Basic psychological needs satisfaction and student engagement: the importance of novelty satisfaction

Abderrahim Benlahcene
School of Education and Modern Languages, College of Arts and Sciences, Universiti Utara Malaysia, Sintok, Malaysia

Amrita Kaur
College of Liberal Arts, Wenzhou-Kean University, Wenzhou, China, and
Rosna Awang-Hashim
School of Education and Modern Languages, College of Arts and Sciences, Universiti Utara Malaysia, Sintok, Malaysia

Abstract

Purpose – The purpose of this paper is to examine the associations between students’ basic psychological needs satisfaction, including novelty satisfaction, and the four aspects of student engagement.

Design/methodology/approach – Data were collected from a total sample of 743 undergraduate students from three public universities in northern Malaysia. Structural equation modelling (SEM) was used to analyse the data.

Findings – Competence and relatedness were positively related to the four aspects of student engagement, while autonomy satisfaction was found to relate to agentic engagement. Novelty satisfaction, on the other hand, is related positively with behavioural, emotional and cognitive engagement.

Research limitations/implications – The results provide a new understanding on the importance of novelty satisfaction alongside existing needs in self-determination theory (SDT) in enhancing student engagement.

Practical implications – Educators are encouraged to develop strategies to provide novelty support and facilitate students’ basic needs satisfaction in order to establish a motivational learning environment that vitalises students’ engagement.

Originality/value – This study breaks new ground by testing the unique relationships of novelty satisfaction along with the psychological needs for autonomy, competence and relatedness, with the four aspects of student engagement in higher education.

Keywords Basic psychological needs satisfaction, Student engagement, Higher education, Self-determination theory

Paper type Research paper

1. Introduction

Student engagement is well recognised at all levels of education as an inducive factor that enhances academic performance, retention, persistence and academic achievement (Awang-Hashim et al., 2015; Maguire et al., 2016). The role of higher institutions in enhancing academic engagement has become more prominent in recent years (Robinson, 2012), as colleges increasingly recognise occurrences of disengagement and stress among undergraduate students that seem to arise from failing to make a successful transition from high school (see Collie et al., 2017). Abdullah et al. (2015), for example, found the phenomenon of disengagement among Malaysian undergraduates. Student engagement has emerged as one of the most central educational concerns of the 21st century as it ensures the quality of education in higher institutions (Trowler and Trowler, 2010). Yet, a decline in motivation and
engagement typically appears as students enter university (Martin, 2009). Hence, academic engagement at the tertiary level merits further study to become a viable medium for improving teaching and learning processes. To this end, it is imperative to identify crucial and effective educational practices that encourage engagement. Using self-determination theory (SDT) (Ryan and Deci, 2017) as its underpinning theory, the current study investigates the relationships of student engagement and its antecedents among undergraduate students.

In the psycho-educational context, SDT remains a useful theoretical base for explaining the motivational factors that enhance students’ engagement and overall academic outcomes (Kaur et al., 2014; Reeve, 2012). According to SDT, fulfilling the basic psychological needs for autonomy, competence and relatedness is the most decisive factor influencing students’ development, enthusiasm and exhibition of adaptive functioning, such as intrinsic motivation and engagement (Ryan and Deci, 2017). Recently however, research on basic psychological needs in SDT has witnessed a remarkable renewal, partially motivated by the theory of basic psychological needs (BPNT), one of the sub-theories within SDT. Accordingly, the number of empirical studies on BPNT had risen considerably to refine this theory by examining additional needs other than the known three needs in SDT (Vansteenkiste et al., 2020).

To examine the motivational process more deeply, recent research on BPNT have proposed considering novelty as a possible need, in addition to the needs for autonomy, competence and relatedness (e.g. González-Cutre et al., 2020; González-Cutre and Sicilia, 2019; González-Cutre et al., 2016). According to these research findings, the need for novelty appears to be an inherent desire that exists in all cultural contexts and development stages and is connected with individuals’ optimal growth, thereby fulfilling some of the inclusion rules laid down by Ryan and Deci (2017) regarding new candidate needs. In the educational domain, above and beyond the satisfaction of the three basic needs, novelty satisfaction has been significantly associated with students’ positive outcomes, especially intrinsic motivation and satisfaction (see González-Cutre and Sicilia, 2019). However, the relationship between novelty satisfaction and student engagement remains unexplored empirically. Moreover, there is a paucity of research on novelty as a basic need in SDT within higher education contexts. The primary purpose of this study, therefore, was to examine whether the fulfilment of the need for novelty, in addition to the fulfilment of the three existing needs, might predict the four components of student engagement.

1.1 Self-determination theory: basic psychological needs

SDT asserts that all students have a set of three inherent, motivational and universal basic psychological needs, namely, their need for autonomy (to regulate themselves and to experience psychological freedom and self-choices), competence (to interact effectively with the learning environment and master challenging activities) and relatedness (to feel connected with their lecturers and fellow students and to experience amicable relationships). The fulfilment of these inherent needs during learning activities allows students to experience high academic satisfaction and persistence, to thrive, and to function optimally (Ryan and Deci, 2017). According to Niemiec and Ryan (2009), the satisfaction of these needs is the most crucial factor that provides what is necessary for energising student engagement in the classroom.

As stated above, novelty has been proposed as a potential candidate need in SDT. Need for novelty refers to the innate desire to experience new things that have not been experienced before or that differ from a person’s daily routine (González-Cutre et al., 2016). Within BPNT, Ryan and Deci (2017) established a set of inclusion criteria that a candidate need should meet to qualify as a basic psychological need: (1) the satisfaction of this need must be strongly associated with well-being, while its frustration must be negatively associated with this consequence and positively related with ill-being; (2) it must specify the experiences and
behaviours that lead to well-being; (3) it should be a significant and constant mediator of the relationships between social factors and personal, motivational and psychological functioning; (4) it should act as a growing need and not as a deficit need that operates only when other basic psychological needs are frustrated; (5) it should be a precursor of intrinsic motivation and (6) it should operate universally for all people and cultures.

In line with this, González-Cutre et al. (2020) affirmed that novelty satisfaction is positively related to adaptive outcomes and optimal functioning and its frustration is related negatively to these outcomes. In an earlier study, González-Cutre et al. (2016) offered theoretical descriptions of the specific novelty experiences and behaviours related to well-being. The results of González-Cutre et al. (2020) support the mediating role of autonomous motivation in the relationships between novelty satisfaction and vitality and enjoyment. Bagheri and Milyavskaya (2020) showed that the need for novelty acted in synergy with the three needs and was not a substitute for one of them when students became frustrated. Furthermore, novelty satisfaction was found to be the best predictor of intrinsic motivation to know (González-Cutre and Sicilia, 2019). Finally, the universality criterion for inclusion as a candidate need is partially fulfilled by the finding that novelty effects on the outcomes did not depend on participants’ age or preference for novelty-seeking (Bagheri and Milyavskaya, 2020). Nevertheless, Bagheri and Milyavskaya (2020) asserted the need for more research on novelty satisfaction with different outcomes to support its universality, especially in non-western contexts.

1.2 Four dimensions of student engagement
Student engagement refers to students’ active involvement in their academic tasks (Reeve, 2012). Student engagement is a multidimensional construct that typically contains behavioural, emotional, cognitive and agentic aspects. The behavioural component is defined as students’ participation, efforts and positive conduct. Behaviourally engaged students act with high levels of commitment, energy, effort and persistence. Emotional engagement refers to the emotional feedback of students towards academic tasks (e.g. interest, curiosity and enthusiasm). Students who are emotionally engaged enjoy their participation in academic tasks. Cognitive engagement denotes students’ psychological efforts to master the necessary knowledge and skills. Cognitively engaged students use deep, self-regulatory and personal learning strategies (e.g. elaboration and planning). Agentic engagement is defined as students’ initiatives in contributing proactively to the flow of instruction. Students who engage with a sense of agency provide feedback, express their preferences, request clarification, ask for examples and solicit how problems are solved (Fredricks et al., 2004; Reeve, 2012, 2013).

1.3 Basic psychological needs and student engagement
According to SDT, basic psychological needs satisfaction is a significant antecedent that is highly relevant to academic engagement (Reeve, 2012). Basic needs satisfaction leads students to pay more attention (behavioural engagement), feel interested (emotional engagement), use in-depth learning strategies (cognitive engagement) and express their thoughts (agentic engagement) during academic activities (Reeve et al., 2019). It creates a sense of energy, vigour, interest and enjoyment, which eventually leads to high-quality engagement (Ryan and Deci, 2017). An essential aspect of most university students’ daily life includes undertaking coursework, progressing in their studies, striving for a degree and a career and fulfilling unexpected requirements (Levesque et al., 2004). To face these challenges, basic needs satisfaction is essential for their motivation, engagement and academic growth (Russell and Slater, 2011). Empirical studies in higher education contexts highlight the relevance of basic needs satisfaction to student engagement. For example,
Núñez and León (2019) showed that autonomy satisfaction predicted each indicator of engagement (behavioural, emotional, cognitive and agentic). In the Malaysian context, satisfaction of the need for competence (Hassan and Al-Jubari, 2016) and autonomy (Benlahcene et al., 2020) has been shown to predict student engagement among undergraduate students.

Although the literature has established consistent evidence regarding the relevance of needs satisfaction to student engagement, the role of novelty satisfaction is not well known. Nevertheless, theorists and researchers have asserted that novelty is a crucial component in defining intrinsic motivation (Ryan and Deci, 2000) and in predicting several optimal consequences such as vitality, flow, autonomous motivation and meaning in life (Bagheri and Milyavskaya, 2020; González-Cutre et al., 2016, 2020; González-Cutre and Sicilia, 2019). According to Silvia (2006), students show active and attentive engagement when they are involved in activities that interest them. Given that novelty satisfaction is an essential component of interest (González-Cutre and Sicilia, 2019), it is reasonable to expect that novelty satisfaction would predict student engagement.

Unfortunately, in addition to the lack of attempt to quantify the association between novelty satisfaction and student engagement, most of the past studies have merely examined aspects of engagement (e.g. Jang et al., 2016; Zhen et al., 2017) as a single factor. In this research, however, each facet of students’ engagement was examined separately. Specifically, this study aimed to investigate the unique relationship of each basic need (autonomy, competence, relatedness and novelty) with the four features of student engagement (behavioural, emotional, cognitive and agentic). Grounded in the above-mentioned theoretical and empirical bases, the following hypotheses were advanced:

- **H1.** Autonomy will positively predict the four aspects of student engagement uniquely.
- **H2.** Competence will positively predict the four aspects of student engagement uniquely.
- **H3.** Relatedness will positively predict the four aspects of student engagement uniquely.
- **H4.** Novelty will positively predict the four aspects of student engagement uniquely.

### 2. Method

The study employed a cross-sectional research design, and data were collected through survey questionnaires.

#### 2.1 Participants

The population of this study comprised undergraduate students in Malaysian public universities. 743 students were recruited from three large public universities in northern Malaysia. A stratified random sampling technique was used. The sample comprised 529 (71.2%) females and 214 (28.8%) males, with a mean age of 21.91 years (SD = 2.82). They were drawn from various courses (40.6% arts and social science, 29.5% information technology and communication, 14.1% science, 13.5% technical and 2.3% education). 22% of the sample were first year students, 37.3% were in their second year, 5.2% were in their third year and 35.5% were in their fourth year. With regards to ethnicity, 58.4% of the students were Malay, 29.2% were Chinese and 12.4% were Indian.

#### 2.2 Procedure

Prior to data collection, the study was approved by the research ethics board. Institutions and lecturers granted permission to conduct the survey in their classrooms. The questionnaires were administered by the primary researcher, who also explained the aim of the research to
the respondents and informed them that their participation was voluntary and would not affect their grades. The researcher remained in the classroom during the survey to clarify any ambiguity in the questionnaire items.

2.3 Measures
Each original English instrument was translated into Malay, the national language of the country, following the back-translation technique with decentering recommended by Brislin (1986). An English-Malay translator from the university’s applied linguistics department translated the original English instrument into the Malay language. The back-translation was made by a Malay researcher fluent in both languages. Any discrepancies found between the translated versions were resolved by consulting language experts. Items were rated on a Likert scale of six points, ranging from strongly disagree to strongly agree. All items of the substantive constructs are provided in the Table A1.

2.3.1 Basic psychological needs satisfaction. Satisfaction of the three basic needs for autonomy, competence and relatedness was measured using the items of the satisfaction subscale from the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015). Beginning with the stem “In this class...”, the scale contains 12 items, with four items measuring each need. Examples of items are as follows: “I feel my choices express who I really am” for autonomy; “I feel capable at what I do” for competence and “I feel connected with people who care for me, and for whom I care” for relatedness. To measure novelty satisfaction, six items from the Novelty Need Satisfaction Scale (NNSS) (González-Cutre et al., 2016) (e.g. “I frequently feel there are novelties for me.”) were interspersed among the items measuring the three needs. Previous studies have reported Cronbach’s alpha of 0.77, 0.77, 0.72 and 0.85 for the autonomy, competence, relatedness and novelty subscales, respectively (Chen et al., 2015; González-Cutre et al., 2016).

2.3.2 Student engagement. Engagement was assessed as a multidimensional factor that included behavioural, emotional, cognitive and agentic aspects. Behavioural engagement (five items) and emotional engagement (five items) were measured by items from the Engagement versus Disaffection with Learning Measurement Scale (Skinner et al., 2009). To measure cognitive engagement, we used four items from the learning strategies subscale of the metacognitive strategies questionnaire (Wolters, 2004). Particularly, this scale describes the cognitive component of engagement as elaboration-based learning strategies (see Reeve, 2013). We adopted the five items of the Agentic Engagement Scale (Reeve, 2013) to measure agentic engagement. Totalling nineteen items, the engagement measure was preceded by the stem “In this class...”. Examples of items are as follows: “I try hard to do well” for behavioural engagement; “I enjoy learning new things” for emotional engagement; “I try to connect what I am learning with my own experiences” for cognitive engagement; and “I ask questions to help me learn” for agentic engagement. Previous studies have reported Cronbach’s alpha of 0.86, 0.90, 0.84 and 0.86 for the behavioural, emotional, cognitive and agentic subscales, respectively (e.g. Reeve, 2013).

2.4 Data analysis
First, descriptive statistics of the variables were computed using SPSS 25. Next, using the structural equation modelling (SEM) approach with latent variables, we performed confirmatory factor analysis (CFA) to evaluate the full measurement model in which we identified basic psychological needs (autonomy, competence, relatedness and novelty) and student engagement dimensions (behavioural, emotional, cognitive and agentic) as latent correlated constructs. Discriminant validity, composite reliability (ρ) and average variance extracted (AVE) were computed for each construct. Discriminant validity is established when correlations among the latent constructs do not exceed the cut-off value of 0.90 (Tabachnick
and Fidell, 2013). Internal consistency and convergent validity are established when the values of composite reliability ($\rho$) and AVE exceed 0.60 (Bagozzi and Yi, 1988) and 0.50 (Hair et al., 2010), respectively.

Before testing our hypothesized model, we tested a model in which only autonomy, competence and relatedness were specified as exogenous constructs. This analysis was carried out to uncover the unique contribution of novelty satisfaction. All models were evaluated using the AMOS 23 statistical package with maximum likelihood method and covariance matrix. The goodness-of-fit of models was examined utilising the following fit indices: the comparative fit index (CFI), the tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA) with 90% confidence interval (CI) and the standardized root mean square (SRMR). The cut-off values defined for model fit were lower than 0.08 for SRMR, equal to or lower than 0.06 for RMSEA and 0.90 or above for CFI and TLI (Hu and Bentler, 1999; Kline, 2011).

3. Results
3.1 Descriptive statistics

The descriptive statistics are shown in Table 1. All the measures showed high internal consistency ranging from 0.85 to 0.90. For all the measures considered, values for skewness (range = −0.54 to −0.01) and kurtosis (range = −0.63 to 0.03) were within −1.00 and + 1.00 range (Leech et al., 2005), which indicated a normal distribution of all variables. Furthermore, we explored whether ethnicity significantly affected the mean scores of all study variables by conducting multivariate analyses of variance. Findings showed no significant differences between ethnic groups on all eight variables: Wilks’ $\Lambda = 0.968$, $F (24, 2123.62) = 1.006, p < 0.455$, multivariate $\eta^2 = 0.01$.

3.2 Confirmatory factor analysis

Prior to testing our hypothesized model, we employed CFA to test the overall measurement model. As mentioned in the data analysis section, this model was specified with eight correlated latent variables (autonomy, competence, relatedness, novelty, behavioural, emotional, cognitive and agentic) and 37 items as indicators. The model revealed an excellent fit to the data as follows: $\chi^2$/df ratio = 2.90 ($\chi^2 = 1744.69$, df = 601), TLI = 0.93, CFI = 0.94, SRMR = 0.03 and RMSEA = 0.05, 90% CI [0.048–0.053]. Table 2 demonstrates the values of composite reliability ($\rho$), AVE, correlations of the latent variables, and loadings.

The findings showed that the values of composite reliability($\rho$) and AVE exceeded the set benchmarks of 0.60 (Bagozzi and Yi, 1988) and 0.50 (Hair et al., 2010), respectively. All loadings of the items on their targeted factors were high and significant. They ranged from the lowest value of 0.71 to the highest value of 0.89. Furthermore, as none of the correlations

<table>
<thead>
<tr>
<th>Number of items</th>
<th>$\alpha$</th>
<th>$M$</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomy</td>
<td>4</td>
<td>0.86</td>
<td>4.46</td>
<td>0.80</td>
<td>−0.26</td>
</tr>
<tr>
<td>2. Competence</td>
<td>4</td>
<td>0.89</td>
<td>4.51</td>
<td>0.77</td>
<td>−0.01</td>
</tr>
<tr>
<td>3. Relatedness</td>
<td>4</td>
<td>0.89</td>
<td>4.63</td>
<td>0.77</td>
<td>−0.19</td>
</tr>
<tr>
<td>4. Novelty</td>
<td>6</td>
<td>0.90</td>
<td>4.66</td>
<td>0.74</td>
<td>−0.27</td>
</tr>
<tr>
<td>5. Behavioural</td>
<td>5</td>
<td>0.90</td>
<td>4.71</td>
<td>0.72</td>
<td>−0.29</td>
</tr>
<tr>
<td>6. Emotional</td>
<td>5</td>
<td>0.90</td>
<td>4.83</td>
<td>0.74</td>
<td>−0.54</td>
</tr>
<tr>
<td>7. Cognitive</td>
<td>4</td>
<td>0.85</td>
<td>4.75</td>
<td>0.67</td>
<td>−0.20</td>
</tr>
<tr>
<td>8. Agentic</td>
<td>5</td>
<td>0.90</td>
<td>4.26</td>
<td>0.90</td>
<td>−0.29</td>
</tr>
</tbody>
</table>

Table 1. Descriptive statistics, internal consistency and distribution of the variables
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>ρ</th>
<th>AVE</th>
<th>Loadings range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomy</td>
<td>–</td>
<td>0.65***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.86</td>
<td>0.62</td>
<td>0.71–0.86</td>
</tr>
<tr>
<td>2. Competence</td>
<td>0.65***</td>
<td>0.57***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.90</td>
<td>0.69</td>
<td>0.78–0.89</td>
</tr>
<tr>
<td>3. Relatedness</td>
<td>0.59***</td>
<td>0.63***</td>
<td>0.66***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.89</td>
<td>0.68</td>
<td>0.81–0.85</td>
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<tr>
<td>4. Novelty</td>
<td>0.59***</td>
<td>0.63***</td>
<td>0.66***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.90</td>
<td>0.61</td>
<td>0.74–0.83</td>
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<tr>
<td>5. Behavioural</td>
<td>0.58***</td>
<td>0.64***</td>
<td>0.63***</td>
<td>0.60***</td>
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<td>–</td>
<td>0.91</td>
<td>0.67</td>
<td>0.79–0.85</td>
</tr>
<tr>
<td>6. Emotional</td>
<td>0.53***</td>
<td>0.59***</td>
<td>0.67***</td>
<td>0.64***</td>
<td>0.68***</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.90</td>
<td>0.66</td>
<td>0.78–0.86</td>
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<tr>
<td>7. Cognitive</td>
<td>0.50***</td>
<td>0.57***</td>
<td>0.62***</td>
<td>0.65***</td>
<td>0.67***</td>
<td>0.72***</td>
<td>–</td>
<td>–</td>
<td>0.86</td>
<td>0.61</td>
<td>0.75–0.82</td>
</tr>
<tr>
<td>8. Agentic</td>
<td>0.53***</td>
<td>0.57***</td>
<td>0.55***</td>
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<td>0.58***</td>
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<td>0.90</td>
<td>0.66</td>
<td>0.74–0.85</td>
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**Note(s):** N = 743, ***p < 0.001
among the latent constructs exceeded the cut-off value of 0.90 (Tabachnick and Fidell, 2013), discriminant validity was well established.

3.3 Structural equation modelling

As explained in the data analysis section, before testing our hypothesized model (see Figure 1), we evaluated a model with the three basic needs as exogenous variables. In this analysis, the two models obtained good fit indices to the data: $\chi^2/df$ ratio = 3.29 ($\chi^2 = 1378.47$, df = 419), CFI = 0.94, TLI = 0.93, SRMR = 0.04 and RMSEA = 0.05, 90% CI [0.052–0.059] for the first model in which we specified the three basic needs as exogenous variables; and $\chi^2/df$ ratio = 2.79 ($\chi^2 = 1665.33$, df = 603), CFI = 0.94, TLI = 0.94, SRMR = 0.04 and RMSEA = 0.04, 90% CI [0.046–0.052] for the model in which we included novelty alongside the three needs. Table 3 summarises the paths coefficients ($\beta$ values) and the explained variances ($R^2$) of both models. It shows that the explained variance of some outcomes (e.g. emotional and cognitive engagement) improved slightly when novelty was added to the

Note(s): Solid lines denote significant relationships, whereas dotted lines denote non-significant relationships. For clarity purposes, we excluded the covariances and indicators. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$
Further, there was a decline in the values of the coefficients ($\beta$ weights) when novelty satisfaction was included in the model.

In addition, the findings of the hypothesized model (Figure 1) showed that autonomy satisfaction predicted agentic engagement ($\beta = 0.13, p < 0.05$), but not behavioural ($\beta = 0.10, p = 0.12$), emotional ($\beta = -0.002, p = 0.99$) and cognitive engagement ($\beta = -0.03, p = 0.70$). Competence satisfaction predicted behavioural ($\beta = 0.32, p < 0.001$), emotional ($\beta = 0.21, p < 0.001$) and cognitive engagement ($\beta = 0.21, p < 0.001$), as well as agentic engagement ($\beta = 0.29, p < 0.01$). Relatedness satisfaction was positively related with behavioural ($\beta = 0.32, p < 0.001$), emotional ($\beta = 0.41, p < 0.001$) and cognitive engagement ($\beta = 0.33, p < 0.001$), and agentic engagement ($\beta = 0.29, p < 0.01$). Lastly, novelty satisfaction predicted behavioural ($\beta = 0.14, p < 0.01$), emotional ($\beta = 0.25, p < 0.001$) and cognitive engagement ($\beta = 0.34, p < 0.001$), but not agentic engagement ($\beta = 0.06, p = 0.32$). The explained variance was 57% for behavioural, 58% for emotional, 55% for cognitive and 44% for agentic engagement.

4. Discussion
This research investigated the role of novelty satisfaction, alongside autonomy, competence and relatedness satisfaction, in predicting each of the four dimensions of student engagement. Research on need for novelty in the field of education, particularly in the higher education context, is very recent (Birdsell, 2018). Hence, focusing on this need provides a better understanding for educators to enhance the teaching-learning process in higher institutions. Furthermore, the inclusion of need for novelty in SDT could also help to refine its propositions in order to provide better explanations regarding students’ motivation (González-Cutre et al., 2020).

Consistent with our hypotheses, we found that the satisfaction of competence and relatedness needs predicted the four types of student engagement significantly. These findings are consistent with the results of earlier studies, which have revealed that basic needs in SDT predicted each aspect of student engagement (e.g. Reeve and Tseng, 2011). In other words, students who are exposed to opportunities that allow for optimal challenges (competence) and responsive relationships (relatedness) are more likely to be engaged behaviourally, emotionally, cognitively and agentially in their learning activities. According to Skinner et al. (2008), basic needs satisfaction is a robust predictor of students’ efforts and persistence as well as their emotional reactions to success and failure. Reeve (2012) highlighted that the fulfilment of basic needs propels students to use sophisticated, deep and self-regulatory learning strategies as well as demonstrate a proactive, intentional and constructive contribution to the flow of their learning activities. According to SDT, the sense of being autonomous, competent and emotionally related to others provides a motivational foundation for high-quality classroom engagement and positive functioning (Niemiec and Ryan, 2009).

Among the four aspects of engagement, autonomy satisfaction predicted agentic engagement only. In this regard, it has been argued that students’ agentic engagement could be viewed as an optimal complement to perceived autonomy as agentic engagement involves students in providing input, making suggestions, and expressing their preferences, while autonomy satisfaction means that students are free to express their thoughts, pursue interests and act volitionally (Reeve and Tseng, 2011). Nevertheless, the current study also found that autonomy satisfaction did not predict behavioural, emotional and cognitive engagement. The interpretation of this result could be supported by evidence from cross-cultural researchers such as Markus and Kitayama (2003), who point out that autonomy is sensitive to cultural values. It has been claimed that being autonomous is only valuable in individualistic societies, whereas in collectivistic societies, individuals are more concerned about caring and harmonious relationships (Iyengar and DeVoe, 2003; Markus et al., 1996). Since this study was carried out in Malaysia, which ranks high in collectivistic cultural values,
(see Fontaine and Richardson, 2005), it is possible that the students were experiencing less sensitivity to autonomy satisfaction.

Except for agentic engagement, students’ novelty satisfaction predicted the three aspects of behavioural, emotional and cognitive engagement positively and significantly. In other words, novelty satisfaction explained additional variances in emotional and cognitive engagement after accounting for the variances in satisfaction of the three needs. In addition to the importance of novelty satisfaction to students’ behavioural engagement (e.g. energy, effort and task persistence), the results reflect that fulfilment of novelty nurtures students’ interest, curiosity and enthusiasm (emotional engagement) as well as deep learning, self-regulation, and elaboration (cognitive engagement) in their learning activities. The incorporation of new content during classroom activities may largely reinforce students’ satisfaction, energy, vigour and intensity of optimal psychological well-being (González-Cutre and Sicilia, 2019). While Sansone et al. (1992) has argued that individuals are more engaged in activities that seek unexperienced things in order to sustain their enjoyment and interest, it is equally important to know that without the pursuit of novelty, students would not be likely to engage in exploratory behaviours to understand themselves and their environment, which may inhibit their personal growth (Kashdan and Silvia, 2009). It is also worth highlighting that the need for novelty has been previously identified as the strongest determinant of students’ intrinsic motivation to know and learn (González-Cutre and Sicilia, 2019). Hence, novelty satisfaction may encourage students’ engagement in activities for the pleasure of learning and development.

Past findings have revealed that novelty satisfaction has a significant association with students’ vitality, motivation, dispositional flow and academic satisfaction in the physical education domain (González-Cutre et al., 2020; González-Cutre and Sicilia, 2019). The present investigation extends the novelty satisfaction literature by showing that the fulfilment of this need is crucial in enhancing behavioural, emotional and cognitive engagement. Therefore, whilst further investigations are needed to validate such findings, taking into account the need for novelty as a candidate need in SDT along with the three basic needs of autonomy, competence and relatedness could provide support towards a better understanding of students’ motivation and engagement.

4.1 Theoretical implications
Considering novelty as a potential basic need in SDT, this study expanded on previous novelty satisfaction research by looking at its unique prediction independent of the other identified needs, on each aspect of student engagement. Experiencing novelty seems to be crucial for interest and enjoyment in learning activities, but it should be accompanied by the satisfaction of autonomy, competence and relatedness needs for students’ optimal performance and for them to be engaged behaviourally, emotionally, cognitively and agentically. Specifically in regards to SDT, which is presently the most commonly used theory of basic needs (Ryan and Deci, 2017), this could mean the addition of a fourth need alongside the three established needs. Given the contribution of novelty to student engagement independent of other needs, the incorporation of novelty could potentially lead to optimal academic functioning. Therefore, the current findings augment the existing literature on novelty as a candidate need in SDT’s proposition by providing further evidence of the criteria concerning the universality of the need for novelty.

4.2 Practical implications
In fostering student engagement, educational practitioners would do well to take into account classroom practices that facilitate the satisfaction of students’ need for autonomy (e.g. providing opportunities for volition and self-decision), competence (e.g. providing
optimally challenging tasks, positive and informational feedback) and relatedness (e.g. supporting warm relationships with peers and lecturers) (Niemiec and Ryan, 2009). In regards to novelty, lecturers could play a critical role by giving varied, unexpected or surprising activities to cultivate students’ curiosity and achieve more satisfactory learning (González-Cutre and Sicilia, 2019). In fact, lecturers’ awareness, involvement and creativity are critical factors in fostering curiosity. More precisely, lecturers can set new strategies that go beyond students’ daily classroom routines by introducing novelty in their content, activities, materials, technologies, spaces, projects and assessment systems. Some of these strategies could perhaps include introducing activities that are out of the ordinary, such as activities outside the classroom (e.g. field-based learning), non-conventional classroom activities (e.g. gamification and friendly competitions), innovative digital materials (e.g. Padlet, Quizlet and Socrative), different assessment practices (e.g. peer assessment and self-assessment) and new delivery approaches (e.g. inviting industry volunteers to present information or concepts). By applying such practices, undergraduate students might devote more attention and effort to learning tasks, learn with a sense of positive emotions (e.g. enjoyment, interest and enthusiasm), adopt more in-depth learning approaches and contribute proactively to the flow of instruction.

4.3 Limitations and future perspectives
Several limitations in the present study should be acknowledged. First, given that novelty might require an appropriate regulatory response from students, it is necessary to know the amount of novelty that should be introduced in the classroom. With regards to this, future studies using intervention methods are needed to analyse prior knowledge of the students in order to establish activities that are genuinely varied and novel and avoid excess of novel stimuli. Second, this study is based on a cross-sectional design that prevented the results from claiming causality between constructs. Thus, longitudinal research that investigates causality is an important area for future research. Third, this study has focused only on students’ perceptions. Therefore, future studies could capture the perceptions of teachers (see Soenens et al., 2012). Fourth, the data were collected using self-reports surveys, which could have caused biased. Future studies should use other methodological instruments, such as interviews and observations. Lastly, the sample in the present study included only Malaysian undergraduates, which somewhat diminishes the generalization of the findings. Thus, future studies could recruit samples involving other educational stages, such as postgraduate students, as well as different cultural backgrounds.

4.4 Conclusion
This research found that novelty satisfaction predicted three aspects of students’ engagement (behavioural, emotional and cognitive) independent of the three basic psychological needs in SDT. The results suggest that novelty is a crucial motivational factor that should be taken into consideration in psycho-educational research, along with the other basic psychological needs proposed in SDT. They also indicate that in order to improve and enhance the quality of cognitive, emotional, agentic and behavioural engagement of students, educators in higher institutions must frequently provide novel and varied activities in their classrooms.

References


Appendix

Constructs and items

Autonomy satisfaction (Chen et al., 2015)
I feel a sense of choice and freedom in the things I undertake
I feel that my decisions reflect what I really want
I feel my choices express who I really am
I feel I have been doing what really interests me

Competence satisfaction (Chen et al., 2015)
I feel confident that I can do things well
I feel capable at what I do
I feel competent to achieve my goals
I feel I can successfully complete difficult tasks

Relatedness satisfaction (Chen et al., 2015)
I feel that the people I care about also care about me
I feel connected with people who care for me, and for whom I care
I feel close and connected with other people who are important to me
I experience a warm feeling with the people I spend time with

Novelty satisfaction (González-Cutre et al., 2016)
I feel I do novel things
I frequently feel there are novelties for me
I feel new sensations
I think that new situations come up for me
I have the opportunity to innovate
I think I discover new things frequently

Behavioural engagement (Skinner et al., 2009)
I try hard to do well
I listen very carefully
I pay attention
I work as hard as I can
I participate in class discussions

Emotional engagement (Skinner et al., 2009)
I enjoy learning new things
I feel good
When we work on something, I feel interested
Class is fun
When we work on something, I get involved

Cognitive engagement (Wolters, 2004)
I try to connect what I am learning with my own experiences
I try to make all the different ideas fit together and make sense
When doing work, I try to relate what I’m learning to what I already know
I make up my own examples to help me understand the important concept I study

Agentic engagement (Reeve, 2013)
I ask questions to help me learn
I let my teacher know what I need and want
I express my preferences and opinions
When I need something, I’ll ask the teacher for it
I let my teacher know what I am interested in

Table A1. Items measured for each construct

Corresponding author
Abderrahim Benlahcene can be contacted at: rahimhacen@gmail.com

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