THE MEDIATING ROLE OF PERSONAL BEST GOALS BETWEEN BASIC PSYCHOLOGICAL NEEDS AND STUDENT ENGAGEMENT

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Abstrak

Berpandukan Teori Penentuan Kendiri (SDT), kajian ini menekankan kepada kurangnya kajian berkenaan penglibatan pelajar dalam konteks pengajian tinggi di Malaysia. Hal ini dilaksanakan bagi memahami lebih mendalam tentang mekanisme keperluan asas psikologi seperti keperluan kepada autonomi, kompetensi, keberhubungan dan kebaharuan yang mampu mempengaruhi penglibatan pelajar melalui matlamat peribadi terbaik (PB). Objektif utama kajian ini adalah untuk menentukan peranan matlamat PB sebagai pemboleh ubah pengantara di antara keempat-empat keperluan asas psikologi dengan penglibatan pelajar. Reka bentuk penyelidikan keratan rentas digunakan dalam kajian ini. Data kajian dikumpulkan daripada 743 orang pelajar ijazah sarjana muda di tiga buah universiti awam di utara Malaysia. Hipotesis kajian diuji dengan menggunakan Model Persamaan Berstruktur melalui AMOS versi 23. Kajian ini telah membuktikan kesahan soal selidik versi bahasa Malaysia melalui analisis faktor pengesahan. Hasil kajian mendapati bahawa hubungan antara autonomi, kompetensi, keberhubungan, dan kebaharuan adalah positif dan signifikan dengan penglibatan pelajar. Selain itu, terdapat hubungan tidak langsung yang signifikan melalui matlamat PB daripada aspek keperluan asas kepada kompetensi, keberhubungan, dan keperluan kepada pembaharuan terhadap penglibatan pelajar. Walau bagaimanapun, matlamat PB tidak berfungsi sebagai pengantara hubungan antara keperluan autonomi dan penglibatan pelajar. Dapatan kajian ini memberikan pemahaman baharu tentang kepentingan keperluan asas kepada kebaharuan bersama dengan keperluan sedia ada dalam SDT. Kajian ini juga mendapati bahawa matlamat PB merupakan satu mekanisme yang dapat mengaitkan hubungan antara keperluan asas dengan penglibatan pelajar. Selain itu, hasil kajian ini memberikan saranan tentang amalan yang mampu menyediakan suasana pembelajaran bermotivasi yang berupaya meningkatkan penglibatan pelajar serta perkembangan akademik mereka dalam konteks pengajian tinggi di Malaysia.

Kata kunci: Keperluan asas psikologi, matlamat peribadi terbaik (PB), penglibatan pelajar, teori penentuan kendiri, Malaysia.

Abstract

Informed by self-determination theory (SDT), this study addressed the paucity of research into student engagement within the Malaysian higher education by examining the mechanism by which the basic psychological need for autonomy, competence, relatedness, and novelty can influence students' engagement through promoting personal best (PB) goals. The main objective of this study was to determine the role of PB goals as a plausible mediating variable between the four basic psychological needs and student engagement. A cross-sectional research design was employed. Data was collected from a total sample of 743 undergraduate students from three public universities in northern Malaysia. Hypothesized relationships were tested using structural equation modeling via AMOS version 23. The current study established the validity of the survey in Bahasa Malaysia for the measures through confirmatory factor analysis. Furthermore, results revealed that autonomy, competence, relatedness, and novelty were positively and significantly associated with student engagement. Besides, there were significant indirect effects through PB goals from basic needs for competence, relatedness, and novelty to student engagement. However, PB goals did not mediate the relationship between the need for autonomy and student engagement. These results provide a new understanding on the importance of the basic need for novelty alongside existing needs in SDT. They also offer insights on the PB goals as one mechanism of which the basic needs may associate with student engagement. In addition, these results provide insightful practices to establish the motivational learning environment that vitalize students' engagement and enhance their academic growth in the Malaysian higher education contexts.

Keywords: Basic psychological needs, Personal best (PB) goals, Student engagement, Self-determination theory, Malaysia.

Dedication

In the name of Allah, most gracious, most merciful

I would like to dedicate this thesis to my beloved parents for their blessings, inspiration, and prayers that guided me to this achievement. To my nephew Feras Anas and his mother, and my beloved brothers and sister. Thank you for being there for me. You are my sources of strength and inspiration

To all my lecturers and friends

Thank you all for your love and support

Acknowledgement

In the name of Allah, the Most Gracious and Most Merciful

Praise and peace be upon Prophet Muhammad S.A.W

Alhamdulillah…. I have finally come to the end of the road of this long journey. I thank Allah for blessing me with the opportunity and willpower to endure this worthy experience

I would like to express my appreciation and gratitude to everyone who has contributed in completing this thesis. My special deepest thanks to my PhD supervisor, Prof. Dr. Rosna Awang Hashim who has been most helpful throughout my entire study. Her valuable support, wisdom, diligence, and ability to motivate me enabled me to earn this degree. I also wish to express my thanks to my second supervisor, Dr. Amrita Kaur who has been such a committed supervisor since my Master project, giving me advices on my research work and critical feedback on my writing. I appreciate her constructive comments, consistent guidance, and advices, not only in research work but in all aspects during this long journey.

My special sincerest thanks to my parents for giving me the best and for being my inspiration. I extend my heartfelt thanks to my dear brothers, sister, and all of my relatives for their love and support. My goal would not have been achieved without them.

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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Higher education institutions, educationists, and students are constantly challenged by governments to make their contribution to national economic growth (Zepke & Leach, 2010). According to Lester (2013), one of these challenges is a drive to boost students' educational success and support them to achieve the most from their higher education experiences. Therefore, in the higher education contexts, educators, curriculum designers, policymakers, and leaders are continuously seeking more efficient ways to foster students' academic success and achievement by providing them with ideal curriculum, effective teaching and learning strategies, and practical assessment. Though many other equally essential factors that significantly impact both students' success and their academic achievement, the engagement of students with their studies and the learning process is widely documented as the most decisive factor in predicting their educational success and personal development (Griffin & Howard, 2017). In the same vein, Thomas (2012) stated that "It has become increasingly clear that 'success' means helping all students to become more engaged and more effective learners in higher education, thus improving their academic outcomes and their progression opportunities after graduation (or when they exit higher education)" (p. 10). In this sense, students' engagement is considered as an essential factor that has an unambiguous connection to students' educational success.

In addition, Finn and Zimmer (2012) seen students' engagement as an intuitive, fundamental, and a pivotal factor in enhancing the learning and teaching processes. Consequently, the crucial role of students' engagement in fostering their holistic

development makes this concept to become a focal point in the agenda of higher education institutions across the globe (Leach, 2016). Not only this, student engagement has become a prominent factor that affects students' persistence and retention in higher education institutions. For example, Zepke (2017) highlighted that academic engagement has become a prominent construct in the educational institutions from all aspects as it makes a considerable contribution to enhance students' persistence, high quality of learning, educational success, and prepares them for the job market. Moreover, higher education institutions are investing more efforts to encourage academic engagement because of its clear links with students' retention and their academic performance (Kahn, 2014). Beyond the educational achievements matters, academic engagement could contribute to various areas which range from competence and skills growth to higher psychological well-being and further positive view of self (Maguire, Egan, Hyland, & Maguire, 2016).

Discourse on student engagement is illustrated in the initiatives implemented by many higher education institutions around the globe in order to increase students' completion and success rates at university level such as The Student Success Program (SSP) at the Queensland University of Technology in Australia (Macfarlane, 2016), Centre for Community College Student Engagement (CCCSE) in the USA (CCCSE, 2019), Teaching and Learning Research Initiative (TLRI) program in the New Zealand (Zepke, 2017), and Developing Inclusive Curricula in Higher Education project in the UK (Trowler & Trowler, 2010). Furthermore, there are different perspectives on how to enhance this construct; for instance, in the United States, the focus is more on facilitating learning processes within a predefined and general educational framework, while in the UK the focus is more on facilitating the students' learning in constructivist contexts

(Zepke, 2014). Additionally, institutions have also begun to set effective educational practices to engage students through the lenses of the National Survey of Student Engagement (NSSE). This survey was first introduced in the US and subsequently adopted by most developed higher education systems around the world such as Australia, South Korea, China, Ireland, Canada, Japan, Mexico, and the United Kingdom (Macfarlane & Tomlinson, 2017).

Malaysia is not an exception, as there have been varied and widespread initiatives to foster the engagement of students in their academic activities. Accordingly, Ministry of Higher education (MOHE) asserted that Higher Learning Institutions (HLIs) should play more significant coordinated roles in enhancing students' growth by involving them in various activities and programmes such as academic, sports, cultural, community, and industry engagement to achieve the ultimate goal of producing holistic, entrepreneurial, and balanced graduates (Ministry of Higher Education, 2016). Besides, since the prevalent usage of the National Survey of Student Engagement (NSSE) in the developed higher education institutions around the world, Yusoff (2012) implemented this survey to explore and better understanding the processes of teaching and learning that enhance students' engagement among Malaysian higher education contexts. Moreover, Jaafar, Awang-Hashim, Ariffin, and Faekah (2012) developed and validated the appropriate local contexts measurement model on student engagement, namely Malaysian University Student Learning Involvement Scale (MUSLIS). However, despite these few initiatives, the phenomenon of disengagement still existing among Malaysian undergraduates due to poor understanding of student engagement' concept; which in turn makes higher

institutions reluctant to take effective practical solutions in order to support engagement among Malaysia undergraduates (Abdullah, Teoh, Roslan, & Uli, 2015).

Several research studies have examined the factors that contribute to the engagement of students in higher education institutions. Possibly the best known of these factors are peer interactions, active and collaborative experiences, learning pedagogy, and a sense of belonging (Leach, 2016). Other factors, such as intellectual, social and emotional well-being considered as essential indicators of student engagement and academic success (Zepke, 2014). However, over last two decades, there is an established literature that showed the crucial role of motivational factors in enhancing students' engagement (Ciani, Sheldon, Hilpert, & Easter, 2011; Diseth, Danielsen, & Samdal, 2012; Gonida, Voulala, & Kiosseoglou, 2009; Zepke, 2017; Zhen et al., 2016). Amongst these factors are the basic psychological needs in self-determination theory (SDT); which have been central to the motivational studies in order to sustain students' motivation for high-quality of their academic engagement (Collie, Martin, Papworth, & Ginns, 2015; Hakimzadeh, Besharat, Khaleghinezhad, & Ghorban Jahromi, 2016; Jang, Kim, & Reeve, 2012; Maralani, Lavasani, & Hejazi, 2016; Reeve, 2012).

Schuetz (2008) highlighted that SDT is a promising theoretical framework that provides leverage to foster students' engagement and success. SDT is a well-validated theory which asserted that students' innate psychological needs for competence, relatedness, and autonomy must be fulfilled for their optimal learning engagement to emerge (Deci & Ryan, 2000). On the other hand, if these three basic needs are not met, then the risk of disengagement and attrition is much higher among students (Benita, Roth, & Deci, 2014; Deci & Ryan, 2000). However, recently, González-Cutre, Sicilia, Sierra, Ferriz, and

Hagger (2016) and González-Cutre and Sicilia (2018) highlighted that novelty could be as the fourth psychological need alongside the proposed needs in SDT.

In psycho-educational research, SDT has been integrated with achievement goal theory and considered students' goals orientation as trajectories of the basic psychological needs; which in turn explain various positive educational outcomes such as student engagement (Benita et al., 2014; Ciani et al., 2011; Diseth & Samdal, 2014; Ozdemir Oz, Lane, & Michou, 2016). Achievement goal theory argued that the students' achievement goals guide their behaviours in the academic activities (Pintrich, 2000), and these goals determine their approach to be engaged in the learning process (Urdan & Midgley, 2003). The more recent attention of literature on the achievement goals has focused on personal best (PB) goals as a new construct within the achievement goal theory (Collie et al., 2015). Martin (2006) defined PB goals as "specific, challenging, competitively self-referenced and self-improvement-based goals that hold implications for motivation and achievement in terms of their facilitating effects for self-efficacy, persistence, participation, task interest, and engagement" (p.804). Moreover, it was argued that students are likely to show a higher level of academic engagement (Jang et al., 2012) and are more oriented towards adopting PB goals (Martin, Collie, Mok, & McInerney, 2016) when they experienced a sense of autonomous or self-determination which emerges mainly from satisfaction of the basic needs.

Hence, it would be reasonable to investigate the interrelation between the basic psychological needs satisfaction, personal best (PB) goals, and student engagement within a framework of an integrated model to seek a deeper understanding of engagement's issues among Malaysian undergraduates. In this sense, the objective of the current study

is to investigate how the interplay of the motivational factors that describe students' perceptions of their learning contexts in terms of basic psychological needs satisfaction and personal factors in terms of PB goals predicts positive outcomes. These constructs are critically relevant to students' optimal functioning during learning activities, as they provide a motivational foundation for students to be more engaged in the learning process. Furthermore, the current study aims to investigate how basic psychological needs may predict student engagement via the mediating role of PB goals. This study may provide a fundamental framework on how the interaction between the established learning contexts and the students' corresponding personal goals might enhance students' engagement in the Malaysian higher education contexts.

1.2 Problem Statement

The importance of engagement has become well documented in educational contexts, with strong links observed between students' engagement and achievement at both the second level (e.g., secondary/high school) and third level (e.g., colleges/universities) (Maguire et al., 2016). However, while its importance is undisputed, the discrete role of higher education institutions around the world to support this construct has gained precedence over recent years. This can be seen in the development of surveys of student engagement as the most notable tool to ensure excellent in the educational practices within developed higher institutions such as National Survey of Student Engagement (NSSE) in USA and Canada (Kuh, 2009), Australian Survey of Student Engagement (AUSSE) in Australia and New Zealand (Coates, 2010) and China College Student Survey (CCSS) (Yin & Wang, 2016). Therefore, institutions are increasingly looking for effective ways to strengthen

students' engagement in the formal curriculum and informal co-curricular activities (Lester, 2013).

Malaysian institutions are not an exception regarding seeking effective ways to enhance the engagement of students and maximise academic research in this area to develop the quality the teaching and learning processes. However, undeniably, the rampant disengagement can be observed in the Malaysian higher education contexts; and this phenomenon becomes apparent when we begin to talk about Malaysian institutions (Abdullah et al., 2015; Osman, Jamaludin, & Mokhtar, 2014; Teoh, Abdullah, Roslan, & Daud, 2013). Certainly, this is not an encouraging scenario in Malaysia. In its National Education Blueprint (2015-2025), Malaysia aspires to develop the quality of higher education by strengthening the levels of engagement and interactivity among students in various academic aspects (Ministry of Higher Education, 2016). Moreover, most of the studies concerning student engagement have only focused on elementary, middle and high school contexts (Awang-Hashim, Kaur, & Noman, 2015; Awang-Hashim & Murad Sani, 2008; Jelas et al., 2014; Sahil & Hashim, 2011; Salleh, Desa, & Tuit, 2013). More precisely, Salleh et al. (2013), argued that academic engagement is not a common variable in studies within Malaysian educational contexts.

As a result, the literature available about factors that enhance student engagement still lacking, and the studies dealt directly with student engagement in Malaysian higher education are even scant. The challenge, therefore, is how higher education institutions in Malaysia maximise student engagement research to improve the teaching and learning quality. Given the fact that student engagement is less explored in Malaysian higher education institutions, the current study addresses a gap in the extant literature.

Specifically, this study proposing a robust literature-based model that investigates the relationships between basic psychological needs in SDT and PB goals simultaneously to enhance the construct of learning engagement; as well as provide further explanation for preventing the disengagement phenomenon among Malaysian institutions.

To further advance the depth of the present study, the model conceptualised for the current study makes a significant contribution to the understanding of the construct of student engagement by extending the proposed model with the inclusion of a new need alongside the existing needs within SDT. SDT suggested that fulfilment of the inherent needs for autonomy, competence, and relatedness considered as the motivational foundation that enhances students' learning engagement, optimal function, and psychological satisfaction (Deci & Ryan, 2000; Ryan & Deci, 2000; Vansteenkiste, Niemiec, & Soenens, 2010). However, recently, there has been a renewed interest in the SDT's propositions. For example, Sheldon (2011) agreed with the contention that theoretical and empirical accounts of SDT had been confined only to the three proposed psychological needs. According to him, these needs are exclusively considered as the essential needs that drive individuals' motivation but SDT did not include alternative basic needs. Accordingly, there would seem to be a definite need for other candidate needs alongside the existing basic psychological needs in SDT.

As per the best knowledge of the researcher, there has not been any proposal studying alternative needs as a psychological basic need in SDT except that studies carried out by González-Cutre et al. (2016) and González-Cutre and Sicilia (2018) in which they highlighted that novelty could be considered as a basic need within SDT in relation to students' life satisfaction, intrinsic motivation, vitality, dispositional flow, and

satisfaction. According to them, failure to satisfy the need for novelty among students produce negative consequences such as boredom, low self-worth, less interest and enjoyment, negative affect, low life satisfaction and psychological well-being. Furthermore, they recommended for more conceptual debate and studies to test the relevance of novelty satisfaction in different outcomes, different educational levels, and different countries. Moreover, there are a paucity in the empirical studies on psychological needs effects in higher education especially on the need for novelty. Accordingly, this study will investigate the role of novelty satisfaction, in addition to autonomy, relatedness and competence in academic engagement within the Malaysian higher education context.

Along with the newly introduced basic psychological need, we incorporate the less explored type of achievement goals; namely PB goals. As was mentioned, goals significantly impact students' motivation and define their approach to be involved in their learning activities (Urdan & Midgley, 2003). SDT maintains that the students' personal goals are more likely to be achieved when social contexts adequately fulfil their basic psychological needs (Deci & Ryan, 1985). However, most of the studies on the relationships between the basic needs and goals orientation have only focused on the mastery and performance types of goals (Benita et al., 2014; Diseth et al., 2012; Diseth & Samdal, 2014; Janke, Nitsche, & Dickhäuser, 2015; Ozdemir Oz et al., 2016; Sari, 2015; Sinatra, Heddy, & Lombardi, 2015). Considering PB goals, Collie et al. (2015), by focusing only on relatedness, have asserted the notion that this type of goals is a mechanism by which students' relationships with their teachers, peers, and parents predicted academic engagement. They argued that the absence of PB goals in the relationships between basic needs and educational outcomes will produce some negative

outcomes in which students will be more inclined in demonstrating their achievement as relative to others instead of focusing on personal standards of excellence and how to attain them. Consequently, we are given no explanation of how the basic psychological needs including novelty may connect with student engagement in the collectivistic contexts; through mediating role of PB goals. The following parts move on to describe in greater detail the cross-cultural and contextual controversy surrounding PB goals and basic psychological needs in SDT.

Cross-cultural studies argued that students in the Western and Asian countries are different regarding their levels of academic achievement, goals, motivation, and engagement (Givens Rolland, 2012; Martin & Hau, 2010; Martin, Yu, & Hau, 2014). In other words, Martin and Hau (2010) and Yu and Martin (2014) argued that the students in Western contexts tend to embrace higher adaptive levels of goals orientation, motivation, and academic engagement compare to the students in Asian contexts. Moreover, several empirical studies found that PB goals are significantly related to higher levels of students' motivation, engagement, and academic achievement (Collie et al., 2015; Martin et al., 2016; Martin & Elliot, 2015a; Martin & Liem, 2010; Yu & Martin, 2014). However, most of the studies on PB goals have been conducted within the Western world, individualistic, and not at the higher institutions. Accordingly, Liem, Ginns, Martin, Stone, and Herrett (2012) emphasized the need to study the role of PB goals among college students within different cultural and educational contexts that holding the collectivistic values. In this sense, it is far doubtful to what extent PB goals are academically worthy within a collectivist context such as Malaysia.

Additionally, stemming from the cultural controversy surrounding SDT, the basic needs constructs of SDT are still at the centre of the criticism from several cross-cultural researchers. For example, Terpstra-Tong, Terpstra, and Tee (2014) highlighted that Asian and mainly Muslim countries such as Malaysia have some unique cultural characteristics including collectivism, relationship orientation, complying to the social norms. In this sense, there are arguments that the basic psychological needs in SDT should not be applied within such cultural contexts (Iyengar & DeVoe, 2003; Markus & Kitayama, 2003). According to them, experiencing those needs within collectivistic contexts correspond less compared to the individualistic nations. In contrast, accumulating evidence indicated that individuals from Eastern nations do benefit through the fulfilment of their psychological needs in SDT. This has been indicated clearly in the contexts that including more collectivistic-oriented culture such as China (Vansteenkiste, Lens, Soenens, & Luyckx, 2006), Jordan (Ahmad, Vansteenkiste, & Soenens, 2013) and South Korea (Jang, Reeve, Ryan, & Kim, 2009). In Malaysian higher education contexts, Hassan and Al-Jubari (2016) have provided excellent support for the SDT propositions concerning student engagement. One question that needs to be asked; however, is whether the SDT's propositions about motivation need to be more examined in the contexts that embrace different cultural values.

In overall, based on the above-mentioned issues, this research sheds new light on the relationships between basic psychological needs (autonomy, relatedness, competence, and novelty), personal best (PB) goals, and student engagement (cognitive, behavioural and emotional) within a framework of an integrated model among Malaysian higher education institutions. Specifically, in respect to the cultural discrepancies, this research helps to

uncover the influences of psychological needs and PB goals on student engagement by examining to which extent basic psychological needs are related to goals and student engagement and how basic psychological needs predict student engagement via PB goals as a mediator within the Malaysian higher education context.

1.3 Research Objectives

The research objectives are formulated to examine:

1. The relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement among undergraduate students in Malaysia.
2. The relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and personal best (PB) goals among undergraduate students in Malaysia.
3. The relationship between personal best (PB) goals and student engagement among undergraduate students in Malaysia.
4. The mediating role of personal best (PB) goals between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement among undergraduate students in Malaysia.

1.4 Research Questions

The research questions of this study are as follows:

1. Is there any significant relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement among undergraduate students in Malaysia?

2. Is there any significant relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and personal best (PB) goals among undergraduate students in Malaysia?
3. Is there any significant relationship between personal best (PB) goals and student engagement among undergraduate students in Malaysia?
4. Do personal best (PB) goals mediate the relationships between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement among undergraduate students in Malaysia?

1.5 Research Hypotheses

The following outcomes were hypothesized:

H1a: There is a significant relationship between autonomy and student engagement among undergraduate students in Malaysia.

H1b: There is a significant relationship between competence and student engagement among undergraduate students in Malaysia.

H1c: There is a significant relationship between relatedness and student engagement among undergraduate students in Malaysia.

H1d: There is a significant relationship between novelty and student engagement among undergraduate students in Malaysia.

H2a: There is a significant relationship between autonomy and personal best (PB) goals among undergraduate students in Malaysia.

H2b: There is a significant relationship between competence and personal best (PB) goals among undergraduate students in Malaysia.

H2c: There is a significant relationship between relatedness and personal best (PB) goals among undergraduate students in Malaysia.

H2d: There is a significant relationship between novelty and personal best (PB) goals among undergraduate students in Malaysia.

H3: There is a significant relationship between personal best (PB) goals and student engagement among undergraduate students in Malaysia.

H4a: Personal best (PB) goals mediate the relationship between autonomy and student engagement among undergraduate students in Malaysia.

H4b: Personal best (PB) goals mediate the relationship between competence and student engagement among undergraduate students in Malaysia.

H4c: Personal best (PB) goals mediate the relationship between relatedness and student engagement among undergraduate students in Malaysia.

H4d: Personal best (PB) goals mediate the relationship between novelty and student engagement among undergraduate students in Malaysia.

1.6 Theoretical Framework

Self-determination theory (SDT) is a macro motivational theory which emphasises addressing motivational factors across all domains of life (Deci & Ryan, 2000). The theory categorically specifies the social contextual factors or events that facilitate or undermine students' motivation, engagement, optimal functioning in the learning settings. Within SDT, there are several mini-theories; one is basic needs theory. Basic needs theory (Deci & Ryan, 2000) identifies three universal basic psychological needs for competence (feeling to be effective in one's ongoing interactions with the social environment), autonomy (experiencing behaviours as endorsed by the self and engaged in activities with

an internal locus of causality), and relatedness (feeling to be emotionally connected to others) as innate motivational sources which tied directly to student's psychological well-being, motivation, high-quality engagement, and optimal functioning (Reeve, 2012). Besides, González-Cutre et al. (2016) and González-Cutre and Sicilia (2018) asserted that the basic need for novelty could be an additional candidate need in SDT alongside competence, autonomy, and relatedness. Thus, in the current research, as presented in Figure 1.1, psychological needs in SDT which include novelty are considered as the independent variables that could play a crucial role in student engagement which considered as the dependent variable.

In addition, a plethora of studies demonstrated the strong relationships between goals orientation in terms of PB goals and various academic outcomes which include academic engagement (Collie et al., 2015; Martin et al., 2016; Martin & Elliot, 2015a; Yu & Martin, 2014). PB goals are self-based goals emphasize personal growth and intrapersonal competition to improve one's prior performance and excel best previous best (Martin, 2006; Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). Achievement goal theory considered one of the main theoretical underpinnings appropriate to the study of PB goals. This theory argues that students' adoption of goals determines their approach to be engaged in their academic activities (Urdan & Midgley, 2003). Furthermore, PB goals emphasise on target attainments which are not only associated with the products such as grades but also to the processes of students' engagement in their academic activities (Martin, 2011). Moreover, previous studies have asserted that PB goals explained variance above and over classical dichotomous of achievement goal theory (mastery approach and performance approach) in relationships with various educational outcomes (Martin &

Elliot, 2015b; Yu & Martin, 2014). Thus, taken together, when students are adopting PB goals orientation, they have more probability of attaining higher levels of cognitive, behavioural, and emotional engagement.

As stated in the background of this study, a bulk of literature from the past studies have integrated SDT with achievement goal theory and examined students' goals adoptions as trajectories of their basic psychological needs satisfaction (Benita et al., 2014; Ciani et al., 2011; Diseth & Samdal, 2014; Ozdemir Oz et al., 2016). Additionally, the mediation hypothesis lies at the core of achievement goal theory where this theory asserted that students' motivational dispositions impact their achievement process and behaviours indirectly by leading them toward various aims in their academic activities (Dickhäuser, Dinger, Janke, Spinath, & Steinmayr, 2016). Given that personal best (PB) goals are self-referenced, self-determined, and determined by autonomous instead of controlled reasons of motivation (Vansteenkiste et al., 2014), this study suggests that experience of autonomous motivation which originates from the fulfilment of basic needs is highly relevant for strengthening PB goals. Taken together, when students experienced the satisfaction of the psychological needs, they are more likely to embrace a sense of self-determination during their activities (PB goals) and experience higher levels of academic engagement. Consequently, this study examines to which extent basic psychological needs for autonomy, relatedness, competence, and novelty are related to PB goals and students' engagement; as well as how these basic needs in SDT predict student engagement via mediating role of the PB goals construct as depicted in Figure 1.1.

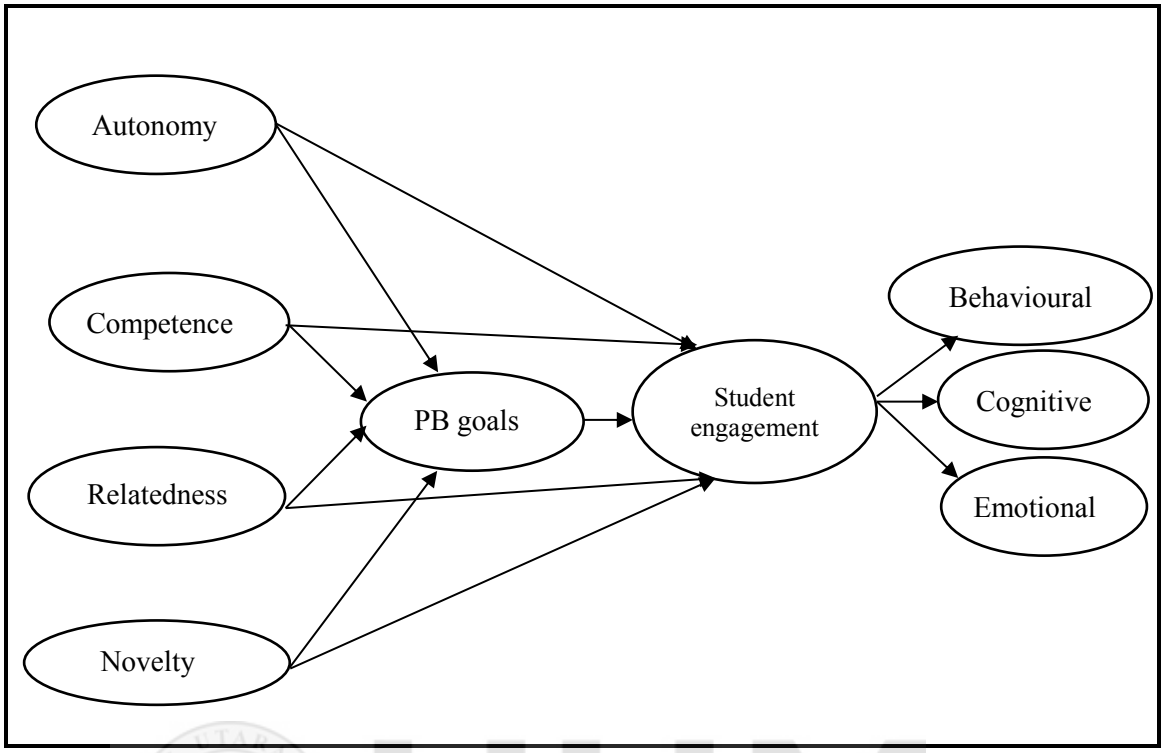

Figure 1.1. Theoretical Framework

1.7 Significance of the Study

SDT postulated that the basic psychological needs for autonomy, competence, and relatedness are the primary motivational sources of optimal functioning and well-being of all human beings irrespective of their cultural values (Ryan & Deci, 2000). All these three basic needs within SDT have been studied in various cultural contexts as independent variables; as well as, their unique and combined influences on several aspects of students' outcomes which include academic engagement have been examined. As mentioned earlier, González-Cutre et al. (2016) and González-Cutre and Sicilia (2018) highlighted that novelty satisfaction is an additional candidate within SDT alongside the current basic needs for competence, relatedness, and autonomy. They reported that fulfilment of the psychological need for novelty significantly predicted intrinsic motivation, life satisfaction, and other positive outcomes same as the three proposed psychological needs

in SDT. Thus, take the inclusion of novelty as an additional need, this research will contribute significantly to SDT's existing literature by examining the relationship of the basic needs for autonomy, relatedness, competence and novelty with academic engagement within Malaysian institutions.

In addition, previous studies showed that both SDT and achievement goal theory have been integrated to examine the psychological needs as the critical antecedents of students' goals adoptions; which in turn predict various educational outcomes including student engagement (e.g., Benita et al., 2014; Ciani et al., 2011; Diseth & Samdal, 2014; Ozdemir Oz et al., 2016). In the same vein, the PB goals construct viewed as a significant predictor of students' outcomes such as motivation, academic engagement, and achievement (Martin et al., 2016; Martin & Elliot, 2015a, 2015b; Yu & Martin, 2014). Consequently, this study will provide novel evidence by linking basic psychological needs in SDT with goals orientation in terms of PB goals. Also, this study will further support the mediating role of goals in terms of PB goals between the basic needs and student engagement. Despite the importance of psychological needs and PB goals in predicting student engagement, most of the previous studies have been conducted separately in elementary, middle and high school contexts. Therefore, the current research may help illuminate the role of personal and contextual factors simultaneously in predicting student engagement by capturing the effects of psychological needs on student engagement through PB goals among higher education contexts.

Educators have widely acknowledged the importance of motivation for students' learning engagement. However, the controversy surrounding the psychological needs proposed in SDT against the evidence produced by cross-cultural psychologists prevented the

implementation of certain motivational strategies in Asian contexts (Jang et al., 2009; Markus & Kitayama, 2003). According to them, SDT should not apply in collectivistic contexts and experiencing the proposed basic needs will correspond less within Eastern cultural contexts that holding collectivist values compare to Western and individualistic contexts. Therefore, the results from the present study will have practical implications for lecturers and educators to understand the role of psychological needs among Malaysian higher education students, whether these needs of SDT facilitates or thwarts or have no effect on academic outcomes (namely student engagement) of the students. Consequently, the results of this study will guide the institutions in designing an optimal learning environment and planning appropriate motivational strategies to foster academic engagement. Hence, in the end, students will be most benefited when their basic needs are fulfilled, which will further promote their abilities and skills to learn and produce better in their higher education institutions.

1.8 Limitations of the Study

The current study has some important limitations which provide valuable perspectives for future studies. The first limitation concerns the research design as this study used the cross-sectional design; so, the longitudinal process was not established. There was a point when the data collected was unable to claim the cause-effect relationships among the substantive constructs based on the results of the structural model. We did not assess causal sequences but rather the patterns of association between the variables based on past theoretical and empirical research findings. The current research proposed that the basic psychological needs predicted PB goals which in turn predicted students' engagement. However, it is also conceivable that high academic engagement leads to high satisfaction

of the basic needs. For example, in their longitudinal design research, Jang et al. (2012) reported that the satisfaction of the need for autonomy could be tested reciprocally; as both an antecedent and a consequence factor of classroom engagement. Thus, there is a possibility that the direction of the causal relationships is reversed. Furthermore, this research did not test the possibility of rival or alternative models that could be reasonably established based on previous studies where the proposed reversed relationships between the variables were plausible. Besides, the main analysis of our hypothesized model did not consider the potential covariances caused by demographic variables such as gender, race, and educational levels.

The second limitation of the current research is related to the measurement process of our constructs, which was strictly derived from the obtained data from students' self-reports surveys. As such, our findings are limited in this term; and are restricted only to the students' perceptions concerning the substantive concepts under study. Self-report is somehow famed to be at risk of biases; particularly in terms of recollection, desirability, accuracy, and completeness. Thus, some of the associations among variables may be overestimated due to bias, shared variance, or intention to answer consistently (N. Podsakoff, 2003). Even though, it has a strong argument that self-reports methods do not automatically and inevitably inflate associations between the examined constructs, as well as do not necessarily result in significant results (Spector, 2006). In this sense, one the questions that raised up is whether the students' perceptions indeed reflected their real lectures' behaviours in classrooms; since the students are asked to report on their lecturers' behaviours towards the satisfaction of the basic psychological needs. In addition, students' functioning in classroom such as engagement might have affected their perceptions about

their teachers' behaviours or even their basic needs satisfaction (Jang et al., 2009). However, the usage of self-reports still exists as an appropriate tool in order to collect data concerning students' perspectives regarding their educational activities. Furthermore, we did not measure students' epistemological beliefs about the nature of knowledge in terms of their growth or fixed mindset.

The third limitation of this study concerns the generalization of the results. The study used data from the Malaysian undergraduates in public universities. Malaysian students may have responded based on their cultural preconceptions that are different from those of students in other cultures. It is unknown to what extent the observed hypothesized, and stationary relationships might generalize to the students of other educational levels and students of other nations. Although the sample is considered as large and broad enough to yield generalizable results, it is imperative to interpret the current results with cautious. More precisely, it is not known whether the students' perceptions have the potential to be different in private and other educational grades than at public universities. Although such universities are most common in the country and represent the current students' population, replication of the present study in samples of different ages and different cultural backgrounds would provide more evidence concerning the generalizability of the current findings.

1.9 Definitions of Key Terms

1.9.1 Autonomy

Autonomy refers to the psychological need to experience the activities as self-endorsed and choice-fully emanating; it is the personal endorsement of the ones' behaviours and sense of psychological freedom (Ryan & Deci, 2000).

1.9.2 Competence

Competence is the psychological need to pursue and efficiently interact with the social environment, being able to express one's capacities, and achieving positive outcomes (Ryan & Deci, 2000).

1.9.3 Relatedness

Relatedness refers to the psychological need to make close emotional bonds and secure attachments as well as experiencing intimacy and genuine relationships with others (Ryan & Deci, 2000).

1.9.4 Novelty

Novelty refers to the psychological need to experience new things that are not previously experienced or deviates from everyday routines (González-Cutre et al., 2016).

1.9.5 Personal Best (PB) Goals

Personal best (PB) goals refer to challenged, specific, self-improvement, and competitively self-referenced targets towards which students strive to meet or exceed their previous best (Martin & Elliot, 2015a).

1.9.6 Student Engagement

Student engagement refers to the extent of students' active involvement in their learning activities (Reeve, 2012). This construct involves three dimensions: behavioural, cognitive, and emotional. For example, students not only engaging behaviourally in term of attendance; but, there will be a cognitive investment towards their educational activities as well as emotional or affective reactions towards their classroom activities (Fredricks, Blumenfeld, & Paris, 2004).

1.9.7 Basic Psychological Needs

This construct refers to the three inherent and universal needs for competence, autonomy, and relatedness that are proposed by SDT as essential psychological factors for personal development, optimal functioning, and overall well-being (Deci & Ryan, 2000). In the current study, the psychological needs in SDT include novelty as the fourth basic need.

1.9.8 Self-Determination Theory (SDT)

SDT is a theory of motivation which has been used for more than 40 years, posits that all students possess inherent growth tendencies (curiosity, intrinsic motivation and psychological needs) regardless their gender, age, socioeconomic status or cultural background and these tendencies provide a motivational foundation for optimal classroom engagement (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000; Vansteenkiste et al., 2010). SDT assumes that motivation is locating in a range from controlled to autonomous and where one falls on that continuum is a result of the fulfilment of the inner psychological needs for competence, autonomy, and relatedness (Deci & Ryan, 2000).

1.10 Chapter Summary

To summarize, given the paucity of empirical research into student engagement in the Malaysian higher education, this study proposed a robust model based on self-determination theory (SDT) in which the basic needs for autonomy, competence, relatedness, and novelty are associated to personal best (PB) goals and student engagement and how PB goals mediate the relationships between these basic needs and student engagement. In this chapter, we presented the research background and problem statement of the current study followed by research objectives and questions and the postulated hypotheses. It provides theoretical framework based on the lenses of SDT. In

addition, significance and limitations of the study were presented, followed by the definitions of the key terms.

The next chapter will be that of a literature review, which dealt with the concept of each variable and how the substantive constructs of the current research are related based on theoretical perspective as well as previous empirical studies.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The purpose of the current study is to test the relevance of basic psychological needs of self-determination theory (SDT) and personal best (PB) goals beliefs in students' engagement, and how PB goals serve as a mediator between that psychological needs and students' engagement in Malaysia higher educational institutions. Therefore, previous studies on psychological needs, PB goals, and student engagement are briefly reviewed in this chapter. This chapter also describes the obstacles of higher education institutions in the world as well as those in Malaysia regarding dropouts and late graduates. Literature gaps are then determined and presented in this chapter, which reveals that there is very little research on student engagement among Malaysian higher education contexts.

Self-determination Theory (SDT) is a motivational theory of personality, development, and social processes. This theory examines if there is a relation between social contexts and individuals, which facilitates various types of motivation as well as predict desired learning outcomes, overall academic performance, and overall psychological health. According to SDT, students get the higher academic performance and more learning experiences when they become more competent and have more ability to learn by themselves as well as have a good relationship with other people which means the fulfilment of their psychological needs (Deci & Ryan, 2000). Furthermore, as stated early, Martin (2006) pointed out that pursuing personal best (PB) goals is a practical approach, which facilitates students' academic trajectories and academic development such as

desirable academic engagement, persistence, educational aspirations, enjoyment of school and, class participation. However, there is little research available on how the fulfilment of basic psychological needs in relation to PB goals influences students' engagement, especially among students in higher education.

This chapter identifies available and relevant literature from a variety of sources. The review contains a brief about the higher education system in Malaysia and the rationale for focusing on student engagement in Malaysian higher education. Additionally, an overview of SDT and achievement goal theory as well as the relevant literature on the topic concerning the role of basic psychological needs which contain the basic need for novelty, and personal best (PB) goal as potential antecedents to explain the various academic outcomes and particularly student engagement.

2.2 Malaysian Higher Education

Malaysian education is governed under two authorities, Ministry of Education (MOE) and Ministry of Higher Education (MOHE). From preschool to secondary as well as post-secondary education was under the jurisdiction of the MOE while tertiary or higher education sector was placed under the jurisdiction of the MOHE. The primary mission of the Malaysian educational system is the development of holistic, entrepreneurial, and balanced aspects of students; which in line with National Education Philosophy. By the year 2013, the ministry began developing the Malaysia Education Blueprint 2015-2025 (Higher Education) or the MEB (HE), which aims to educate students who have sufficient talents, skills, and knowledge needed for the 21st-century challenges. This blueprint ensures that students become the primary human source for the entire transformation path

of education. The main aim of higher education in Malaysia is to develop professional individuals such as researchers, educators, and innovators who have various outlooks in order to benefit and contribute to the development of Malaysia. As known, education is not compulsory at the higher education level. Thus, the ministry attempts to improve both the efficiency and productivity of higher education institutions (Ministry of Higher Education, 2016).

The MOHE using the National Education Philosophy's vision to make a balance between skills, knowledge, morality, and ethics (Ministry of Higher Education, 2016). In this sense, effective strategies are encouraged to be used for improving the quality of tertiary education. Thus, the National Higher Education Strategic Plan (NHESP) or Pelan Strategik Pengajian Tinggi Negara (PSPTN) which was launched in 2007 to establish a clear plan for developing tertiary education in Malaysia. The goal of PSPTN was to improve the quality of higher education in Malaysia, focusing on a provision of both skills and knowledge required by Malaysian society to develop its economy. Also, the PSPTN attempts to balance between two visions within Malaysian institutions: (1) education has a mission to prepare people for the workforce; and (2) education focuses on developing holistic human (Ministry of Higher Education, 2016).

To ensure that more and more Malaysian graduates become the central workforce to meet the demands of the 21st-century and to push Malaysia to achieve its primary goal for the year 2020, higher education institutions in Malaysia should ensure the quality of teaching and learning. For this reason, the NHESP 2007-2020 established several strategic thrusts, including the high quality of students' educational practices within the Malaysian higher

institutions (Ministry of Higher Education, 2016). Teaching in Malaysian university classrooms needs to be involved and consistently adjusted to support learning within a more complicated teaching environment. This can be clearly in target outcomes of NHESP or PSPTN, which include improving the ability of lecturers to apply student-centred approaches into teaching and learning activities (Ministry of Higher Education, 2012). The Malaysian government admitted that applying student-centred learning approaches is necessary (Kasim, 2014).

The current curriculum in higher education system focuses on learning; however, teacher-centred approach is still mainly used in most of the university classrooms, which requires all higher education institutions to overcome obstacles because the current curriculum needs to pay more attention to learning; as well as classrooms' instructions should use student-centred approach instead of the conventional teacher-centred approach (Ministry of Higher Education, 2016). However, despite MOHE's initiative to enhance undergraduates' holistic development through the adoption of student-centred learning, challenges and concerns still remain the same. For example, employers report that most of the graduates lack critical thinking, communication skills, and language proficiency that are essential for success in the 21st-century (Ministry of Higher Education, 2016). Moreover, the most recent challenge that is faced by Malaysian higher educational institutions is the situation of attrition or dropout rates among students. Thus, higher education institutions across the globe, including Malaysia are encountering challenges to identify factors that lead to students' leave or late graduating from their higher education institutions.

2.3 Challenges of Higher Education

Students who are less involved and engaged in their study may drop out of their courses, which decreases the retention proportion in higher learning institutions. In recent years, most of the colleges in the world pay great deal of attention to students' dropout rates that could restrict students' future career opportunities as well as their income. In this regard, institutions lose their reputation, revenue, and opportunity, which limits the development of society; in fact, an educated workforce is needed to compete in the global marketplace (Sternberg, 2013).

The participation, completion, dropout, and retention rates of college students may vary within the institution and country. For instance, in the UK, it was reported that nearly 8 % of students leave their university in their first academic year. However, the results of the survey conducted by What Works? group indicated that approximately 33% to 42% of students are thinking of leaving their universities (Thomas, 2012). In the US, the graduated rate of college students is 57% of freshmen, who spent six years getting a baccalaureate degree instead of four years (see Flynn, 2014; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). Each year, approximately 30% of first-year students at baccalaureate institutions in the US refuse to return and pursue their studies in their second year (Aulck, Velagapudi, Blumenstock, & West, 2016). Besides, the dropout rates are 18% in Australia and 25% in Germany (Cardak & Vecci, 2016). In 2015, according to the Ministry of education in Thailand, in the academic year (2007-2012), the dropout rate was 2.99% during the first year, 5.86% during the second year, and 2.13% during the third year (as cited in Lerdpornkulrat, Koul, & Poondej, 2016).

Malaysia is one of the countries aiming to train students to become skilled workforce for the 21st century as well as achieve its ultimate goal of being a developed country by 2020. However, the dropout rate of undergraduate students is rampant at the higher educational level in Malaysia. It was reported that out of the 168,000 who pursued their education to get their diploma and certificate, 30,000 would not graduate (18%). Out of the 100,000 students who studied for their program degree, only 83,000 completed the entire program, whereas the rest dropped out (BorneoPost Online, 2012). It means that 17% of total students studying at the higher educational level in Malaysia decided to give up their studies. A private university in Malaysia has a dropout rate exceeding 14% within six months in 2012 (Sangodiah, Beleya, Munjandy, Heng, & Ramendran Spr, 2015). The attrition rate among Malaysian students in public higher education institutions is caused by a lack of interest and examination failure. By 2013, 10% of students for a bachelor's degree program from the 2009 enrolment intake had dropped out of the program and 85% of students from the 2009 intake graduate in 2013 (Ministry of Higher Education, 2016). These percentages reflect the salience of both dropouts and late graduates among Malaysian undergraduates. Indeed, this is not an encouraging scenario in Malaysia who aspires to produce the most educated and expert employees.

In this regard, investigating factors that lead to preventing the increasing number of dropouts as well as supporting retention and completing study has become a matter of significant interest to researchers. Accordingly, student engagement has emerged and become an essential factor for improving students' retention and continuing participation in higher educational levels (Horstmanshof & Zimitat, 2007; Kahn, 2014; Zepke, 2015, 2017). The strong sense of belonging or engaging in higher education for all students is

located in the heart of successful retention and educational success (Thomas, 2012). This gives them a sense of belonging and identity with the institution; thus, they are less likely to leave or think about withdrawing from the university. Furthermore, academic engagement is considered as a crucial factor for students' retention, educational success, and completion of their studies (Zepke, 2017). Therefore, engaged students are more likely to demonstrate positive student outcomes such as decreased dropout rates and higher grades. They are also more likely to demonstrate more effort in classwork, pay more attention, and experience more positive emotions (Fredricks et al., 2004). Student engagement is viewed as a standard indicator for the quality regarding the teaching and learning processes; as well as students' positive educational outcomes (Zepke, 2015). Moreover, students' engagement is one of the significant predictors of their academic performance and holistic development regarding their soft skills at the tertiary level (Jaafar et al., 2012).

A substantial and far-reaching educational literature has asserted the critical role of students' engagement in strengthening teaching and learning processes, and even in the policy development of higher educational institutions. However, in Malaysia, there seems to be a dearth of investigations along this line. For instance, Salleh et al. (2013), claimed that the construct of academic engagement is not a common construct in studies within Malaysian educational contexts. Furthermore, Abdullah et al. (2015) discussed that the phenomenon of disengagement still exist among Malaysian undergraduates due to poor understanding of student engagement' concept which makes educational institutions reluctant to take effective solutions in areas such as curriculum design and student support services to enhance students' engagement. Moreover, most studies in the field of student

engagement have only focused on elementary, middle, and high school contexts (Awang-Hashim et al., 2015; Awang-Hashim & Murad Sani, 2008; Jelas et al., 2014; Sahil & Hashim, 2011; Salleh et al., 2013). In other words, the literature available about the factors that enhance student engagement still lacking and the empirical studies dealt directly with student engagement in Malaysian higher education contexts are even scant. Taken together, it is imperative for more studies on student engagement that are necessary within Malaysian higher institutions to combat high dropouts' rates, assure the quality of teaching and learning, and produce an educated workforce that can compete in the global marketplace.

2.4 Overview of Student Engagement

The term "engagement" is ubiquitous in the educational realm as it is appearing in the instructors' assessment and evaluation criteria, educators' vernacular, and widely in the educational research. The concept of engagement began to appear in the research literature in the late 1970s, mainly in the studies concerning dropout issues (Finn & Zimmer, 2012; Reschly & Christenson, 2012). Students who dropped out were believed to be disengaged from their academic tasks. Student engagement has such intuitive meaning in education which is reflected in the various definitions in the previous literature review. Mosher and MacGowan (1985) defined engagement as "the attitude leading to, and the behaviour of, participation in the school's programs" (p. 14); they suggested that engagement is both a state of mind and a way of being/behaving and perceptual. Moreover, engagement not only focuses on the quality of students' involvement in their academic tasks; however, it embraces various distinguishable components such as behavioural, emotional, cognitive, and psychological aspects (Skinner & Pitzer, 2012). Accordingly, the construct of

engagement provides a holistic picture of students' involvement during their academic tasks.

2.4.1 Defining Student Engagement

The definition of student engagement construct has developed over time through the efforts of several theorists and educational researchers to be inclusive and representative of changes in the types of students entering higher education and changing pedagogy in educational institutions. For example, student engagement has been defined as a multidimensional concept that consists of behavioural characteristics (Astin, 1993). However, Bean (2005) argued that student engagement is not understood in its entirety with behavioural components only and that it includes cognitive and psychological aspects alongside behavioural characteristics. Student Engagement is an active interaction with others with different constellations of social identity and requires the ability to hold multiple perspectives relating to a specific topic (Comerford, 2005). This active student involvement and engagement is an essential factor that has been shown to influence student learning and personal development (Astin, 1999), as well as student retention and persistence (Tinto, 1998). In other words, student engagement occurs in a learning environment where students are active participants and not merely passive recipients of their education (Astin, 1993; Pascarella & Terenzini, 2005).

Following numerous attempts over time to describe the concept of the construct, Shernoff and Schmidt (2008) defined student engagement as the simultaneous perception of concentration, interest, and enjoyment while interacting with an activity. Furthermore, Kuh et al. (2008) highlighted that "Student engagement represents both the time and

energy students invest in educationally purposeful activities and the effort institutions devote to effective educational practices" (p. 542), while Trowler (2010) stated:

> *"*Student engagement is concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimize the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution*"* (p. 3)

Additionally, Radloff and Coates (2010), in their affiliation and closely work for developing of Australian Survey of Student Engagement (AUSSE) defined the construct as "students' involvement in activities and conditions that are linked with high-quality learning ... learning is also seen to depend on institutions and staff generating conditions that stimulate student involvement" (p.3,4).

The term engagement is ordinarily used to indicate several concepts such as students' commitment, agency, and reciprocity (Conner, 2011; Taylor & Parsons, 2011; Trowler, 2010). Besides, this concept "engagement" sometimes employed as a synonym of some other constructs such as active participation, students' attention, students' effort, and students' interest and motivation (Conner, 2011). However, although the strong association between motivation and engagement has been observed in the literature, these two constructs are different, and they cannot be used as synonyms of each other. As such, motivation is viewed as the sources or the reasons that induce individuals' behaviours in their undertaking activities. On the other hand, engagement is viewed as the source of energy during actions and emphasizing the connection between the persons and their

activities. Even though, as any personal experience, engagement is an wide construct that could be described from several aspects (Trowler, 2010). For example, Kraft and Dougherty (2013) suggested that this factor is profoundly understood to denote the sense of competence, efficacy, and the feeling of relatedness to the academic settings. In the same vein, Wang and Eccles (2013) presented engagement as the factor that optimized when the perceived social context facilitates the fulfilment of students' inherent needs for competence, autonomy, and relatedness. Such definition accurately presents student engagement as a direct outcome of the environmental learning that facilitate the satisfaction of the suggested basic psychological needs in SDT.

As noted above, there is no single definition for the diverse and complex construct of student engagement which makes previous literature that deals with educational issues especially in the institutional levels overwhelmed with various definitions of this construct. In this sense, Zepke (2017, p. 8) stated that "certainly, a single definition cannot capture the many-faceted contributions that engagement makes to our understanding of learning and teaching in higher education." However, despite the evidenced disparity within the literature regarding student engagement' definition and its dimensionality (e.g., Fredricks & McColskey, 2012; Reschly & Christenson, 2012); there have been growing unanimity among several scholars that engagement is a multidimensional concept including behavioural, emotional, and cognitive aspects (e.g., Finn & Zimmer, 2012; Maroco, Maroco, Campos, & Fredricks, 2016; Sinatra et al., 2015). In this sense, it is sound in the current study to refer to the definition of Fredricks et al. (2004) which considered as the most comprehensive and exhaustive in the field.

The three-faceted model of engagement is dominant in previous studies. As such, this model was provided with a psychometric validation, utilized to examine and categorize psychometric instruments, taken up and cited by subsequent studies to interpret the existing results concerning academic engagement (Doğan, 2014; Fredricks et al., 2004; Fredricks et al., 2011; Gunuc & Kuzu, 2015; Maroco et al., 2016; Sinatra et al., 2015; Veiga, Reeve, Wentzel, & Robu, 2014). Furthermore, behavioural, emotional, and cognitive engagement can be intuitively understood as distinctive factors. As such, students could demonstrate behavioural but not cognitive engagement; or demonstrate emotional rather than cognitive engagement. For example, Reschly and Christenson (2006) suggested that cognitive and affective engagement predict changes in a student's behaviour. However, many researchers agreed that engagement effects are iterative (Reschly & Christenson, 2012). More precisely, abundance of studies have studied this construct by considering all such dimensions separately or collectively; as focusing on how students are behaving (behavioural), thinking (cognitive), and feeling (emotional) (Fredricks et al., 2004). Taken together, the three mentioned subscales are used to investigate and measure the construct of student engagement in the current study.

2.4.2 Dimensions of Student Engagement

Student engagement can be explained throughout four approaches, (1) behavioural perspective which focuses on efficient teaching practices; (2) psychological perspective which views engagement as an internal individual process; (3) the sociocultural perspective which emphasizes the main role of socio-cultural context; and (4) a holistic perspective which strives to draw the strands together (Kahu, 2013). The psychological perspective on engagement is particularly dominant in the research literature; and views

engagement as an "internal psycho-social process that evolves over time and varies in intensity" (Kahu, 2013, p. 761). The psychological perspective of student engagement shows a close relationship between motivation and engagement. The former comprises private, psychological, and unobservable factors; and the latter comprises publicly observable behaviour (Reeve, 2012). The psychological perspective is highly appreciated in academic settings. This approach does not distinguish between the predictors and the consequences of students' engagement in academic activities (Kahu, 2013). Furthermore, as early stated, based on the psychological perspective, Fredricks et al. (2004) pointed out that engagement is a multidimensional concept which denotes the behavioural, cognitive, and affective sub-dimensions. These mentioned three dimensions are described in the following:

2.4.2.1 Behavioural Engagement

The behavioural dimension contains three main components: (1) perform some rules positively such as students' regular attendance; (2) active involvement in the learning activities which include invested time for doing tasks and asking questions; and (3) active participation in the extracurricular academic activities (Fredricks et al., 2004). For example, a model of participation-identification proposed by Finn (1993) states that students will get more successful if they participate in both classroom and other school activities. Furthermore, Furlong and Christenson (2008) stated that "Behavioural engagement is reflected in attendance, active participation in classes (e.g., asking questions, participating in discussions), and/or involvement in extracurricular activities" (p. 366). In the participation-identification model, "most children begin school as willing participants, encouraged to become involved in classroom activities by parents and

teachers. Continued participation over the years, accompanied by a degree of academic success, leads to an internalized sense of identification with school" (Finn & Cox, 1992, p. 144). In this model, emotions and behaviours are considered as intercorrelated factors and are useful for understanding both student engagement and disengagement.

2.4.2.2 Emotional Engagement

From a psychological perspective, affective dimensions are included as important components for understanding student engagement. In this sense, Askham (2008) stated that "there is an emotional intensity attached to the experience of learning that is often overlooked" (p.94). Emotional engagement is referred to as students' affective reactions towards their classroom activities, including psychological factors such as interest, boredom, happiness, sadness, and anxiety (Connell & Wellborn, 1991; Fredricks et al., 2004; Skinner, Furrer, Marchand, & Kindermann, 2008). Kahu (2013) concludes that this dimension of engagement results from two kinds of motivation: (1) extrinsic motivation (e.g., high grades or qualifications) and (2) intrinsic motivation (e.g., interest). Students with extrinsic motivation could engage in activities cognitively and behaviorally; whereas students with intrinsic motivation are motivated to engage their learning by their pleasure and interest. Literature, therefore, tends to privilege the intrinsic approach through the extrinsic one (instrumental approach).

2.4.2.3 Cognitive Engagement

Cognitive engagement is a key engagement dimension (Fredricks et al., 2004). According to Newmann, Wehlage, and Lamborn (1992), cognitive engagement refers to "a student's psychological investment and effort directed towards learning, understanding, or

mastering the knowledge skills or crafts" (p. 12). This key dimension reflects students' self-regulated learning as well as their effective practices of more deep learning strategies; as touched in the behavioural perspective (Fredricks et al., 2004; Kahu, 2013). In this regard, cognitive engagement can help to differentiate the levels of students' engagement through their adopted learning strategies; such as deep or surface learning strategies. Within the psychological perspective, the cognitive dimension includes students' perceptions and beliefs related to self, school, teachers, and other students (e.g., self-efficacy, motivation, perceiving that teachers or peers care, aspirations, expectations) (Jimerson, Campos, & Greif, 2003; Kahu, 2013).

2.5 Student Engagement in Educational Contexts

The body of research on engagement has extensively highlighted the importance of student engagement as an essential factor for academic success as well as for the quality of education at all levels. Student engagement has been considered as a composite of psychological processes, involving attention, investment, and effort expended by the students in their academic work (Virtanen, Kiuru, Lerkkanen, Poikkeus, & Kuorelahti, 2016). Over the past two decades, this concept gained the precedence and more interest in the realm of education as a robust predictor of students' overall educational success (Skinner & Pitzer, 2012). Furthermore, academic engagement is the direct predictor of students' personal growth, and different positive skills such as critical thinking, problem-solving, collaborative work, and communication (Griffin & Howard, 2017). Christenson et al. (2008) pointed out that student engagement is considered as a valuable factor in academic activities that not only focuses on behavioural and educational skills but extends to the psychological and social aspects of education for learners.

As the interest about the construct of academic engagement grows consistently, it has become imperative for the educational researchers and scholars to clarify their different conceptualizations concerning this construct; both the definitions of learning engagement itself as well as providing a complete picture and models in order to explain its functions in the academic settings (Skinner & Pitzer, 2012). Student engagement is taken into consideration as the fundamental theoretical model for understanding dropouts and a necessary factor in promoting study completion (Christenson et al., 2008; Finn & Zimmer, 2012). Furthermore, student engagement plays a crucial role in facilitating students' development, retention, academic adjustment, academic achievement, and positive behaviours within the academic environments (Ansong, Okumu, Bowen, Walker, & Eisensmith, 2017). High-quality students' engagement leads to learning and scholastic success which in turn makes the students more academically competent, connected, and get more interactions and support from their instructors (Skinner & Pitzer, 2012).

Additionally, students' engagement is perceived as a part of the process of resilience in students' academic life which helps them overcome difficulties and be more adaptively toward daily challenges, and setbacks in their academic settings (Skinner & Pitzer, 2012). Moreover, the importance of engaging all students in their educational work continues to find a strong resonance from families, instructors, researchers, and students themselves (Appleton, Christenson, & Furlong, 2008). However, while the importance of engagement in education is undisputed, the discrete role of higher education institutions around the globe to enhance this construct has gained the precedence because of its significant effects on both, improving student outcomes and institutions' quality and reputation.

2.6 Student Engagement in Higher Education

Student engagement has become a current buzzword applied to ensure excellence in teaching quality and learning experiences among higher education institutions worldwide. Thus, it draws a great deal of attention among scholars to improve the quality of learning and teaching in the higher education' sector. Student engagement positively influences the success and career promotion of the students (Trowler, 2010). Kuh (2003) reported that what students bring to higher education, or where they study, matters less to their success and development than what they do during their time as a student. In parallel, Coates (2005) argued that most of the educators focus on seeking for information related to institutions and teaching to ensure the quality of the university instead of emphasizing what and how the students are performing in their classrooms; thus, student engagement has an advantages by providing a clear picture of what the students are doing actually in their classrooms and colleges.

The engagement has been posited as a significant predictor of students' desired learning outcomes and personal development in higher educational institutions. For example, Zepke (2017) asserted the strong association of engagement with the quality of teaching and learning and students' success. It is also related positively to students' outcomes such as cognitive development, critical thinking, persistence, self-concept, academic adjustment, and academic satisfaction (Pascarella, Seifert, & Blaich, 2010). Also, Bryson and Hardy (2012) suggested that students' engagement is an essential factor for necessary skills and dispositions and satisfactions, even after their graduation. Moreover, Kuh (2009) asserted the positive association between student engagement and the critical students' outcomes such as cognitive development, psychosocial development, self-

esteem, development of an internal locus of control, moral and ethical development, and persistence. Taken together, it is assumed that when more students are engaged in their academic activities, the chances of educational success will increase.

Results of empirical studies in higher education contexts have repeatedly revealed a positive association between students' engagement with their academic achievement, intellectual skills, critical thinking skills and greater likelihood of persistence and graduation college (Carini, Kuh, & Klein, 2006; Fuller, Wilson, & Tobin, 2011; Kuh et al., 2008; Lerdpornkulrat et al., 2016; Lu, Hu, Peng, & Kang, 2014). Student engagement benefits extended students' personal development to institutions' performance and reputation. For example, Carini et al. (2006) pointed out that student engagement is a key for colleges and universities to add value to the institutional experiences for their students. Student engagement focuses on conditions beyond the students, including policies and practices that institutions implement to induce students to take part in these activities (Griffin & Howard, 2017). According to Trowler (2010), student engagement is concerned with the effort and time invested by the students and their institutions which lead to optimal outcomes such as student experience, learning outcomes, student development, institutional reputation, and institutional performance. In this view, the measures of student engagement could influence how institutions allocated resources and provided services intended to encourage students' participation and persistence (Kuh, 2009). As a result, student engagement could play a critical role in establishing the desired high-quality of the higher education system in contemporary educational sectors across the globe (Gourlay, 2017).

The most commonly adopted view of student engagement within higher education contexts is based on the "National Survey of Student Engagement" (NSSE) data which is focussed mainly on students' behaviours and institutions' instructional practices as viewed in behavioural perspective. Kahu (2013) conducted behavioural research in terms of students' time, effort, and participation. In this study, NSSE was established to provide accurate data for college institutions to help undergraduate students gain more experiences, to identify effective ways of practices, and then to improve the quality of education (Kuh, 2009), whereas Schlinsog (2010) did not support the hypothesis that engagement is a predictor of academic achievement, persistence, and graduation. However, he recognized that NSSE is designed as an instrument for institutions to compare the quality measures rather than intended to be used as a variable in predicting academic achievement, persistence, or graduation. Although there is a relationship between NSSE benchmarks and student outcomes, NSSE does not directly measure psychological constructs. It measures students' studying habits that gain from their colleges' experiences and other aspects of students' life (Maroco et al., 2016).

2.7 Factors Affecting Student Engagement

Prior studies have identified several factors affecting student engagement from both quantitative and qualitative research. Student engagement in learning activities is presumed to be malleable by direct intervention and to changes in the context and environment (Fredricks et al., 2004; Lawson & Lawson, 2013; Skinner & Pitzer, 2012). According to Shernoff, Ruzek, and Sinha (2016), both the environmental challenge and environmental support are the key aspects of learning context that promotes students' meaningful academic engagement.

The factors of the environmental challenge that are relevant to students' engagement include opportunities for experimenting and solving meaningful problems (Bransford, Brown, & Cocking, 2004), classroom context, especially the structure (Hospel & Galand, 2016), lessons' difficulties (Goetz, Lüdtke, Nett, Keller, & Lipnevich, 2013), high expectations for students' achievement (Rubie-Davies, Peterson, Sibley, & Rosenthal, 2015), and relevance of academic tasks to their lives and goals (Shernoff, 2013). On the other hand, the factors of the environmental support that are relevant to students' engagement including instructors' affective feedback and emotional support (Cooper, 2014), supportive and positive relationships with the instructors (Skinner & Pitzer, 2012) and classmates (Ruzek et al., 2016), autonomy-supportive classroom activities (Hospel & Galand, 2016; Reeve, 2012), social interactions and collaboration (Hakimzadeh et al., 2016), and effective teacher-student relationships (Roorda, Koomen, Spilt, & Oort, 2011). In overall, Shernoff et al. (2016) reported that engagement significantly mediated the relationship between environmental support, not environmental challenge, and learning; which indicated the relevance of environmental support over the environmental challenge in respect to academic engagement and learning.

An abundance of research revealed that both learning environment and teaching styles vitalizing students' engagement within higher education institutions. For instance, based on drawn data from 33,000 students in Thailand, Hallinger and Lu (2013) in their longitudinal study found that active learning methods such as learner-centred approach positively predicted changes in the students' engagement. Furthermore, Almarghani and Mijatovic (2017) in their study with 279 university students in Libya, reported that lecturers' active employment of their institutions' ICTs tools in their teaching promoting

their students' academic engagement. In addition, a qualitative research synthesis of the literature related to academic engagement in higher education by Wimpenny and Savin-Baden (2013) highlighted the importance of the instructors' positive feedback and empathy students' positive learning experiences; as well as the need to foster students' recognizing how certain aspects of their lives empower their engagement in the educational realm. Moreover, in his study with 381 Turkish university students, Sahin (2014) revealed that instructors' professional competencies had a significant effect on students' engagement.

While the extensive influence of teaching approach, learning climate, and learning environment on student engagement has acknowledged by previous research, there is a consensus regarding the crucial role of psychological factors in facilitating student engagement. For example, intrinsic value (Zhen et al., 2016), student's level of emotional intelligence (Maguire et al., 2016), adaptability, self-efficacy, and expectations (Burns, Martin, & Collie, 2018; Jimerson et al., 2003), and students' motivation (Finn & Zimmer, 2012), all play a dominant role in facilitating the process of students' engagement. Based on the psychological perspective, academic engagement is viewed as a highly interlinked concept to students' motivation (Yin & Wang, 2016). Martin (2012a) contended that despite the ideas that differ between motivational and engagement factors, there seems to be a broad consensus among the previous literature that considered motivation as a primary antecedent of students' engagement. Accordingly, there are various motivational theories such as self-efficacy, expectancy, need achievement, self-worth, attributions, control, achievement goal, self-regulation, and self-determination that all have been considered in the motivational research for engagement (Eccles & Wang, 2012).

Self-determination theory (SDT) is one of these theories that help educationists and researchers not only to understand and sustain students' motivational resources; however, their active engagement that engenders from that resources (Reeve, 2012). According to Zepke (2017), SDT is a valuable perspective that gained considerable attention and countenance by the abundance of previous studies because it is the most theory that well described the necessary motivational resources and factors to foster the optimal academic engagement among students. In the same vein, syntheses of the research literature concerning students' engagement in higher education contexts, Zepke and Leach (2010) asserted the crucial role of SDT's psychological basic needs to predict intrinsic motivation; which in turn has a significant and positive effect on learning involvement and engagement. Taken these pieces of literature together, there is a strong possibility to assume that student engagement is a function appears from the interactions of the individual qualities that student brings to the learning situations and the contextual qualities facilitated by the course design created by the instructors.

2.8 Self-Determination Theory (SDT)

According to self-determination theory (SDT), regardless of age, gender, socio-economic status, nationality, or cultural background, all students possess inherent growth tendencies (e.g., intrinsic motivation, curiosity, and psychological needs). All students are provided with a motivational foundation for their high-quality classroom engagement and positive school functioning (Reeve, 2012). SDT comprises six, mini-theories, one of which is basic psychological needs theory (BPNT). BPNT emphasizes individuals' psychological needs and the importance of meeting these needs for optimal wellbeing (Reeve, 2012). These three basic needs are the need for autonomy, competence, and relatedness.

2.8.1 Autonomy

According to SDT, autonomy denotes volitional actions or behaviours and emanating from those behaviours that embrace self-determination, attributed to the perceived internal locus of causality, and are self-endorsed (Deci & Ryan, 1985, 2000; Deci et al., 2001; Ryan & Deci, 2000). Furthermore, the need for autonomy understood as our need for feeling that we are acting out of our own volition and following our values as opposed to feeling as though our behaviours stem from coercion or pressure (Grolnick & Raftery-Helmer, 2013). When people are acting or behaving in concurrence with their personal values and interests (self-determination), they are more likely to embrace that sense of autonomous upon their behaviours (Deci & Ryan, 2000). Additionally, the feeling of autonomy and self-determination is what makes us become the most fully human, and thus most of us can lead to profoundly satisfying our lives that are meaningful and constructive, perhaps the only lives that are worth living (Chirkov, Sheldon, & Ryan, 2011). Accordingly, SDT shows that autonomy (versus controlling) is critical. It affects students' outcomes, such as performance, motivational internalization, emotional quality, and personal progress (Sheldon & Ryan, 2011).

Unlike independence or self-sufficiency, autonomy is not the opposite of relatedness as it is commonly wrongly comprehended; since individuals could be either autonomously independent or autonomously related (Helwig & McNeil, 2011). Based on the SDT's perspective, the opposite of dependence is not autonomy; but rather the state of independence which denotes the circumstance whereby one not relying on others for support, help, or supplies (see Chirkov, Ryan, Kim, & Kaplan, 2003 for a discussion). Furthermore, autonomy relates to its nature; as such the consequences demonstrate how

this construct is developed or diminished through responding to a specific social and environmental circumstance (Deci & Ryan, 2002; Ryan & Deci, 2000). The concept of autonomy in SDT was widely used among educational psychologists; however, it receives a great deal of criticism from cross-cultural researchers and scholars. According to Ryan and Deci (2006), it is a definitional confusion or overgeneralization of the concept of autonomy that has led to the misinterpretation and reduced functional importance of this concept. As a result, differentiating this concept from other concepts such as independence or even individualism, it is assumed that autonomy cannot be an essential contributor in the collectivistic contexts compared to the individualistic one. Thus, there is a contradiction with SDT's proposition, which asserts that autonomy has predicted several positive outcomes in various domains such as work, education, and sport; irrespective of cultures, age, and gender of participants (Reeve, 2012).

In the educational domains, when classroom activities provide students with an internal locus of causality, sense of psychological freedom, and perceived self-choice in their undertaking activities, those students are more likely to perceive their autonomy need to be satisfied (Reeve, 2012). According to SDT, if students are behaving autonomously, their intrinsic motivation is higher, which facilitates the internalization and integration of extrinsic motivation. Both intrinsic and well-internalized extrinsic motivations are expected to promote the outcomes of adaptive learning (Vansteenkiste, Lens, & Deci, 2006). Besides, in addition to the crucial role of the basic needs for competence and relatedness in enhancing students' learning experiences and optimal functioning, the need for autonomy is the most salient need to stimulate intrinsic motivation, which in turn contributes to the most desired educational outcomes among students (Hassan & Al-

Jubari, 2016; Ryan & Deci, 2006). More specifically, perceived competence is necessary for any motivation, whereas perceived autonomy is required for intrinsic one (Deci & Ryan, 2000). It is essential to note that autonomy is necessary, but not enough to achieve optimal outcomes. Nevertheless, the need for relatedness and competence are also critically important for optimal educational outcomes.

2.8.2 Competence

Competence in SDT defined as a feeling of being efficient while interacting with the social environment. To feel competent, people seek challenges and put efforts to master new skills. It is highlighted that "Competence refers to feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Deci & Ryan, 2002, p. 7). When the individuals' basic need for competence fulfilled, some psychological factors such as self-efficacy and self-esteem are more likely to be enacted which in turn foster their sense of well-being (Emery, Heath, & Mills, 2016). Competence is not only an obtained skill or capability but also a sense of confidence and efficacy in action (Deci & Ryan, 2002). Accordingly, this need aligns well with other well-established concepts. For example, Bandura's (1986) concept of self-efficacy entails the importance of perceived competence (Teoh et al., 2013). However, the concept of self-efficacy did not differentiate the academic desired outcomes; but this concept considered all of the desired outcomes as similar incentives that cause students' motivation. In this sense, Ryan and Deci (2006) viewed self-efficacy as a necessary condition for motivation; however, the belief that one can successfully perform an action or control an outcome does not address why one acts which considered an issue at the very heart of personal commitment and engagement. According to them, the self-efficacy

theory is unable to distinguish alienated from autonomous actions or predict the consequences that follow from this distinction.

Instructors could foster students' sense of competence during academic activities by providing them with clear communication, consistent and reasonable guidelines; as well as meaningful teacher-student relationships (Muñoz & Ramirez, 2015; Reeve, 2002). Besides, the sense of competence might be enhanced by providing students with positive feedback during their learning activities which also empowers their sense of efficacy (Deci & Ryan, 1980). Similarly, Deci and Ryan (2000) contended that "events such as negative feedback that foster perceived incompetence tend to undermine intrinsic motivation, whereas events such as positive feedback that foster perceived competence tend to enhance intrinsic motivation" (p. 235). Furthermore, in several studies, perceived competence has been found to predict intrinsic motivation in educational settings (Chue & Nie, 2016; Deci & Ryan, 2002; Goldman, Goodboy, & Weber, 2016) and learning goal orientation (Babenko & Oswald, 2019; Janke et al., 2015). The results showed that perceived competence mediates the relationships of both positive and negative feedback with intrinsic motivation.

2.8.3 Relatedness

Relatedness refers to the need to be emotionally attached to and accepted by others, as well as to strong social relationships and the sense of belongingness. Deci and Ryan (2002, p. 7) highlighted that "Relatedness reflects the homonymous aspect of the integrative tendency of life, the tendency to connect with and be integrated and accepted by others." The satisfaction of the need for relatedness occurs when relationships are nurturing and

reciprocal, and importantly when they involve the acceptance of the authentic self (Legault, 2017). Experiencing the satisfaction of the relatedness considered a critical factor in internalization. For instance, Niemiec and Ryan (2009) stated: "People tend to internalize and accept as their own the values and practices of those to whom they feel, or want to feel, connected, and from contexts in which they experience a sense of belonging" (p. 139). In other words, when individuals experience a general sense of relatedness satisfaction, they are more likely to display intrinsically motivated exploration (Deci & Ryan, 2002).

In educational environments, students experience relatedness need satisfaction when the contextual learning provides them with supportive relationships with others such as teachers and peers in an authentic, caring, and reciprocally way (Reeve, 2012). According to Niemiec and Ryan (2009), secure and responsive relationships are the most critical indicators of students' relatedness satisfaction. Therefore, the presence of a genuine students-teachers relationship is essential in enhancing relatedness satisfaction which in turn fosters students' motivation and emotional development in the academic settings. According to SDT, "intrinsic motivation will be more likely to flourish in contexts characterized by a sense of secure relatedness" (Deci & Ryan, 2000, p. 235). Furthermore, relatedness in the academic domain teaches students the beliefs, orientations, and values needed to function efficiently and effectively in academic environments. In turn, these feelings (if positive and adaptive) direct behaviour in the form of enhanced persistence, goal striving, and self-regulation (Martin & Dowson, 2009). Especially, when students experienced a high-quality sense of the relationship with teachers and peers (relatedness) in the educational contexts, they are more potential to feel the sense of self-determination

upon their undertaking activities; which in turn empower their desired educational outcomes such as high-quality of engagement (Collie et al., 2015). In summary, by instructors' specific practices during classroom activities, the basic need for autonomy, competence, and relatedness will be fulfilled which in turn provide the motivational foundation for students to achieve their desired academic outcomes. Besides, as early mentioned, in this study, we will further define the basic need for novelty as an additional candidate within SDT. This basic need is described below.

2.8.4 Novelty as a Novel Need

As early stated, SDT proposed three universal psychological needs as the essential motivational resources for all behaviours of individuals irrespective of their gender, culture, or race. As such, most of the proposed events and contexts in SDT were based on basic psychological needs for autonomy, competence, and relatedness. However, although the fulfilment of these proposed needs played a critical role in producing several optimal behaviours and development for all human, Sheldon (2011) stated that one of the limitations in the SDT needs-as-requirements literature had been a lack of examination of comparison or alternative needs in addition to autonomy, competence, and relatedness. In this sense, González-Cutre et al. (2016), and González-Cutre and Sicilia (2018) argued that the well-established literature of SDT's principles indicated that novelty satisfaction could be addressed as an additional basic psychological need in this theory.

Before we go further to the concept of novelty as a new need in SDT, we talk about other scholars' perspectives about novelty or rather novelty seeking. Novelty seeking is concerning individuals' desires for new experiences, while the degree of novelty is

considered as a function of the discrepancy between previous and current experience. For example, Pearson (1970, p. 199) as cited in (Reio & Choi, 2004) pointed out that novelty-seeking defined as "a disposition toward changing, new or unexpected experiences versus a disposition to avoid these experiences. The degree of novelty in any one experience is a function of the discrepancy between an individual's past experience and the present one". In a long history of systematic animal studies, researchers have shown that animals prefer novel stimuli and contexts. Later on, Berlyne (1950) as cited in Reio and Choi (2004), extended this idea of novelty preference and curiosity to a human being. In this sense, it was argued that organisms view their living contexts as a source of novelty. A novel stimulus from that contexts creates a discrepancy, which in turn fosters the organisms' sense of curiosity and exploration; as well as novelty hold the key foundation to our understanding some of the more complex levels of motivation to explore in the human being (Berlyne, 1950). Furthermore, feelings of curiosity are particularly reactive to novelty and by focusing on novelty and challenge, people who feel curious challenge their views of self, others, and the world with an inevitable stretching of information, knowledge, and skills (Kashdan & Silvia, 2009).

Life with the pursuit of novelty means that individuals would be more likely to engage in exploratory pursuit for understanding themselves and their environment, looking for meaning, and searching for the development of oneself (Kashdan & Silvia, 2009). In the learning environment, one of its key features is the sense of novelty, which can serve as a crucial factor in alerting students' attention and motivation (Jankowska & Atlay, 2008). Ryan and Deci (2000, p. 71) stated that "people will be intrinsically motivated only for activities that hold intrinsic interest for them, activities that have the appeal of novelty."

It is highlighted that intrinsic types of motivational sources viewed as "the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (p.70). Additionally, Deci and Ryan (1990) considered the internal motivation as the process that "leads people to encounter new challenges that are optimal for their self-development and that can be integrated as development proceeds naturally" (p. 244). However, in spite of the well-known critical role of novelty in several fields like education, work, and interpersonal relationships; as well as, this construct was frequently mentioned in the SDT's literature as crucial factor in intrinsic motivation; there has been no study considered novelty as an additional psychological need in SDT except the two studies of González-Cutre et al. (2016) and González-Cutre and Sicilia (2018) which conceptualize novelty satisfaction as an inherent and universal need that could behave according to the SDT' principles.

González-Cutre et al. (2016) defined novelty as "the need to experience something not previously experienced or deviates from everyday routine, as an additional basic need alongside the needs proposed in self-determination theory" (p. 165). Following the literature of SDT, González-Cutre et al. (2016) stated that "novelty seems to be an innate need which is present in all cultures and stages of development, the satisfaction of which contributes to increased intrinsic motivation and well-being, and is related to adaptive behavioural outcomes and optimal functioning" (p. 161). According to them, the perception of this need is entirely in accord with the basic principles of SDT and meets the established criteria of Deci and Ryan (2000). Following their review of the literature, González-Cutre et al. (2016) stated that "Although this need to innovate is related to the needs for competence and autonomy, it seems a source of motivation in its own" (p. 160).

Besides, they assumed that novelty satisfaction is subsumed by the need for autonomy in the autonomous activities which tend to have a sensational or unique component and subsumed by the need for competence in the challenging experiences which require extending the skills through trying something new. From this point of view, individuals seek to experience the new skills and knowledge, but when these skills might be terminated to be novel for them, their satisfaction with this need could be diminished which limits their sense of novelty to be in connection with autonomy and/or competence.

2.8.5 The Importance of Basic Psychological Needs in Student Engagement

As early stated, self-determination theory (SDT) offers a broad framework for understanding students' motivation and personality by defining the psychological nutrients for autonomy, competence, and relatedness which are required for optimal motivation, engagement, and well-being in educational domains (Legault, 2017; Reeve, 2012). SDT maintains that, when students' basic psychological needs are supported in a classroom, they are more likely to internalize their motivation to learn and to be more autonomously engaged in their studies (Niemiec & Ryan, 2009). Vallerand, Pelletier, and Koestner (2008) in their concluding article about collection articles on SDT pointed out that all articles underscore the fact that environments that provide autonomy support lead to qualitatively superior forms of motivation characterized by high levels of self-determination (i.e., intrinsic motivation and identified regulation) that, in turn, are conducive to more adaptive cognitive, affective, and behavioural outcomes. In addition, classroom contexts where students experience the fulfilment of that needs tend to foster not only more intrinsic motivation but also more active engagement in less attractive academic activities, better quality learning outcomes, enhanced wellness, and more

excellent value for sustained learning (Ryan & Deci, 2013). As a result, in academic settings, SDT provides valuable recommendations for educationalists during the flow of instructions to involve, support, and vitalize the internal motivational resources that all students own; which in turn empowers their engagement in those academic settings (Niemiec & Ryan, 2009).

Deci and Ryan (2011) stated that satisfaction of psychological needs contributes to behavioural engagement because the fulfilment of these needs provides energy and direction, which in turn leads individuals to sustain the same behaviours. In addition to evaluating the type and directions of classroom behaviours students partake in, SDT seeks to address the issues related to the promotion of students' interests in learning, a valuing of education, and confidence in their capacities and attributes (Deci et al. 1991). From this point of view, students' active involvement in their learning process is contingent mainly on the fulfilment of their innate psychological needs (Deci & Ryan, 2000; Ryan & Deci, 2000). In other words, the optimal learning behaviours takes a place in the particular learning settings; in which students' feelings of competent, autonomous, and connected to their environmental learning induce them to engage cognitively, emotionally, and behaviorally in their undertakings (Trenshaw, Revelo, Earl, & Herman, 2016; Zhen et al., 2017). This assertion has received considerable empirical support, especially on the relationships between psychological needs and student engagement.

Maralani et al. (2016), Zhen et al. (2016) and Yu, Li, and Zhang (2015) showed that exogenous variable of basic psychological needs directly and positively predicted academic engagement. Similarly, a study in Romanian colleges showed that satisfaction

of students' basic needs has an incremental value over and above their personality traits in explaining engagement (Sulea, Van Beek, Sarbescu, Virga, & Schaufeli, 2015). In longitudinally study in Korea, Jang et al. (2012) showed that mid-semester autonomy satisfaction predicted end-of-semester engagement. Furthermore, a study with 1,025 Korean students showed that students' psychological needs satisfaction was a better predictor of classroom engagement (Cheon, Reeve, & Moon, 2012). Also, among middle and high school students in the USA, the direct link was observed between winter psychological needs and spring behavioural engagement (Ruzek et al., 2016).

In addition, there were inconstancy results on the unique or individual prediction of psychological needs toward student engagement. For example, a series of studies (four studies) in Korea, Jang et al. (2009) showed that the basic needs collectively predicted high student engagement. However, the basic need for relatedness failed individually to predict student engagement and other outcomes of these studies. In contrast to that, the study of Hassan and Al-Jubari (2016) found that only competence need (neither autonomy nor relatedness need) significantly predicted student engagement among Malaysian undergraduates. However, this study used Utrechet's Work Engagement Scales (UWES), that cover vigour, absorption, and dedication subscales instead of three components: behavioural, emotional, and cognitive, to measure student engagement.

Furthermore, a study examined the role of psychological needs satisfaction among medical students at a Canadian university found that the need for competence had the most considerable significant contributions to students' engagement followed by the need for autonomy (Babenko, Mosewich, Abraham, & Lai, 2018). In parallel, Molinari and

Mameli (2017) and Zhen et al. (2017) reported that only the needs for competence and relatedness predicted students' engagement significantly among high school students in Italy and China respectively. Moreover, despite the experimental and theoretical assertion on the universal of SDT' proposition irrespective of gender, age, culture or race, studies are still arguing about the cultural difference concerning the effects of Eastern and Western cultural values and context on the role of the basic needs; especially the need for autonomy. In overall, most of the conducted studies were in non-higher education contexts and the absence of the need for novelty as a fundamental need to explain student engagement.

In respect to novelty as a basic psychological need within SDT, González-Cutre et al. (2016) found that the novelty need satisfaction alongside the three psychological basic needs (autonomy, competence, and relatedness) in SDT predicted life satisfaction (general adults) and intrinsic motivation in physical education among 1035 Spanish secondary school students. Recently, González-Cutre and Sicilia (2018) found that novelty satisfaction predicted vitality, dispositional flow, and satisfaction in addition to intrinsic motivation with 764 students in physical education classes. Their findings showed that novelty satisfaction could be measured as an additional inherent need besides the three proposed needs in the SDT. Furthermore, these studies have recommended to set up students' motivational profiles referring to the fulfilment of the four psychological needs; as well as, study these psychological needs fulfilment as motivational predictors of other educational outcomes. To date, however, no attempt was made to quantify the association between novelty as psychological need and other educational outcomes, especially academic engagement. As a result, to the extent that novelty as a psychological need in

SDT predicted life satisfaction as well as intrinsic motivation, we might expect that fulfilment of this need for novelty has a significant relevant in predicting student engagement. In other words, it would be interesting in the current research to assess the effects of the basic need for novelty alongside the proposed needs in SDT on academic engagement.

2.8.6 Basic psychological needs and Collectivist Cultures

Self-determination theory (SDT) posits that all people have the needs for competence, autonomy, and relatedness. SDT maintains that regardless of gender, race, culture, or socioeconomic status, and regardless of whether the value of competence, autonomy, and relatedness, each of these needs must be satisfied to develop and to function optimally (Deci & Ryan, 2011). According to this theory, these cross-culturally universal psychological needs promote more positive academic functioning when they are more nurtured via the social contexts (Reeve, 2012; Ryan & Deci, 2000). However, some cross-cultural researchers (e.g., Markus & Kitayama, 2003; Markus, Kitayama, & Heiman, 1996) have explicitly argued that the fundamental propositions of SDT should not apply to students in Eastern cultures. At the centre of this critique is the question of whether autonomy is a universal psychological need. According to them, autonomy is a Western ideal and is taught in Western cultures that focus on individualism, but that it is not essential in Eastern cultures. It plays a little role in the lives of East Asians and people from other traditionalist cultural contexts. Moreover, they assume that relatedness is an essential need in cultures that emphasize collectivism and interdependence (Deci & Ryan, 2008). From this cultural relativists view, the need for autonomy is relevant only in cultures that value individualism; however, is mostly irrelevant in cultural characteristics

of Asia as well as Malaysia which hold collectivism, incorporating into a group, strong subordination to the social and religious values norms, emphasize group goals over individual goals and desires, power distance, and fully acquiescence to the values and rules of authority or societies (see Fontaine & Richardson, 2005; Terpstra-Tong et al., 2014).

Theorists and researchers (proponents) of SDT have responded to the cross-cultural critics by making two key points. First, they argued that it is a conceptual error to equate the concept of autonomy with other concepts such as individuality, uniqueness, and independence (Jang et al., 2009). Autonomy connotes a personal endorsement of one's behaviour, not a separating of the self from one's ties with others, whereas independence means to function alone and not rely on others (Deci & Ryan, 2008). Second, Iyengar and DeVoe (2003) have implied that a cultural valuing of social harmony necessarily means that the members of that society do not have a need for autonomy, or at least have a lesser need for autonomy. Within this focus, Jang et al. (2009) in their studies using collectivistically oriented Korean students in high school showed that the participants enjoyed their learning activities that enhance their basic psychological needs satisfaction and particularly autonomy satisfaction. Also, the autonomy-supportive teaching style and their own psychological need satisfaction experiences predicted their achievement, engagement, and intrinsic motivation during classroom activities.

In addition, findings from cross-cultural studies underscore SDT's universality claim. For example, it was found that basic needs satisfaction predicted well-being; whereas basic needs frustration predicted ill-being within four culturally diverse participants (Belgium,

China, USA, and Peru) and Japanese undergraduates, respectively (Chen et al., 2015; Nishimura & Suzuki, 2016). Sheldon et al. (2004) showed that the self-determination of personal goals predicted the multiple indicators of well-being in Turkey, China, South Korea, Taiwan, and in the USA. In respect to the local collectivist contexts, Hassan and Al-Jubari (2016) asserted the SDT's propositions by showing that autonomy-supportive learning climate has a significant relationship with intrinsic need satisfaction of three needs among undergraduate students in Malaysia. As a result, feelings of autonomy, as such competence and relatedness, are essential for optimal functioning regardless of individuals' collectivism, traditional, and individualist cultural values.

2.9 Personal Best (PB) Goals

One of the most influences on students' academic development is goals. In psycho-educational research, numerous goal orientations have been proposed and operationalized like goal setting, achievement goals, and structure goals (Yu & Martin, 2014). The present research focuses on one newly proposed concept within achievement goal theory: personal best (PB) goals. Achievement goal theory is one perspective relevant as well as a key theoretical framework associated with the PB goals studies (Martin & Elliot, 2015b).

2.9.1 Achievement Goal Theory

Some of the most important antecedents of educational outcomes are goals orientation. Goal orientation is explained by the achievement goal theory (AGT). Achievement goal orientation defined as the purpose of actions and behaviour in achievement situations. It has emerged as a background to explain the motivation and achievement of the students (Chen & Wong, 2015). According to Pintrich (2000), achievement goal theory posits that

students' behaviour in achievement settings is guided by the achievement goals they pursue for learning. These goal orientations have been shown consistently as significant predictors of academic achievement as well as several cognitive, emotional, and behavioural and overall desired educational outcomes (Senko, Hulleman, & Harackiewicz, 2011; Skaalvik & Federici, 2016). In recent years, research has further asserted the significant role of the contextual and situational factors in students' goal orientations (Chen & Wong, 2015). Accordingly, the educational settings should consider the learners' goals to get the ideal motivational levels and educational outcomes.

The goal orientation's concept has drawn several researchers' attraction in psychological education (Elliot & Dweck, 2005). According to achievement goal theory, students are interested in taking part in their learning activities because they have a wide range of goals or reasons. The standards for assessing their learning activities outcomes are also diverse, based on their goals' adoption. This theory reveals two forms of goals, namely: performance and mastery goals (Ames, 1992; Elliot, 1999). Performance goals are defined by Ames (1992) as an attempt to show one's higher competence to others, such as peers whereby one's self-worth depends on his performance. Whereas in mastery goals, the competence level of students is improved, their new skills are developed, a sense of mastery-based on self-referenced (intrapersonal) is achieved. Several studies on achievement goal theories show an association between mastery goals with emotional experiences compared to performance goals. Also, mastery goals are linked with positive consequences. For example, a preference for challenging tasks, overcoming obstacles, and attributing success to effort and interest as well as positive emotions related to self, contexts, and tasks (Benita et al., 2014).

A framework of achievement goal orientation incorporates avoidance and approach dimensions, which describe the multidimensional nature of mastery and performance goals. Thus, a more elaborate model of 2 x 2 achievement goals was proposed (Elliot, 1999). In this model, the constructs of mastery goal and performance goals are distinguished in terms of approach and avoidance. As a result, this framework has four achievement goals: (1) mastery-approach (focusing on acquisition or understanding of knowledge, mastering skills and capabilities); (2) performance-approach (attempt to achieve the objective of performing better than other people in terms of grades and scores); (3) mastery-avoidance (focusing on avoiding a loss of skills and competence); and (4) performance-avoidance (avoiding the perception of relative incompetence or inferiority) (Chen & Wong, 2015; Elliot & McGregor, 2001; Wolters, 2004). However, in goals setting, PB goals are considered as another type of goals (Martin, 2006). Traditional achievement goals such as mastery and performance goals and even 2 x 2 achievement goal framework have been studied so far. Therefore, this study attempts to investigate goals as a relatively new construct of PB goals.

2.9.2 Defining Personal Best (PB) Goals

At a basic level, a theory of achievement goal is formed based on both mastery and performance goals. In this sense, for better understanding, it is imperative to articulate the meaning of PB goals' in the light of the classic goals, namely: mastery and performance. Mastery goals are based on the mastering of a specific task; whereas performance goals mention that students show their better performance of their tasks to their peers (Elliot, Murayama, & Pekrun, 2011; Maehr & Zusho, 2009). In contrast, PB goals are students' specific, challenging, competitively self-referenced targets to outperform their previous

tasks (Martin, 2006; Martin & Elliot, 2015b). The critical difference between these goals here involves the type of standards that the students focus, which can be a task-based, outdoing others, or focusing on oneself' intrapersonal standards. Accordingly, PB goals emphasize students' self-paced progress towards the improvements in their current tasks compared to previous ones (Liem et al., 2012; Martin et al., 2016).

There is a wide range of practical strategies to improve the effectiveness of PB goals into the achievement development of students. By doing so, PB goals may take two forms: "process PB goals" and "product (outcome)" PB goals (Martin, 2011; Martin & Elliot, 2015b; Yu & Martin, 2014). With process PB goals, students could spend their extra time revising for the upcoming tests compared to a previous one. Students are encouraged to ask their teacher for help to prepare their tests. In case, the teacher refused to help them; these students still organize their learning activities. They are ready to engage in class discussions. They also spend their extra hours doing their homework (Martin, 2011; Martin & Elliot, 2015b). Product PB goals refer to doing the quiz in the current week better than that in the last week, doing the final exam better than the middle one (Martin, 2011; Yu & Martin, 2014). In this sense, there is a close relation between PB goals and mastery goals regarding their conceptualization and operationalization. According to Yu and Martin (2014)), mastery goals mainly focus on the task and learning; whereas PB goals primarily focus on the self and the outperforming of one's previous efforts or performance (Martin & Elliot, 2015a).

2.9.3 The Elements of Personal Best (PB) Goals

Personal best (PB) goals have three main elements, namely: specificity, difficulty/challenge, and reference (Locke & Latham, 2002; Martin, 2006; Martin & Elliot, 2015b). Unlike the global or long-term goals, specificity refers to specific goals emphasizing well-defined outcomes of an individual (Locke & Latham, 2002; Yu & Martin, 2014), providing a clear explanation about what a person aims to achieve. It is found that specific goals have a close association with better performance (Locke, Chah, Harrison, & Lustgarten, 1989; Martin & Elliot, 2015b). Thus, it is possible that PB goals construct is adaptive because of its establishment of a clear target at an initial aim. For example, known scores which are widely used to evaluate learners' performance could motivate the students to get their PB goals (Martin, 2006). Moreover, the difficulty level is confirmed to provide better chances for the students to get the best performance and higher than previous one (Martin, 2006; Yu & Martin, 2014). It appears that the specificity and difficulty of the goal interact; as such, specific and challenging goals produce a higher level of optimal students' performance (Martin, 2006). The third element of goals is known as a reference. Best goals mainly emphasize a standard established regarding one's previous effort or performance (Martin & Elliot, 2015b). Competitive self-reference is a crucial aspect that can help the students to achieve their PB goals (Martin, 2006, 2011). Thus, as mentioned above, PB goals are different from normative ones. Normative goals involve outdoing others and getting competitive advantages, whereas PB goals are considered as a personal progress to compete with the past performance of the learners (Martin & Elliot, 2015b).

2.9.4 Personal Best (PB) Goals and Educational Outcomes

There are numerous functions inherent in a PB approach that would significantly connect PB goals to the desired educational outcomes (Martin, 2011). Students could know what they are going to do through PB goals, which leads them to compete with their previous best performance. Moreover, with clear PB goals, students could make their effort to complete their tasks, which results in better educational outcomes. It is also indicated that students become more motivated to engage in their learning activities through self-competition. Finally, students have a chance to fulfil gaps between the current and desired attainment. Martin (2006) maintained that pursuing academic PB goals has the potential to facilitate and promote students' self-efficacy in learning. Further, it is also stated that PB goals relate to self-determination perspective because pursuing PB goals are considered as a critical factor in enhancing learners' intrinsic motivation. The competence and autonomy of students are gained through overcoming a challenge. However, students' academic performance is improved based on their own decision (Liem et al., 2012). Taken together, pursuing PB goals could facilitate and improve the students' educational processes and outcomes.

Turning now to the empirical evidence on the significant role of PB goals in the improvements of students' academic outcomes. Martin (2006) conducted a study involving 1016 Australian high-school students. His results revealed that the construct of PB goals significantly predicted students' educational outcomes such as aspirations, interest, participation, and persistence. In their longitudinal cross-lagged study with Australian high-school students, Martin and Liem (2010) found that PB goals could predict later achievement, test effort, perseverance, interest in school, participation in

class, completion of homework and academic engagement. This second study is considered as worthy because it emphasises the vital effects of PB goals on students' engagement and academic achievement by using longitudinal design. Likewise, in another longitudinal study conducted with high school students in Australia, Liem et al. (2012) revealed that PB goals significantly predict deep learning, flow in schoolwork and positive relationships between the teacher and students. Moreover, a study conducted with academically at-risk (attention-deficit/hyperactivity disorder; ADHD) students in Australia showed a positive effect of PB goals on students' engagement (Martin, 2012b).

A study employed a longitudinal cross-lagged panel design revealed that PB goals of high-school students in Australia could develop students' implicit beliefs and intelligence (Martin, 2014). Additionally, PB goals are examined alongside "classic" mastery and performance goals among middle and secondary school students in China and Australia. Both PB and mastery goals played a crucial role in motivation and engagement (Martin & Elliot, 2015a; Yu & Martin, 2014). Moreover, among Australian elementary and secondary school students, Martin and Elliot (2015b) found that the treatment group (PB goals setting) showed a better achievement growth than the control one. However, most mentioned studies of PB goals have only been carried out among elementary, secondary, and high school contexts in Western countries. Therefore, it is noteworthy that the current study will be conducted in higher education contexts in the Eastern world.

2.9.5 Personal Best (PB) Goals and Basic Psychological Needs

Most of the researchers have been interested in identifying the reasons for applying achievement goals in educational settings (e.g., Benita et al., 2014; Elliot et al., 2011;

Michou, Matos, Gargurevich, Gumus, & Herrera, 2016; Ozdemir Oz et al., 2016; Vansteenkiste et al., 2014). Self-determination theory (SDT) is suitable for this purpose (SDT) (Vansteenkiste et al., 2014). This theory is, therefore used to determine the reasons "why" students engaging in learning activities, "why" students attempt to achieve their achievement goals (Vansteenkiste et al., 2014), and "what" goals are pursued (Deci & Ryan, 2000). SDT (Ryan & Deci, 2000), mentioned that people's behaviour could be regulated based on the use of different reasons (controlling or autonomous). It means that if learners' achievement goal pursuit is controlled regulate, they will feel depressed. By contrast, if learners pursue their achievement goals autonomously, they will feel more of self-choice upon the pursuit of their goals (Vansteenkiste et al., 2014).

In the educational setting, it was found that there is a relationship between autonomous motivation and a wide range of adaptive outcomes including in-depth learning strategies and effort, academic and social competence, academic performance, prosocial behaviour, and adjustment. On the contrary, controlled motivation related to maladaptive educational outcomes such as maladaptive coping strategies, low academic performance, superficial cognitive processing, and dropout (Michou et al., 2016). Furthermore, considering the positive outcomes of mastery goals, autonomous motivation can lead to students' mastery goal pursuit. For example, students can be mastery-approach oriented because they found it challenging, interesting, or personally important to fully master the requirements of a task (autonomous motivation) (Benita et al., 2014).

According to the SDT (Deci & Ryan, 2000), the first prerequisite of autonomous motivation is the satisfaction of the three inherent psychological needs of students.

Accordingly, when the students' innate needs for autonomy, competence, and relatedness are fulfilled, they are more likely to perform autonomously in their activities. In this regard, Deci, Ryan, and Williams (1996) emphasized the importance of study psychological basic needs to goals. Goals let us know how students are motivated. Psychological needs let us know the reason why students are motivated. Thus, to get a better understanding of the reasons why a person has his or her specific achievement goal is necessary (Diseth & Samdal, 2014). Additionally, bulk of empirical evidence showed the positive effect of psychological needs on achievement goals (e.g., Babenko & Oswald, 2019; Benita et al., 2014; Diseth et al., 2012; Diseth & Samdal, 2014; Janke et al., 2015; Ozdemir Oz et al., 2016; Sari, 2015; Sinatra et al., 2015). However, those studies have mostly examined mastery and performance goals. Furthermore, very few studies revealed that psychological needs are related to PB goals in educational settings.

As mentioned earlier, when the students create a PB goals, these goals are for them (not for someone else), self-determined (they are in charge for pursuing those goals), and this type of goals emphasizes personal progress and growth of the students (self-preferences, not others preferences) (Collie et al., 2015). As a consequence, PB goals emphasize the decision and self-determination of students; a key factor that promoted by basic needs fulfilment (Collie et al., 2015; Deci & Ryan, 2000). Furthermore, there is an association between autonomous and controlled reasons and goals. PB goals are self-focused and self-determined, as well as, this type of goals is driven by autonomous reasons (Collie et al., 2015). Thus, as mentioned, autonomous motivation and self-determination are based on the needs' fulfilment, suggesting that the need for autonomy, competence, and relatedness are significantly relevant to the PB goals construct.

As per the best knowledge of the researcher, only Collie et al. (2015) addressed the relationship between psychological needs in SDT and PB goals which focused only on the need for relatedness and found that this need strongly associated with PB goals. Although their study did not examine the other two needs for autonomy and competence, they argued that these needs could have a significant role in PB goals. For example, PB goals could emerge from the students' current competency in which students compete with their previous best performance (competence); as well as, students' sense of self-endorsement is at the core of these goals (autonomy satisfaction). However, it was pointed out that none of the psychological needs could be compensated (Deci & Ryan, 2000), and researchers often aggregate them into one construct labelled need satisfaction in order to adequately address their positive effect on human motivation (Deci et al., 2001; Janke et al., 2015; Niemiec & Ryan, 2009). Moreover, to this date, there is no empirical research that investigated the relationships of the need for novelty as a psychological need in SDT, neither with classical dichotomous achievement goals (mastery and performance goals) nor with PB goals. Therefore, there is a need for additional empirical examinations of multifaceted psychological needs with PB goals. Specifically, there is a need for multivariate modeling, including the different psychological needs to understand the relationship of autonomy, competence, relatedness, and novelty with PB goals.

2.9.6 Personal Best (PB) Goals and Student Engagement

Achievement goal theory has been a dominant approach to better understanding the motivational goals that foster students' learning and engagement (Ames, 1992; Elliot & McGregor, 2001; Martin, 2006). As indicated earlier, personal best (PB) goals are also relevant to achievement goal research. However, research on individual goals has

primarily focused on the relationship between dichotomous (mastery and performance) achievement goals with student engagement (e.g., Babenko et al., 2018; Diseth & Samdal, 2015; Gonida et al., 2009; Ronnel Bornasal King, Dennis M McInerney, & David A Watkins, 2012; Lee & Koszalka, 2016; Mih, Mih, & Dragoş, 2015; Wolters, 2004). Notably, the salient research literature on PB goals showed the association of the construct with students' engagement. For example, a study by Martin (2006) and Martin and Liem (2010) showed that PB goals are related to student engagement among Australian high school students. Furthermore, a study on the students with ADHD (attention-deficit/hyperactivity disorder) in Australia showed a positive effect of PB goals on the behavioural engagement component of the students with ADHD as well as non-ADHD students (Martin, 2012b).

In addition, researchers (i.e., Martin & Elliot, 2015a; Yu & Martin, 2014) examined the relationship of PB goals and classic goals (mastery and performance) with students' motivation and engagement among middle and secondary school students in China and Australia. The study found a positive effect of both PB and mastery goals on students' motivation and engagement. Importantly, concerning students' academic engagement, PB goals have demonstrated the higher explained variance compare to the classical goals. Furthermore, a study with 450 high school students (Chinese-speaking background Australian and English-speaking background Australian students) suggested generality of the effects of perceived PB goal structure in school and individual PB goals on student engagement (Martin et al., 2016). Another study with 3232 schools' students in the US, Canada, and the UK showed that PB goals mediated the associations between personal relationships with teachers, parents, and peers and students' engagement (Collie et al.,

2015). Moreover, Burns et al. (2018) found that PB goals significantly predicted gains in both academic engagement and achievement among 1,481 Australian high school students. However, these studies predominantly investigated PB goals in Western school contexts. Moreover, cross-cultural research revealed that there are a significant differences in levels of the educational psychological outcomes (e.g., goals, motivation, engagement, and achievement) between the students in Asian and Western contexts (Givens Rolland, 2012; Ronnel B King, Dennis M McInerney, & David A Watkins, 2012; Martin & Hau, 2010; Martin et al., 2014). Accordingly, given limited in the empirical studies, it is imperative to test the effect of PB goals construct on students' engagement within higher educational and collectivist contexts such as in Malaysia.

2.9.7 The Mediating Role of Personal Best (PB) Goals

Research revealed that both achievement goal theory and self-determination theory (SDT) are quite useful for explaining students' motivation and success in their academic contexts (Ciani et al., 2011). According to SDT, when students experience the satisfaction of the three universal basic needs for relatedness, autonomy, and competence, they are more likely to be more motivated in their undertakings which in turn make them achieve their desired educational outcomes (Deci et al., 2001; Ryan & Deci, 2000). Besides, the learning environment that facilitates basic needs satisfaction will fosters students to be motivated during pursuing their desired academic goals (Deci et al., 2001). Previous studies have found a consistent relationship between psychological needs and achievement goals (Ciani et al., 2011; Diseth et al., 2012; Diseth & Samdal, 2014). Furthermore, previous studies showed that basic needs support in predicting the learning and well-being of students via achievement goals. For example, Diseth et al. (2012) found

that students' basic needs have a significant relationship with both academic achievement level and life satisfaction via their motivational variables such as self-efficacy and goal orientation. However, this mentioned study was based on mastery goals and performance goals.

As above mentioned, PB goals are identified as an additional type of goal that plays a crucial role in student engagement. At this point, it is essential to highlight that PB goals are self-determined to the extent that they are student-led more than teacher-led and driven by autonomous reasons rather than controlled reasons (Collie et al., 2015; Vansteenkiste et al., 2014). Therefore, given the psychological nature of the basic needs and PB goals where both are concerned with the issue of "self-determination," it is likely that these constructs will work in alignment to predict student engagement. Furthermore, Benita et al. (2014) highlighted that goals considered a crucial factor in predicting positive outcomes when those goals are enacted in an autonomy-supportive context. When the students experience basic needs satisfaction, they are more expected to embrace the sense of self-direction and self-determination during their activities (PB goals), which in turn would predict positive educational outcomes in terms of high-quality academic engagement (Benita et al., 2014; Reeve, 2012). In this sense, we suggest that basic psychological needs that originate from autonomy support are crucial for PB goals, which in turn make those goals serve as an essential factor for student engagement.

Previous research showed that PB goals mediated the relationship between perceived PB goals structure and student engagement (Martin et al., 2016). On the other hand, concerning psychological needs, with 3232 schools' students in the US, Canada, and the

UK, Collie et al. (2015) found that the students' personal relationship with peers, teachers, and parents (relatedness) predicted academic engagement via PB goals. Furthermore, with 1,481 Australian high school students, the results revealed that PB goals significantly mediate the relationships between adaptability, self-efficacy, and teachers' support with both academic engagement and achievement (Burns et al., 2018). Consistently, these mentioned studies have statistically asserted the indirect effects of the mentioned antecedents on student engagement via students' PB goals by showing a more significant explained variance in student engagement and rejected the alternative models that showed PB goals as independent variable. Accordingly, we can certainly suggest that it is the basic psychological needs that may foster the construct of students' PB goals, which in turn raises student engagement. However, there is no study on the investigations into the mediating role of PB goals in the influence of the basic need for autonomy, competence, and relatedness on students' learning engagement. Thus, there is a need to conduct further research on this issue, especially, further research should focus on exploring the extent to which psychological needs for autonomy, competence, relatedness, and novelty predict students' engagement through mediating role of PB goals.

As explained, academic engagement can be enhanced when students' psychological basic needs are satisfied (Babenko et al., 2018; Legault, 2017; Reeve, 2012). The relationship between PB goals and students' engagement is also clearly established by previous studies (Burns et al., 2018; Collie et al., 2015; Martin, 2012b; Martin & Liem, 2010; Yu & Martin, 2014). Studies examining a link between psychological needs and student engagement, as well as those who examined the associations between PB goals and academic engagement provided an empirical and theoretical basis to investigate all these three substantive

variables simultaneously in one integrated model. Therefore, for better understanding of how basic psychological needs for autonomy, competence, relatedness, and novelty predict students' engagement, we contend that the salient new construct of personal best (PB) goals may play a mediating role between psychological needs and students' engagement in the current study.

2.10 Summary

The purpose of this study was to examine the mediating role of PB goals between basic psychological needs (autonomy, relatedness, competence, and novelty) and students' engagement among undergraduates in Malaysia.

The literature review chapter gave an overview of the higher education system in Malaysia as well as the challenges of higher education related to dropout and retention issues in higher education institutions around the world and especially within Malaysian educational context and highlighted the scarcity of the empirical studies concerning academic engagement in Malaysian higher education institutions; and ends with emphasizing the construct of student engagement as crucial solution in Malaysian higher education issues. It also gave an overview on engagement and the importance of this factor in educational settings and particularly in higher education contexts.

In addition, in this chapter, we threw light on the various definitions of students' learning engagement given by different scholars and provided the definitions of each dimension of the construct: cognitive, behavioural, and emotional engagement. Further, this chapter explained in detail the variables that have been examined and their impacts on student engagement in the learning environments. In the end, we highlighted the perspective of

self-determination theory (SDT) regarding engagement, especially the role of the basic psychological needs in enhancing students' engagement.

In the following, the literature review gave an overview of SDT; following by introducing novelty as a unique need in SDT in the current study. Additionally, it offers the importance of these needs in students' engagement. Furthermore, it explains the controversies surrounding the proposition of SDT and provided evidence from cross-cultural studies which support the universality and relevance of the psychological needs in educational contexts, especially in the collectivistic contexts.

Besides, we provided an overview of achievement goal theory and introduced the salient new construct related to this theory namely: personal best (PB) goals. It gives the definition of PB goals and their elements as well as evidence from previous studies on the importance of these goals in various educational outcomes. In respect to the current study, the literature explained the relationship between PB goals and psychological needs as well as student engagement. In the end, there is more evidence on the relevance of basic psychological needs in explaining student engagement by the mediating role of PB goals. Taken together, therefore, this study attempts to examine the interrelations between basic psychological needs satisfaction (autonomy, relatedness, competence, and novelty), personal best (PB) goals, and student engagement among undergraduates in Malaysia. To illustrate, it is going to make a more comprehension of PB goals by uncovering the role of such type of goals as the plausible mechanism by which students' psychological basic needs predict students' engagement. In the following, we move on to the methodology section in order to explain research design, population and sampling, instrument,

procedures of data collection, and data analysis that were carried out to answer the current study questions.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section describes the methods used to achieve the purpose of the current study, which mainly concerning testing the mediating role of personal best (PB) goals in the relationships between the basic psychological need for autonomy, competence, relatedness, and novelty with student engagement among undergraduates in Malaysia. In addition, it discusses the research design, population, sample, research instruments, data collection procedures, data analysis techniques, and the results of pilot study.

3.2 Research Design

Quantitative methodological approaches address a problem by measuring variables for individual respondents in order to obtain data that is usually in the numerical form, and the findings are mainly the product and summary of the statistical analysis (Gravetter & Forzano, 2012; Shaughnessy, Zechmeister, & Zechmeister, 2012). It was pointed out that the quantitative approach is unbiased, narrow, and specific in its focus, and concentrates on the objectives and measures of the substantive variables (Creswell, 2012). According to Fowler (2009), survey research design is a procedure in quantitative research whereby data is administered for only a fraction from the entire population which known as a sample to produce the statistical descriptions about trends of the target population regarding the constructs being examined. There are two basic types of survey-research design, namely: the cross-sectional design and the longitudinal design. In the cross-sectional design the researchers gather information regarding current participants'

attitudes, opinions, or beliefs at one point in time. While in the longitudinal design, the researchers investigate the respondents' perceptions based on timeframes (Cohen, Manion, & Morrison, 2007; Creswell, 2012).

In the current study, a cross-sectional research approach was utilized to collect information concerning the perceptions of undergraduate students. The cross-sectional survey design is one of the most popular used survey designs in which the investigator collects data at one point in time from one or more samples drawn from the target population (Shaughnessy et al., 2012). In this sense, Cohen et al. (2007) stated that "Cross-sectional designs are inappropriate in causal research as they cannot sustain causal analysis unless they are repeated over time" (p, 216). Thus, cross-sectional design was chosen due to the nature of the study which is self-report questionnaires and not a causal inference about the relationships between the constructs under investigation. Furthermore, this design was chosen over the longitudinal design because of time and money constraints which do not allow examination of trends over periods, and less potentiality to suffer from control effects such as loss of interests, participants' dropout, or move away (Gravetter & Forzano, 2012). Therefore, a cross-sectional design has been employed to address the research questions of the current study and provide an accurate picture about the relationships that might exist among the variables being examined.

3.3 Population and Sampling

3.3.1 Population

Population refers to the identifiable group of individuals or other units that the researcher desires to study something specific about them (Goodwin, 2010). As elaborated by

Gravetter and Forzano (2012), a target population is a defined group of individuals based on the specific interests of the researcher. Typically, those people in the target population holding similar characteristics that the researcher can identify and investigate. The population of the present study is the local undergraduate students from Malaysian public universities. There are 20 public universities in Malaysia which are divided into three categories: (A) Malaysian focused/comprehensive universities, (B) Malaysian research universities, and (C) Malaysian technical universities (Ministry of Higher Education, 2016).

The selection of undergraduates at Malaysian public universities was based on the nature of the study. For example, it was reported that a lack of interest and examination failure are the primary reasons causing the attrition rate among Malaysian students in public higher education institutions (Sangodiah et al., 2015). Moreover, the selection of the undergraduates for this investigation not only ensured the relationship of variables being examined but also allowed for a comparison of our findings with those reported in studies focusing on similar populations.

Since getting the population frame of all local undergraduate students from the Malaysian public universities was difficult and nearly impossible as well as it will be uphill to collect the data from all of them, a "geographically close cluster" (Cohen et al., 2007, p. 112) technique was used. In this sense, three public universities in northern Malaysia were selected. Hence, in the current research, the target population consisted of undergraduate students who are presently studying at public universities in northern Malaysia: A, B, and C. The population of these three universities is representing the main characteristics within

Malaysian public universities in terms of focused/comprehensive, research, and technical universities. Furthermore, selecting the northern Malaysian universities is useful for the current study due to the large and widely scattered population in the whole country as well as time and money constraints.

In the Malaysian educational system the students with Sijil Pelajaran Malaysia (SPM) or Malaysian Certificate of Education (MCE) and Sijil Tinggi Persekolahan Malaysia (STPM) or Malaysian Higher School Certificate need to select courses to public universities via The Student Admissions Management Division (SAMD) which formerly known as Unit Pusat Universiti (UPU) (Ministry of Higher Education, 2016). This unit is currently taking responsibility and in charge of coordinating students' admission to their public universities and facilitates the placement of undergraduate students based on their eligibility and courses' requirements. Therefore, the local undergraduate students in these three selected universities could represent the whole population, and generalization of the results to the whole population could be achieved. The combination of these three categories of public universities was made to ensure heterogeneity and homogeneity within the cluster and within each category regarding the public universities, respectively.

As mentioned above, the target population of the current study is the local undergraduate students from three public universities such as A, B, and C. As such, the second sampling strategy involved stratified random sampling; in which these three universities represent three strata (subgroups): research, focused/comprehensive, and technical universities. An official letter (see Appendix A) was sent to the Department of Students Affairs (HEP) of each respective university to obtain the total number of local undergraduate students. The

total number of the students was 48506 (A: 18801, B: 18141, C: 11564). Their percentages were calculated proportionally based on the variation in the number of undergraduate students in these universities. The calculated percentage which each university represents in the whole population was: A: 39%, B: 37%, and C: 24%. This proportion was considered later to select the number of students as a sample size from each of the selected universities (i.e., proportionate sampling). Table 3.1 demonstrates the proportional procedure of the current study.

Table 3.1

The Proportional Table

Selected Public Universities	Undergraduate local students' population	Percentages based on the total number of undergraduates	Sample size
A	18801	39%	312
B	18141	37%	296
C	11564	24%	192
Total	48506	100	800

3.3.2 Sampling Size

Kothari (2004) defined the size of the sample as the number of items to be selected from the target population to determine the sample being studied. There is no simple answer to how large the sample would be to make up the representativeness of the entire population. However, there is a consensus among scholars, that is, the larger the sample, the better representative of the population, more excellent reliability, more sophisticated statistics to be used, and less the sampling errors (Cohen et al., 2007; Creswell, 2012; Gravetter & Forzano, 2012). Therefore, the higher sample size is more accurate in comparison to smaller sample size in terms of diminishing sampling errors; also, the obtained perceptions

from the sample are more likely to be similar to the actual perceptions in the entire population.

The current study employed power analysis through G*Power software to determine the minimum sample size (Hair, Hult, Ringle, & Sarstedt, 2014, p. 23). In line with this, Cohen (1992) pointed out that sample size increases with an increase in the statistical power (1-β), a decrease in the effect size (ES), and a decrease in standardized significance criterion α, simultaneously. Accordingly, referring to Cohen (1988) sample size tables to identify the adequate sample size for multiple regression analysis and building a model, we used G*Power software as a function of the standardized significance criterion α, the effect size (ES), the statistical power (1- β), and the number of indicators. By doing so, using G*Power software for two tails, small ES (0.02), α (0.05), power (0.95), and five indicators, the results indicated a minimum of 652 participants required to achieve the statistical power of .95 at the significant level of 0.05 (α) as shown in Figure 3.1. The researcher decided to print out 800 sets of questionnaires to ensure a high respondent rate.

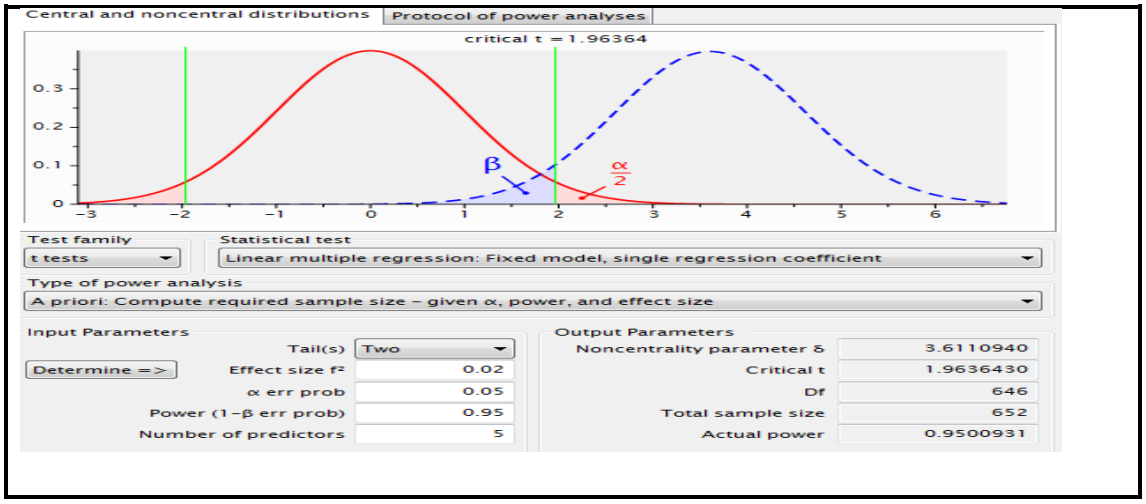

Figure 3.1. Output of Power Analysis Using G*Power 3.1.9.4

As mentioned above, 800 sets of surveys were distributed during class time to the undergraduate students at the three public universities in northern Malaysia. The respondents were selected from each university based upon the percentage that each subgroup represented in the entire population. In this sense, As shown in Table 3.1, to reflect the same percentage from the total number of 800 undergraduate students from each university, a total of 312, 296, and 192 sets of questionnaires were distributed in A, B, and C, respectively.

3.3.3 Sampling Techniques

Sampling is the procedure of the selection and identification of an adequate number of elements from the population to form the sample that will be able to represent the target population (Shaughnessy et al., 2012). In the quantitative approach, it is likely to generalize the results to the entire target population if the sample under study is selected carefully using the accurate sampling technique (Dawson, 2007). Sampling techniques could be characterized into two main categories, namely: the probability sampling and non-probability sampling. Probability sampling involves simple random, cluster, stratified, systematic, and multistage sampling techniques. Non-probability sampling involves self-selective, snowball, purposive, quota, and convenience sampling techniques.

In the current study, probability sampling which applies stratified random sampling was used to obtain a sample that is representative of the undergraduate students' population at the public universities in Malaysia. Stratified random sampling technique is conducting by dividing the target population into homogenous groups, each group holding subjects with similar characteristics (Cohen et al., 2007). Creswell (2012) stated that "In stratified

sampling, researchers divide (stratify) the population on some specific characteristic and then, using simple random sampling, sample from each subgroup (stratum) of the population" (p, 144). Furthermore, Fowler (2009) stated that "Stratification of a sample usually reduce the estimates of standards errors, because stratification is likely to reduce uncontrolled variation in the composition of the sample" (p, 160).

A stratified random sampling technique is a useful blend of randomization and categorization by enabling both a quantitative and qualitative piece of research to be undertaken. A quantitative piece of research will be able to use analytical and inferential statistics, while a qualitative piece of research will be able to target those students in institutions who will be able to be approached to participate in the study. To implement the stratified random sampling technique, undergraduate students were stratified into three strata (subgroups) which are research, focused/comprehensive, and technical universities. Then, the researcher randomly selected proportional numbers of students (see Table 3.1) from different classes in each university (stratum).

3.4 Research Instruments

According to Gravetter and Forzano (2012), surveys and questionnaires are extensively used in the behavioural sciences research as relatively effective ways to obtain large amounts of information regarding participants' attitudes, believes, behaviours, or personal characteristics. A personal administered (self-administered) questionnaire has been used as a research tool in the current study. It is a self-explanatory survey where reading the instructions is necessary, and the respondent fills it in on his own, away from the researcher (Fowler, 2009). Self-administered survey has unique advantages: (1) makes

large sample feasible, (2) administering questionnaires is less expensive and quicker than interview survey, (3) it does not require many skills as in conducting interviews, and (4) describes the characteristics of large population by asking many questions on the given topic (Babbie, 2008; Fowler, 2009). In the following, we explained in detail the instruments used in the current study to collect data from the participating students.

3.4.1 Demographic information questionnaire

The demographic information form has been used to gather information regarding respondents' background characteristics including their age, race, gender, number of semesters, the program of study, and university.

3.4.2 Basic Psychological Needs Satisfaction

Concerning the current study, the basic psychological needs satisfaction contains four inherent psychological needs for relatedness, autonomy, competence, and novelty. The items of the four basic needs in this study have been translated from English language to Bahasa Malaysian (Malay language) using the technique of back-translation with decentering (Brislin, 1980a, 1980b, 1986). In the following, we explained in detail the instruments used for each basic need.

3.4.2.1 Basic Psychological Need for Autonomy

Autonomy is the personal endorsement of one's behaviours and sense of psychological freedom (Ryan & Deci, 2000). Students' psychological need for autonomy was assessed by seven items generated from an extensive review of past studies concerning measuring the basic psychological need for autonomy in the educational settings (Chen et al., 2015; Gagné, 2003; Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). It was

necessary to make minor wording changes in the instrument's items to suit the context in which the study is carried out and to target students' perceptions on their autonomy satisfaction in the undergraduate classroom settings. The items were preceded by the stem "In this university …". The items were measured using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree); whereby a higher score represents higher levels of autonomy satisfaction. All the items used in this study to measure the basic need for autonomy and their sources are listed in Table 3.2.

Table 3.2

Sources and Items of Autonomy

Items	Sources
1. I feel a sense of choice and freedom in the things I undertake.	(Chen et al., 2015)
2. The tasks I have to do reflect what I really want.	(Van den Broeck et al., 2010)
3. I generally feel free to express my ideas and opinions.	(Gagné, 2003)
4. I don't feel pressured to do too many things.	(Chen et al., 2015)
5. I feel I have been doing what really interests me.	(Chen et al., 2015)
6. I feel free to do my tasks the way I think it could best be done.	(Van den Broeck et al., 2010)
7. I don't feel forced to do things I do not want to do.	(Van den Broeck et al., 2010)

3.4.2.2 Basic Psychological Need for Competence

Competence reflects the inherent desire to exercise one's capacities, feel that one is doing things in proper ways, achieve goals, and seek out and master skills (Ryan & Deci, 2000). Students' psychological need for competence was assessed by seven items generated from an extensive review of past studies concerning measuring the basic psychological need for competence in the educational settings (Chen et al., 2015; Van den Broeck et al., 2010). It was necessary to make minor wording changes in the instrument's items to suit the context in which the study is carried out and to target students' perceptions on their

competence satisfaction in the undergraduate classroom settings. The items were preceded by the stem "In this university …". The items were measured using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree); whereby a higher score represents higher levels of competence satisfaction. All the items used in this study to measure the basic need for competence and their sources are listed in Table 3.3.

Table 3.3

Sources and Items of Competence

Items	Sources
1. I feel confident that I can do things well.	(Chen et al., 2015)
2. I feel capable at what I do.	(Chen et al., 2015)
3. I feel competent to achieve my goals.	(Chen et al., 2015)
4. I feel I can successfully complete difficult tasks.	(Chen et al., 2015)
5. I don't have serious doubts about whether I can do things well.	(Chen et al., 2015)
6. I feel competent as student.	(Van den Broeck et al., 2010)
7. I don't feel disappointed with many of my performance.	(Chen et al., 2015)

3.4.2.3 Basic Psychological Need for Relatedness

The basic psychological need for relatedness denotes the inherent desire to experience the feeling of being emotionally connected and valued to and by others such as lecturers and students, ensure reciprocal and strong social relationships, and the sense of belonging to a group (Ryan & Deci, 2000). Students' psychological need for relatedness was assessed by six items generated from an extensive review of past studies concerning measuring the basic psychological need for relatedness in the educational settings (Chen et al., 2015; Gagné, 2003; Van den Broeck et al., 2010). It was necessary to make minor wording changes in the instrument's items to suit the context in which the study is carried out and to target students' perceptions on their relatedness satisfaction in the undergraduate

classroom settings. The items were preceded by the stem "In this university …". The items were measured using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree); whereby a higher score represents higher levels of the relatedness satisfaction. All the items used in this study to measure the basic need for relatedness and their sources are listed in Table 3.4.

Table 3.4

Sources and Items of Relatedness

Items	Sources
1. I really like the lecturers and classmates I interact with.	(Gagné, 2003)
2. I get along well with my lecturers and classmates.	(Gagné, 2003)
3. lecturers and classmates care about me.	(Gagné, 2003)
4. lecturers and classmates are generally pretty friendly towards me.	(Gagné, 2003)
5. I really mix with my lecturers and classmates.	(Van den Broeck et al., 2010)
6. I feel close and connected with the lecturers and classmates I spend time with.	(Chen et al., 2015)

3.4.2.4 Basic Psychological Need for Novelty

Novelty refers to the psychological need to experience new things not previously experienced or deviates from everyday routine (González-Cutre et al., 2016). In order to measure students' novelty satisfaction, the adapted "Novelty Need Satisfaction Scale" (NNSS) has been employed (González-Cutre et al., 2016). This subscale (NNSS) consists of six (6) items. In addition to the original items from NNSS, we have added five (5) items from the candidate items provided by González-Cutre et al. (2016) to measure different components of the novelty satisfaction construct: activities, skills, situations, emotions, and knowledge (11 items in total) as shown in Table 3.5. Items were preceded by the stem

"In this university …". The items were rated on a 6-point Likert scale ranged from 1 (strongly disagree) to 6 (strongly agree) scale, where higher scores represent higher levels of novelty satisfaction among students. All the items used in this study to measure the basic need for novelty and their sources are listed in Table 3.5.

Table 3.5

Sources and Items of Novelty

Items	Sources
1. I have the opportunity to discover new things.	(González-Cutre et al., 2016)
2. I think I discover new things frequently.	(González-Cutre et al., 2016)
3. I think I learn something new every day.	(González-Cutre et al., 2016)
4. I think that the activities I carry out are varied.	(González-Cutre et al., 2016)
5. I perform activities that seem novel to me.	(González-Cutre et al., 2016)
6. I think I manage to develop my originality.	(González-Cutre et al., 2016)
7. I feel new sensations.	(González-Cutre et al., 2016)
8. I feel I do novel things.	(González-Cutre et al., 2016)
9. I frequently feel there are novelties for me.	(González-Cutre et al., 2016)
10. I have the opportunity to innovate.	(González-Cutre et al., 2016)
11. I think that new situations/experiences come up for me.	(González-Cutre et al., 2016)

3.4.3 Personal Best (PB) Goals

Personal best (PB) goals refer to challenging, specific, self-improvement, and competitively self-referenced objectives in order to meet or excel previous best academic outcomes (Martin & Elliot, 2015a). In order to measure students' PB goals, the adapted Personal Best Scale (PBS) (Martin, 2006; Martin & Liem, 2010) has been employed. PBS is a self-report scale that includes four subscales, namely: "specific goals, challenging goals, competitively self-referenced goals, and self-improvement goals." Although the four PB goals' dimensions have provided with strong evidence of validity and reliability

in their psychometrics, in the first published PB goals' study, Martin (2006) found very high correlations (up to r=.93) between the four dimensions, which potentially leading to multicollinearity (as cited in Collie et al., 2015; Martin, 2006).

Thus, four items that measure the self-improvement aspect have been adapted from Martin' study to measure academic personal best goals as used by several previous studies on this construct (Collie et al., 2015; Martin, 2012b, 2014; Martin et al., 2016). In this study, we have added two items from competitively self-referenced goals dimension which also considered as most conceptually defensible in representing the concept of PB goals (Martin, 2006). Therefore, as shown in Table 3.6, six (6) items were preceded by the stem "In this university…" to measure the PB goals' using 6-point Liker scale ranged from 1 (strongly disagree) to 6 (strongly agree); in which high scores on this construct indicates higher levels of students' PB goals. Minor wording changes were made to assess this variable in the undergraduate classroom settings. For example, the original item "When I do my schoolwork, I try to do it better than I've done before" has been stated as "… when I do my work, I try to do it better than I've done before." The reported Cronbach's alpha for the PB goals is .90 (Collie et al., 2015) which represents a high degree of internal consistency of this scale. Furthermore, the items of PBs have been translated from English language to Bahasa Malaysian (Malay language) using the technique of back-translation with decentering (Brislin, 1980a, 1980b, 1986).

Table 3.6

Sources and Items of Personal Best Goals

Items	Sources
1. When I do my work, I try to do it better than I've done before.	(Martin, 2006)
2. When I do my work, I try to do the best that I've ever done.	(Martin, 2006)
3. When I do my work, I try to improve on how I've done before.	(Martin, 2006)
4. When I do my work, I try to get a better result than I've got before.	(Martin, 2006)
5. I compete with myself more than with other students.	(Martin, 2006)
6. I compete with my own previous performances more than I compete with other students.	(Martin, 2006)

3.4.4 Student Engagement

Student engagement is a multidimensional concept including three elements, namely: behavioural, emotional, and cognitive elements (Fredricks et al., 2004). Behavioural engagement is defined as students' participation in their academic tasks and involvement in curricular-related and extracurricular activities. Emotional engagement denotes the affective reactions to lecturers' instructions, peers, and classroom work, as well as the beliefs about the value of academic tasks. Finally, cognitive aspect of engagement is defined as students' psychological investments to extend their necessary efforts for comprehension and mastering the challenging ideas and skills. Student engagement was assessed using 30 items that tapped the three dimensions of student engagement (see Table 3.7). The items in the questionnaire were generated from an extensive review of past studies concerning measuring the multidimensional construct of learning engagement (e.g., Burch, Heller, Burch, Freed, & Steed, 2015; Fredricks et al., 2004; Lam et al., 2014; Reeve & Tseng, 2011; Skinner et al., 2008; Z. Wang, Bergin, & Bergin, 2014; Wolters, 2004) to empower validity of the current study as well as to enable the researcher to gain

more information from the respondents. The items of engagement have been adapted and modified by minor wording changes to assess this construct related to undergraduate classroom experiences in the university context.

To measure behavioural engagement subscale, we used ten items that tapped students' efforts and participation in their undertaking learning activities. To assess the emotional subscale of engagement, we used ten items that denote students' affection and interest in their undertaking activities in the classroom. Finally, the cognitive element of engagement was measured by ten items that evaluate students' practices of meaningful strategies regarding knowledge and information processing in learning. The items were preceded by the stem "In my class…", and the students were asked to indicate their perceptions on their engagement levels through a 6-point Likert scale ranged from 1 (strongly disagree) to 6 (strongly agree) whereby high score signifies high student engagement' levels. Furthermore, the original English items of student engagement have been translated into the Malay language using the back-translation with decentering technique (Brislin, 1980a, 1980b, 1986). All items employed in this study to measure the aspects of engagement (behavioural, emotional, and cognitive engagement) are listed in Table 3.7.

Table 3.7

Sources and Items of Student engagement

Items	Sources
Behavioural engagement	
1. I listen very carefully.	(Skinner et al., 2008)
2. I pay attention.	(Skinner et al., 2008)
3. I try my hardest to perform well.	(Burch et al., 2015)
4. I actively participate in class discussions.	(Wang et al., 2014)
5. I work as hard as I can to complete tasks.	(Skinner et al., 2008)
6. I get really involved in class activities.	(Wang et al., 2014)
7. I complete my tasks on time.	(Fredricks et al., 2004)
8. If I have trouble understanding a problem, I go over it again until I understand it.	(Lam et al., 2014)
9. I take an active role in extra-curricular activities.	(Lam et al., 2014)
10. I exert my full efforts toward tasks.	(Burch et al., 2015)
Emotional engagement	
11. I feel amused (smile, laugh, have fun).	(Wang et al., 2014)
12. I enjoy learning new things.	(Skinner et al., 2008)
13. I am very interested in learning.	(Lam et al., 2014)
14. I feel happy.	(Fredricks et al., 2004)
15. I like what I am learning.	(Lam et al., 2014)
16. I don't feel bored.	(Fredricks et al., 2004)
17. I feel excited in material I learn.	(Fredricks et al., 2004)
18. I feel positive about the tasks I complete.	(Burch et al., 2015)
19. I feel good.	(Skinner et al., 2008)
20. I feel curious about what we are learning.	(Reeve & Tseng, 2011)
Cognitive engagement	
21. I try to connect what I am learning with my own experiences.	(Wolters, 2004)
22. I try to make all the different ideas fit together and make sense when I study.	(Wolters, 2004)
23. I try to relate what I'm learning to what I already know.	(Wolters, 2004)
24. I make up my own examples to help me understand the important concepts I study.	(Wolters, 2004)
25. I figure out how the information might be useful in the real world.	(Lam et al., 2014)
26. If I don't understand what I read, I go back and read it over again.	(Fredricks et al., 2004)
27. I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics by just reading them over.	(Lam et al., 2014)
28. I try to combine different pieces of information from course material in new ways.	(Lam et al., 2014)
29. I think deeply when I take quizzes.	(Wang et al., 2014)
30. If I'm not sure about things, I check my books or use other materials like charts.	(Wang et al., 2014)

3.5 Questionnaire Design

As mentioned above, the items in the current instruments were adapted and appropriately modified for the better comprehension of the participants' perceptions within the Malaysian context; specifically, in the higher education environment. In addition to the introduction part, the questionnaire contained three sections; section A) included items about respondents' demographic information (6 items); section B) included items about basic psychological needs (autonomy, competence, relatedness, and novelty) and PB goals (37 items) ; and section C) included items about three aspects of student engagement namely: behavioural, emotional, and cognitive engagement (30 items). Each item representing the statements about the main variables was written in a bilingual format which is in both English and Malay languages. Items of the current research (67 items) were measured using a six-point Likert scale. This type of scale provides higher reliability and validity when the respondents are familiar with quantitative research procedure (see Chang, 1994). Further, it was claimed that this type of scale produces higher discrimination and tends to reduce the deviation compared to a scale that includes midpoint such as five-point Likert scale (Chomeya, 2010). A complete set of the questionnaire that was used in the current study is attached as Appendix B.

3.6 Procedures

3.6.1 Translation of instrument

Since the current study has been employed in the context of Malaysian higher education, it was necessary to translate the instruments of psychological variables into the Malay language to fit the Malaysian higher educational contexts. However, primary data which is sociological (demographic) variable, were collected via available standard instruments.

Therefore, creating a new standard, reliable and valid instrument is time-consuming, and the created instruments would not have adequate reliability and validity. Dixon (2004) stated that "quality of translation and validation of the translated instrument plays a significant role in ensuring that the results obtained in cross-cultural research are not due to errors in translation, but rather are due to real differences or similarities between cultures in the phenomena being measured" (p. 175).

The instruments were translated from English to Malay language using the back-translation technique with decentering (Brislin, 1986). Brislin's back-translation method, which also known as double translation, is the most used method by cross-cultural researchers (Cha, Kim, & Erlen, 2007). In back-translation, the first bilingual translates the source language version into the target language version. Then, independent, second bilingual translates back the translated version into the source language version. The researcher then has two sources of language forms to verify the quality of the translation; even he/she does not know the target language (Brislin, 1970, 1980a). If the back-translated version is similar to the source version, the translation procedure is adequate; whereas, if the discrepancies exist between the two versions, the decentering procedure takes place. Decentering refers to "a process by which one set of materials is not translated with as little change as possible into another language" (Brislin, 1980b, p. 433).

In this study, the English version of the original instrument was translated into the Malay language by an expert English-Malay translator from the applied linguistics department who had been briefed about the abstracts in this study. Then, the Malay version was edited and translated back into English by a second bilingual person independently. The

equivalence between the back-translated version and the source version has been reviewed regarding their semantic equivalence by an expert in the psychometrics and a professor in the field of educational psychology; particularly, motivation and engagement in education with fluency in both languages. Nasser (2005) stated that "When the source language does not have an equivalent term in the target language the translation will result in partiality and does not fulfil the construct domain of items. As a result, the psychometric properties or constructs could be lost in the translation to the target" (p. 233). However, in the current study, none of the discrepancies was found to exist between the source and the back-translated versions; thus, no decentering process was conducted.

3.6.2 Main study

Official letter requesting permission has been presented by the researcher to permit drawing a students' sample of local undergraduates in the chosen public universities (see Appendix C). Primary data are those which are collected first-hand by the researcher through observation and investigation on the variables of interest for the specific purpose of the study (Dawson, 2007; Kothari, 2004). Primary data is the collected data from the actual places whereby the events are occurring or taking place. Primary data can be obtained by several methods. One of the common methods used extensively by most of the researchers is administering questionnaires to participants of the study. Accordingly, this research relied on the self-administration survey method to gather information from the participants.

After getting the consent of respondents, research instruments were given to them, but they were informed that the participation is voluntary, anonymous, and will not affect any

of their courses' grades. Then, the researcher at that point requested respondents to fill out the survey. Participants have been given 30 minutes to respond to the instruments which are then gathered after completing the process. After collecting the participants' data and information, the researcher prepared the data to be analyzed in order to answer the research questions and draw meaningful conclusions.

3.7 Data Analysis Techniques

3.7.1 Descriptive Analysis

After completing data collection, both descriptive and inferential statistics have been employed for data analysis. Statistical Package for the Social Sciences (SPSS) version 25 was used for descriptive statistics analysis which helped in describing and identifying the profiles of the study' participants and data screening process. Descriptive analysis is a common technique to describe the general characteristics of the participants or to describe overall trends, tendencies, and variability of the data (Creswell, 2012; Gravetter & Forzano, 2012; Shaughnessy et al., 2012). Descriptive information has been calculated statistically in order to investigate how the data take place in terms of frequency, mean, and standard deviations. In the current study, descriptive analyses were conducted primarily to analyze the respondents' background, missing values, normality testing, analysis of outliers, and correlations among the substantive variables under study (i.e., basic psychological needs, PB goals, and student engagement), and common methods bias test. All descriptive data analyses were computed using version 25 of the Statistical Package for the Social Sciences (SPSS).

In addition, to evaluate the robustness of the scales used in the instruments, we employed the exploratory factor analysis (EFA) and the confirmatory factor analysis (CFA). These two analyses are the most useful statistical tools in determining the actual number of the variables that loaded under each construct. By doing so, we could establish the validity of the constructs involved in the instruments by evaluating the fitness of our measurement models (Byrne, 2016). The measurement model defines the relations between the latent variables and their observed measures (Byrne, 2010). In assessing the measurement model through the confirmatory factor analysis (CFA), the researcher examined the reliability of the items (individual indicator reliability), convergent validity, and discriminant validity following the previous criterions established by various scholars (Bagozzi & Yi, 1988; Kline, 2011; Schumacker & Lomax, 2004). Additionally, the discriminant validity of the constructs was also measured through examining the overall measurement model using CFA.

3.7.2 Structural Equation Modeling Technique

To evaluate the relationships among the constructs and testing the hypotheses, latent modeling by structural equation modeling (SEM) approach was employed in the current study. SEM approach is extensively recommended amongst social science studies as a powerful statistical technique in order to test the theoretical model by a scientific method and understand the complicated relationship between the constructs being examined (Hair et al., 2014; Kline, 2011; Schumacker & Lomax, 2004). In SEM, the research models can be tested in two-steps process, through measurement model and structural model. The measurement model depicts the relationships between the latent constructs and their

observed measures (i.e., the CFA model), whereas the structural model depicts the relationships between the latent constructs themselves (Byrne, 2016).

There are two types of SEM: covariance-based SEM (CB-SEM) and partial least squire SEM (PLS-SEM; also called PLS path modeling). Hair, Ringle, and Sarstedt (2011, p. 144) stated that "where prior theory is strong and further testing and confirmation are the goals, CB-SEM is the more appropriate statistical methodology." CB-SEM has advantages over PLS-SEM in several situations in social science research. For example, CB-SEM works with much larger sample size as well as much smaller samples compared to PLS; further, if the structural model is less complicated (few latent variables and indicators), CB-SEM approach is recommended by several scholars (Hair et al., 2014; Hair et al., 2011; Sarstedt, Hair, Ringle, Thiele, & Gudergan, 2016). Another issue is that the PLS-SEM approach does not have an adequate global goodness-of-fit criterion measure in testing and confirming the theory which does not allow to evaluate the overall model fit indices (Hair et al., 2014; Hair et al., 2011). Accordingly, given that the sample size is large (more than 200) and less complicated model, CB-SEM is the appropriate approach to test and confirm theory by drawing global goodness-of-fit criterions to test the overall model fit. Thus, the current study employed the CB-SEM approach, which can be obtained by AMOS software to test the hypothesized relationships. Specifically, IBM's AMOS 23 software was applied in order to analyze the data and presenting the obtained outcomes.

To test the postulated hypotheses in terms of relationships between the substantial constructs (unobserved latent variables) of the study, fit indices of the model were

computed through structural covariance method or structural equation modeling (SEM). Besides, the relationships hypothesized in the structural model have been assessed by testing the significance of path coefficients and the coefficient of determination (R^2 value) (Bagozzi & Yi, 1988; Hair et al., 2014; Kline, 2011; Schumacker & Lomax, 2004). More precisely, SEM was implemented to test the hypothesized model which examined the relationships between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement, being mediated by PB goals.

The evaluation process of the measurement models and the structural model focused on two aspects: 1) goodness of fit of the model as a whole; and, 2) goodness of fit of the individual parameter estimates. To measure goodness of fit for measurement models and structural model, Byrne (2016) and Kline (2011) recommended the following goodness-of-fit (GOF) indices: chi-square/degree of freedom (χ^2/df) (< 2 good; < 5 acceptable), the Comparative Fit Index (CFI) (> .95 great; >.90 good), Tucker–Lewis Index (TLI) (>.95 good; >.90 reasonable), the Standardized Root Mean Square Residual (SRMR) (< .08), and the root mean square error of approximation (RMSEA) (< .06 great; < .08 acceptable) with the 90% confidence interval, based on the values recommended by previous scholars in the field (Bagozzi & Yi, 1988; Byrne, 2010; Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004; Schumacker & Lomax, 2004; Tabachnick & Fidell, 2013). The goodness of fit related to individual parameters focused on both the appropriateness (no correlation > 1.00 and no negative variances) and statistical significance (p<.05, p<.01, and p<.001).

3.7.3 Rationale of Using Structural Equation Modeling (SEM)

Several aspects of SEM set it apart from the older generation methods of multivariate procedures such as the multiple regression analysis. SEM is able to estimate chains of direct and indirect relationships among variables simultaneously by introducing them into a structural model (Hair, Black, & Babin, 2010). Besides, Cohen et al. (2007) agreed that the use of multiple regression is not realistic or feasible because it has a limited capacity to find results for linear relationships between the constructs. In such cases, multiple regression may yield misleading results. Furthermore, traditional multivariate procedures (i.e., multiple regression) are incapable of either assessing or correcting for measurement error, while in SEM, the relationships are free of measurement error because the error has been estimated and removed (corrected for measurement error), leaving only common variance (Tabachnick & Fidell, 2013). Disattenuating observed correlations is one way to take measurement error into account. According to Kline (2011), a better way to do so is to use SEM where constructs are specified as latent variables, each measured by multiple indicators (observed variables). SEM is much more accurate at estimating correlations between factors or between indicators and factors than first-generation methods such as multiple regression. Indeed, this property of SEM provides a major motivation for its use over observed variable methods.

3.8 Pilot Study

It is important to assess the reliability and validity of the instruments prior to the full-scale study. Accordingly, before collecting the final study, a pilot study was conducted with a sample of undergraduate students resembling the target population of this study. The pilot study is a test in which the survey questions are distributed to the people who are readily

available or who volunteer to measure the way variables are drooped together or the range of ideas and opinions of the participants (Fowler, 2009). In the current study, the pilot study was mainly implemented in order to ensure the validity and reliability of the variables included in our survey. Furthermore, it was conducted to ensure the clarity of the instruments' items and layout, to determine the ambiguities and difficulties in the wording, to determine the misunderstood and non-completed items, to obtain feedback on the validity of the instrument's items, and ability to use the Likert type scale. There were 68 items included in the pilot test's questionnaire to measure the reliability and validity of the variables. The data of this pilot were analyzed using SPSS version 25.

3.8.1 Sample for Pilot Study

The demographic features of the respondents in the pilot study were similar to those of the target population that are planned to be surveyed in the main study. A total of 200 questionnaires were distributed for the pilot study among the undergraduate students in the university A. A total of 180 students (90%) returned their surveys, and the final data analysed in the pilot study contained 171 sets of valid questionnaires. The respondents were 39 males (22.8%) and 132 females (77.2%) aged from 19 to 25, and most of them were in their final year (seventh semester by 43.9%). Students were Malay (69%), Chinese (14%), Indian (10%), and 7% represent other ethnics.

3.8.2 Pilot Data Collection Procedure

Since instruments of the current study were adapted from previous studies, it was essential for testing the adequacy of psychometric properties of the constructed instruments through pre-test and pilot test. Once the final instrument for the pilot test has been established, it

was pre-tested with ten undergraduate students in the university A to detect any ambiguity or difficulty regarding the items. Further, it was tested for face and content validity, sensitivity, and relevance of the instruments within Malaysian higher education contexts through two educational psychology lecturers who are experts in psychometric properties of the instruments; particularly, in motivation and learning. They also reviewed and gave some useful feedback, which was considered in the refinement of items, especially some wording changes to fit Malaysian undergraduates' contexts. The final pilot study was conducted in September 2018, and the process lasted for two weeks. The questionnaire was personally administered by the researcher in undergraduates' classrooms after the instruction was given. The participants were asked to give their perceptions in reference to various courses that they are pursuing during their undergraduate studies and not in reference to the specified classes where the survey was conducted. The students were given approximately 20 minutes to fill up the survey.

3.8.3 Results of Pilot Study

The results concerning descriptive statistics and reliability for all the instruments involved in our pilot study were computed through SPSS version 25. The results of the descriptive statistics such as the number of items, means' values, standard deviations, alphas' values, skewness, and kurtosis values are exhibited in Table 3.8. Cronbach's Alpha was employed to demonstrate the internal consistency reliability of each scale. The values of Cronbach alpha close to one (1) denote a high degree of internal consistency of the items; and the values above .70 denote an adequate reliability coefficient (Kline, 2011). Based on the results of the present pilot study, alpha values ranging from .87 to .94, which signifies a high degree of internal consistency. Skewness and kurtosis values used to test the normal

distribution of data. Leech, Barrett, and Morgan (2013) suggested a simpler way to check normal data distribution; if the values for skewness and kurtosis are within the range of -1.00 and +1.00. From the reported results in Table 3.8, the skewness values are ranging from the lowest value of -.90 to the highest value of -.09; whereas, the kurtosis values are ranging from the lowest value of -.73 to the highest value of .55 for all constructs. Since all values are within -1 and +1 range; this signifies normal distribution of the pilot data.

Table 3.8

Descriptive Statistics and Reliability Analysis of Constructs in the Pilot Study

Variables	Items	M	SD	Alpha	Skewness	Kurtosis
Autonomy	7	4.11	.90	.88	-.61	.35
Competence	7	4.43	.77	.88	-.22	-.73
Relatedness	6	4.41	.95	.94	-.28	-.40
Novelty	11	4.48	.77	.93	-.09	-.58
Personal best (PB) goals	6	4.88	.73	.87	-.60	-.02
Behavioural engagement	10	4.78	.65	.91	-.90	.55
Emotional engagement	10	4.66	.76	.92	-.57	-.10
Cognitive engagement	11	4.67	.70	.91	-.58	-.09

N=171

3.8.4 Exploratory factor analysis

All measurement items of the scales in the pilot study were subjected to exploratory factor analysis because these items were translated into Malay language and built from different existing scales in the previous literature. According to Hambleton, Merenda, and Spielberger (2004), the psychometric properties of the translated instruments will be more adequately when exploratory factor analysis is employed. Furthermore, it was argued that the translated items in the instrument result in more confidence in terms of reliability and

validity when these items are subjected to a complete psychometric assessment such as exploratory factor analysis (Arafat, Chowdhury, Qusar, & Hafez, 2016).

The main goal of this analysis is to ensure that the extracted items are loaded under the constructs that underlie them. In general, this analysis able to spot problematic variables which prepare the constructs to be used for cleaner structural equation modeling. Since our goal of factor analysis is to produce a theoretical solution uncontaminated by unique and error variability and to understand the intercorrelations among a set of variables under their underlying latent factor; rather than data reduction, principal axis factoring (PAF) statistical extraction technique was used in our factor analysis of all scales. Principal axis factor (PAF) is considered as the superior factor extraction method because other many default extraction methods, such as Principal Components Analysis (PCA), do not partition unique variance from shared variance, so the factor loadings are generally inflated (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Principal axis factor estimates the level of shared variance (communalities) for the items which make the values of factor loadings more accurate. This method is also highly recommended when the data violate the assumption of multivariate normality (Osborne, Costello, & Kellow, 2008). Further, with an expectation that the factors of our study could be correlated, we employed the oblique rotation procedure, as well as pattern matrix was computed in order to present the coefficients that reflect the unique contribution of each variable to each factor (Reio & Shuck, 2015; Tabachnick & Fidell, 2013).

A principal axis factoring extraction method and oblique rotation using Promax method were employed on the 31 items of basic psychological needs. The factor extraction

analysis of these items was forced to provide a four factors solution based on a prior theory (self-determination theory). The factor loadings of all items with absolute values of .40 and above (Reio & Shuck, 2015) were accepted as adequate items to constitute a meaningful and interpretable factor and contribute significantly towards explaining each of the basic psychological needs constructs. As shown in Table 3.9, all items loaded on their designated factors with accepted loadings values ranging from .45 to .90, which provides an initial psychometric property and validity for subscales of the basic psychological needs. The Kaiser-Mayer-Olkin (KMO) measure revealed a value of .90, which is above the threshold value of .70 (Leech, Barrett, & Morgan, 2005). Bartlett's test of sphericity value was significant at $p<.05$ with 465 degrees of freedom, providing that the correlation matrix was not an identity matrix. Also, the four extracted factors accounted for 60.86% of the total variance. Therefore, it was considered appropriate to keep all items in the subscales of basic needs for the final study.

Table 3.9

Exploratory Factor Analysis for Basic Psychological Needs: Factor Loadings based on Principal Axis Factoring and Promax Rotation Method

	Factors Loadings			
Items	Factor 1 Novelty	Factor 2 Relatedness	Factor 3 Autonomy	Factor 4 Competence
N5	.88			
N9	.87			
N8	.83			
N7	.82			
N4	.78			
N3	.74			
N11	.72			
N6	.71			

Table 3.9 continued

N2	.69			
N10	.63			
N1	.55			
R5		.90		
R3		.89		
R4		.86		
R6		.86		
R2		.76		
R1		.72		
A3			.84	
A2			.74	
A7			.73	
A1			.66	
A4			.64	
A6			.58	
A5			.45	
C4				.87
C3				.80
C2				.69
C6				.59
C5				.56
C7				.51
C1				.50
Total.Eigenvalues	9.25	6.62	1.89	1.10
Percentage of variance explained	29.85	21.36	6.10	3.55
KMO	.90			
Bartlett's Test of Sphericity	*3924.03			
df.	465			
Total.variance explained	60.86			

*p<.05; N=171
Only loadings >.40 were displayed
A= Autonomy; C=Competence; R=Relatedness; N= Novelty

Table 3.10 shows the one-factor solution for PB goals scale (PBS) using the principal axis factoring method of extraction and Promax statistical techniques. Based on the table, all six items loaded strongly on their targeted factor with loadings ranged from the minimum value of .65 to the maximum value of .81; as well as exceeded the recommended cut-off value of .40. This analysis also showed that Kaiser-Mayer-Olkin (KMO) revealed a value of .82 with a degree of freedom of 15, and Bartlett's test of sphericity with a value of 571.48 was significant at $p<.05$; which provide evidence of sampling adequacy and correlation matrix is not an identity matrix. Besides, the percentage of the total variance of the factor explained by the subjected items is 55.64%. Hence, the whole items of this scale are valid and retained for the final analysis.

Table 3.10
Exploratory Factor Analysis for Personal Best Scale (PBS): Factor Loadings based on Principal Axis Factoring and Promax Rotation Method

	Factor 1
Items	PB goals
PBG2	.81
PBG3	.77
PBG4	.74
PBG1	.74
PBG5	.73
PBG6	.65
Total Eigenvalues	3.33
Percentage of variance explained	55.64
KMO	.82
Bartlett's Test of Sphericity	*571.48
Df	15
Total variance explained	55.64

*p<.05; N=171
Only loadings >.40 were displayed

Following factor analyses by the implementation of principal axis factoring of extraction and oblique rotation methods, Table 3.11 presents the factor loadings of student engagement items (30 items). The factor extraction analysis of these items was forced to provide a three factors solution for behavioral, emotional, and cognitive engagement. As the above analyses, the factor loadings of all items with absolute values above of .40 were accepted as valid items (Reio & Shuck, 2015). However, there was one item (CE11) which supposed to measure cognitive engagement resulted in coefficient less than .40 in its original construct and cross-loaded on emotional engagement with a value of .48; was excluded in the main study after considering that the omit of this item will not influence the content validity of the construct of cognitive engagement. According to the table, factor loadings are ranging from the lowest value of .55 to the highest value of .98. Besides, the subscales revealed a value of .96 for KMO with 435 degrees of freedom and significant Bartlett's test of sphericity at $p<.05$, indicating that the correlation matrix is not an identity matrix. Also, the three factors reported a percentage of the total variance of 59.46%. Further, a total number of 30 items were valid to measure the three aspects of student engagement after factor analysis was employed; whereby ten items measured each aspect (see Table 3.11).

Table 3.11

Exploratory Factor Analysis for Student Engagement Dimensions: Factor Loadings based on Principal Axis Factoring and Promax Rotation Method

	Factors Loadings		
Items	Factor 1 Behavioural	Factor 2 Emotional	Factor 3 Cognitive
BE5	.92		
BE1	.90		
BE3	.79		
BE9	.73		
BE2	.72		
BE4	.68		
BE7	.67		
BE10	.66		
BE6	.66		
BE8	.62		
EE4		.98	
EE2		.86	
EE10		.82	
EE1		.76	
EE8		.69	
EE3		.68	
EE5		.68	
EE9		.63	
EE7		.56	
EE6		.55	
CE2			.84
CE3			.77
CE9			.75
CE6			.72

Table 3.11 continued

CE1			.70
CE7			.69
CE10			.66
CE4			.64
CE5			.64
CE8			.62
Total Eigenvalues	15.19	2.04	1.76
Percentage of variance explained	49.32	5.60	4.54
KMO	.96		
Bartlett's Test of Sphericity	*16685.87		
df	435		
Total variance explained	59.46		

*p<.05; N=171
Only loadings >.40 were displayed
BE= Behavioral Engagement; EE= Emotional Engagement; CE= Cognitive Engagement

3.8 Chapter summary

In this chapter, the research methodology has been described in overall by giving a clear explanation of the quantitative research methods paradigm in terms of research design, population, sampling, research instruments, and procedures of data collection. Further, the chapter discussed precisely the techniques used in the data analysis phase with a justification of the choices that have been made. At the end, the chapter presented the findings concerning the instruments' validation that were obtained by the pilot study.

CHAPTER FOUR

FINDINGS

4.1 Introduction

In the current chapter, we presented the outcomes concerning the primary and main results of this research. The chapter presented the results of the main study, including data screening procedures, descriptive statistics, profiles of respondents, reliability, and exploratory factor analysis (EFA). The confirmatory factor analysis (CFA) was conducted to test the validity of the individual measurement models and the overall measurement model. Lastly, answering our study's main research questions and testing our postulated hypotheses through structural equation modeling (SEM) was the bulk of this chapter.

4.2 Main Study

4.2.1 Data Collection and Response Rate

The process of gathering data started in early October 2018 and lasted until the end of December 2018. As it is stated in the sample size section (see chapter three), there were 800 questionnaires printed out and distributed across three public universities in northern Malaysia: A, B, and C. At the end of the data collection, out of 800 questionnaires, 767 questionnaires were returned. The retrieved questionnaires were resulting in a very satisfactory response rate of 95.87%.

4.2.2 Data Preparation and Screening

After the field study has been called off, the first step was screening the obtained data to optimize the usage of data and consider all the issues that could influence the main analyses. Following Tabachnick and Fidell (2013) recommendations for ungrouped data,

a series of data screening process has been conducted in several steps: a check on the precision of data entry, observing missing values in the data; as well as, fulfil the multivariate analysis' assumptions such as testing normality, detecting univariate and multivariate outliers, and testing multicollinearity and singularity.

4.2.2.1 Accuracy of Data Input

The accuracy of data entry was conducted through frequency command in the SPSS software. All statistical values on the continuous variables (6-point Likert scale was used) were within the range and did not indicate any issues concerning the data entry procedure. Besides, there was no peculiar value or out of range values within the data for the other variables (demographic information) involved in the questionnaire.

4.2.2.2 Analysis of Missing Values

Missing data is a widespread problematic issue in all types of survey research because they usually embrace a large sample size. Missing values usually emerge when the data is lost, respondents skipped questions, or they refused to complete some sensitive items (Creswell, 2012). Many analytical techniques do not endure data with missing values and could be problematic (Leech et al., 2013). Although there are no clear set guidelines concerning what constitutes a large number of missing values in the data; Kline (2011) suggested that the percentage of missing values less than 5% on a single construct in a large sample of participants is not problematic in the statistical analysis. In this research, the descriptive statistics analysis in terms of frequency analyses using SPSS software was applied to discover the missing values. The results showed that there were no missing

values in any of the variables, either dependent or independent variables as well as in demographic information; therefore, data were treated as normal data.

4.2.2.3 Test of Normality

Normal distribution of the data is an important early step because it is an assumption of many statistics, and it is imperative to be measured and addressed before performing inferential analyses (Tabachnick & Fidell, 2013). Most of the statistical assessments need normally distributed variables, especially when working with covariance-based structural equation modeling "CB-SEM"; predominantly AMOS as the most common and well-known software tool to perform this kind of analysis (Hair et al., 2014). Table 4.1 presents the values of skewness and kurtosis, which considered as the two main components to check the normal distribution of the data. For skewness and kurtosis, if the z-value does not exceed the value of -/+2.58 the data is normally distributed. The z-score is calculated by way of dividing the statistics of skewness and kurtosis by their standard error. However, Leech et al. (2013) suggested a simpler way to check normality rather than use manual calculation; that is, the data is normally distributed if the values for skewness and kurtosis are within -1.00 and +1.00 range. According to the following table, skewness values are ranging from -.43 to -.10, and the kurtosis values are ranging from -.71 to -.34; thus, all measured variables in this research revealed a normal distribution of their data.

Table 4.1

Values of Skewness and Kurtosis for all Scales

Scale	No. of items	Skewness	Kurtosis
Autonomy	7	-.10	-.38
Competence	7	-.13	-.45
Relatedness	6	-.16	-.71
Novelty	11	-.32	-.40
PB goals	6	-.19	-.45
Behavioral engagement	10	-.29	-.38
Emotional engagement	10	-.43	-.36
Cognitive engagement	10	-.27	-.34

N=743

4.2.2.4 Univariate Outliers

Univariate outliers are the cases with extreme values that deviate from other observations on one variable which can have a deleterious influence on the outcome of the statistical analyses. According to Tabachnick and Fidell (2013), any case with standardized scores of the measured variable exceeding ±3.29 ($p<.001$) is considered as a potential outlier on that variable. In the present study, z scores values of the substantive variables were calculated. The results showed that z score values for all variables were within the range of +3.29 and -3.29, except 9 cases are disconnected from other cases. By this criterion, nine of the 767 cases are identified as univariate outliers; thus, those participants were deleted from our data set, leaving a total number of 758 as sample size.

4.2.2.5 Multivariate Outliers

Multivariate outliers are cases with an unusual or such a strange combination of values over multiple variables that can undesirably distort the statistical results (Byrne, 2016). Thus, it is imperative to examine data for such elements and offer a remedy if they exist

in our data set to perform ideal inferential statistics. A common approach to detect multivariate outliers is computing the squared Mahalanobis distance at p <.001 for each case in the data set (Byrne, 2010). Through regression command in SPSS, all cases with a Mahalanobis distance values that exceed the upper critical value of chi-square distribution with 8 degrees of freedom (following the number of variables), χ^2 (8, 0.001) = 26.12, are observed as multivariate outliers and should be omitted (Tabachnick & Fidell, 2013). Based on this criterion, out of 758, 15 cases reported values higher than 26.12. These cases were considered as multivariate outliers and were deleted; thus, leaving a final sample size of 743.

4.2.2.6 Test of Multicollinearity and Singularity

Multicollinearity (or collinearity) occurs when there are high intercorrelations among various predictor variables which can lead to statistical instability or/and inaccurate statistical results. The threshold values that suggest serious multicollinearity are <.1 for tolerance and >10 for the variance inflation factor (VIF) (Kline, 2011). Furthermore, singularity and multicollinearity occur when there high correlations among a set of independent variables (r =.90 and above) (Tabachnick & Fidell, 2013). As provided in IBM SPSS version 25, the collinearity diagnostic was conducted. Table 4.2 demonstrated that the tolerance lowest value is .42, and the highest VIF value is 2.37, which are in the recommended range.

Table 4.2

Tolerance and VIF Values of Independent Variables

Independent Variable	Tolerance	VIF
Autonomy	.50	2.00
Competence	.46	2.14
Relatedness	.48	2.06
Novelty	.42	2.37
PB Goals	.52	1.90

N=743

In addition, the correlations between all the predictors ranged between the lowest r = .45, ($p < .01$) to the highest r = .65, ($p < .01$) as shown in Table 4.3. There was no value exceeding r =.90; therefore, there is no indication of the presence of multicollinearity and singularity among variables of the current study.

Table 4.3

Correlation Matrix

	Autonomy	Competence	Relatedness	Novelty	PB goals	BE	EE	CE
Autonomy	1.00							
Competence	.65**	1.00						
Relatedness	.57**	.55**	1.00					
Novelty	.56**	.60**	.64**	1.00				
PB goals	.45**	.54**	.56**	.64**	1.00			
Behavioural	.56**	.61**	.61**	.59**	.60**	1.00		
Emotional	.55**	.58**	.65**	.65**	.60**	.70**	1.00	
Cognitive	.51**	.56**	.61**	.63**	.57**	.69**	.72**	1.00

Note: N=743; **. Correlation is significant at the 0.01 level (2-tailed).
BE= behavioral engagement; EE = emotional engagement; CE = cognitive engagement

4.2.2.7 Common Method Variance

In this research, data was collected at one time and from single source (undergraduate students) for both independent and dependent constructs. Therefore, it is highly potential

for common method bias to occur. To address the issues concerning common methods bias in the data, Podsakoff, MacKenzie, Lee, and Podsakoff (2003) claimed that testing the correlations among the variables and Harman's single factor are among the most common remedial statistics. It was argued that a very high inter-construct correlations of .90 or above cause common method bias in the data (Bagozzi, Yi, & Phillips, 1991). The correlation matrix in Table 4.3 showed that maximum correlation is between cognitive and emotional engagement, which is .72.

In addition to that, Harman's single factor was conducted by SPSS 25, by loading all indicators as single factor. All the measurement items were subjected to no-rotation principle component factor analysis. In this case, if one of the factors distinctively explained the majority of the variance, the common method effects are indicated and become problematic to the data. However, there is also no evidence of common method bias as all the factors extracted showed the values of eigenvalues higher than 1.0. In the same way, the first factor explained a value of 42.24 percent of the total variance which; is lower than 50 percent.

4.2.3 Profile of Respondents

A total number of 800 questionnaires were printed out and distributed to the participants at the chosen universities. As stated earlier in this chapter (see data collection and response rate section), the response rate was 95.87% (767 participants). After data screening procedure, followed the suggested thresholds of z-score > 3.29 and Mahalanobis distance >26.12 as the criterion to detect univariate and multivariate outliers, respectively (Tabachnick & Fidell, 2013), a total of 24 (9 univariate and 15 multivariate) outliers were

eliminated from the data set. This leaves the final data with a set of 743 respondents to further the main analyses and answer the research questions. A summary of the descriptive statistics for all demographic variables is provided in Table 4.4.

The following table showed that approximately three-quarter of the participants were female which represents 71.2% (n = 529) and 28.8% (n = 214) were male students, which signifies that the sample of this study is female-dominated. The largest percentage (58.4%, n = 434) of the respondents reported their ethnicity as Malay, 29.2% (n = 217) identified as Chinese, 9% (n = 67) responded as Indian, and 3.4% (n = 25) indicated that they were from another ethnicity. In terms of age (Mean = 21.91, SD = 2.82), the participants were categorized under three groups of the age range. Majority of respondents were from the age group of (19-24 years old) which represents 96.1% (n = 714), followed by the age group of (25-39 years old) which represents 3.2% (n = 24), and 0.7% (n = 5) were at least 40 years old. The largest percentage of students (40.6%, n = 302) were enrolled in arts and social science programs, followed by information technology and communication (29.5%, n = 219), science (14.1%, n = 105), technical (13.5%, n = 100), and education program (2.3%, n = 17). Moreover, in terms of college status, the highest percentage of students was from second year (37.3%, n = 277), followed by fourth-year (last year, 35.5%, n = 264), first-year (22%, n = 163), and third-year (5.2%, n = 39). As stated earlier in the methodology section, A, B, and C are the three northern public universities in which data was drawn from. The distribution of participants from these universities is 288, 275, and 180, representing 38.8%, 37%, and 24.2 %, respectively.

Table 4.4
Summary of Participant's Profile

Variables	Category	Frequency	Percentage
Gender	Male	214	28.8
	Female	529	71.2
	Total	743	100
Race	Malay	434	58.4
	Chinese	217	29.2
	Indian	67	9.0
	Others	25	3.4
	Total	743	100
Age	19-24	714	96.1
	25-39	24	3.2
	≥40	5	0.7
	Total	743	100
Program of study	Information Technology & Communication	219	29.5
	Education	17	2.3
	Arts & Social Science	302	40.6
	Science	105	14.1
	Technical	100	13.5
	Total	743	100
College status	First year	163	22
	Second year	277	37.3
	Third year	39	5.2
	Fourth year	264	35.5
	Total	743	100
University	A	288	38.8
	B	275	37
	C	180	24.2
	Total	743	100

N=743

4.2.4 Reliability and Descriptive Analysis for Scales

To investigate the consistency of responses, the internal consistency of each variable in the instrument was tested by observing Cronbach's alpha values. Descriptive statistics, such as the number of items, Cronbach's alpha values, means, and standards deviation (SD) concerning each scale are shown in Table 4.5. As exhibited in the table, all the measurement variables had high Cronbach's alpha values which ranged from .89 to .94. This indicates a good internal consistency for each scale used in the main study.

Table 4.5
Summary Statistics for Scales

Scale	No. of items	Alpha	Mean	SD
Autonomy	7	.89	4.35	.79
Competence	7	.91	4.52	.70
Relatedness	6	.92	4.61	.75
Novelty	11	.94	4.68	.70
PB Goals	6	.92	4.91	.67
Behavioural engagement	10	.93	4.72	.69
Emotional engagement	10	.93	4.78	.72
Cognitive engagement	10	.92	4.72	.64

N=743

4.2.5 Exploratory Factor Analysis

In order to test the factor analysis assumption regarding the variables measured in this study, the exploratory factor analysis was conducted. By doing this analysis, items that have a value of factor loading below .40 or cross-loaded on other factors are omitted from the analysis (Reio & Shuck, 2015). A single process of factor analysis was conducted by entering all items of our substantive variables included in the survey of the main study. The items were forced to load on eight factors based on the original scales and prior theoretical framework. Following the same process as such in the pilot study, principal

axis factoring of extraction and oblique rotation methods were used for all items (67 items).

Table 4.6

Exploratory Factor Analysis for all Scales: Factor Loadings based on Principal Axis Factoring and Promax Rotation Method

	Factor Loadings							
Items	Novelty Factor 1	Behavioural Factor 2	Cognitive Factor 3	Emotional Factor 4	Autonomy Factor 5	PB goals Factor 6	Competence Factor 7	Relatedness Factor 8
N9	.84							
N5	.83							
N8	.82							
N4	.76							
N7	.74							
N2	.74							
N10	.71							
N1	.70							
N3	.69							
N6	.62							
N11	.60							
BE5		.91						
BE1		.90						
BE3		.79						
BE2		.73						
BE9		.70						
BE4		.69						
BE6		.66						
BE7		.64						
BE10		.63						

Table 4.6 continued

BE8	.60				
CE2		.83			
CE3		.80			
CE9		.74			
CE1		.69			
CE10		.68			
CE6		.67			
CE8		.66			
CE7		.65			
CE4		.62			
CE5		.61			
EE4			.98		
EE10			.83		
EE2			.83		
EE1			.73		
EE3			.68		
EE5			.67		
EE8			.65		
EE9			.61		
EE6			.57		
EE7			.54		
A3				.83	
A1				.79	
A6				.78	
A5				.71	
A4				.70	
A2				.67	
A7				.66	
PBG4					.91
PBG5					.83

Table 4.6 continued

PBG3						.83		
PBG1						.82		
PBG6						.68		
PBG2						.65		
C6							.87	
C5							.82	
C3							.81	
C2							.70	
C1							.65	
C4							.62	
C7							.56	
R4								.93
R1								.85
R3								.73
R5								.70
R6								.70
R2								.61
Total Eigenvalues	28.49	2.74	2.56	1.92	1.56	1.42	1.26	1.11
Percentage of variance explained	42.52	4.09	3.82	2.87	2.32	2.13	1.88	1.66
KMO	.97							
Bartlett's Test of Sphericity	*39321.47							
df	2211							
Total variance explained	61.33							

*p<.05; N=743
Loadings less than .40 were suppressed

Table 4.6 presents a clear eight-factor solution for the constructs used in the present study with items loading greater than .40 on their target factors and none of the items cross-loaded to other factors. Thus, all items were loaded on their expected factor as per the original instruments. Principal axis factoring extraction method of extraction was applied to extract factors. Since items of the instrument could be correlated, the oblique rotation using Promax technique was utilized; as well as, the pattern matrix was computed in factor analysis procedure in order to demonstrate coefficients that reflect the unique contribution of each variable to each factor (Reio & Shuck, 2015; Tabachnick & Fidell, 2013). As exhibited in the table above, all eight factors explained 61.33 % of the total variance, and each factor reported eigenvalues above the value of 1. KMO value was .97 which is above the recommended value of .7 (Leech et al., 2005). Bartlett's test of sphericity was significant at $p < .05$ with 2211 degrees of freedom, assuring that the correlation matrix is not an identity matrix. Therefore, the results of the exploratory factor analysis provided initial evidence regarding the validation of measurements involved in the current research.

4.3 Assessment of Measurement Models

In the structural equation modeling (SEM) methods, two main steps are imperative to be conducted during the assessment of any model (Byrne, 2010). Measurement model through confirmatory factor analysis (CFA) which depicts the structural correlations between scores on the measuring instruments (observed indicator variables) and their underlying factors that are designed to measure (unobserved latent variables); and, the structural model which depicts the relationship between the latent unobserved constructs themselves (Kline, 2011). Since the data set showed a normal distribution, we employed

the maximum likelihood estimation procedure. Besides, the covariances matrix were analysed for both CFA and structural model.

Several assumptions are necessary to be considered while conducting analyses using SEM. It is assumed that the variables are unstandardized, and another critical assumption is the absence of missing data because SEM is susceptible to the effects of missing data. Furthermore, the statistical assumptions include the independence of the scores, multivariate normality of the endogenous (dependent) variables, independence of the exogenous variables and error terms, and the exogenous (independent) variables must be measured without error (Byrne, 2016; Tabachnick & Fidell, 2013). Perhaps the specification of the model is the most critical assumption. Accordingly, we specified each single measurement model in the current study based on the general guidelines (Byrne, 2016; Kline, 2011) for specifications of a standard confirmatory factor analysis as follow: 1) each indicator was measured by continuous scale (6-point Likert scale was employed in the current study) and represented as having a single non-zero loadings on the factor which the indicator is supposed to measure as well as having an error term; 2) the measurement errors are independent of each other and the factors; and, 3) all associations between the measured factors are unanalysed. Also, among the indicators that subjected to measure the same factor, one path of loadings is constrained to a fixed value of 1.00 to establish model specification assumptions. Once the measurement models are well-established and well-identified, these models were examined for the goodness of fit indices via a maximum likelihood approach. The maximum likelihood method is considered as a full-information method when all statistical assumptions are met, and the model is well specified, especially with a large sample size (Byrne, 2016; Kline, 2011).

In the SEM approach, the most basic fit index is a chi-square statistic. The chi-square statistic tests the null hypothesis that the model is correct; thus, the chi-square test is based on a central distribution that has only one parameter (i.e., the degrees of freedom) (Byrne, 2016; Kline, 2011). The higher the value of the chi-square statistic relative to degrees of freedom signifies that model needs more refinement in order to fit the data better. It is important to note that chi-square statistics are sensitive to large sample sizes (generally above 200), which in turn makes its value larger (Kline, 2011). To correct this issue, some researchers (Kline, 2011) have used the normed chi-square (NC) which divides the value of chi-square by the degrees of freedom (χ^2/df) in attempt to make model chi-square less dependent on sample size. Hair et al. (2010) suggested that the value should not exceed 3 to indicate a reasonable fit. According to Tabachnick and Fidell (2013), the value of two or less reflects good fit; while others allow values between 1 and 5 to consider an acceptable model fit (e.g., Schumacker & Lomax, 2004). Further, Paswan (2009) stated that the value of 2 or below is preferred, but between 2 and 5 is considered acceptable.

In addition, to test goodness fit of the measurement models, we checked out several other fit indices as recommended by Byrne (2016) and Kline (2011) such as the Comparative Fit Index (CFI; Bentler, 1990) (> .95 great; >.90 good), Tucker-Lewis Index (TIL; Tucker & Lewis, 1973) (>.95 good; >.90 reasonable), the Standardized Root Mean Square Residual (SRMR; Hu & Bentler, 1999) (< .08), and the root mean square error of approximation (RMSEA; Steiger, 1990) (< .06 great; < .08 good) with the 90% of confidence interval (CI), as recommended by previous scholars in the field (Bagozzi & Yi, 1988; Byrne, 2016; Hu & Bentler, 1999; Kline, 2011; Marsh et al., 2004; Schumacker & Lomax, 2004; Tabachnick & Fidell, 2013). Furthermore, we consider the individual

parameters of the model by focusing on both the appropriateness (no correlation > 1.00 and no negative variances) and statistical significance of parameters estimates whereby probability level is .05 and the critical ratio (C.R) needs to be > 1.96 (Byrne, 2016). In the following, we reported the findings of the confirmatory factor analysis of each factor in the current study.

4.3.1 Measurement Model 1: Basic Psychological Needs

To test the confirmatory factor analysis of the basic psychological needs, we postulated a measurement model that contained four latent factors (autonomy, competence, relatedness, and novelty). This model was composed of four latent factors and 31 items (7 autonomy, 7 for competence, 6 for relatedness, and 11 for novelty). The postulated measurement model of the basic psychological needs specified that the perceptions of students regarding basic psychological needs measure were explained by four associated constructs (latent factors). All indicators were specified to have nonzero loadings on their underlying latent factor and zero loadings on other latent factors, as well as error terms were specified to be uncorrelated.

The results of the first measurement model, CFA for the basic psychological needs subscales are displayed in Figure 4.1. The results revealed that the model had an acceptable fit to the data based on the standards for this study: χ^2/df ratio = 3.94 (χ^2 = 1689.71, df = 428), CFI = .92, TLI = .91, RMSEA = .063 (.060 - .066), and SRMR = .033. The factor loadings for autonomy ranged from .65 to .81, the factor loadings for competence ranged from .63 to .87, the factor loadings for relatedness ranged from .77 to .86, and the factor loadings for novelty ranged from 73 to .82. All the factor loadings are

considered good to excellent (Tabachnick & Fidell, 2013), and all items significantly loaded on their underlying latent constructs at p<.001; hence convergent validity was confirmed and fulfilled for this measurement model. Besides, the correlations between the subscales (latent constructs) of basic psychological needs are in the range between the lowest value of r = 0.60 (between competence and relatedness) and the highest value of r = 0.71 (between autonomy and competence). The results displayed in Figure 4.1 showed that the values of the correlations between the measured dimensions of the basic needs are not excessively high (less than the absolute value of 0.90); which denote the established discriminant validity as well as the variables are distinct constructs (Kline, 2011).

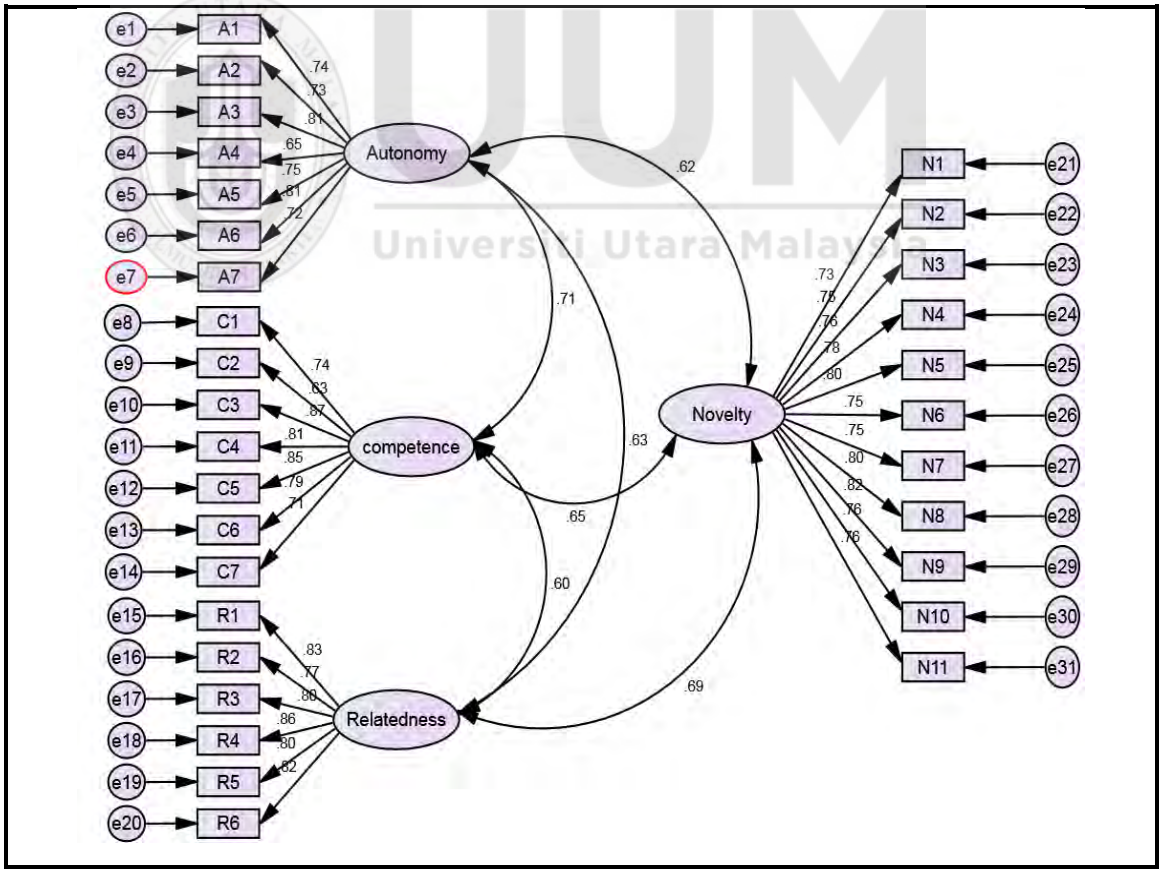

Figure 4.1. Measurement model 1: Basic Psychological Needs

4.3.2 Measurement Model 2: Personal Best (PB) Goals

Concerning PB goals, we postulated a measurement model containing a single latent construct and six indicators (items); based on prior theory and past empirical research (Martin, 2006, 2011). For model specification, all items were postulated to have nonzero loadings on their targeted latent factor, and one of the loadings paths was fixed to the value of 1.00. Once the model was specified and identified, fit indices and all parameters were computed. Several fit indices were observed as follow: chi-square/degree of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), standardized root mean residual (SRMR), and the root mean square error of approximation (RMSEA). The initial model revealed the following fit indices: χ^2 /df ratio = 11.03 (χ^2 = 99.31, df = 9) which was above the suggested criterion of 5.0, the values for CFI and TLI were .97 and .95 respectively; RMSEA = .116 (.096 - .137) was slightly above the threshold value of .08, and SRMR = .015.

These results indicated for further refinement of the model as the results were not consistent with the recommended values of the fit indices. The initial specified measurement model revealed that the goodness of fit indices of the initial χ^2/df and RMSEA were not within the recommended values. Thus, further refinement procedures were applied to refine the model to improve the fit of the model as recommended by several researchers (Byrne, 2016; Kline, 2011). According to Byrne (2016), the modification indices (MI) and the standardized residuals are the main two types of information that can help in detecting model misspecification. The initial model revealed that the standard residual values are all within the threshold (above 2.58 or below – 2.58) as recommended by Byrne (2016); thus, according to these values and accepted factor

loading, no item needs to be omitted. Therefore, in order to improve model fit modification indices were observed to make the path covariances between the error terms which will drop overall χ^2 value and subsequently χ^2 /df ratio.

The Modifications Indices (MI) showed that some items had high covariances: (PB1 and PB2), (PB1 and PB5), (PB2 and PB4), (PB4 and PB5). The mentioned high covariances reflected the redundancy due to the shared content among items which make the respondents' perceptions on one item influence their perceptions on other items. In other words, there are a content overlap among items as most of item ask if the respondents try to do better than their previous performance and compete themselves instead of competing with other students. Due to these high covariances among items, a second CFA was conducted to improve the overall fitness of the measurement model. In the second model, covariance paths were added between the mentioned items (error terms) to improve the model fit. The final measurement model is displayed in Figure 4.2. The model revealed a good fit to the data: χ^2 /df ratio = 2.57 (χ^2 = 12.86, df = 5), CFI = .99, TLI = .99, RMSEA = .046 (.015 - .529), and SRMR = .006. Besides, all factor loadings were significant and in the range between the lowest value of .75 to the highest value of .91; which denote that convergent validity is fulfilled.

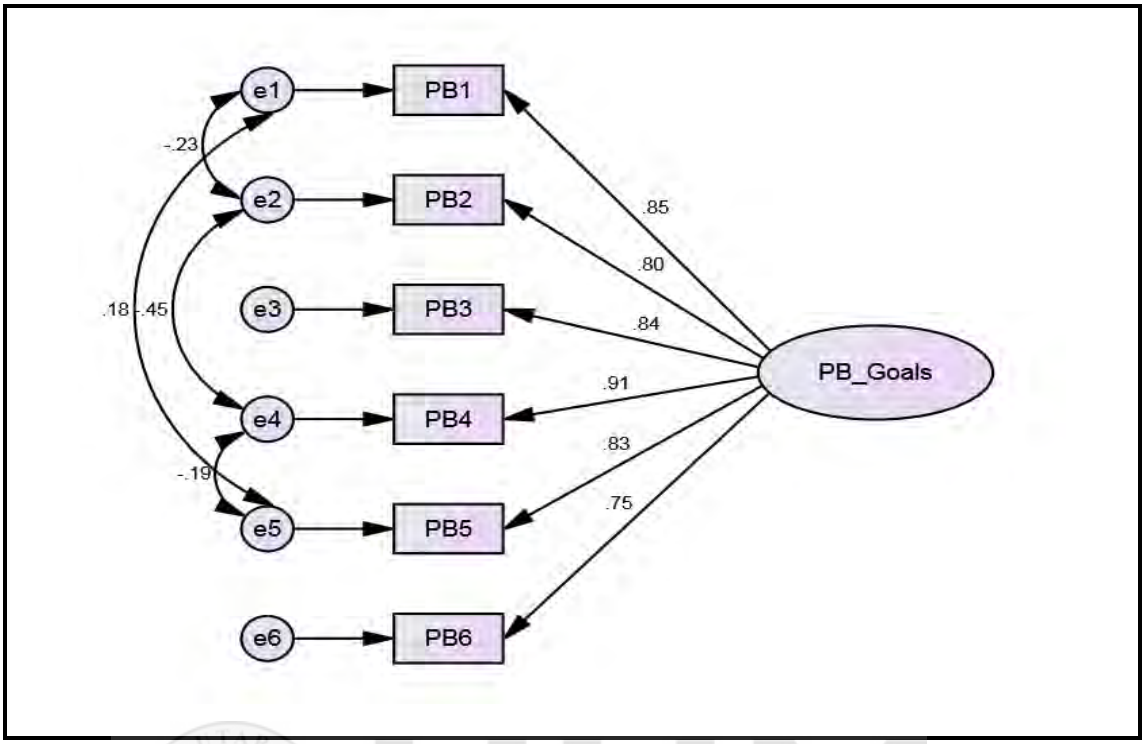

Figure 4.2. Measurement model 2: Personal Best Goals

4.3.3 Measurement Model 3: Student Engagement

The last individual model was for the multidimensional construct of students' engagement. This model was postulated as having second-order factors, containing three lower-order factors: 1) behavioural engagement; 2) emotional engagement, and 3) cognitive engagement (see Figure 4.3). In specifying a second-order measurement model, there was no double-headed arrow linking the three lower-order factors to one another (no covariances between lower-order factors). Besides, there were arrows from the higher-order factor of student engagement leading to the three lower-order factors which indicate that the higher-order factor is hypothesized to predict the lower-order factors of behavioural, emotional, and cognitive engagement. There was a total number of 30 items;

whereby each of the three-second order factors was postulated to have ten indicators (10 items).

All items were submitted to the confirmatory factor analysis (CFA) in order to test the second-order measurement model of student engagement. The fit indices (chi-square/degree of freedom: χ^2/df, Comparative Fit Index: CFI, Tucker-Lewis Index: TLI, standardized root mean residual: SRMR and the root mean square error of approximation: RMSEA) which were examined for the previous measurement models were computed for testing the fit indices of this model. The model had an acceptable fit to the data: χ^2 /df ratio = 4.49 (χ^2 = 1807.63, df = 402), CFI = .91, TLI = .90, RMSEA = .069 (.065 - .072), and SRMR = .030. The loadings were all significant and ranged from the lowest value of .69 to the highest value of .86. These values signified the establishment of convergent validity for student engagement dimensions (lower-order factors).

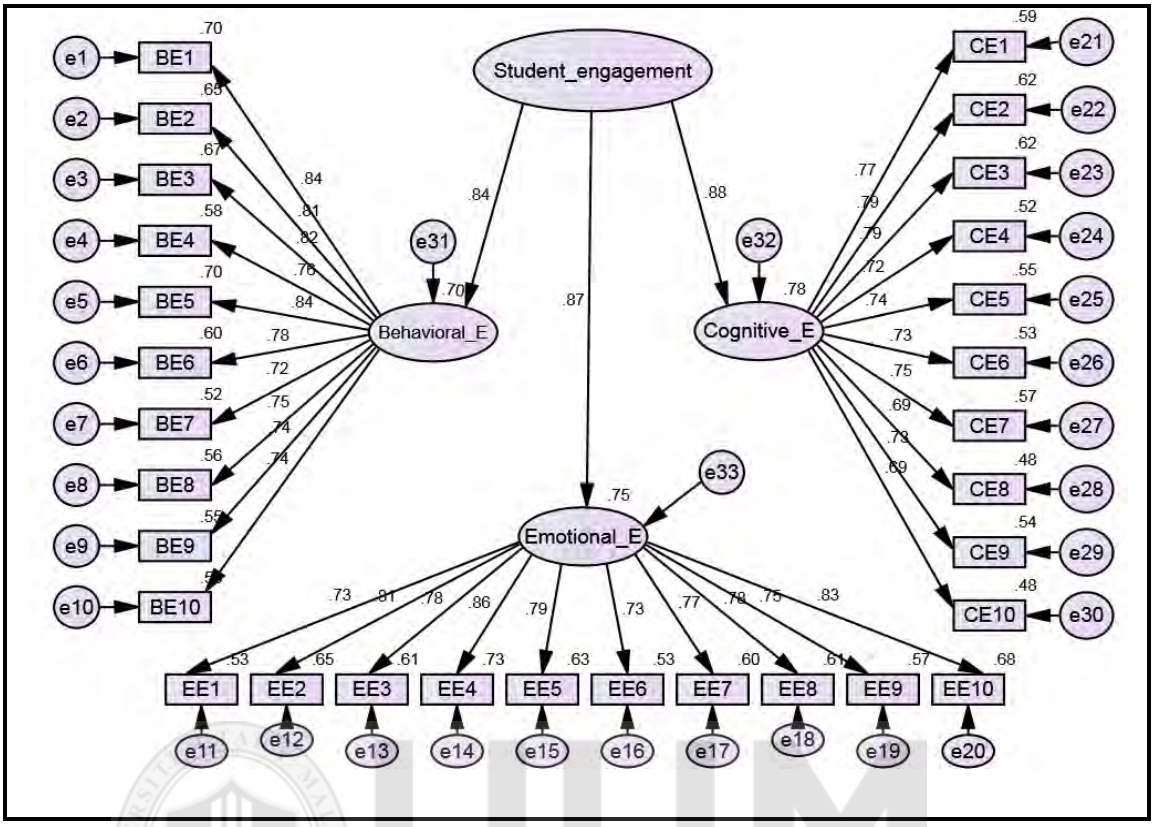

Figure 4.3. Measurement model 3: Second-Order of Student Engagement

4.3.4 Overall Measurement Model

Given the large total number of the implicated items in this study (67 items), it was appropriate to employ items parcelling rather than subject them individually in the analysis concerning the full measurement model; also, in later analysis of the structural equation modeling (SEM) which used to test the postulated hypotheses of the current study. To test model fit, using individual items will result in a larger covariance matrix which is problematic for the model to fit well in a comparison of using items parcelling (Williams & O'Boyle, 2008). The usage of items parcelling technique is a common method in SEM analyses because it results in small number of model parameters that will be estimated; thus, produce more optimal variable to sample size ratio as well as more

stability in the estimations of parameters (Bandalos, 2002; Byrne, 2016; Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013). However, despite these advantages, there are two main arguments against the implementation of items parcelling from several scholars (Bandalos, 2002; Hau & Marsh, 2004; Little, Cunningham, Shahar, & Widaman, 2002). The first critique concerns the issue of parameter estimation bias. The second issue focuses on scale dimensionality. According to them, when this latter assumption is not fulfilled the implementation of parcels can be doubtful rather than clarify the factor structure. Despite these critiques, it was argued that parcelling method reduces the problems concerning convergent validity; as such, using individual items are often unstable and need for more iterations to be converged under their underlying factor (Little et al., 2002). Moreover, Little et al. (2002) argued that the items parcelling are not appropriate in situations where the relationships between indicators and constructs are the primary consideration such as in the validation study of a new instrument. If the structural model is the primary target, items parceling are less problematic and maybe more appropriate. To conduct items parcelling, several scholars have recommended a random assignment approach to parcel the individual items (e.g., Little et al., 2002; Williams & O'Boyle, 2008). Hence, in this study, a total of 67 individual items that measured all substantive variables were randomly bundled (random assignment approach) into 24 parcels (see Table 4.7).

Table 4.7

Item Parcels for all Factors

Construct	**Parcel**	**Items**
Autonomy	AP1	Autonomy 1
		Autonomy 4
		Autonomy 7
	AP2	Autonomy 2
		Autonomy 5
	AP3	Autonomy 3
		Autonomy 6
Competence	CP1	Competence 1
		Competence 4
		Competence 7
	CP2	Competence 2
		Competence 5
	CP3	Competence 3
		Competence 6
Relatedness	RP1	Relatedness 1
		Relatedness 4
	RP2	Relatedness 2
		Relatedness 5
	RP3	Relatedness 3
		Relatedness 6
Novelty	NP1	Novelty 1
		Novelty 4
		Novelty 7
		Novelty 10

Table 4.7 continued

	NP2	Novelty 2
		Novelty 5
		Novelty 8
		Novelty 11
	NP3	Novelty 3
		Novelty 6
		Novelty 9
PB goals	PGP1	PB goals 1
		PB goals 4
	PGP2	PB goals 2
		PB goals 5
	PGP3	PB goals 3
		PB goals 6
Behavioural engagement	BEP1	Behavioural 1
		Behavioural 4
		Behavioural 7
		Behavioural 10
	BEP2	Behavioural 2
		Behavioural 5
		Behavioural 8
	BEP3	Behavioural 3
		Behavioural 6
		Behavioural 9
Emotional engagement	EEP1	Emotional 1
		Emotional 4
		Emotional 7
		Emotional 10
	EEP2	Emotional 2
		Emotional 5

Table 4.7 continued

		Emotional 8
	EEP3	Emotional 3 Emotional 6 Emotional 9
Cognitive engagement	CEP1	Cognitive 1 Cognitive 4 Cognitive 7 Cognitive 10
	CEP2	Cognitive 2 Cognitive 5 Cognitive 8
	CEP3	Cognitive 3 Cognitive 6 Cognitive 9

(Note: AP = autonomy parcel; CP = competence parcel; RP = relatedness parcel; NP = novelty parcel; PGP = PB goals parcel; BEP = behavioural engagement parcel; EEP = emotional engagement parcel; CEP = cognitive engagement parcel).

After item parcels were conducted, the overall measurement model was evaluated before proceeding to the analysis of the hypothesized structural model. The overall measurement model was postulated to involve all substantive variables (latent constructs) elaborated in the current research; whereby each latent construct was represented by three parcels as indicators (see Figure 4.4). The fit of the overall measurement model was assessed using the following goodness-of-fit indices: chi-square/degree of freedom (χ^2/df); Comparative Fit Index (CFI); Tucker-Lewis Index (TLI); standardized root mean residual (SRMR); and lastly, the root means square error of approximation (RMSEA). Besides, we computed the correlations among the substantive variables in order to investigate the discriminant validity within our overall model.

All the results of the confirmatory factor analysis concerning parameter estimates in the full measurement model have been exhibited in Figure 4.4. Confirmatory factor analysis of the overall measurement model had a very good fit to the data as follow: χ^2 /df ratio = 2.42 (χ^2 = 566.62, df = 234), CFI = .98, TLI = .97, RMSEA = .044 (.039 - .048) with 90% confidence interval, and SRMR = 0.017. All loadings values were significant and ranged from the lowest value of .81 to the highest value of .95, which indicate the establishment of convergent validity. Besides, given that none of the correlations between the latent factors exceeds the cut-off value of .90, the assumption of discriminant validity was confirmed. The highest correlation was between r = .78, between relatedness and student engagement.

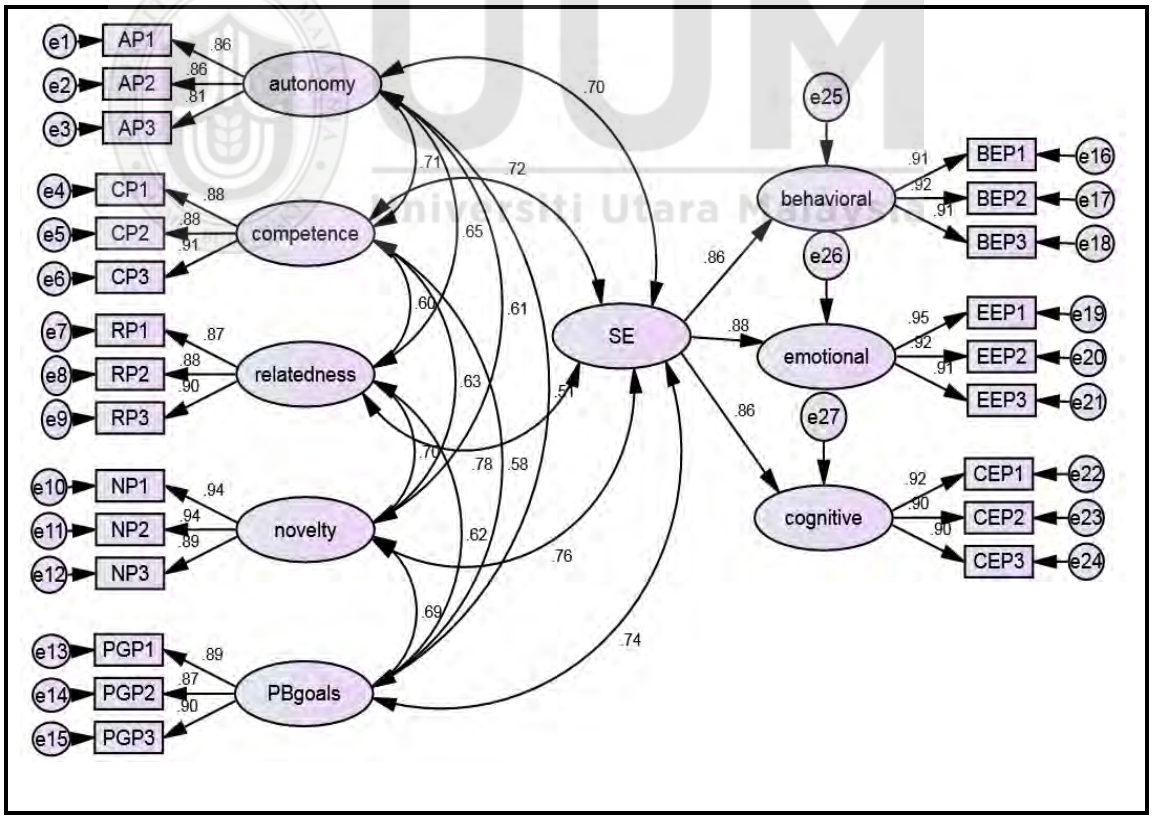

Figure 4.4. Overall measurement model

4.4 The Structural Equation Model

The final and the most critical analysis in this research is the assessment of the structural equation modeling (SEM) with latent variables to estimate the parameters, standard errors, and overall fit indices. After securing goodness of fit of the individual and overall measurement models via confirmatory factor analysis (CFA), it is rationale to test the structural model. This model postulated to test the hypotheses concerning the direct and indirect relationships between our four basic psychological needs, PB goals, and students' engagement. This model specified direct and indirect paths from basic psychological needs for autonomy, competence, relatedness, and novelty to student engagement; via the mediation of PB goals. To answer all four research questions, the model posited that PB goals are the plausible mediating factor in relationships of the basic psychological needs for autonomy, competence, relatedness, and novelty with student engagement (see Figure 4.5). As stated in the overall measurement model, each main latent construct in the structural model has three indicators (parcels). The analysis in the structural model was implemented via the maximum likelihood (ML) estimation procedure using IBM SPSS AMOS 23.0 software.

After the model was specified and identified correctly, the goodness-of-fit of the model was examined holistically as recommended by Byrne (2016) and Kline (2011). To do so, the following fit indices were computed: the Comparative Fit Index (CFI; Bentler, 1990) (> .95 great; >.90 good), Tucker-Lewis Index (TIL; Tucker & Lewis, 1973) (>.95 good; >.90 reasonable), the Standardized Root Mean Square Residual (SRMR; Hu & Bentler, 1999) (< .08), and the root mean square error of approximation (RMSEA; Steiger, 1990) (< .06 great; < .08 good) with the 90% confidence interval (CI). The model revealed an

excellent fit to the data by showing the following fit indices values: χ^2 /df ratio = 2.42 (χ^2 = 566.62, df = 234), CFI = .98, TLI = .97, RMSEA = .044 (.039 - .048), and SRMR = .017. The following section presents in detail the results of the postulated hypotheses concerning direct and indirect relationships between the latent variables being examined.

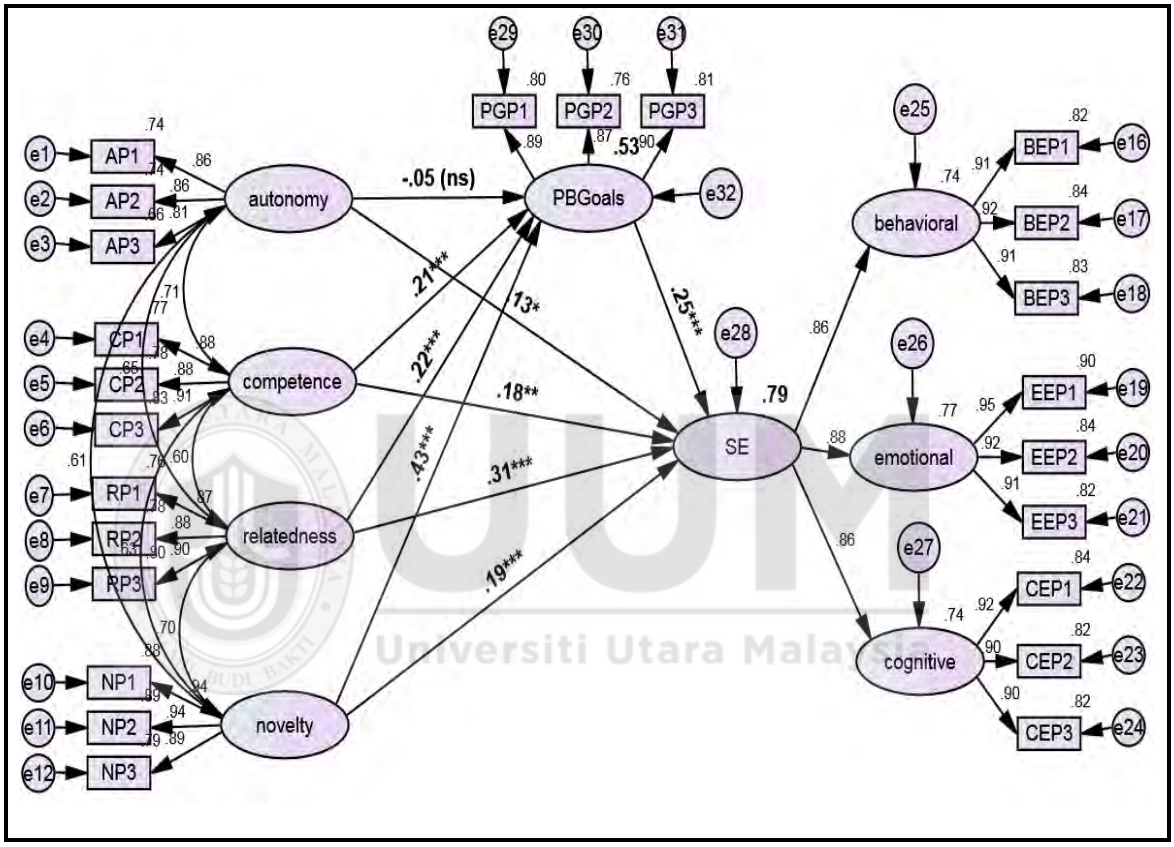

Figure 4.5. Graphic portrayal of the hypothesized model. All standardized coefficients reported are significant at *** p< .001, ** p< .01, and *p< .05. (ns)= not significant path.

Figure 4.5 presents all the statistical standardized path coefficients between the latent variables. The results of estimates of the path coefficients indicated that student engagement was positively and significantly predicted by the basic psychological need for autonomy (β = .13, p < .05), competence (β = .18, p < .01), relatedness (β = .31, p < .001), novelty (β = .19, p < .001), and PB goals (β = .25, p < .001). Furthermore, PB goals were

significantly predicted by the basic psychological need for competence (β = .21, p < .001), relatedness (β = .22, p < .001), and novelty (β = .43, p < .001); but not the basic need for autonomy (β = -.05, p = .38).

The bootstrap method for testing indirect effects (mediation) was used with the confidence level set at 0.95 and bias-corrected bootstrap samples set at 2000 in AMOS. Table 4.8 shows the bias-corrected bootstrap test results, such that basic needs could predict students' engagement through PB goals. The results indicated that there are significant indirect effects (all at p <.001) from competence (β = .05), relatedness (β = .05), and novelty (β = .10) to student engagement through the mediating effect of PB goals. However, there was no indirect effect from the basic need for autonomy (β = -.01, p = .35) on student engagement via PB goals. However, considering the effect size of path coefficient, it is imperative to highlight that the practical significant of the indirect effects of competence and relatedness on student engagement should be interpreted cautiously. According to Cohen (1988), the values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. More precisely, the value of β = .05 is at the range between small and medium effects which make the indirect effects of competence and relatedness are less practical significant.

Nevertheless, these results provide empirical support that PB goals play a significant mediating role in which the basic needs for competence, relatedness, and novelty are related to the dependent variable of students' engagement. In other words, the relationships of the basic needs for competence, relatedness, and novelty with student engagement were partially mediated by PB goals as these basic needs were found to have both indirect and direct significant paths to student engagement. Besides, considering both

the direct and indirect relationships, the results revealed that the variance explained by the exogenous factors in each of the endogenous variables of PB goals and student engagement was 53% and 79%, respectively.

Table 4.8

Bias-Corrected Bootstrap Test on Mediating Effects

Paths	β	95% CI	
		Lower	Upper
Autonomy—student engagement	.13*	.03	.21
Autonomy—PB goals—student engagement	-.01	-.04	.01
Competence—student engagement	.18**	.08	.27
Competence—PB goals—student engagement	.05***	.02	.09
Relatedness—student engagement	.31***	.22	.39
Relatedness—PB goals—student engagement	.05***	.02	.09
Novelty—student engagement	.19***	.10	.26
Novelty—PB goals—student engagement	.10***	.07	.15

Note: N=743; *** p< .001, ** p< .01, and *p< .05. (ns)= not significant path.

In overall, out of thirteen, elven hypotheses were supported (H1a, H1b, H1c, H1d, H2b, H2c, H2d, H3, H4b, H4c, and H4d) while two hypotheses (H2a and H4a) were rejected. Table 4.9 gives a summary of the hypotheses with decisions of whether they were supported or vice versa from the analyses carried out.

Table 4.9

Summary of the Acceptance or rejection of Hypotheses

No.	Hypothesis statement	Decision
H1a	There is a significant relationship between autonomy and student engagement.	Supported
H1b	There is a significant relationship between competence and student engagement.	Supported
H1c	There is a significant relationship between relatedness and student engagement.	Supported
H1d	There is a significant relationship between novelty and student engagement.	Supported
H2a	There is a significant relationship between autonomy and personal best (PB) goals.	Rejected
H2b	There is a significant relationship between competence and personal best (PB) goals.	Supported
H2c	There is a significant relationship between relatedness and personal best (PB) goals.	Supported
H2d	There is a significant relationship between novelty and personal best (PB) goals.	Supported
H3	There is a significant relationship between personal best (PB) goals and student engagement.	Supported
H4a	Personal best (PB) goals mediate the relationship between autonomy and student engagement.	Rejected
H4b	Personal best (PB) goals mediate the relationship between competence and student engagement.	Supported
H4c	Personal best (PB) goals mediate the relationship between relatedness and student engagement.	Supported
H4d	Personal best (PB) goals mediate the relationship between novelty and student engagement.	Supported

4.5 Summary

In this chapter, we highlighted the procedure of data analysis and presented the results of this study to answer each research question. The overall goal of the current research is investigating the mediating role of PB goals between basic psychological needs and students' engagement assessing through structural equation modeling (SEM) method. In

this chapter, we presented the obtained data from the main study, which were checked for entry accuracy and missing values. The data were then checked for normality, outliers, multicollinearity, and common method bias using skewness and kurtosis, z-scores and Mahalanobis distance, Variance Inflated Factor (VIF), and Harman's single factor test, respectively. Those analyses were followed by testing the reliability and the descriptive statistics of our scales. The demographics of participating students were then observed using descriptive statistics. The exploratory factor analysis was then conducted for all the scales used in the main study to identify the underlying relationships between our measured variables and prepare them for cleaner structural equation modeling.

Additionally, for the primary goal of this study, the structural equation modeling was conducted in two steps processes; by assessing the measurement models and structural model using the recommended fit indices by Byrne (2016) and Kline (2011) which included the Comparative Fit Index (CFI; Bentler, 1990) (> .95 great; >.90 good), Tucker–Lewis Index (TLI; Tucker & Lewis, 1973) (>.95 good; >.90 reasonable), the Standardized Root Mean Square Residual (SRMR; Hu & Bentler, 1999) (< .08), and the root mean square error of approximation (RMSEA; Steiger, 1990) (< .06 great; < .08 good) with the 90% confidence interval (CI). The measurement models assessed by the reliability and validity of the latent constructs and their indicators to establish the convergent and discriminant validity. Accordingly, all the assessments measures met the stipulated criterions, which allow for the assessment of the structural model to examine the postulated hypotheses. Consequently, direct and mediating hypotheses were tested, using a bootstrapping procedure. As a result, out of the thirteen hypotheses, eleven were accepted and two were rejected.

CHAPTER FIVE
DISCUSSION, IMPLICATION AND RECOMMENDATION

5.1 Introduction

The primary objective of the current study was to test the hypothesized structural model which postulated personal best (PB) goals as a mediating factor in the relationships between the basic psychological needs and student engagement. Four basic psychological needs; including the need for autonomy, competence, relatedness and novelty were hypothesized to have a direct and indirect effect on student engagement; and PB goals mediated these effects. The discussions on the review of the hypothesized structural model included discussions on the results of direct and mediating hypotheses. In total, four research questions in conjunction with thirteen hypotheses were formulated to fulfil the objectives of current research.

In this chapter, the results are discussed in detail. By doing so, it began by summarizing the research questions and findings. Furthermore, it discusses each aspect of the findings in light of the past research and the SDT literature concerning the substantive constructs of this study. Besides, this chapter highlighted the theoretical and practical implications of the current results, and suggestions for future studies.

As above mentioned, the primary purpose of this study was to determine whether PB goals mediated the relationships between the basic psychological needs and student engagement. The research questions also focused on the unique direct relationships between basic psychological needs and PB goals and between PB goals and student engagement among undergraduates in Malaysia. Hence, it is imperative to provide a

concise review regarding the key statistical findings in conjunction with the proposed research questions in this research to facilitate the part of discussion later.

The results of all the research questions are based on the evaluated hypothesised model in this study (see Figure 4.5). Before going for further discussions, it would be helpful to recapture some of the important points concerning the findings from the hypothesized model. The results revealed that 79% of the variance in student engagement was explained by the exogenous variables examined in this study through direct and indirect effect. Three out of the four basic psychological needs (competence, relatedness, and novelty) had a significant effect on PB goals. These three basic psychological needs explained 53% of the variance in the PB goals construct. Furthermore, the results revealed that PB goals mediated the relationships between only three of the basic psychological needs (competence, relatedness, and novelty) in SDT and students' engagement; but not the basic psychological need for autonomy. The proposed structural model produced acceptable values in terms of the goodness-of-fit indices: χ 2 /df ratio = 2.42 (χ2 = 566.62, df = 234), CFI = .98, TLI = .97, RMSEA = .044 (.039 - .048), and SRMR = .017 (refer Figure 4.5).

5.2 Discussion

The chapter now will go further to discuss the main findings of the current study. The subheadings of the discussion part are organized by the relationships between the substantive constructs with respect to the research questions of this study. The discussion part starting with 1) the relationships between basic psychological needs and student engagement; 2) between basic psychological needs and PB goals; 3) between PB goals

and student engagement; and 4) the mediating role of PB goals in the relationships between the four basic psychological needs and student engagement. The main goal of this chapter is to discuss the results of the current theoretical-driven structural model in light of SDT's literature as well as the findings of the past empirical studies.

5.2.1 Research Question 1: Is there any significant relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement?

Concerning the first research question of the current research; findings of the structural model which postulated that basic psychological needs for autonomy, competence, relatedness, and novelty have direct relationships with student engagement revealed that the model had an acceptable fit to the data (see Figure 4.5). The results of estimates of the path coefficients indicated that the basic psychological needs for autonomy ($\beta = .13$, $p < .05$), competence ($\beta = .18$, $p < .01$), relatedness ($\beta = .31$, $p < .001$), and novelty ($\beta = .19$, $p < .001$) predicted students' engagement positively and significantly. These results support our first four hypotheses concerning the direct relationships between the basic psychological needs of SDT which include novelty and students' engagement. The results of this study also indicated that the basic psychological need for relatedness had the highest coefficient value on student engagement, followed by novelty, competence, and autonomy, respectively.

Ryan and Deci (2017) claimed that SDT identifies a trinity of intrinsic motivational factors that promote student engagement. They suggest that engaged students behave autonomously, enjoy relationships with others in the learning settings, and feel competent

to achieve their own goals. According to SDT, when students experience the fulfilment of their needs for autonomy, competence, and relatedness, they are more likely to behave with a sense of autonomous motivation which enhances their academic engagement during learning activities in the classroom (Reeve, 2012). In line with the perspective of SDT, this study found that basic psychological needs for autonomy, competence, relatedness, and novelty were all independently and significantly associated with student engagement. These are very interesting results that confirm SDT's assertion based on the idea that contextual factors in term of teaching styles able to sustain students' inner motivational sources such as fulfilling their basic psychological needs which include novelty to vitalize their engagement during classroom activities. In the following, we discussed the results of the relationship of each basic need with student engagement in detail.

As expected, the results of this study supported our hypothesis by showing that the basic psychological need for autonomy had a significant and positive relationship with student engagement ($\beta = .13$, $p < .05$). This result supported the hypothesized relationship as postulated in H1a. The significant relationship of the basic psychological need for autonomy with students' engagement means that students who feel they are acting autonomously (no external or internal pressures) and act based on their own volition, they are more likely to show higher levels of academic engagement. More specifically, students who experience a sense of freedom and self-decision during their activities are made to believe that they are autonomous in their undertakings are more likely to be more engaged in their classroom activities. The current result is consistent with past studies that indicated that basic psychological need for autonomy predicted student engagement (Babenko et

al., 2018; Jang, Kim, & Reeve, 2016; Sulea et al., 2015; Zhen et al., 2016). As evidenced by both experimental manipulation (Cheon et al., 2012) and longitudinal surveys (Jang et al., 2012), students' experience of autonomy need satisfaction is a strong predictor of students' positive classroom functioning such as engagement, conceptual learning, and well-being. The primary reason that leads the students to show a robust classroom engagement is experiencing the satisfaction of the need for autonomy. Furthermore, autonomy has consistently been reported to be the main contributor to students' engagement (Skinner et al., 2008); and if it is satisfied will predict more positive behavioural, cognitive, and emotional outcomes (Reeve & Tseng, 2011). Moreover, these results are in line with those findings provided by Núñez and León (2019), who reported that the basic psychological need for autonomy influenced each of the four types of engagement positively and significantly.

As mentioned before, the results of the current research are found to be consistent with SDT's proposition. Students who perceived themselves to be acting with the sense of autonomy during learning activities they experience the feeling of enjoyment, interest, enthusiasm, vitality, high-quality adaptive behaviours, and psychological outcomes (Ryan & Deci, 2000; Skinner et al., 2008). SDT posits that students who experience a sense of autonomy, they are more likely to embrace self-determination and self-direction during their academic activities, which in turn predict positive educational outcomes such as higher levels of student engagement (Reeve, 2012). However, contrary results from the previous studies have also been reported and showed no significant association between the need for autonomy and students' engagement. For example, in the local context of Malaysian higher education, Hassan and Al-Jubari (2016) found that autonomy did not

predict student engagement among undergraduate students. Further, Zhen et al. (2017) showed that the relationship between the basic need for autonomy and students' engagement among Chinese middle school students was not significant. According to these authors, this may be due to the received criticism on SDT, where it is argued that autonomy is sensitive to cultural differences and learners in the collectivistic-oriented educational context such as in the Asian societies may not value autonomy as much as learners do in the individualistic societies (Western context).

According to SDT, the satisfaction of basic psychological needs is necessary for students' optimal functioning and well-being regardless of differences in the institutional and cultural context (Jang et al., 2009). The result of this study has confirmed this statement by showing that the satisfaction of the psychological need for autonomy had a significant relationship with student engagement among the participants of the current study which ranked as high on collectivistic culture (see Fontaine & Richardson, 2005). We can now understand that undergraduate students in the current study experienced the environmental learning that is conducive to satisfy their need for autonomy which in turn predicted their academic engagement. Their lecturers and other systems must have been positive in having students who act autonomously and experiencing a high sense of volition and self-choice in their learning activities. Students might have been presented with classroom contexts that facilitate their self-determination, self-control, and volition upon their undertakings; which enhance their learning engagement. Consistent with previous studies and the SDT, this study also recommends that students' need for autonomy must be nurtured by implementing the appropriate classroom environment and activities that support and vitalize this need by providing them with choices, fostering their

understanding and interest about the learning subjects, and encouraging them to think independently and critically. By doing, the students will feel free to express their thoughts and preferences, which makes them more engaged in their classroom activities.

In addition, the results from the current study revealed that the basic psychological need for competence had a positive and significant effect on student engagement ($\beta = .18$, $p < .01$). This result supported the hypothesized relationship as postulated in H1b. The significant association between the basic need for competence and students' engagement means that students who feel they are more competent and efficient in accomplishing their tasks, are more likely to demonstrate high levels of academic engagement. In other words, students who feel capable and are made to believe in their competencies, are likely to be more engaged. The current findings asserted the importance for students to be recognized as having the ability and efficiency to meet and overcome the challenging tasks during their activities. This finding is consistent with the previous empirical studies concerning the significant prediction of the basic need for competence on student engagement (Babenko et al., 2018; Hassan & Al-Jubari, 2016; Molinari & Mameli, 2017; Raufelder et al., 2014; Reeve & Tseng, 2011; Sulea et al., 2015; Zhen et al., 2017). For instance, with a sample of local undergraduates in Malaysia, Hassan and Al-Jubari (2016) reported that among the three basic psychological needs, only competence significantly predicted student engagement. In the same vein, among college students in Romania, satisfaction of the need for competence had the strongest effect on student engagement (Sulea et al., 2015). Furthermore, it was found that the need for competence had significant and positive relationships with four types of students' engagement (behavioural, emotional, agentic, and cognitive) (Reeve & Tseng, 2011). Raufelder et al. (2014), have confirmed this

relationship partially by showing that competence significantly predicted both emotional and behavioural engagement.

According to SDT, when students feel as capable of realizing abilities, plans, and feel a sense of efficacy, they will be oriented to conduct more in-depth learning strategies and show more cognitive, behavioural, and emotional engagement (Reeve, 2012; Ryan & Deci, 2000). The satisfaction of the need for competence need among students boosts their believes about their ability and potency to affect and challenge their learning environment which gradually instils a high sense of self-efficacy which support them to implement more in-depth learning strategies to be engaged in their classroom activities (Ryan & Deci, 2008; Zhen et al., 2017). We can now understand that students in the current study experienced the learning environment that is conducive in fulfilling their basic need for competence. Their lecturers and other systems must have been positive in having students' belief in their capacity. The results of the current research showed that Malaysian undergraduate students might have been presented with challenging tasks and proper supports that increase their competency beliefs and at the end make them show high levels of learning engagement. Consistent with previous studies and the SDT perspective, this study also recommends that students' competency beliefs must be nurtured by providing the appropriate classroom environment and activities that are suitable with students' skills and enhance their competence by giving more positive feedbacks, presenting challenging and attainable goals, and praises for their academic performance. By doing so, the students will experience the sense of effectiveness and confidence in their carrying out activities which lead them to be more engaged in the classroom activities.

In term of the basic psychological need for relatedness, the present study hypothesized that there is a significant relationship between relatedness satisfaction and students' engagement. By examining this hypothesis, the results revealed that among the basic psychological needs, the need for relatedness had the highest effect on student engagement ($\beta = .31$, $p < .001$). Therefore, this result supported the hypothesized relationship as postulated in H1c. This finding signifies that students who experience the sense of being accepted, valued, and connected to others in their classrooms are more likely to show higher levels of academic engagement. In other words, students demonstrate high engagement during their learning activities when they experience a sense of close emotional bonds and secured attachments with others such as their lecturers and classmates. This finding asserted the importance for students to be emotionally connected and interpersonally involved in responsive, warm, and reciprocal relationships during their learning activities.

The result of the current study is consistent with the findings of previous studies concerning the relevance of the need for relatedness satisfaction for students' engagement (Collie et al., 2015; Molinari & Mameli, 2017; Raufelder et al., 2014; Shen, McCaughtry, Martin, Fahlman, & Garn, 2012; Zhen et al., 2017). In the same vein, Zhen et al. (2017) highlighted that the basic need for relatedness is the strongest predictor of student engagement among Chinese adolescents. In their large sample study (3232 students), Collie et al. (2015) found that students' perceptions of the teacher, peer and parent relationships predicted the three elements of students' engagement: behavioural, cognitive, and emotional. Furthermore, a sense of relatedness and particularly relatedness to the teachers was the most predictor of behavioural and emotional engagement (Shen et

al., 2012). It was also found that the basic need for relatedness predicted behavioural engagement with secondary schools students in Germany (Raufelder et al., 2014).

According to SDT, the sense of relatedness in terms of high-quality interpersonal relationships with others surrounding foster students' internalization the values and beliefs of significant others regarding academic growth; which allow them to perform effectively as well as demonstrating more engagement during learning activities (Martin & Dowson, 2009). For example, in the classroom, relatedness is deeply associated with students' feeling that the lecturers genuinely like, respect, and value them. Students who experience a sense of relatedness satisfaction are more likely to exhibit identified and integrated regulation for the arduous learning tasks. Thus, they are more likely to internalize their sources of motivation which in turn increases their engagement in their studies (Niemiec & Ryan, 2009). That is, considering the current findings, undergraduate students internalize the behaviours that are valued by close others such as their lecturers and peers which enhance their learning engagement.

In contrast to the result of the current study, some previous research reported that the basic need for relatedness did not significantly predict student engagement. For example, Hassan and Al-Jubari (2016) and Babenko et al. (2018) found that the basic need for relatedness did not predict classroom engagement among undergraduate students in Malaysia and Canada, respectively. At this point, from individualistic (Canada) and collectivistic (Malaysia) perspectives regarding these results, we can highlight that instead of cultural factors, other factors influence the function of relatedness in the educational context. For example, it was argued that Western cultures value autonomy, whereas

Eastern societies value relatedness (Heine, Lehman, Markus, & Kitayama, 1999). Furthermore, Jang et al. (2009) found that the basic need for relatedness failed to predict student engagement among Korean students. According to them, this result is problematic not only for the SDT view but also for the cross-cultural critics that focus on the importance of students' social harmony orientations (sense of relatedness) in collectivistic cultural contexts such as Korea. Further, they argued that secondary school students in Korea are not situated within the learning context with a high sense of relatedness; as well as, learning activities in that contexts are primarily considered as competence-based and achievement-based rather than social or relationship-embedded activities which diminish the satisfaction of relatedness among students.

The current result indicated that students in the current study experienced a learning environment that is conducive to fulfil their need for relatedness. More precisely, the students of the current study showed that they are in a learning context which makes them experience the relatedness need satisfaction to the extent to which they connect to others, such as lecturers and classmates, in an authentic, caring, and reciprocal way; which facilitate the process of internalization. Students of the current research might have been presented with an educational context that facilitates their sense of belonging or relatedness; which in turn makes an integral contribution to students' growth. In this sense, consistent with previous studies and SDT's perspective, this research recommends that students' sense of belonging, valued, or relatedness must be nurtured by providing appropriate classroom environments and activities that implement strategies such as conveying warmth, caring, and respect to students. Taken together, the results of the current study showed that students who are exposed to and involved in the opportunities

that allow for volition initiatives and self-determined (autonomy), as well as optimal challenges (competence) and positive interactions with others (relatedness), are more likely to feel interested and engaged behaviourally, emotionally, and cognitively in their learning activities.

Before we further our discussion regarding the role of the basic need for novelty, it is worthy to note that there are empirical and theoretical indications based on the SDT that novelty satisfaction is a fourth basic need in addition to the needs for autonomy, competence, and relatedness. Within SDT, there are several mini-theories; one is basic needs theory. Basic needs theory (Deci & Ryan, 2000) identified three universal basic psychological needs for competence, autonomy, and relatedness as inherent motivational sources that tied directly to student's psychological well-being, motivation, high-quality engagement, and optimal functioning (Reeve, 2012). Additionally, González-Cutre et al. (2016) and González-Cutre and Sicilia (2018) confirmed that satisfaction of the need for novelty is an additional candidate need in SDT alongside the needs for competence, autonomy, and relatedness. Moreover, following the aim of the current study which proposed the need for novelty as a basic psychological need in SDT, it is imperative to provide empirical support for its validity at the global and contextual levels. The findings of the confirmatory factor analysis showed that novelty need satisfaction measurement exhibited construct, discriminant, and convergent validity alongside other measures of psychological need satisfaction and forms of motivation within SDT. Furthermore, more interesting for our purposes are the results of the structural equation model in respect to the direct relationship between novelty and student engagement.

The present research is the first empirical study on the relationship between novelty and student engagement from the perspective of SDT. The results of the hypothesized structural model revealed that novelty satisfaction has a positive and significant relationship with students' engagement ($\beta = .19$, $p < .001$), which is in line with our hypothesis H1d. This significant relationship of novelty as a fourth basic psychological need in SDT with students' engagement means that students who feel that they are learning new things are more likely to be interested and get their need for novelty satisfied which produces positive consequences such as classroom engagement. It was pointed out that without the pursuit of novelty, individuals would not engage in exploratory behaviours to understand themselves and their environment; this, in turn prevents them from enhancing their personal growth (Kashdan & Silvia, 2009). Sansone, Weir, Harpster, and Morgan (1992) argued that individuals are more engaged in the most of their daily activities that seek for unexperienced things in order to foster and sustain their satisfaction and interest. Aligning with previous findings which found that novelty satisfaction had a direct prediction on students' intrinsic motivation as well as the desired educational outcomes such as satisfaction, vitality, and dispositional flow in the physical education domain (González-Cutre & Sicilia, 2018; González-Cutre et al., 2016), our results provide a clear picture to understand the process of the incorporation of the novelty satisfaction in SDT and how this additional need predict student engagement in the educational settings in higher education.

Novelty is viewed as a crucial factor that necessary in several domains and contexts of our life; such as work, education, leisure, physical activity, and even interpersonal relationships. Particularly, in the educational domain, to foster motivation, academic

satisfaction, well-being, and overall educational success, it is critical for the students to balance between their competence and novelty by balancing their routine and not previously experienced activities in an optimal challenge (Sylvester et al., 2016). Further, in parallel with the findings of the current research, it was stated that introducing novel aspects during learning activities is crucial to empower satisfaction, efforts, and persistence among the learners (González-Cutre & Sicilia, 2018). We now understand that students in the current study experienced a learning environment that is conducive in implementing novelty-supporting strategies to fulfil their need for novelty. This study shows that Malaysian undergraduate students might have been presented with the classroom environments and tasks that help them to experience new aspects not previously experienced, plus having had to experience novel learning activities that deviate from their everyday routines. In this sense, this study recommends that students' sense of novelty must be nurtured by providing appropriate classroom environments and activities that include novel aspects by instilling a sense of curiosity, giving more varied, unexpected, or surprising learning activities. By doing so, the students will experience a sense of novelty satisfaction in their carrying out activities which lead them to produce positive cognitive, emotional, and behavioural outcomes.

In overall, as the impact of the basic need for novelty on student engagement has never been tested before, this finding contributed to refining the SDT's postulation. Specifically speaking, the inclusion of novelty satisfaction in SDT alongside the needs for autonomy, competence, and relatedness provides a better understanding of the motivational process that foster Malaysian undergraduate students' learning context; and how this context increases their engagement in their learning activities.

5.2.2 Research Question 2: Is there any significant relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and personal best (PB) goals?

One of the primary objectives in the current research is to examine the relationships between the basic psychological needs which include the need for novelty and less explored construct in achievement goals, namely: personal best (PB) goals. However, it is worthy of highlighting that most of the previous literature on academic' goals orientation, much attention has been paid on the relationships between the basic psychological needs and the classical achievement goals, namely: mastery and performance goals (e.g., Babenko & Oswald, 2019; Benita et al., 2014; Diseth et al., 2012; Diseth & Samdal, 2014; Janke et al., 2015; Ozdemir Oz et al., 2016; Sari, 2015; Sinatra et al., 2015). Nevertheless, in the current research, the hypotheses regarding the direct relationships between basic needs and PB goals were just partially supported by our results, which revealed that only the basic need for competence ($\beta = .21$, $p < .001$), relatedness ($\beta = .22$, $p < .001$), and novelty ($\beta = .43$, $p < .001$) had positive and significant relationships with students' PB goals. However, the relationship between the basic need for autonomy and PB goals was not significant ($\beta = -.05$, $p = .38$). Furthermore, the results revealed that the basic need for novelty has the highest path coefficient value on PB goals, followed by relatedness and competence. These three basic psychological needs contributed 53% of the explained variance in the PB goals construct.

The results revealed that satisfaction of the need for autonomy did not predict PB goals significantly ($\beta = -.05$, $p = .38$). Therefore, this result rejected the hypothesized relationship as postulated in H2a. To our knowledge, there is no existing research that

might explain why autonomy did not relate to the construct of PB goals significantly. Nevertheless, the possible explanation about the inability of the basic need for autonomy to predict students' PB goals is the nature of goal orientation in the collectivist contexts. Concerning achievement goals, Yu and Yang (1994) highlighted that in the collectivistic societies of Asia, an important factor in achievement is socially oriented motivation. For participants from a collectivist cultural background, or those acting in a context that endorses collectivism, salient goals would be promoted by harmony and demonstrate belongingness to the group which make them wilfully chose to relinquish their need for personal choice to an in-group member because the group norms make group goals (Hagger, Rentzelas, & Chatzisarantis, 2014). Furthermore, individuals in collectivistic societies are more disposed to give priority to social goals over their personal one. For example, lecturers and parents may push students to adopt different goals that might conflict with their personal goals (Fuligni, Yip, & Tseng, 2002) which leads the students to act under control and put them under pressure, as well as experience less sense of self-choice to set their PB goals.

Another possible explanation for an insignificant relationship between autonomy and PB goals is might the notable cultural and educational differences between students in the eastern contexts such as Malaysia and students in the western contexts. For instance, it was argued that acting with a sense of autonomous is only exists in individualistic contexts; as such contexts strongly value the individuals' sense of independence and acting autonomously. However, on the other hand, individuals in collectivistic contexts such as Asian countries are more oriented to embrace a sense of caring and harmonious relationships, as they value social norms over their personal values in their actions

(Markus & Kitayama, 2003; Uchida & Kitayama, 2009). In addition, although higher education in Malaysia has moved towards outcome-based education (OBE) (Mohayidin, Suandi, Mustapha, & Konting, 2008) and student-centered approach in teaching, traditional teaching styles, namely: teacher-centred approach still in existence in the most of the Malaysian higher education institutions. In this teaching method, the instructors are the dominant, controllers of the courses, and the transmitters of content; but, the students are recipients of the knowledge in passive way (Kasim, 2014). In this context, when students are accustomed to following their lecturers' instruction may cause a conflict between their personal decisions (autonomy) and their personal goals.

In this sense, in the context of the current study, the students were members of an interdependent culture which propagates the need for in-group harmony; and thus, they will be more consistent to act as part of the in-group. As a result, the need for autonomy failed to predict PB goals as these later are considered self-based goals; on the contrary, the students are not in the fully autonomy-supportive context (collectivistic context) that could enhance them to set their PB goals. Therefore, this research recommends that students' PB goals must be nurtured by providing the appropriate classroom environment and activities in terms of competence, relatedness, and novelty support which consider the possibilities that students feel compelled to improve their past performance and intrapersonal standard (PB goals). The lecturers should pay more attention to the motivational environment in which PB goals are endorsed and accentuate the PB goals' climate during classroom activities.

In addition, as expected, and consistent with SDT, there was a positive and significant relationship between the basic psychological need for competence and PB goals ($\beta = .21$, $p < .001$). This result supported the hypothesized relationship as postulated in H2b. The significant relationship between the basic need for competence and PB goals means that students who feel they are more competent and efficient in accomplishing their tasks are more likely to demonstrate high levels of efficient in pursuing their goals. In other words, students who feel capable and are made to believe in their competencies, are likely to be more encouraged to use positive learning strategies to set their PB goals and achieve their excellence. This finding asserted the importance for students to be recognized as having the ability to meet and overcome the challenges they face in their learning activities to compete against their own previous best. Despite the scarcity of empirical studies on this relationship, this finding is consistent with a study conducted among high school students in Australia which confirmed that students who experienced a high level of self-efficacy for learning which can be considered as competence need satisfaction were more likely to choose PB goals (Burns et al., 2018).

There is a number of literature that provides rationale support concerning the relevance of SDT for understanding and supporting students' growth goals. In this sense, some of the most recent theorists suggested a link between the basic need for competence and growth goals' types such as PB goals in the realm of education (e.g., Vansteenkiste et al., 2014). This may occur because of the nature of PB goals which emphasize self-competition to achieve personal excellence rather than compete against others (Martin, 2006). In the same vein, Elliot et al. (2011) argued that self-goals correspond to the intrapersonal standards of competence and in this type of goals, competence defined as the capability to improve

one's performance relative to the past best performance. Furthermore, Collie and Martin (2015) stated that students who experience competence need satisfaction in the classroom, are more likely to obtain the confidence necessary to excel their previous best efforts which considered as a key feature in the PB goals.

We can now understand that students in the current study experienced an environment that is conducive to satisfy their need for competence. The results of the current study showed that Malaysian undergraduate students might have been presented with challenging tasks and proper support to increase their competency beliefs which consequently boost their confidence to set high standards of PB goals to achieve their best potential. In this sense, consistent with previous studies and the SDT perspective, this research recommends that students' sense of accomplishment and efficacy must be nurtured by providing appropriate classroom environments and activities that enhance the sense of competence by facilitating students' desire to exercising their capacities, seeking out optimal challenges, and extending their skills and knowledge.

The results of this research also support our hypothesis concerning the relationship between the basic need for relatedness and PB goals. As expected, in consistence with SDT, there was a positive and significant relationship between the basic psychological need for relatedness and PB goals ($\beta = .22$, $p < .001$). This result supported the hypothesized relationship as postulated in H2c. The significant relationship between the basic need for relatedness and PB goals signifies that students who experience a strong sense of relatedness, they are more likely to set higher standards of PB goals. In other words, when students feel emotionally connected, close and accepted with important

others, and belongingness, they are likely to be more oriented towards choosing PB goals. For example, it was argued that a strong sense of relatedness considered as a supportive learning environment that may encourage students to follow on their goals and invest more efforts to exceed their previous best outcomes and performance (Martin & Dowson, 2009; Wentzel, 1999). The current finding is consistent with the only study who found a significant and positive relationship between the basic need for relatedness (measured by looking at the quality of interpersonal relationships with teachers, peers, and parents) and PB goals among a sample of secondary school students from the US, Canada, and the UK (Collie et al., 2015).

SDT provides strong evidence on the significant relationship between the basic need for relatedness and PB goals which grounded on the ideas of the internalization and self-determination. According to this theory, sense of relatedness satisfaction in term of the high-quality interpersonal relationships with significant others that students deal with in their classrooms lead them to internally endorse the beliefs and values of those important others (Deci & Ryan, 2012; Vansteenkiste et al., 2010). This is because when those others value and appreciate educational growth such as goals, student internalizes that values which promote his or her PB goals. For example, students' high-quality relationships with their instructors inspire them to value and adopt the same goal and academic targets valued by those instructors such as outperforming oneself academically (PB goals) (Collie et al., 2015). The current result indicates that students experienced the environment that is conducive in meeting their need for relatedness. The current findings show that the Malaysian undergraduates are in a learning context that makes them experience positive relationships with others in the classroom such as peers and lecturers. This supports the

process of internalization which is vital for motivation and goals setting such as PB goals. As a result, consistent with previous studies and SDT, this study also recommends the appropriate classroom environment and activities that nurture the sense of relatedness among students by creating a positive emotional climate, fostering warm, and listening to the students' perceptions. By doing so, the students will experience a sense of belonging and relatedness which in turn promote their academic growth in terms of PB goals.

As mentioned, in this study, novelty satisfaction is considered as an additional motivational need in SDT. To the best knowledge of the researcher, there is no existing empirical research that examine the relationship between the need for novelty and PB goals. Nevertheless, it is interesting to find that novelty satisfaction is the strongest predictor of PB goals ($\beta = .43$, $p < .001$), followed by relatedness ($\beta = .22$, $p < .001$) and competence need satisfaction ($\beta = .21$, $p < .001$). This result supports our hypothesis H2d. As such PB goals are self-based goals, self-improvement goals, and based on the idea to exceed best previous performance (Martin, 2006), novelty played an important role in enhancing students' persistence in pursuing their PB goals and extend their capacities to outperform their previous best performance. Seek novelty was frequently mentioned as an essential motivational source in the previous literature. Ryan and Deci (2000, p. 70) stated that "the intrinsic motivation is the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn." Furthermore, in the educational domain, if students seek different activities in an optimal challenge, they are likely to experience high sense of motivation, academic satisfaction, goals' persistence, and overall academic success (González-Cutre et al., 2016; Sylvester et al., 2016).

We can now understand that students in the current study experience the environment that is conducive to implement novelty-supporting strategies to fulfil their need for novelty. The students might have been in the learning settings and classroom activities that make them learn and discover new aspects in their learning activities frequently; which induce them to compete their previous best performance. As a result, consistent with previous studies on novelty, this study also recommends that students' sense of novelty must be nurtured by facilitating the sense of curiosity and giving more varied, unexpected, or surprising learning activities. As such, the students will experience a sense of novelty in their carrying out activities which promotes their persistence in PB goals.

In overall, it appears that the students' novelty satisfaction denotes what they enjoyed the most during their undertakings; as well as when they discover new aspects in their classroom activities. These new aspects and experiences better to be in concurrence with their satisfaction of their needs for relatedness and competence in order to achieve their personal goals and exceed their previous best successfully. According to SDT, when the students experience basic psychological need satisfaction in the classroom, this assists them to set growth goals that meet or outperform their previous best (Collie & Martin, 2015). The current study showed that perceived competence, relatedness, and novelty had a significant and positive influence on PB goals. This is based on the idea that basic psychological needs satisfaction promotes self-determination and internalization, which are key aspects of PB goals (Collie et al., 2015).

5.2.3 Research Question 3: Is there any significant relationship between personal best (PB) goals and student engagement among undergraduate students in Malaysia?

The third research question propped in the relationship between PB goals and student engagement. The results revealed that the path coefficient between these two constructs was practically important and statistically significant ($\beta = .25$, $p < .001$), which supported our hypothesis H3. This significant link between the intervening variable of PB goals and the dependent variable of engagement may provide initial support concerning the mediating role of PB goals between basic psychological needs and students' engagement; particularly, after the significant direct relationships between the basic need for competence, relatedness, and novelty and PB goals were found.

For decades, achievement goal theory has been a dominant framework in the educational studies in order to explain the motivational sources of students' learning and engagement (Ames, 1992; Elliot & McGregor, 2001; Martin, 2006). Achievement goal theory argued that students' achievement goals guide their behaviours in an achievement setting (Pintrich, 2000), and these goals determine their approach to be engaged in their learning process (Urdan & Midgley, 2003). Previous research has extensively highlighted that mastery and performance goals are positively associated with student engagement (e.g., Babenko et al., 2018; Diseth & Samdal, 2015; Gonida et al., 2009; Ronnel Bornasal King et al., 2012; Lee & Koszalka, 2016; Mih et al., 2015; Wolters, 2004). In the current research, we focused on the relatively new construct in achievement goals, namely: PB goals. As expected, the results of the current study support our hypothesis by demonstrating that PB goals predict student engagement significantly and positively.

Consequently, the present results extend the achievement goals' literature by confirming that the desired growth goals (PB goals) that students set for themselves are associated positively with their engagement.

The result of this study signifies that students who are more oriented towards pursuing PB goals are more likely to demonstrate high levels of academic engagement. In other words, when the students employ PB goals that mainly focus on competing previous best performance, they are likely to be involved in academic tasks to meet their self-improvement goals; and thus adopt the behaviours which are more conducive to their personal growth and excellence such as academic engagement (Martin & Elliot, 2015a). The results of the current study are consistent with previous studies which found that PB gaols played a significant role in students' academic engagement in the Western contexts (Burns et al., 2018; Collie et al., 2015; Martin, 2006, 2012b; Martin & Liem, 2010). Similarly, Yu and Martin (2014) asserted the critical role of PB goals in promoting student engagement in the Asian context (China) among middle school students. They suggest that the construct of PB goals is more relevant to foster learners' engagement in comparison to the construct of the mastery goals which were found to be more relevant to foster motivational features among the students. Therefore, based on the reported findings, we can suggest that the critical role of PB goals in enhancing academic outcomes in Western and some Eastern (China) contexts can be generalised to the Malaysian context. The present findings confirmed the relevance of PB goals for learning engagement among Malaysian students in the higher educational context. As a result, the crucial role of adopting PB goals has been validated by several empirical studies within various cultural settings.

In order to understand why this relationship may have existed, it is imperative to highlight that PB goals, in their nature, embrace the sense of self-determination and self-control. In other words, PB goals are relevant to more positive academic outcomes such as learning engagement when the students are pursuing growth goals that are chosen based on their self-choice and self-preferences; which are aligned with their sense of self-determination (Collie et al., 2015). On the same note, students are more likely to be motivated to engage in their learning activities as self-regulated learners when they act with the sense of self-determination to achieve their goals (Martin & Liem, 2010). Consistent with previous studies, the current study recommends that lecturers should extend their efforts to support students' engagement by inducing them to pursue PB goals. To achieve this, it may be necessary for students to be encouraged to set clear, specific, challenging, self-improvement based, and competitively self-referenced goals; which in turn lead them to produce high-quality academic engagement. In other words, students should be changed to excel beyond their expectations.

5.2.4 Research Question 4: Do personal best (PB) goals mediate the relationship between basic psychological needs (autonomy, competence, relatedness, and novelty) and student engagement?

In psycho-educational research, SDT and achievement goal theory have been incorporated together in which considered goals' adoptions as the close consequences of the basic psychological needs satisfaction in order to explain various educational outcomes such as students' engagement (Benita et al., 2014; Ciani et al., 2011; Diseth & Samdal, 2014; Ozdemir Oz et al., 2016). Despite the theoretical affirmation concerning the integration of the basic psychological needs and goals to predict various academic outcomes, very few

studies have examined the joint contributions of the basic psychological needs and PB goals on students' engagement from the lenses of SDT. In the current research, more interesting for our purpose is testing the mediating role of PB goals in the associations between basic psychological needs for autonomy, competence, relatedness, novelty, and student engagement.

For the primary purpose of the current study, we tested the structural model which proposed PB goals as the plausible mediating variable in the associations between the basic psychological needs (autonomy, competence, relatedness, and novelty) and students' engagement. The results of the bias-corrected bootstrap approach revealed significant and positive indirect effects (all at $p < .001$), from competence ($\beta = .05$), relatedness ($\beta = .05$), and novelty ($\beta = .10$) to student engagement, mediated by PB goals. Further, the results indicated that PB goals did not mediate the effect of the need for autonomy on students' engagement ($\beta = -.01$, $p = .35$). Although, the bias-corrected bootstrap method showed that there were statistically significant indirect associations of the needs for competence, relatedness, and novelty with students' engagement via PB goals, the direct relationships are still statistically significant. These results suggest that PB goals have a partial mediation in the relationships of students' competence, relatedness, and novelty satisfaction with their engagement. These findings show that only three out of four hypotheses in conjunction with research question 4 are supported.

Based on the statistical results, it is valuable to highlight that the intervening variable of PB goals did not mediate the effect of the basic need for autonomy on students' engagement ($\beta = -.01$, $p = .35$). This result rejected our postulated hypothesis H4a. To our

knowledge, there are currently no studies that might explain why PB goals did not act as a mediator in the relationship between autonomy and student engagement. This deserves further scrutiny. Nevertheless, the absence of the mediating role of PB goals might be attributed to the non-significant relationship between autonomy and PB goals (see section 5.2.2), which refers to the sensitivity of these two concepts to the cultural contexts as such in the current context. For example, individuals in collectivistic societies are more disposed to give priority to social goals over their personal one. Further, individuals in collectivistic contexts are more oriented to embrace sense of caring and harmonious relationships, which make them embrace social norms over their personal values in their actions (Markus & Kitayama, 2003; Uchida & Kitayama, 2009). In this sense, given the significant direct relationship of the basic psychological need for autonomy with student engagement, it appears that the need for autonomy is more influential than the construct of PB goals concerning the prediction of student engagement. Next, we discussed the results regarding the role of PB goals between each need of competence, relatedness, novelty, and student engagement in detail.

In term of the need for competence, the results from our hypothesized model supported our hypothesis H4b by showing that PB goals mediated the relationship between the basic need for competence and student engagement positively and significantly ($\beta = .05$, $p < .001$). The significant mediation role of PB goals between competence and engagement denotes that goals are considered as one mechanism by which the satisfaction of the need for competence predicts student engagement. This finding signifies the essential and consequences for students to feel competent and effective in their tasks for promoting their PB goals, which in turn promote their levels of academic engagement. Given the self-

competition focus of PB goals, these goals could emerge from the students' current competency, which enhances their engagement (Collie et al., 2015). Moreover, the result of this research is consistent with the only study which was conducted by Burns et al. (2018) among high school students in Australia and revealed that students' PB goals mediated the effect of self-efficacy (a sense of the basic need for competence) for learning and positive outcomes in terms of engagement and achievement.

According to Liem et al. (2012), emphasizing PB goals is aligned with SDT' perspective (Ryan & Deci, 2000) as the process of pursuing PB goals potentially evokes and strengthens students' intrinsic motivation through the sense of competence students gain when pursuing a challenging but attainable target performance set based on their own decision. In other words, those students who act with a strong sense of competence attain the necessary efficacy and confidence in their capacities to set a higher standard of PB goals to exceed their previous best performance (Collie & Martin, 2015). This type of goals which are chosen by the students and focus on self-compete rather than compete with others such as peers; lead them to be more inclined in behaviours that are conducive to their personal growth such as academic engagement (Collie et al., 2015; Martin & Liem, 2010). We can now understand that students in the current study experienced an environment that is conducive in meeting their need for competence. The students might have been presented with challenging tasks that instil the confidence to choose PB goals which in turn produce high-quality engagement. Based on the current result and consistent with SDT, this study recommends that the need for competence must be fulfilled by providing the appropriate classroom environment and activities that include optimal

challenging tasks; this, in turn will assist students in setting growth goals (PB goals) and be more engaged in their classroom activities.

In addition, the statistical result concerning the analyses of the indirect effects indicated that PB goals mediated the association between the need for relatedness and student engagement ($\beta = .05$, $p < .001$). This result supported the hypothesized relationship as postulated in H4c. This result suggests that students who feel they are close and more connected with other people who are important to them such as their lecturers and peers, are more likely to choose PB goals and in turn demonstrate high levels of academic engagement. In other words, this finding revealed that PB goals behave as one of the mechanisms in which the need for relatedness is associated with student engagement. This finding asserted the importance for students to have a sense of belongingness, acceptance, and strong relationships with peers and lecturers to shape the optimal motivational learning contexts for pursuing their personal goals, which in turn foster their levels of engagement. The finding of this study is consistent with the only study (Collie et al., 2015) concerning the mediating role of PB goals between relatedness satisfaction and student engagement. For example, in a sample of schools' students in the US, Canada, and the UK, Collie et al. (2015) found that PB goals mediated the prediction of the personal relationship with peers, teachers, and parents (relatedness satisfaction) on student engagement.

From the educational perspective, a high sense of relatedness satisfaction in the learning contexts fosters students' motivation by stimulating them to engage in challenging skills, persistence in goals, and increase their sense of positive expectancy towards learning

(Martin & Dowson, 2009). This is mainly originated from the process of internalization as well as a high sense of self-determination among students. SDT suggested that students who have a positive and supportive emotional bond with significant others surrounding such as teachers and peers, they will be oriented to internalize and self-endorse the values and beliefs that are embraced by those significant others (Deci & Ryan, 2012; Vansteenkiste et al., 2010). For instance, when the instructors and classmates valued academic growth, that similar values concerning educational growths are more likely to be endorsed internally by the students, which promotes their PB goals orientation and in the end their learning engagement. Besides, responsive and high quality of the relationships between instructors and students or between students and their classmates prompt them to pursue the similar goals of their instructors and their classmates (Collie & Martin, 2015). Given that these types of goal orientation are considered as self-determined goals and are driven by autonomous reasons rather than controlled sources of motivation (Martin, 2006; Vansteenkiste et al., 2014), students who adopt these goals are more likely to be more engaged in their classroom activities as a consequence of experiencing the sense of self-determination and autonomous in pursuing their goals (Jang et al., 2012).

The current result indicates that students in the current study experienced an environment that is conducive in meeting their need for relatedness. More specifically, the Malaysian undergraduates might have been presented with a learning context that fulfilled their need for relatedness and enhances their sense of belongingness that supported the process of internalization, which is vital for desired academic outcomes such as PB goals and learning engagement. As a result, consistent with previous studies and SDT, this study recommends that is imperative to establish the appropriate classroom environment and

activities that nurture the sense of relatedness among students by creating a positive emotional climate, fostering warm and caring interactions, and supporting the positive social relationship with lecturers and peers. As such, the students will be more oriented towards PB goals, which in turn promote their academic engagement. Taken together, when the students' basic psychological needs for competence and relatedness are fulfilled, they are likely to get the confidence to invest more academic efforts in pursuing their personal standards regarding growth goals (PB goals); which in turn produce high-quality academic engagement.

In addition to the basic needs for competence and relatedness, it is essential to highlight that PB goals mediated the relationship between the basic psychological need for novelty and student engagement significantly and positively ($\beta = .10$, $p < .001$). Therefore, this result supported the hypothesized relationship as postulated in H4d. This significant relationship signifies that students who feel that they are learning new things frequently are more likely to be interested and get their need for novelty satisfied, which produces positive consequences such as PB goals' adoption and academic engagement. This finding asserts the importance for students to be introduced by novel aspects during learning activities, which then promote their motivation and lead to a series of desired academic outcomes such as PB goals and student engagement. The current research is the first concerning the mediating role of PB goals in the relationship between novelty as a candidate need in SDT and student engagement. Thus, there is no study with which findings of the present study could be compared with for consistency. Previous studies on the need for novelty have only focused on the effect of this need on different outcomes

such as intrinsic motivation, vitality, dispositional flow, and satisfaction (González-Cutre & Sicilia, 2018; González-Cutre et al., 2016).

Even though, the results obtained in this study are in line with our expectations by showing that the novelty behaves according to the SDT perspective. According to González-Cutre et al. (2016), people are more likely to engage in unusual activities and pursuits, if those activities are not in conflict with other personal life goals; or if they feel that their new activities and pursuits are not induced to them by external factors. By focusing on novelty and challenge, people expand their knowledge, skills, goal-directed efforts and sense of self-determination (Kashdan & Silvia, 2009). In the educational domain, if students seek new activities in an optimal challenge, they are likely to foster their intrinsic motivation, learning satisfaction, goals' persistence, and overall academic performance (González-Cutre et al., 2016; Sylvester et al., 2016). In addition, previous empirical studies demonstrated that PB goals were associated with student engagement (Burns et al., 2018; Collie et al., 2015; Martin, 2012b; Martin & Elliot, 2015a; Martin & Liem, 2010; Yu & Martin, 2014). In other words, given that novelty arises students' curiosity to challenge their view of self and search for personal growth, the satisfaction of the need for novelty could enhance internally driven goals in terms of PB goals; which in turn vitalize their engagement. Taken together, the current study suggested that novelty could be considered as an inherent source of motivation to produce optimal academic functioning; which provides more comprehensive and empirical support for the inclusion of novelty as an additional basic need in SDT.

We can now understand that students in the current study experienced the learning environment that is conducive to implement novelty-supporting strategies to fulfil their need for novelty. The students might have been presented with novel aspects in their classroom activities which created opportunities for them to set clear and specific goals in order to compete their previous best (PB goals); this, in turn, enhanced their levels of academic engagement. Consistent with previous studies on novelty, this study also recommends that lectures in higher education institutions must give more varied, unexpected, or surprising learning activities. As such, the students will experience the sense of novelty in their carrying out activities which promote their persistence in pursuing PB goals and be more likely to engage behaviourally, emotionally, and cognitively in their learning activities.

In the context of the current study, the results suggested that novelty could complement the current needs within SDT; as well as the satisfaction of this need, in parallel with the satisfaction of needs for competence and relatedness will lead to positive outcomes such as growth goals and student engagement. While the findings of this study are consistent with the results of previous empirical research which focused only on the three existing needs in SDT, this study further demonstrates the unique and significant effect of the basic need for novelty on student engagement which fosters the existing literature review of the motivational studies by two important ways. Firstly, these findings extended the importance of the basic needs for autonomy, competence, and relatedness to growth goal setting in terms of PB goals and student engagement. Secondly, these relationships were examined simultaneously with the inclusion of the basic need for novelty. Taken together, this is an innovative finding, casting a light on the crucial role of the basic needs for

autonomy, competence, relatedness, and novelty in the development of PB goals; which in turn vitalize cognitive, behavioural, and emotional engagement among undergraduate students.

5.3 Implication of the Findings

Despite several limitations of the study, the findings and critical review of the literature are thought to have made a constructive contribution to the theory and its practices in higher education classrooms. This part of the chapter moves on to the discussion on the implications of the research, beginning with the theoretical implications, and then followed by practical implications.

5.3.1 Theoretical Implications

The current research contributes substantially and theoretically to the research concerning basic psychological needs satisfaction, achievement goals, and academic engagement. First, given that theoretical and empirical accounts of the self-determination theory (SDT) have been restricted only on the basic psychological needs for autonomy, competence and relatedness as the essential needs that drive individuals' motivation, this study provides an empirical support for González-Cutre et al. (2016) and Sheldon (2011) propositions to look for other candidate needs alongside the proposed basic psychological needs in SDT. In this study, we proposed the basic need for novelty as an additional candidate in SDT. Second, the current study sheds new light on the role growth goals in terms of personal best (PB) goals construct as a mediating factor between the basic psychological needs which include novelty and student engagement. Third, the findings of this study contribute significantly to the cross-cultural issues surrounding the SDT, by testing the applicability

of the basic psychological needs with the sample that represents a core value of a collectivist society such as Malaysian undergraduates. Fourth, this research succeeded in providing statistical evidence concerning the validity and reliability of each instrument. In the following, we will elaborate each of these mentioned theoretical contributions in detail.

5.3.1.1 Empirical Evidence of Novelty as a Novel Need

The model propounded in the current study emanated from previous empirical studies and was driven by a theoretical framework based on the self-determination theory (SDT) principles. SDT is a theory of motivation that came into existence for more than forty years ago by propounding three basic psychological needs (autonomy, competence, and relatedness) as essential needs for promoting individuals' optimal functioning within several domains (Deci & Ryan, 2000; Reeve, 2012). According to this valuable theory of motivation, a satisfaction of the basic psychological needs is related to more autonomous forms of motivation concerning individuals' activities and behaviours (Ryan & Deci, 2000). However, there has been a reanimated interest regarding the SDT's propositions. For example, Sheldon (2011) argued that SDT has been confined only to the psychological needs for autonomy, competence, and relatedness as the essential needs that drive individuals' motivation, but have not considered other basic needs alongside the existing psychological needs. In this sense, recently, González-Cutre et al. (2016) proposed novelty as a candidate for basic psychological need within SDT. Taking this into account, this study is slightly different, as it looked at the unique prediction of the basic psychological need for novelty independent of the other need satisfaction variables on PB goals and student engagement within Eastern educational settings such as Malaysian

institutions. Therefore, the current results made significant theoretical support to the SDT's existing literature through the inclusion of novelty as an additional basic need in the theory.

5.3.1.2 The Significant Role of PB Goals as Mediator

The current research highlighted and confirmed the crucial role of PB goals as an intervening factor that explicated the influences of the basic psychological needs for competence, relatedness, and novelty on students' engagement. Previous studies have examined the mediating role of PB goals in the relationships between the basic psychological needs and student engagement (e.g., Burns et al., 2018; Collie et al., 2015). However, these researchers have restricted only on the effect of basic needs of relatedness and competence (in terms of self-efficacy). As discussed earlier, one of the central theoretical implication is that the empirical findings in this study provided a new understanding of PB goals construct as one of the trajectories through which the basic psychological needs for competence, relatedness, and novelty predicted student engagement. Furthermore, given that SDT has been incorporated with achievement goal theory by previous studies in order to investigate basic psychological needs in SDT as key precursors of goals' adoptions which in turn explain various educational outcomes including student engagement (e.g., Benita et al., 2014; Ciani et al., 2011; Diseth & Samdal, 2014; Ozdemir Oz et al., 2016), this study contributed significantly to the SDT' literature by highlighting a novel evidence on the mediating role of PB goals between psychological needs for competence, relatedness, and novelty and student engagement.

5.3.1.3 The Functional Role of Needs satisfaction Across Cultures

As discussed earlier in chapter two (section 2.8.6), the proposed basic psychological needs have gained much popularity under cross-cultural controversy. The core of controversy suggested that autonomy is a western value and is not significant in the eastern cultural contexts. Moreover, from a cross-cultural relativist perspective, the need for relatedness is strongly valued in the cultural contexts that emphasize collectivism and interdependence. However, numerous studies that were conducted to test the relevance of the basic needs of SDT in educational settings with Asian samples (e.g., Chen et al., 2015; Hassan & Al-Jubari, 2016; Nishimura & Suzuki, 2016) have obtained significant results in favour of the theory and reaffirmed the universality of psychological needs satisfaction for all human beings irrespective of their culture. The present study, as the best knowledge of the researcher, is the first of its kind to examine the relevance of the basic psychological needs that include novelty on PB goals and student engagement with Malaysian students in higher education. The findings of this study have contributed significantly to the cross-cultural issue surrounding the SDT, by testing the basic needs for autonomy, competence, relatedness, and novelty with a sample that represents a core value of a collectivist society as per the cultural model of Markus et al. (1996).

The current findings renew the claim proposed by SDT that culturally defined values are easily internalized by the individuals which facilitate self-determined behaviours and actions. It was earlier discussed in the second chapter that Malaysian society is embracing the collectivistic values which make the students acting according to the values of their society over their personal values. The results of present research suggested that if the lecturers implement the autonomy-supportive teaching styles and have students work in

conformity with their emerging interest and integrated values, they can facilitate students' autonomy, competence, relatedness, and novelty satisfaction which resulted in more self-determined behaviours during classroom activities. It is clear, in this study, that students' PB goals and academic engagement increased when they perceive their learning environment as a context that fulfils their basic psychological needs. Therefore, the values of the basic psychological needs were asserted to be equally essential for Malaysian undergraduate students' optimal academic outcomes as it is for students in the Western contexts which underscore SDT's universality claim.

5.3.1.4 Validation of the Instruments

Another critical theoretical implication of the current study is the validation of the instruments utilized in measuring basic psychological needs, PB goals, and students' engagement in the Malaysian higher education settings. Particularly, this was the first time when the basic psychological need for novelty' subscale and the PB goals' instruments were used with Malaysian students in higher education settings. The process of the instruments' validity was established by conducting not only the exploratory factor analysis (EFA) technique in SPSS (version 25); but further, by employing the confirmatory factor analysis (CFA) using AMOS (version 23). Cronbach alpha was performed to check the reliability of the instruments for all the scales of this research. The results revealed that all scales, with slight adaptations, were confirmed in terms of their reliability and validity with undergraduates in the Malaysian higher education settings. However, it is advisable to replicate the validity of these instruments in similar settings in order to have more evidence concerning their psychometric properties.

5.3.2 Practical Implications

Concerning the practical implications, the obtained findings in the current research have made substantial contributions in the Malaysian higher educational settings. The following sections explain each practical contribution in detail.

5.3.2.1 For a Motivational Learning Environment

The findings of the current research offered several valuable implications for higher education institutions that aim to support the motivation and establish the optimal learning contexts. Several motivational studies underpinned by SDT basis around the globe have asserted that it is a great of importance to create a motivational learning environment that facilitates satisfaction of the basic psychological needs which considered as the key for learners' growth goals and high-quality academic engagement (Benita, Shane, Elgali, & Roth, 2017; Collie & Martin, 2015; González-Cutre & Sicilia, 2018; Jang et al., 2009; Reeve, 2012). Therefore, the findings of the current research highlighted the merit of promoting the basic psychological needs for autonomy, competence, relatedness, and novelty which provide an insightful guide to enhance motivation for students' engagement and foster the teaching and learning processes in the Malaysian higher education institutions. Furthermore, educators might encourage students to focus more on personalized standards of excellence in terms of PB goals and how to attain them instead of focusing on competition or comparisons with others. As a result, lecturers in the higher education contexts should establish the learning environment characterized by the opportunities for self-choice (autonomy), optimal challenging activities (competence), responsive and strong relationships with peers and instructors (relatedness), and effective

novel activities (novelty). By doing so, the students will be more oriented to choose PB goals and highly engaged in their activities.

5.3.2.2 For Practitioners in Higher Education

Establish the learning environment that sustains students' motivation to pursue personal goals and be engaged in the learning activities may not be solely dependent on the lecturers; but, is largely dependent on the practices of administrators, academicians, and education policymakers. According to SDT, when teaching strategies are more towards autonomy-supportive, the students are more likely to perceive their basic psychological need for autonomy, competence, relatedness, and novelty as fulfilled because they are given the opportunities to take control over their learning, offered with clear pathways for success, and are supported emotionally (Collie et al., 2015; Reeve, 2012). As such, lecturers need flexible and creative curriculums to support activities that vitalize the basic needs, growth goals, and students' engagement. Therefore, the present research with the support of its findings provides insightful information for stakeholders in the Malaysian institutions on the implementation of the proper classroom context that supports the basic psychological needs satisfaction. For example, intervention training programs could be conducted for lecturers to learn how to be autonomy-supportive lecturers to facilitate students' basic needs satisfaction which leads to optimal functioning such as PB goals and academic engagement. Therefore, the major implication of this research is inducing practitioners in Malaysian higher education to increase their capacity to include more autonomy-supportive teaching styles on their agenda.

5.3.2.3 For Culturally Appropriate Teaching

The present study makes an important contribution to the debate concerning the cultural universality of the basic psychological needs in SDT. The current findings reaffirmed the claims made by SDT that basic needs are equally important for students' academic motivation and overall academic outcomes in the collectivistic contexts (Chen et al., 2015; Chirkov, 2009). This signifies that the instructional strategies to support psychological need satisfaction do not depend on students' cultural characteristics but, instead, could be applied in equal measure to all students regardless of their cultural values. On the other hand, some scholars have questioned the thesis about the universal benefits of the basic needs in SDT (Iyengar & DeVoe, 2003; Markus et al., 1996). According to them, the autonomy-supportive contexts and the basic psychological needs are not encouraged in Asian classrooms because of cultural bias.

The general belief among those scholars is that Asian educators do not have an idea on how to exercise these basic needs in their academic atmosphere. For example, Littlewood (1999), argued that this culturally biased leads to prevents several educators in the Asian academic settings to implement teaching styles that mainly enhance the basic needs which include autonomy-supportive teaching style. However, in contrast, the current research reaffirmed the significant role of the basic psychological needs in SDT which include novelty and their educational benefits in the Asian classroom settings. It is expected that the findings of this research will help several educators to expand their present teaching strategies into a more autonomy-supportive teaching style by highlighting the crucial role of the basic psychological needs in fostering students' PB goals and academic engagement. In other words, educators in the collectivistic contexts, and particularly in

the Malaysian higher education are recommended to implement the suitable teaching styles that support students' basic psychological needs regardless of cultural debate surrounding the applicability of the SDT.

5.4 Recommendations for Future Research

One of the key recommendations for future researches is concerning the type of research design. As mentioned earlier, one of the major limitations is employing a cross-sectional design to collect the data. Future studies utilizing longitudinal designs are needed to replicate the model of the current study for more valid interpretations of the causality relationships between the substantive variables over time. Furthermore, future studies might test rival or alternative models. As well as, future research would provide much more information if they consider including the covariates (demographic variables) as statistical controls in their hypothesized model.

Besides that, one of the recommendations for future studies is on the type of data collection. The current research obtained data from students' self-reports. Some relationships may be overestimated due to bias and common variance. Keeping limitation of self-report measure in mind in the future studies, one next step is to replicate this study using meaningful qualitative methods from multiple sources of information such as students and teachers interviews and class observation in order to gain in-depth knowledge from the perspectives of both teachers and students; as well as, to show some aspects that the students are unable to indicate in their reflections using self-report survey. Also, examine other factors that might be relevant to PB goals and student engagement, such as

classroom structure, self-efficacy, seating location, and perceived goal structure are suggested for future studies.

This study has successfully presented the importance of PB goals as a mediator in the relationships of the basic psychological needs with students' engagement among Malaysian undergraduates in public universities. Further research might expand the sample composition by recruiting a sample involving other educational stages as well as a sample from other cultural backgrounds. Thus, it is imperative for research in the future to investigate more on these concepts with samples from a different culture and highly heterogeneous samples of students in order to make the possibility to generalize the current findings to a broader population within and outside Malaysia.

5.5 Conclusion

Despite the above limitations, the current results are very supporting, which provided answers to the formulated research questions and succeeded in achieving the main aims of the current research. Although there are plenty of studies on the relationships of the basic psychological needs (autonomy, competence, and relatedness) with students' engagement in learning, the current study filled up the existing gaps in literature by the inclusion of basic need for novelty as an additional need in SDT; as well as, by introducing the construct of PB goals as a potential intervening factor between the four basic needs and engagement.

The current research helps to understand how the learning context in terms of facilitating the students' basic needs satisfaction and their personal goals operated together in the undergraduate course context to predict their academic engagement as mapped out based

on SDT. This was evidenced when the hypothesized model had an adequate fir to the data; as well as, eleven out of the thirteen hypotheses were significant and supported. More precisely, each of the basic needs for autonomy, competence, relatedness, and novelty found to be a significant and direct predictor of student engagement. Further, except for the basic need for autonomy, all basic needs (competence, relatedness, and novelty) predicted student engagement through the mediating role of PB goals significantly and positively. The basic psychological needs contributed to the total variance of 53% in students' PB goals, and all these variables contributed by 79% in the explained variance of student engagement. It is important to note that although this may not be the only or the best model, it was confirmed that SDT could be as a theoretical framework to build the educational strategies and practices that will provide learners and even their instructors with the optimal educational contexts needed for their optimal psychological development and overall academic growth.

To sum up, the current study has successfully provided evidence for the significance of the need for novelty as an additional motivational basic need within SDT in explaining high-quality academic engagement. More importantly, the current research highlighted the importance of the PB goals construct as a crucial and potential mechanism by which the basic psychological needs predicted students' engagement within a sample of Malaysian undergraduates. As such, based on the lenses of SDT, this research has contributed to the boundary of knowledge by introducing a mediation model that not only supported but also extended the notion of the effect of students' basic needs on their personal growth and learning engagement. In other words, this study extended the conceptual and empirical understanding of the basic psychological needs and PB goals by

providing a practical guidance for lecturers and educational practitioners in order to facilitate student engagement in higher education institutions. Taken together, the findings of the current research contributed in multiple ways to the existing literature and future perspectives concerning the topic of students' motivation and engagement; as well as, to the general refinement of the academic practices in the higher education contexts in Malaysia.

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Appendix A: Seek Information Letter

PUSAT PENGAJIAN PENDIDIKAN DAN BAHASA MODEN
SCHOOL OF EDUCATION AND MODERN LANGUAGES
College of Art and Sciences
Universiti Utara Malaysia
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"MUAFAKAT KEDAH"

24 October 2018

To Whom It May Concern

Dear Sir/Madam

Subject- Seek information on local undergraduate students for Post graduate research

Mr. Abderrahim Benlahcene (Matric no-901832) is a doctoral candidate registered at School of Education and Modern Languages (SEML) at Universiti Utara Malaysia. He is conducting a research entitled "The mediating role of personal best goals between basic psychosocial needs and student engagement among undergraduates in Malaysia". The participants of his study are the local undergraduate students enrolled in public universities in Malaysia. We expect that the findings from this study will have beneficial implications for the universities and the undergraduate students studying in Malaysia.

In order to determine the appropriate number of sample for the study, Abderrahim seeks to obtain information on the total number of local students enrolled in your university. The obtained data well be kept confidential and will be utilized solely for educational purpose.

I hope that he is granted permission to collect this information in order to accomplish his study on time.

Yours sincerely

Rosna Awang-Hashim, PhD
Professor of Educational Psychology
School of Education and Modern Languages
College of Arts & Sciences
UNIVERSITI UTARA MALAYSIA

ROSNA AWANG HASHIM, Ph.D
Professor (Educational Psychology)
School of Education and Modern Languages
UUM College of Arts and Sciences
Universiti Utara Malaysia

Appendix B: The Questionnaire

Dear respondent,

I am a PhD candidate in educational psychology from the School of Education and Modern Languages (SEML), UUM. I am conducting a research on the mediating role of personal best goals between basic psychological needs and student engagement among undergraduates in Malaysia. The information obtained is crucial for me to complete my PhD research project. Thus, your sincere response is highly appreciated.

Please note that your response is **private and confidential**. Individual respondents will not be identified in any data or reports. If you have any enquiries about the survey, kindly contact or SMS me at 060-18-2536-268 or email to rahimhacen@gmail.com

Thank you very much for considering your involvement, time and cooperation in this survey.

Sincerely,

Abderrahim Benlahcene

Ph.D. Scholar

School of Education and Modern Languages
College of Arts & Sciences
Universiti Utara Malaysia

SECTION A:

Demographic information profile

Instruction: please fill in the blank on each item that is applicable to yourself.

1- Gender: 1. ☐ Male

2. ☐ Female

2- Race: 1. ☐ Malay

2. ☐ Chinese

3. ☐ Indian

4. ☐ Others (please state: ……....)

3- Age: _____

4- Program of study: ……...

5- Semester in attendance at university:

1. ☐ First
2. ☐ Second
3. ☐ Third
4. ☐ Fourth
5. ☐ Fifth
6. ☐ Sixth
7. ☐ Seventh
8. ☐ Eighth
9. Others ☐ (please state: ……..)

6- University: ❑ UUM ❑ USM ❑ UniMAP

SECTION B:

Instruction:

A number of statements that describe your **undergraduate learning experience** as a degree student are given below. Read each statement and indicate how true it is for you by circling the scale provided. Use the following scale to respond:

1	2	3	4	5	6
Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Sangat Tidak Bersetuju	Tidak Bersetuju	Agak Tidak Setuju	Agak Setuju	Bersutuju	Sangat Bersetuju

1.	*In this university, I feel a sense of choice and freedom in the things I undertake.* Di universiti ini saya berasa diberikan pilihan dan kebebasan untuk melaksanakan sesuatu perkara.	**1**	**2**	**3**	**4**	**5**	**6**
2.	*In this university, the tasks I have to do reflect what I really want.* Di universiti ini tugasan yang perlu saya lakukan menggambarkan apa yang sebenarnya ingin saya lakukan	**1**	**2**	**3**	**4**	**5**	**6**
3.	*In this university, I generally feel free to express my ideas and opinions.* Di universiti ini secara umumnya saya berasa bebas untuk menyampaikan idea dan pendapat saya.	**1**	**2**	**3**	**4**	**5**	**6**
4.	*In this university, I don't feel pressured to do too many things.* Di universiti ini saya tidak berasa tertekan untuk melakukan terlalu banyak tugasan/kerja	**1**	**2**	**3**	**4**	**5**	**6**
5.	*In this university, I feel I have been doing what really interests me.* Di universiti ini saya berasa bahawa saya telah melakukan perkara yang benar-benar saya suka.	**1**	**2**	**3**	**4**	**5**	**6**
6.	*In this university, I feel free to do my tasks the way I think it could best be done.* Di universiti ini saya berasa bebas untuk melakukan kerja dengan cara yang saya rasakan terbaik.	**1**	**2**	**3**	**4**	**5**	**6**
7.	*In this university, I don't feel forced to do things I do not want to do.* Di universiti ini saya tidak rasa dipaksa untuk melakukan perkara yang saya tidak mahu lakukan.	**1**	**2**	**3**	**4**	**5**	**6**
8.	*In this university, I feel confident that I can do things well.*	**1**	**2**	**3**	**4**	**5**	**6**

	Di universiti ini saya berasa yakin yang saya boleh melakukan kerja dengan baik.						
9.	*In this university, I feel capable at what I do.* Di universiti ini saya berasa yang saya berupaya menyempurnakan kerja saya.	**1**	**2**	**3**	**4**	**5**	**6**
10.	*In this university, I feel competent to achieve my goals.* Di universiti ini saya berasa cukup cekap untuk mencapai matlamat saya.	**1**	**2**	**3**	**4**	**5**	**6**
11.	*In this university, I feel I can successfully complete difficult tasks.* Di universiti ini saya rasa boleh menyempurnakan kerja yang sukar dengan jayanya.	**1**	**2**	**3**	**4**	**5**	**6**
12.	*In this university, I don't have serious doubts about whether I can do things well.* Di universiti ini saya tidak berasa ragu untuk menyempurnakan tugasan dengan baik.	**1**	**2**	**3**	**4**	**5**	**6**
13.	*In this university, I feel competent as student.* Di universiti ini saya berasa yang saya pelajar yang cukup baik.	**1**	**2**	**3**	**4**	**5**	**6**
14.	*In this university, I don't feel disappointed with many of my performance.* Di universiti ini saya tidak berasa kecewa dengan kebanyakan pencapaian saya.	**1**	**2**	**3**	**4**	**5**	**6**
15.	*In this university, I really like the lecturers and classmates I interact with.* Di universiti ini Saya sangat suka dengan para pensyarah dan rakan sekelas yang saya gauli.	**1**	**2**	**3**	**4**	**5**	**6**
16.	*In this university, I get along well with my lecturers and classmates.* Di universiti ini Saya bargaul baik dengan para pensyarah dan rakan sekelas.	**1**	**2**	**3**	**4**	**5**	**6**
17.	*In this university, lecturers and classmates care about me.* Di universiti ini para pensyarah dan rakan sekelas pedulikan (mengambil berat tentang) saya.	**1**	**2**	**3**	**4**	**5**	**6**
18.	*In this university, lecturers and classmates are generally pretty friendly towards me.* Di universiti ini para pensyarah dan rakan sekelas secara umumnya, agak ramah terhadap saya.	**1**	**2**	**3**	**4**	**5**	**6**
19.	*In this university, I really mix with my lecturers and classmates.* Di universiti ini saya bergaul dengan para pensyarah dan rakan sekelas saya.	**1**	**2**	**3**	**4**	**5**	**6**
20.	*In this university, I feel close and connected with the lecturers and classmates I spend time with.* Di universiti ini saya berasa rapat dan mesra dengan pensyarah dan rakan sekelas saya.	**1**	**2**	**3**	**4**	**5**	**6**
21.	*In this university, I have the opportunity to discover new things.* Di universiti ini saya mempunyai peluang untuk menemui perkara baharu.	**1**	**2**	**3**	**4**	**5**	**6**

22.	*In this university, I think I discover new things frequently.* Di universiti ini saya merasakan bahawa saya sering menemui perkara baharu.	**1**	**2**	**3**	**4**	**5**	**6**
23.	*In this university, I think I learn something new every day*. Di universiti ini saya merasakan bahawa saya belajar perkara baharu setiap hari.	**1**	**2**	**3**	**4**	**5**	**6**
24.	*In this university, I think that the activities I carry out are varied.* Di universiti ini saya merasakan bahawa aktiviti yang saya lakukan adalah pelbagai.	**1**	**2**	**3**	**4**	**5**	**6**
25.	*In this university, I perform activities that seem novel to me.* Di universiti ini saya melakukan aktiviti yang kelihatan baharu pada saya.	**1**	**2**	**3**	**4**	**5**	**6**
26.	*In this university, I think I manage to develop my originality***.** Di universiti ini saya berasakan bahawa saya berupaya membina sesuatu yang asli dalam diri saya.	**1**	**2**	**3**	**4**	**5**	**6**
27.	*In this university, I feel new sensations.* Di universiti ini saya berasa perasaan baharu.	**1**	**2**	**3**	**4**	**5**	**6**
28.	*In this university, I feel I do novel things.* Di universiti ini saya berasa saya melakukan perkara yang baharu.	**1**	**2**	**3**	**4**	**5**	**6**
29.	*In this university, I frequently feel there are novelties for me.* Di universiti ini saya sering berasa bahawa ada perkara baharu untuk saya.	**1**	**2**	**3**	**4**	**5**	**6**
30.	*In this university, I have the opportunity to innovate.* Di universiti ini saya mempunyai peluang untuk melakukan pembaharuan/inovasi.	**1**	**2**	**3**	**4**	**5**	**6**
31.	*In this university, I think that new situations/experiences come up for me.* Di universiti ini saya berasa yang situasi/pengalaman baharu muncul untuk saya.	**1**	**2**	**3**	**4**	**5**	**6**
32.	*In this university, when I do my work I try to do it better than I've done before.* Di universiti ini apabila melakukan tugas, saya mencuba sedaya upaya untuk melakukannya dengan lebih baik daripada sebelumnya.	**1**	**2**	**3**	**4**	**5**	**6**
33.	*In this university, when I do my work I try to do the best that I've ever done.* Di universiti ini apabila melakukan sesuatu tugas, saya berusaha untuk melaksanakan yang terbaik yang pernah saya lakukan.	**1**	**2**	**3**	**4**	**5**	**6**
34.	*In this university, when I do my work I try to improve on how I've done before.* Di universiti ini apabila melakukan sesuatu tugas, saya cuba memperbaiki cara berbanding cara sebelumnya.	**1**	**2**	**3**	**4**	**5**	**6**
35.	*In this university, when I do my work I try to get a better result than I've got before.*	**1**	**2**	**3**	**4**	**5**	**6**

	Di universiti ini apabila melakukan sesuatu tugas, saya mencuba untuk mendapatkan hasil yang lebih baik daripada sebelumnya.						
36.	*In this university, I compete with myself more than with other students.* Di universiti ini saya bersaing dengan diri sendiri lebih daripada dengan pelajar lain.	**1**	**2**	**3**	**4**	**5**	**6**
37.	*In this university, I compete with my own previous performances more than I compete with other students.* Di universiti ini saya bersaing dengan pencapaian saya yang terdahulu lebih daripada pencapaian pelajar lain.	**1**	**2**	**3**	**4**	**5**	**6**

SECTION C:

Instruction:

A number of statements that describe your undergraduate **learning experience** as a degree student **in your classroom in this university** are given below. Read each statement and indicate how true it is for you by circling the scale provided. Use the following scale to respond:

1	2	3	4	5	6
Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Sangat Tidak Bersetuju	Tidak Bersetuju	Agak Tidak Setuju	Agak Setuju	Bersutuju	Sangat Bersetuju

	In my class … Dalam kelas …						
38.	... *I listen very carefully.* … Saya mendengar dengan teliti.	**1**	**2**	**3**	**4**	**5**	**6**
39.	... *I pay attention.* … Saya memumpukan perhatian.	**1**	**2**	**3**	**4**	**5**	**6**
40.	... *I try my hardest to perform well.* … Saya cuba dengan seboleh-bolehnya untuk melakukan kerja dengan baik.	**1**	**2**	**3**	**4**	**5**	**6**
41.	... *I actively participate in class discussions.* … Saya bergiat secara aktif dalam perbincangan di kelas.	**1**	**2**	**3**	**4**	**5**	**6**
42.	... *I work as hard as I can to complete tasks.* … Saya bekerja sangat keras untuk menyempurnakan kerja.	**1**	**2**	**3**	**4**	**5**	**6**

43.	... *I get really involved in class activities.* … Saya benar-benar melibatkan diri dengan aktiviti di kelas.	**1**	**2**	**3**	**4**	**5**	**6**
44.	... *I complete my tasks on time.* … Saya menyempurnakan tugas tepat pada masanya.	**1**	**2**	**3**	**4**	**5**	**6**
45.	... *if I have trouble understanding a problem, I go over it again until I understand it.* … Apabila saya menghadapi kebuntuan untuk memahami sesuatu masalah, saya akan meneliti masalah itu berkali-kali sehingga saya memahami masalah tersebut.	**1**	**2**	**3**	**4**	**5**	**6**
46.	... *I take an active role in extra-curricular activities.* … Saya mengambil peranan yang aktif dalam kegiatan luar kurikulum.	**1**	**2**	**3**	**4**	**5**	**6**
47.	... *I exert my full efforts toward tasks.* … Saya memberikan sehabis daya usaha saya untuk melakukan kerja.	**1**	**2**	**3**	**4**	**5**	**6**
48.	... *I feel amused (smile, laugh, have fun).* … Saya berasa terhibur (senyum, ketawa, bergembira).	**1**	**2**	**3**	**4**	**5**	**6**
49.	... *I enjoy learning new things.* … Saya suka belajar perkara baharu.	**1**	**2**	**3**	**4**	**5**	**6**
50.	... *I am very interested in learning.* … Saya sangat berminat dengan pembelajaran.	**1**	**2**	**3**	**4**	**5**	**6**
51.	... *I feel happy.* … Saya berasa gembira.	**1**	**2**	**3**	**4**	**5**	**6**
52.	... *I like what I am learning.* … Saya suka apa-apa yang saya pelajari.	**1**	**2**	**3**	**4**	**5**	**6**
53.	... *I don't feel bored.* … Saya tidak berasa bosan.	**1**	**2**	**3**	**4**	**5**	**6**
54.	... *I feel excited in material I learn.* … Saya berasa teruja dengan perkara yang saya pelajari.	**1**	**2**	**3**	**4**	**5**	**6**
55.	... *I feel positive about the tasks I complete.* … Saya berasa positif dengan kerja yang saya sempurnakan.	**1**	**2**	**3**	**4**	**5**	**6**
56.	... *I feel good.* ... Saya berasa baik.	**1**	**2**	**3**	**4**	**5**	**6**
57.	... *I feel curious about what we are learning.* … Saya berasa ingin tahu tentang apa-apa yang kami pelajari.	**1**	**2**	**3**	**4**	**5**	**6**
58.	... *when I study, I try to connect what I am learning with my own experiences.*	**1**	**2**	**3**	**4**	**5**	**6**

	… apabila saya mentelaah, saya cuba menghubungkaitkan perkara yang dipelajari dengan pengalaman sendiri.						
59.	*... I try to make all the different ideas fit together and make sense when I study.* … Saya mencuba untuk menselaraskan idea yang berbeza supaya bermakna semasa saya mentelaah.	**1**	**2**	**3**	**4**	**5**	**6**
60.	*... when doing work, I try to relate what I'm learning to what I already know.* … apabila saya melakukan sesuatu tugas, saya mencuba mengaitkan perkara yang dipelajari dengan perkara yang saya sudah ketahui.	**1**	**2**	**3**	**4**	**5**	**6**
61.	*... I make up my own examples to help me understand the important concept I study.* … Saya membuat contoh sendiri untuk membantu saya memahami konsep penting yang dipelajari.	**1**	**2**	**3**	**4**	**5**	**6**
62.	*... when I study, I figure out how the information might be useful in the real world.* … apabila belajar, saya memikirkan bagaimana maklumat tersebut mungkin berguna dalam dunia sebenar.	**1**	**2**	**3**	**4**	**5**	**6**
63.	*... if I don't understand what I read, I go back and read it over again.* … sekiranya saya tidak faham apa-apa yang dibaca, saya akan baca semula berulang kali.	**1**	**2**	**3**	**4**	**5**	**6**
64.	*... I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics by just reading them over.* …Saya cuba untuk memahami topik yang dipelajari dan tentukan apa yang sepatutnya diperolehi daripada topik tersebut, bahkan bukan sekadar membaca topik tersebut.	**1**	**2**	**3**	**4**	**5**	**6**
65.	*.... when studying, I try to combine different pieces of information from course material in new ways.* … Semasa saya belajar, saya cuba untuk mengintegrasi pelbagai maklumat yang terkandung dalam bahan kursus dengan cara yang baharu.	**1**	**2**	**3**	**4**	**5**	**6**
66.	*... I think deeply when I take quizzes.* … Saya berfikir secara mendalam apabila menjawab soalan kuiz.	**1**	**2**	**3**	**4**	**5**	**6**
67.	*... if I'm not sure about things, I check my books or use other materials like charts.* … Saya menyemak buku atau menggunakan bahan lain seperti carta sekiranya saya tidak pasti tentang sesuatu perkara.	**1**	**2**	**3**	**4**	**5**	**6**

Appendix C: The Permission Letter

PUSAT PENGAJIAN PENDIDIKAN DAN BAHASA MODEN
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"MUAFAKAT KEDAH"

24 October 2018

To Whom It May Concern

Dear Sir/Madam

Subject: Permission for Post-graduate Research Data Collection

This is to certify that Mr. Abderrahim Benlahcene (Matric no-901832) is a doctoral candidate registered at School of Education and Modern Languages (SEML) at Universiti Utara Malaysia. He is conducting a research entitled "The mediating role of personal best goals between basic psychosocial needs and student engagement among undergraduates in Malaysia" under the supervision of Prof. Rosna Awang-Hashim and Dr. Amrita Kaur. The participants of his study are the local undergraduate students enrolled in public universities in Malaysia. Therefore, please grant his permission to collect data from your organization.

Your cooperation will be highly appreciated.

Best Regards,

ROSNA AWANG HASHIM, PH.D
Professor (Educational Psychology)
School of Education and Modern Languages
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