students' needs satisfaction

Factor	No. of Items	χ^2 (df)	p	Goodness of fit indices			
				CFI	TLI	SRMR	RMSEA
Needs Satisfaction Model	21	254 (186)	< .001	0.924	0.914	0.0315	0.0207

Moreover, the learning atmosphere supports learners' academic growth. Students feel they can perform learning tasks at varying levels of difficulty and that the learning activities are exciting and something that tests their competencies. Among the aspects that improve students' aptitude are highly challenging tasks, accessibility to school facilities and providing feedback for improvement (Niemiec & Ryan, 2009). Also, to some extent, findings mirror a classroom environment with caring and supportive peers, classmates, and teachers. This is essentially good because affection and care of faculty members and functioning collaboratively with peers are crucial ingredients in developing confidence, perception of connectedness with the university, and use of self-regulatory approaches (Fried & Konza, 2013).

Furthermore, results reflect the interconnectedness of universal needs illustrating that when students are contented in their affection with their professors and peers (relatedness), it follows that they are also contented in the challenges met in carrying out their learning tasks (autonomous) so with their eagerness to allocate their time and effort to their studies (competence). This suggests that although the three needs are distinct, yet gratification of one need may influence the gratification of the other two to a degree, showing its relatedness. For instance, a learner is encouraged and given a choice, most likely he feels the support of the people surrounding him, thus developing the feeling that he can achieve the undertaking in the most efficient way of doing it. Findings were also supported by the study of Dagupto (2015) that the three psychological needs are strongly correlated that when one need is met, then the other need is reinforced as well.

3.2 Students' Extent of Psychological (Affective) and Cognitive Engagement

The CFA results provide insights into the latent factors/constructs of Teacher-Student Relationships (TSR), Control and Relevance of School Work (CRSW), Peer Support at School (PSS), Future Aspirations and Goals (FG), Family Support for Learning (FSL), and Intrinsic Motivation (IM). These factors are fundamental to understanding motivational factors in educational settings and support with frameworks that highlight the significance of relational, contextual, and motivational factors on student engagement and achievement.

Tables 5 and 6 depict the results from the CFA and composite reliability for students' psychological and cognitive engagements, respectively. Most TSR items showed significant factor loadings (0.253 to 0.761), with TSR 9 having the highest loading (0.761). These high loadings support the idea that TSR is a well-represented construct in this model. Strong TSRs are known to foster student engagement, motivation, and academic success, as established by Hamre and Pianta (2006), who highlighted that positive TSR contribute to a supportive learning environment. Items measuring peer support showed a range of factor loadings, with PSS5 having the highest loading (0.877), while items such as PSS1 and PSS3 had lower factor loadings (0.311 and 0.338, respectively). Peer support is a critical factor in promoting a sense of belonging and well-being in school. Wentzel (1998) found that peer relationships contribute to students' motivation and persistence in school settings, which is partially reflected in the present findings, though some items may require refinement. Items in the FSL factor had solid and significant loadings, particularly FSL1 (0.819) and FSL3 (0.744), reflecting the importance of family support in student academic motivation. Hill and Tyson (2009) noted that family support plays a significant role in students' educational outcomes by providing encouragement and resources for learning, which is evident in the strong factor loadings observed in this study.

In terms of composite reliability, all factors under the psychological engagement model demonstrated a good internal construct reliability, ranging from 0.742 to 0.829, with FSL yielding the highest construct reliability (Table 5).

Table 5

Results of CFA and composite reliability analysis of the students' psychological (affective) engagement

Factor	Items	Factor Loading	ω
Teacher -Student Relationships (TSR)	TSR1: My instructors/professors are there for me when I need them.	0.548	0.812
	TSR2: Instructors/Professors at my college/university listen to the students.	0.660	
	TSR3: The college/university rules are fair.	0.560	
	TSR4: Most teachers at my college/university are interested in me as a person, not just as a student.	0.253	
	TSR5: Overall, my instructors/professors are open and honest with me.	0.623	
	TSR6: Overall, faculty and staff at my college/university treat students fairly.	0.581	
	TSR7: I enjoy talking to the faculty and staff in college/ university.	0.418	
	TSR8: I feel safe in the university.	0.666	
	TSR9: In college/university, instructors/professors care about students.	0.761	
Peer Support at School (PSS)	PSS1: Other students in college/university like me the way I am.	0.311	0.742
	PSS2: Other students at college/university care about me.	0.437	
	PSS3: Students at my college/university are there for me when I need them.	0.338	
	PSS4: Students in college/university respect what I have to say.	0.577	
	PSS5: I enjoy talking to the students in college/university.	0.877	
	PSS6: I have some friends at my college/university.	0.794	
Family Support for Learning (FSL)	FSL1: My family/guardian(s) are there for me when I need them.	0.819	0.829
	FSL2: When something good happens at college/university, my family/guardian(s) want to know about it.	0.742	
	FSL3: When I have problems at school, my family/guardian(s) are willing to help me.	0.744	
	FSL4: My family/guardian(s) want me to keep trying when things are tough in college/university.	0.653	

In the cognitive engagement model, CRSW items exhibited high, significant factor loadings (Table 6), particularly CRSW7 (0.737) and CRSW8 (0.826), indicating that these items effectively capture the sense of relevance and control in schoolwork. According to Eccles and Roeser (2003), when students perceive school tasks as meaningful and within their control, they are more likely to feel competent and motivated, which aligns with the findings of this present study. Similarly, the FG factor was well-represented, with high loadings across all items, ranging from 0.742 to 0.822, signifying strong consistency with this construct. Research by Schunk and Zimmerman (2007) emphasized the role of future aspirations in fostering self-regulated learning and goal setting, key components of long-term academic success. The high factor loadings suggest that these items accurately measure students' aspirations and future orientations. Finally, IM had the highest factor loadings, particularly IM1 and IM2 loading at 0.881 and 0.870, respectively, indicating robust measurement of intrinsic motivation. These findings are consistent with Deci and Ryan's (2000) SDT which posits that intrinsic motivation is crucial for engagement and persistence in learning tasks. High factor loadings suggest that these items effectively capture the intrinsic motivation construct.

Table 6

Results of CFA and composite reliability analysis of the students' cognitive engagement

Factor	Items	Factor Loading	ω
Control and Relevance of School Work (CRSW)	CRSW1: After finishing my schoolwork, I check it over to see if it's correct.	0.592	0.866
	CRSW2: Most of what is important to know you learn in college/university.	0.653	
	CRSW3: When I do schoolwork, I check to see whether I understand what I'm doing.	0.618	
	CRSW4: When I do well in college/university, it's because I work hard.	0.673	

	CRSW5: The tests in my classes do a good job of measuring what I'm able to do.	0.688	
	CRSW6: I feel like I have a say about what happens to me in the college/university.	0.439	
	CRSW7: Learning is fun because I get better at something.	0.737	
	CRSW8: What I'm learning in my classes will be important in my future.	0.826	
	CRSW9: The grades in my classes do a good job of measuring what I'm able to do.	0.563	
Future Aspirations and Goals (FG)	FG1: My education will create many future opportunities for me.	0.751	0.888
	FG2: Going to college/university after high school is important.	0.782	
	FG3: I plan to continue my education following college.	0.742	
	FG4: College/University is important for achieving my future goals.	0.822	
	FG5: I am hopeful about my future.	0.820	
Intrinsic Motivation (IM)	IM1: I'll learn, but only if the instructor/professor gives me a reward.	0.881	0.868
	IM2: I'll learn, but only if my family/guardian(s) give me a reward.	0.870	

Within psychological and cognitive engagement models, varying covariances were observed between constructs. A significant positive covariances between TSR and CRSW (0.885), PSS and FG (0.772), and other factor pairs indicate that these constructs are interrelated, which supports theories suggesting that supportive relationships and meaningful tasks are crucial to fostering motivation. The negative covariances involving intrinsic motivation, such as with IM and FG (-0.547) may reflect a shift in motivation focus. Ryan and Deci (2000) describe how external factors, such as peer or family influence, may at some point detract from purely intrinsic motivation if students rely on these external supports rather than internal motivation. As shown in Table 6, all factors under the cognitive engagement model exhibited a strong internal construct reliability, with the highest in FG construct at 0.888.

The goodness of fit calculated by CFA for the non-observable engagement model indicated a significant chi-square result (χ^2 = 837, df = 545, p < .001) suggesting that the model does not perfectly fit the data. With the limitations of chi-square as being highly sensitive to sample size, other reliable model fit indices are advised to be consulted to assess the overall performance of the hypothesized model against the observed data. In fact, model fit indices, such as CFI (0.949), TLI (0.945), SRMR (0.0329), and RMSEA (0.0251), exhibited an excellent fit with minimal residual discrepancies. Thus, the CFA confirmed that factors measured, namely TSR, CRSW, PSS, FG, FSL, and IM, are valid and reliable indicators of students' motivational and relational experiences in educational settings. These results revealed that students are clearly engaged in activities that are relevant to their chosen career and what they think is to their advantage if they are already in the workplace. Findings could give an insight to school personnel to focus more on activities that will hone students for their career path and make them ready for their life after graduation. Nevertheless, the attitude of students showing their active involvement and valuing their learning if sustained will result in positive academic outcomes. As found in the study of Green et al. (2012) participating actively in class activities and homework completion positively predicted test achievement and negatively predicted absenteeism. It cannot be denied that participation in school activities, quality teaching, and student capabilities are contributory factors in the attainment of students' academic performance.

Table 7

Calculated fit indices using CFA of non-observable engagement model

Factor	No. of Items	χ^2 (df)	p	Goodness of fit indices			
				CFI	TLI	SRMR	RMSEA
Psychological and Cognitive Engagement	35	837 (545)	< .001	0.949	0.945	0.0329	0.0251

3.3 Correlation of Basic Needs Satisfaction and Non-observable Engagements

The CFA results substantiate the validity of each factor, reflecting the multi-dimensional nature of student

motivation in educational contexts. High factor loadings for most items confirm that the observed variables are reliable indicators of the latent constructs, which aligns with the established literature on students' needs satisfaction and engagement in education.

The high model fit indices (CFI = 0.912; TLI = 0.907; SRMR = 0.0368; RMSEA = 0.0226) indicate an acceptable fitness to students' needs satisfaction and non-observable (psychological and cognitive) engagement. These findings support Eccles and Wigfield's (2002) expectancy-value theory, which posits that students' motivation is shaped by their beliefs about task importance and their ability to succeed. However, certain items showed low factor loading, potentially due to ambiguity or weak association with the intended construct. As mentioned by DeVellis (2016), to improve clarity and reliability of hypothesized models, refining or removing poorly fitting items may be useful particularly in constructs with complex psychological underpinnings like motivation. Similarly, these findings are in harmony with that of Fried and Konza (2013) showing that students' sense of relatedness and feeling of competence in the classrooms were strongly correlated to their cognitive engagement, whereas autonomy was medium correlated with emotional engagement. Likewise, results promote the claim of Zhang et al. (2011) that students' overall psychological need satisfaction is positively related with perceived need support, intrinsic motivation and activity participation. It is also consistent with the results in the study of Maulana et al., (2016) showing that high autonomy, competence, and relatedness support is an influential predictor of students' innate pleasure, challenge, and excitement of engaging in learning. Moreover, findings are made known that the three dimensions of need satisfaction in autonomy, competence and relatedness influence intrinsic motivation. Need in autonomy, competence and relatedness dictated engagement of students through enhancing their innate interest in learning. Results are consistent with SDT stands that students are more inclined to show their inherent interest and active involvement in learning when their basic needs are met (Fried & Konza, 2013).

The validated constructs underscore the need for educational environments that support autonomy, provide relevant tasks, foster positive teacher and peer relationships, and encourage family support. Schools should consider implementing strategies that promote these aspects to enhance students' engagement and intrinsic motivation, as Reeve et al. (2004) emphasizes the importance of autonomy-supportive environments for student persistence.

Table 8

Model Fit indices as calculated by confirmatory factor analysis

Model	No. of Items	χ^2 (df)	*p*	CFI	TLI	SRMR	RMSEA
Needs Satisfaction-Student Engagement	56	2077 (1448)	< .001	0.912	0.907	0.0368	0.0226

4. Conclusion and Recommendation

This Confirmatory Factor Analysis (CFA) establishes that the constructs measured—Autonomy, Competence, Relatedness, Teacher-Student Relationship (TSR), Control and Relevance of School Work (CRSW), Peer Support at School (PSS), Future Aspirations and Goals (FG), Family Support for Learning (FSL), and Intrinsic Motivation (IM)—are valid and reliable indicators of students' motivational experiences. Aligned with theoretical expectations from Self-Determination Theory and supported by empirical studies, this model offers a robust framework for understanding the relational, contextual, and motivational factors contributing to student engagement and academic success. However, studies on need satisfaction and its influence on student engagement—particularly cognitive and psychological aspects—are relatively limited in Asian contexts, especially in the Philippines. This scarcity leaves a gap in understanding the local context, highlighting the importance of this study.

Findings reveal that Filipino university students experience moderate satisfaction in autonomy (the sense of making their own decisions), competence (experiencing mastery), and relatedness (feeling connected).

Psychologically, they show moderate engagement, while their cognitive engagement is notably strong. These students perceive their instructors, staff, and peers as supportive, fostering a sense of belonging within the university. The university's efforts to create a conducive learning environment appear effective, as students' active involvement is linked to their sense of contentment and connection to the institution. This suggests that when students feel their needs are met, they are more likely to engage both cognitively and psychologically.

Based on these findings, it is recommended that teachers foster and sustain engaging, relevant learning opportunities to further stimulate student motivation. By providing dynamic and meaningful activities, students are more likely to participate actively in tasks that develop positive attitudes, identification with school, and interest in their academic work. Efforts should emphasize socio-academic activities that support autonomy, competence, and relatedness, as these foster stronger connections with the university community and enhance students' appreciation of their studies and career goals.

Although this study contributes to existing research on student engagement, some limitations should be noted. First, it relies on self-reported data, which, while valuable, can be influenced by biases such as social desirability, recall issues, or personal beliefs (Fredricks & McColskey, 2012; Arshadi, 2010). Future research would benefit from incorporating various perspectives, such as insights from mentors, peers, and family members, and employing diverse methods like interviews or observations. These approaches could help validate the findings and provide a more comprehensive understanding of the relationship between need satisfaction and engagement.

Second, the study's cross-sectional design limits its ability to make causal inferences about the association between need satisfaction and engagement. Future studies should consider longitudinal designs to better examine how these factors evolve over time and affect long-term engagement. Third, this research focuses on a single university, which restricts the generalizability of the results. Expanding future studies to multiple institutions would offer a more representative view of college students' engagement across the Philippines. Additionally, exploring cultural influences on needs satisfaction and engagement would provide valuable insights, as cultural norms may affect how students experience and prioritize their needs. Differences in the strength of these relationships could reflect how well needs are typically met within various cultural contexts, making such investigations an essential area for future research.

Future research could explore further refinement of low-loading items and examine the potential suppressor effects seen in negative covariances with intrinsic motivation. Additionally, cross-validation with different student populations could provide more insights into the generalizability of these constructs across diverse educational contexts.

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