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Student teachers' psychological needs, subjective experience and perceived competence in teaching during practicum

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ABSTRACT

This paper, using the Self-Determination Theory (SDT) as the underpinning framework, examines student teachers' basic psychological needs, their subjective experience and their perceived teaching competence during practicum. It attempted to establish whether there were distinct groups of student teachers with different needs satisfaction, and how their levels of needs satisfaction were related to the groups' subjective experience and perceived teaching competence. Quantitative data were collected. Data were analysed using cluster analysis and MANOVA. Overall, the results suggest that SDT can be effectively utilized as a framework for looking at how needs satisfaction is related to student teachers' subjective experiences and perceived competence in teaching during practicum. The findings from this study are useful in providing evidence for teacher educators to strengthen their practicum model and plan mentoring workshops. The findings also provide much-needed insights into groups of student teachers that may need more support during practicum. Finally, the findings may help mentors understand their mentees better.

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Self-determination theory; basic psychological needs; student teachers; practicum; subject experiences; perceived competence in teaching

Introduction

The Self-Determination Theory (SDT) is one of the most comprehensive theories on human motivation (Ryan & Deci, 2000b), and a key explanatory system for the understanding of volitional behaviours (Deci & Ryan, 1985, 1991). SDT differentiates the different types of behavioural regulation with different degrees of self-determined motivation (Ryan & Deci, 2000b). According to the SDT, human beings require "nutrients" or "supports from the social environment" to function effectively and to grow (Ryan & Deci, 2000b, p. 262). SDT posits this requirement to be the satisfaction of three innate psychological needs: (a) autonomy, (b) competence, and (c) relatedness. *Autonomy* refers to the feeling to make a choice without being pressured (Ryan & Deci, 2000b). Ryan and Deci (2000b) cited that the conditions of choice and acknowledging feelings will help to facilitate the perception of an internal locus of causality. This will enhance the intrinsic motivation and increase in a person's confidence (p. 234). In contrast, they cited threat, evaluation, and deadlines as conditions that can undermine intrinsic motivation, presumably through a shift towards "a more external perceived locus of causality" (p. 234). *Competence* refers to a person's perception of his or her capability to do well in an activity (Ryan & Deci, 2000c). According to SDT, positive feedback will satisfy the need for competence, thus enhancing intrinsic motivation. In contrast, negative feedback will diminish the need for competence (Ryan & Deci, 2000b). *Relatedness* is defined as the need to feel belongingness and connectedness with others (Ryan & Deci, 2000c), and it is deemed to be important in achieving intrinsic motivation (Ryan & Deci, 2000b).

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Numerous research have shown that the satisfaction of needs facilitates autonomous motivation and adaptive affective and behavioural outcomes, whilst the thwarting of needs is linked to undermining of autonomous motivation and other negative affective and behavioural outcomes (e.g., Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan & Deci, 2000a; Sheldon, Elliot, Kim, & Kasser, 2001; Skinner & Edge, 2002). Nonetheless, limited research has been done with student teachers, especially during practicum. In a one-to-one teaching situation within a laboratory setting, Reeve, Bolt, and Cai (1999) found that when student teachers' need for autonomy was satisfied, they experienced positive emotions, and were oriented towards the satisfaction of the need for autonomy in their students. In contrast, when their need for autonomy was not satisfied, they tended to feel pressured, lost motivation, and experienced a decrease in positive emotions and contact with the students. Likewise, Evelein (2005) found that when the need of autonomy was fulfilled while teaching, student teachers experienced a feeling of being authentic, and had a strong sense of personal and professional development. When their need of relatedness was fulfilled, they reported a feeling of contact, positive connection to their students, and demonstrated behaviour reinforcing it. In addition, Korthagen and Evelein (2016) reported that student teachers' needs satisfaction was linked to positive teaching behaviour.

Given the importance of need satisfaction towards student teachers' developing adaptive teacher behaviours (e.g., satisfaction of need for autonomy in students, positive connection to students) and experiencing positive affective outcomes, more empirical research should be done examining student teachers' level of psychological needs satisfaction during practicum.

In Singapore, all aspiring teachers have to go through teacher preparation at the National Institute of Education (NIE). NIE strives to prepare teachers for their roles by having a value-based teacher education that aids them to become autonomous thinking teachers.

University-based teacher education programmes have often been criticized for having courses that are too theoretical with too little connection to practice (Liu, Tan, & Salleh, 2014). NIE strives to overcome the criticism by looking at its teacher education model and (re)designing and (re)conceptualizing the key component of practicum. In particular, the most significant enhancements to NIE's practicum model happened after the introduction of the Teacher Education model for the 21st Century (TE21) (National Institute of Education, 2009) and the conceptualization of the Autonomous Thinking Teacher Framework (see Figure 1, refer to Tan & Liu, 2015 for details), which led to a greater focus on theory-practice link and purposeful mentoring, and the introduction of the Professional Focused Conversations and e-portfolio (refer to Liu et al., 2014; Liu, Tan, & Wong, 2017 for details).

Key features of NIE's enhanced practicum model

The practicum in NIE is designed as an integral part of teacher preparation. It is the spine of the programmes. It not only provides opportunities for practice, but is designed with the intent of providing a platform for student teachers to reinforce and reflect on key ideas and theories so that they build a deeper understanding of teaching and learning (Liu et al., 2014).

During practicum, student teachers are mentored and guided by their School Coordinating Mentors (SCMs), Cooperating Teachers (CTs) and NIE Supervisors (NIES) through a process of modelling, co-teaching, systematic observations, practice and feedback, structured reflections and professional conversations. (Liu et al., 2014). They also have the chance to actively participate in all aspects of school-based activities. Through these experiences, it is hoped that student teachers will be able to make a stronger connection between theory and practice, and gain the understanding and skills necessary to teach in a variety of classroom situations.

Developmental supervision is at the centre of NIE's practicum model. For instance, for every lesson observation conducted by the mentor, whether CT or NIES, there is a three-stage lesson observation cycle (Liu et al., 2014, Liu et al., 2017; Png & Liu, 2017). The first stage, that is, *the pre-observation conference*, aims to help a student teacher prepare and plan the lesson for observation. In essence, the mentor will check that the lesson plan has appropriate goals and activities for the class, and is workable in terms of pedagogies. He/she will discuss the lesson plan with the student teacher, suggest

Autonomous Thinking Teacher

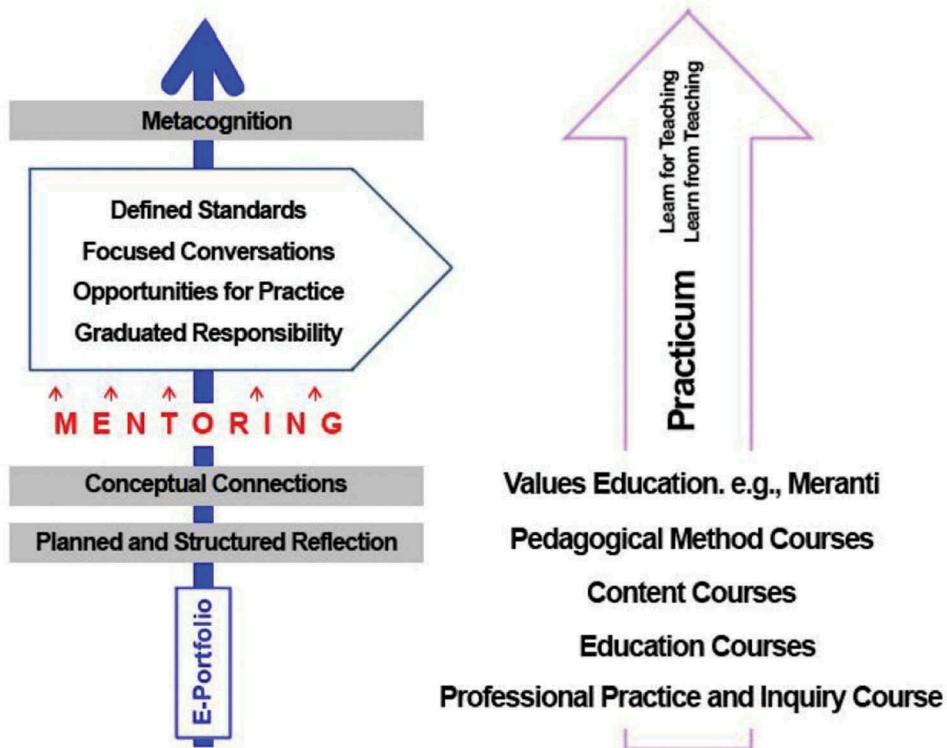


Figure 1. Autonomous thinking teacher framework (Tan & Liu, 2015, p. 141).

modifications, and advise the student teacher on problems that he/she may encounter and how these can be handled, if necessary. Mentors are mindful that the pre-observation conference is not a time for them to instruct their mentees to carry out their preferred teaching strategies. During the conference, the mentor will also discuss with the student teacher the area(s) of focus during observation, for example, classroom management or questioning skills. It is important to agree on some teaching aspects to focus on so that the student teacher will pay special attention to them and not be overwhelmed by the whole experience, and the mentor, in turn, will be able to provide specific feedback on these aspects.

During stage two, that is, *the lesson observation*, the role of the mentor is primarily that of an unobtrusive data-gatherer while the student teacher teaches. The mentor will use the NIE Assessment of Performance in Teaching (APT) form to guide the systematic recording of observations, and will not intervene in the student teacher's teaching. The APT form includes four teaching processes, that is, lesson preparation, lesson implementation, assessment and feedback, and classroom management, as well as a section on professional attributes and attitude (Liu et al., 2014, 2017). Each section is accompanied by a list of clearly defined competencies expected of a beginning teacher. The form is used by the mentors as a tool to provide student teachers with an objective account of the levels of competence achieved, that is, not yet, emerging, satisfactory, proficient or excellent, for the competencies in the teaching processes during the lesson observation.

The design of the NIE APT form is consistent with Shulman and Shulman's (2004) view that, along with various knowledge bases, teaching constitutes a number of processes that require teachers to have a good understanding of the subject matter, the knowledge of what to teach and how to teach, the capability to design and implement instruction, and the ability to assess students' interactions,

learning and development (Liu et al., 2014, 2017). It is also aligned to the position held by many teacher educators that in order to assess the teaching competency of student teachers, the rubric should look at how student teachers plan and implement the lesson; how they communicate with the students; and their attitude and attribute during practicum (e.g., Al-Mutawa & Al-Dabbous, 1997; Brooker, Muller, Mylonas, & Hansford, 1998).

After the lesson observation, that is, during *the feedback conference*, the mentor provides feedback to the student teacher on his/her teaching. The discussion centres on what goes well during the lesson, what areas require improvement and how to improve them. The same feedback cycle is repeated for subsequent lesson observations throughout the practicum. It is important to emphasize that the focus of the analysis is on student learning and the ways in which the teaching facilitated the learning.

In the NIE enhanced practicum model, "learning to teach is more than the mastery of a list of competencies or teaching techniques. It is about the development of the whole person in terms of knowledge, experiences, beliefs and values ... " (Liu et al., 2017, p. 205). Thus, student teachers are assessed holistically through multiple sources of evidence that include the APT forms, observational data, lesson plans, reflections, as well as samples of student work and feedback given by the student teachers to the students (Liu et al., 2014).

Apart from developmental supervision, another new feature of the enhanced practicum model is the **Focused Conversation** (FC, see Liu et al., 2017, for details). FC gives student teachers and their SCMs an avenue to engage in professional conversation that is directed so that they can discuss about the student teachers' teaching, and work through issues they face in class. It provides student teachers with a platform for (a) getting support and guidance from their SCMs in making sense of their experience, (b) co-constructing knowledge with their mentors pertaining to teaching and learning, and (c) fostering emotional bonds with their peers and future colleagues. If done well, FC should facilitate a culture of openness and trust in the mentoring process.

Finally, student teachers keep a **Professional Practice and Inquiry** (PPI) portfolio to help them integrate and aggregate their learning throughout the programme (see Liu et al., 2017). The portfolio provides a platform for the student teachers to reflect and organize what they have learned throughout their coursework and practicum. It encourages them to document their growth, and co-construct their learning with their mentors. Specifically, at the start of the practicum, the student teachers attempt to make their thinking visible by articulating their conceptual map of learning gleaned from coursework. They share with their mentors their teaching philosophy, beliefs, and their "learning for teaching". The articulation of their conceptual map helps them make connections between courses. During the practicum, they collate artefacts such as lesson plans, reflections, feedback, FC notes, video snippets and/or student work. At the end of the practicum, they do another sharing with their mentors as a means of consolidating their learning experience. They talk about how the practicum has shaped their conception of teaching and learning, and has helped them develop their teaching competencies.

With the enhancements in place, it would be important to examine the student teachers' perceptions and subjective experience during practicum, especially in terms of their psychological needs' satisfaction. The enhanced practicum model would not achieve its objectives of developing autonomous thinking teachers if the student teachers do not feel supported and cared for by their mentors.

Liu and Wang's (2011) study on the first phase of the NIE's Enhanced Practicum Model established that the PGDE student teachers ($N = 854$, 2010 cohort) had moderate competence and autonomy, but high relatedness. In addition, they had moderate enjoyment and pressure, but the high effort and relatively high value of practicum. They also had relatively high perceived competence in lesson preparation, delivery, classroom management, and feedback and evaluation, and high professional attributes and attitudes. The positive results provided NIE with a good basis to continue working on phase two of the enhanced practicum model, which included the introduction of the FC and PPI Portfolio.

Furthermore, Liu and Wang (2011) found that there were three distinct clusters of student teachers in terms of their levels of needs satisfaction. In essence, the results revealed a High Needs Satisfaction cluster, a Moderate Needs Satisfaction cluster and a Low Needs Satisfaction cluster. The three clusters

differed significantly in terms of their subjective experiences and perceived teaching competence. The High Needs Satisfaction cluster reported high enjoyment, effort and value, low pressure, as well as high perceived teaching competence of their teaching and professional attitude. The Moderate Needs Satisfaction cluster had moderate subjective experiences, as well as perceived teaching competence and professional attitude. The Low Needs Satisfaction had extremely low RAI (controlled motivation), enjoyment, valuing of practicum, perceived competence in four teaching processes, professional attitude, as well as high pressure. It has to be noted that Liu and Wang's (2011) study was done before phase two of the NIE's enhanced practicum model, that is, the introduction of FC and PPI portfolio.

Practicum is generally considered one of the most valued and prized part of teacher preparation. In the Singapore context, it is also of high stakes because if the student teachers fail their practicum or re-practicum, they could be terminated from the programme. Hence, to have a comprehensive understanding of the student teachers' experience under the enhanced practicum model, it is imperative that we examine outcomes such as student teachers' valuing of practicum and their level of pressure during practicum. It is probable that student teachers would feel a fair level of stress and pressure. Effort is seen as a reflection of a teacher's commitment. From this perspective, the amount of effort a student teacher puts into practicum may be an indication of his/her commitment as a teacher-to-be. Thus, the effort will also be included as an outcome in this study.

Research questions

Considering the importance of needs satisfaction on developing adaptive teacher behaviours (e.g., satisfaction of need for autonomy in students, positive connection to students) and facilitating adaptive outcomes, it is disappointing that so few studies have examined student teachers' experience during practicum. To fill the empirical gap, the following research questions were formulated:

- What are the levels of needs satisfaction of student teachers under the enhanced practicum model?
- Are there distinct clusters of student teachers in terms of their basic psychological needs?

Are there cluster differences in terms of student teachers' levels of enjoyment, value, effort and pressure during practicum?

Are there cluster differences in terms of student teachers' perceived competence in lesson preparation, lesson implementation, feedback and evaluation, and classroom management?

Methods

Participants

The participants were student teachers from three teachers preparation programmes. They were the Diploma in Education programmes (n = 216), the Bachelor of Art (Education) and Bachelor of Science (Education) programmes (n = 165), and the Postgraduate Diploma in Education (n = 357) programmes.

Research design and instrument

To measure student teachers' autonomy, competence, and relatedness, the Basic Need Satisfaction at Work questionnaire (Baard, Deci, & Ryan, 2004) was adapted for use in Liu and Wang (2011), as well as the current study. Sixteen items were drawn from the original scale of 21 items, and were adapted for use in the practicum context. Specifically, six items were used to assess autonomy (e.g., "I feel free to express my ideas and opinions during my practicum"); six items were used to measure competence (e.g., "During practicum, I often did not feel very capable"); and four items were used to measure relatedness (e.g., "My CTs cared for me"). Student teachers rated themselves on a 5-point

Likert scale, from 1 (*not true at all*) to 5 (*very true*). The mean scores of three needs were computed from the means of the relevant items in the scales.

The Intrinsic Motivation Inventory (IMI) is a multidimensional measurement device intended to assess participants' subjective experience related to a target activity in laboratory experiments (McAuley, Duncan, & Tammen, 1989). The instrument has seven subscales but only four were used in this study, that is, participants' enjoyment (four items) (e.g., "Practicum was fun"), value (five items) (e.g., "I think practicum is important"), effort (four items) (e.g., "I put a lot of effort into practicum"), and pressure (four items) (e.g., "I felt pressured during practicum"). Student teachers rated themselves on a 5-point Likert scale, from 1 (*not true at all*) to 5 (*very true*). The mean scores of the four scales were computed from the means of the items in the scales.

Student teachers were asked to assess their perceived competence in four teaching processes of Lesson Preparation (5 items) (e.g., "delineate appropriate learning objectives"), Lesson Implementation (10 items) (e.g., "introduce and conclude lesson appropriately"), Feedback and Assessment (3 items) (e.g., "give appropriate and timely feedback to students") and Classroom Management (5 items) (e.g., "set and enforce classroom rules/routines effectively"). The items were adapted from the APT form used for classroom observations. Student teachers rated themselves on a 5-point Likert scale, from 1 (*not true at all*) to 5 (*very true*). The mean scores of the four scales were computed from the means of the items in the scales.

Data analyses

Confirmatory Factor Analyses (CFA), using the Robust Maximum Likelihood Estimation method, were conducted to examine the validity of the measures followed by computation of alpha coefficients. EQS for Windows 6.1 was used for the CFAs (Bentler, 2006). The Bentler-Bonett normed fit index (NFI), comparative fit index (CFI), and mean square error of approximation (RMSEA) were used in the evaluation of model fit to the data. For the NFI and CFI, the conventional cut-off values of close to 0.90 were used (Hu & Bentler, 1999). For RMSEA, the value close to .08 was used as the cut-off. Descriptive statistics of the main variables were computed. Thereafter, cluster analysis was used to identify distinct groups of student teachers with similar patterns of needs satisfaction. In the current study, before the cluster analysis was carried out, all the variables were standardized using Z-scores ($M = 0, SD = 1$). The hierarchical cluster analysis was performed using Ward's method, with Euclidean distance as a measure of similarity (see Hayenga & Corpus, 2010), and the three psychological needs as the clustering variables. Ward's method was chosen as the clustering method to minimize the within cluster differences and avoid long, snake-like chains associated with other clustering methods (Aldenderfer & Blashfield, 1984). The dendrogram showed the first large discrepancy in the rescaled distance when four clusters were combined into three clusters. Hair, Black, Babin, Anderson, and Tatham (2006) professed that a larger discrepancy means that more dissimilar solutions were merged. As such, the decision was made that a four-cluster solution was most suitable for the data.

To determine whether the clusters differed according to their basic psychological needs, subjective experience and perceived competence in teaching, three MANOVAs were conducted using cluster as the independent variable and the basic psychological needs, subjective experience and perceived competence in teaching as dependent variables, respectively. Follow-up one-way ANOVAs and post hoc comparisons using the Bonferroni test to control for Type I error were carried out thereafter to examine the differences between each pairs of clusters.

Results

CFA for the measures

CFA on the three needs showed acceptable fit indices (Scaled $\chi^2 = 382.56, df = 96, p < .001, NFI = .907, CFI = .928, RMSEA = .064, 90\% CI \text{ of } RMSEA = .057, .070$). The alpha coefficients for autonomy ($\alpha = .80$,

relatedness ($\alpha = .87$), and competence ($\alpha = .81$) were satisfactory as they exceeded the .80 threshold identified by Nunnally (1978). Likewise, CFA on the four-factor IMI showed acceptable fit indices (Scaled $\chi^2 = 324.55$, $df = 108$, $p < .001$, NFI = .939, CFI = .958, RMSEA = .052, 90% CI of RMSEA = .046, .059). Cronbach alphas for enjoyment, effort, pressure, and value were .90, .82, .84, and .84, respectively. Similarly, CFA on the four teaching processes showed acceptable fit indices (Scaled $\chi^2 = 509.67$, $df = 219$, $p < .001$, NFI = .925, CFI = .955, RMSEA = .042, 90% CI of RMSEA = .038, .047). The alpha coefficients for lesson preparation ($\alpha = .85$), lesson implementation ($\alpha = .90$), classroom management ($\alpha = .88$), and feedback and assessment ($\alpha = .84$) were satisfactory.

The means, standard deviations, alpha coefficients of the main variables are presented in Table 1.

In this study, a mean below 3 would be regarded as low, any range from 3 to 4 is regarded as moderate, and range above 4 is regarded as high. The results showed that the student teachers had high relatedness, but moderate autonomy and competence. In addition, they had high value and effort, but moderate enjoyment and pressure. They also had moderate to high perceived competence for the four teaching processes (3.90–4.02).

Cluster analysis

The cluster analysis revealed that the four clusters had the following characteristics. Cluster 1 ($n = 115$) was characterized by low competence. Specifically, the z-score was extremely low for competence (-1.05), and were moderate for autonomy (-0.25) and relatedness (-0.10). This cluster was labelled as “*low competence (moderate autonomy and relatedness)*”.

Cluster 2 ($n = 150$) had low z-scores for the three psychological needs, namely, autonomy (-1.35), relatedness (-1.39) and competence (-1.00). The cluster was labelled as “*low psychological needs*”.

Cluster 3 ($n = 246$) was characterized by moderate psychological needs. Specifically, this cluster had z-scores of 0.21 for competence, and close to zero for autonomy (0.01) and relatedness (-0.02). The cluster was labelled as “*moderate psychological needs*”.

Cluster 4 ($n = 228$) was characterized by extremely high psychological needs. The z-scores were extremely high for autonomy (1.00), relatedness (0.99) and competence (0.96). This cluster was labelled as “*high psychological needs*”.

The first one-way MANOVA was conducted to determine the effect of cluster on the three dependent variables, autonomy, competence and relatedness. Results indicated that the four clusters differed significantly in terms of needs satisfaction, $F(9, 1784) = 297.65$, $p < .001$; Wilk's $\Lambda = 0.107$; partial $\eta^2 = .53$. A follow-up one-way ANOVA on each dependent variable revealed that there were significant cluster differences for all three psychological needs, namely, autonomy [$F(3, 735) = 555.99$, $p < .001$; partial $\eta^2 = .69$], competence [$F(3, 735) = 504.75$, $p < .001$; partial $\eta^2 = .67$] and relatedness [$F(3, 735) = 560.70$, $p < .001$; partial $\eta^2 = .70$]. Going by the general rules of thumb by Cohen (1988), where a partial η^2 of 0.01 is considered small, 0.06 is considered medium, and 0.14 is considered large, the partial η^2 indicated strong effect sizes between clusters for the three psychological needs.

Table 1. Means, standard deviations, alphas of the key variables.

Variable	M	SD	α
Autonomy	3.52	.74	.80
Competence	3.76	.69	.81
Relatedness	4.18	.73	.87
Enjoyment	3.38	.98	.90
Value	4.01	.66	.84
Effort	4.36	.63	.82
Pressure	3.33	.94	.84
Lesson Preparation	4.00	.50	.85
Lesson Implementation	3.90	.50	.90
Feedback and Assessment	3.94	.56	.84
Classroom Management	4.02	.56	.88

Table 2. Comparison of basic psychological needs by clusters.

Variable	Cluster 1 Low Competence (n = 115)		Cluster 2 Low needs (n = 150)		Cluster 3 Moderate needs (n = 246)		Cluster 4 High needs (n = 228)	
	M	SD	M	SD	M	SD	M	SD
Autonomy	-.25 _a	.57	-1.35 _b	.57	.01 _c	.54	1.00 _d	.55
Competence	-1.05 _a	.49	-1.00 _a	.69	.21 _b	.47	.96 _c	.62
Relatedness	-.10 _a	.66	-1.39 _b	.64	-.03 _a	.60	.99 _c	.33

Row means with different subscripts differ significantly at $p < .001$.

The post hoc Bonferroni comparisons to the univariate ANOVA of the three psychological needs are shown in [Table 2](#).

The second one-way MANOVA was conducted to determine the effect of cluster on the four subjective experiences as the dependent variables. The results revealed that there were statistically significant cluster effect in terms of their subjective experiences, $F(12, 1936.98) = 36.03, p < .001$; Wilk's $\Lambda = 0.587$; partial $\eta^2 = .163$. A follow-up one-way ANOVAs on each dependent variable established that there were statistically significant cluster differences for all subjective experiences, namely, enjoyment [$F(3, 735) = 116.38, p < .001$; partial $\eta^2 = .32$], value [$F(3, 735) = 46.06, p < .001$; partial $\eta^2 = .16$], effort [$F(3, 735) = 5.015, p < .005$; partial $\eta^2 = .02$] and pressure [$F(3, 735) = 83.45, p < .001$; partial $\eta^2 = .25$]. Apart from a small effect size for effort, the partial η^2 indicated strong effect sizes between clusters for the other subjective experiences. The post hoc Bonferroni comparisons to the univariate ANOVA of the four subjective experiences by clusters are shown in [Table 3](#).

Finally, to find out whether there was any cluster effect for perceived competence in the four teaching processes, a third one-way MANOVA was conducted using cluster as the independent variable, and the four teaching processes as the dependent variables. The results revealed that there were statistically significant cluster effect, $F(12, 1936.98) = 13.56, p < .001$; Wilk's $\Lambda = 0.81$; partial $\eta^2 = .069$.

A follow-up one-way ANOVAs on each dependent variables revealed that there were statistically significant cluster differences for perceived levels of competence in the four teaching processes, namely, lesson preparation [$F(3, 735) = 48.29, p < .001$; partial $\eta^2 = .17$], lesson implementation [$F(3, 735) = 35.31, p < .001$; partial $\eta^2 = .13$], feedback and evaluation [$F(3, 735) = 30.37, p < .001$; partial $\eta^2 = .11$] and classroom management [$F(3, 735) = 26.47, p < .001$; partial $\eta^2 = .10$]. The partial η^2 indicated medium to strong effect sizes between clusters for the four teaching processes. The post hoc Bonferroni comparisons to the univariate ANOVA of the four teaching processes by clusters are shown in [Table 4](#).

Overall, the high needs cluster had the most positive subjective experiences and significantly higher perceived competence in teaching processes compared to all the other clusters. It is noteworthy that none of the differences between the low competence (moderate autonomy and relatedness) and low psychological needs clusters was significant for subjective experiences and perceived competence in the four teaching processes.

Table 3. Comparison of subjective experiences by clusters.

Variable	Cluster 1 Low Competence (n = 115)		Cluster 2 Low needs (n = 150)		Cluster 3 Moderate needs (n = 246)		Cluster 4 High needs (n = 228)	
	M	SD	M	SD	M	SD	M	SD
Enjoyment	-.48 _a	.83	-.76 _a	.81	.00 _b	.80	.74 _c	.85
Value	-.36 _a	.96	-.44 _{ab}	1.00	-.08 _{ac}	.88	.56 _d	.89
Effort	-.14 _a	1.07	-.14 _a	1.09	-.03 _a	.97	.20 _a	.91
Pressure	.48 _a	.79	.65 _a	.83	-.01 _b	.82	-.66 _c	.97

Row means with different subscripts differ significantly at $p < .001$.

Table 4. Comparison of perceived levels of competence in teaching processes by clusters.

Variable	Cluster 1 Low Competence (n = 115)		Cluster 2 Low all needs (n = 150)		Cluster 3 Moderate all needs (n = 246)		Cluster 4 High all needs (n = 228)	
	M	SD	M	SD	M	SD	M	SD
Lesson preparation	-.40 _a *	.85	-.47 _a	.94	-.04 _b *	.82	.55 _c	1.02
Lesson implementation	-.49 _a	.77	-.31 _{ab}	1.02	-.02 _b	.85	.47 _c	1.04
Feedback and evaluation	-.46 _a	.92	-.28 _{ab}	.99	-.03 _b	.82	.45 _c	1.04
Classroom Management	-.49 _a	.90	-.21 _{ab}	1.03	-.02 _b	.92	.41 _c	.96

Row means with different subscripts differ significantly at $p < .001$, except * differ significantly at $p < .005$.

Discussion

The results established that the student teachers had high relatedness and moderate competence and autonomy. They are consistent with those reported by Liu and Wang (2011). The findings affirm that student teachers in Singapore are cared for and supported by their mentors during practicum. They also feel relatively competent and enjoy a level of autonomy. Largely, the finding suggests that the enhanced practicum model that incorporates developmental supervision, FCs and PPI supports student teachers' basic psychological needs.

The current result on "relatedness" is encouraging as Pinder (2008) found that the "what" and "how" that student teachers learn during practicum is largely determined by their ability to find their way and manage their cognitive, physical, emotional, and social interactions with a range of people. Pinder also noted that there are important links between personal relationships, emotions, and personal attributes. Interestingly, amongst the three needs, Ryan and La Guardia (1999) contended that relatedness could be more difficult to promote as it involves honest caring and sincere concerns. It may not be something that can easily be instilled in people; whereas autonomy and competence, considered to be less personal principles, might be easier to "teach". In the current study, it would mean that perhaps not much could be done if student teachers do not feel a sense of care and concern from their mentors. This is thankfully not a concern.

Nonetheless, it is noteworthy that the mean for autonomy was only 3.52 (out of a 5-point scale). Considering that low need satisfaction for autonomy is linked to negative emotions such as doubt, anger and fear (Reis et al., 2000; Sheldon et al., 2001), and stagnation in growth (Ryan & Deci, 2000a), more should be done in supporting student teachers' need for autonomy.

For cluster analysis, the results established that there are four clusters of student teachers in terms of their needs satisfaction. The four clusters were the low competence (moderate autonomy and relatedness) cluster, as well as the low, moderate and high needs clusters. The clusters had significantly different levels of psychological needs. The only exceptions were (i) the low competence and the low needs clusters had comparable levels of competence, and (ii) the low competence and moderate needs clusters had comparable levels of relatedness.

In essence, the high needs cluster had significantly higher subjective experiences and perceived competence in all the four teaching processes compared to the other clusters. The only exception was for effort. Although there was a cluster effect, the effect size was small, and there was no significant difference between each pairs of clusters. Overall, the results provide support to the SDT's contention that the basic psychological needs are nutrients for effective functioning, well-being and growth (Ryan & Deci, 2000b). They are also consistent with Evelein, Korthagen, and Brekelmans' (2008) findings that showed that the basic psychological needs are essential to the psychological health and growth, the intrinsic motivation and optimal functioning of student teachers during practicum. In addition, the results shared a similar pattern to that of Liu and Wang (2011) for the high, moderate and low psychological needs clusters, although with the exception of lesson preparation, the differences between the other three teaching processes between the moderate and the low needs clusters were not statistically significant in this study.

The low needs cluster (Cluster 2) is a cause for concern as the student teachers had extremely low autonomy, relatedness, and competence. This could be due to several reasons such as the way they were mentored by their mentors; the culture of the schools that they were posted to during their practicum and/or their personal attitude and attributes towards practicum. There is a need to examine the possible contributing reasons for this group of student teachers, perhaps through a more in-depth qualitative study. The results are in line with Ryan and Deci (2000b)'s contention on how thwarting the three basic needs can lead to many undesirable outcomes such as developing compensatory motives, maladaptive motivation, and undesirable behaviour pattern.

The low competence (moderate autonomy and relatedness) group was not observed in the earlier study by Liu and Wang (2011). Although the cluster had significantly higher autonomy and relatedness than the low needs cluster, none of the differences for the student teachers' subjective experience or perceived competence in the teaching processes was statistically significant. In a sense, it suggests that low competence is so detrimental that their moderate levels of autonomy and relatedness are not sufficient to affect their enjoyment, value, effort and pressure, or perceived competence in teaching during practicum. The finding clearly shows the importance of addressing low competence in student teachers during practicum.

Implications to teacher educators

Considering that the three needs are nutrients for growth and well-being (Ryan & Deci, 2000b), teacher educators may want to take a look at their practicum models to see how the processes can be enhanced to facilitate needs satisfaction. For instance, there is evidence to suggest that cognitive and instructional features such as the collective construction of ideas and discussion of teaching strategies can satisfy students' basic needs (Karaarslan, Ertepinar, & Sungur, 2013), so such opportunities should be incorporated into the practicum process. In the context of NIE, in addition to the existing FCs and PPI, opportunities such as setting up a platform for student teachers to work together in co-constructing their lesson plans and sharing resources can be explored. From another perspective, teacher educators should help student teachers understand the difference between satisfaction and non-satisfaction of their basic psychological needs as it will help them make sense of what is happening within them as they enter into the teaching profession (Evelein et al., 2008).

Furthermore, the current findings have important implications in terms of mentor preparation. In essence, mentors need to understand the importance of student teachers' needs satisfaction, and be cognizant that their interactions with them can facilitate or thwart their basic psychological needs. They should be aware that their mentees are unlikely to feel competent the moment they step into school for practicum unless they are guided by them (Evelein et al., 2008). They need to know that they have to help student teachers acquire a sense of competence through support and guidance, and they are an important source of confidence (Caires & Almeida, 2007; Sampson & Yeomans, 1994). Mentors should also strive to adopt more informational autonomy-feedback to promote student teachers' sense of autonomy and competence (Reeve, Jang, Hardre, & Omura, 2002). Finally, their effort in building a relationship with their mentees will support them in their growth and even alleviate the pressure they feel during practicum.

Limitations

Although the results are interesting, the study has its limitations. The participants of the current study were only given a post-practicum survey, which was part of the Beginning Teachers Orientation Programme. Hence, the feedback gathered was only on how the student teachers felt after their practicum. It would be good to use the pre- and post-test method for future study because it provides a measure of the participants' knowledge, beliefs, feelings or behaviour prior to the start of the study. This can be helpful in refocusing the information to be presented while providing

a point of comparison from the beginning to the end (Ary, Jacobs, Razavieh, & Sorensen, 2006). In the current study, permission for conducting a pre-test was not granted because there was not enough time during the practicum briefing.

The results gathered were quantitative. A mixed method of combining qualitative and quantitative research designs would help to triangulate the results and offer more insights into the experience and feelings of the student teachers during practicum.

The current study measured a limited set of indicators such as basic psychological needs, student teachers' levels of enjoyment, effort, value and pressure, as well as their perceived competence in teaching. For future studies, the indicators could increase to areas such as behavioural regulations, mentor autonomy support and even the roles of mentors so that we have a more comprehensive picture of student teachers' experience during their practicum.

Conclusion

The present study affirmed that the student teachers' needs satisfaction are associated with their perceived levels of enjoyment, effort, value and pressure, as well as their perceived competence in teaching. The results support the SDT's postulation that the three innate psychological needs are crucial for growth and personal well-being (Deci & Ryan, 1985, 1991). In addition, this study established that competence may be the most important predictor of student teachers' subjective experience and perceived competence in teaching. Although it is conceivable that student teachers want the autonomy to decide on the what and how of teaching, they need to feel competent with the support given through scaffolding and a close relationship with their mentors. This finding has meaningful implication for practice and should be highlighted during mentor preparation programmes.

The findings in this research offer useful insights, especially into the distinct groups of student teachers with varying levels of needs satisfaction. Teacher educators may consider the use of the current findings to enhance their practicum models, design mentoring programmes and interventions for the low psychological needs and low competence (moderate autonomy and relatedness) clusters. For NIE, the results are highly encouraging and they show that the enhancements in practicum are steps in the right direction. The next phase is perhaps to focus on mentors, and get them to consciously work on facilitating student teachers' basic psychological needs during practicum.

Disclosure statement

No potential conflict of interest was reported by the authors.

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