SUPERVISORY PRACTICES FOR INTRINSIC MOTIVATION OF DOCTORAL STUDENTS: A SELF-DETERMINATION THEORY PERSPECTIVE

Vijay Kumar*	University of Otago, Dunedin, New Zealand,	Vijay.kumar@otago.ac.nz
Amrita Kaur	School of Education and Modern Languages, University Utara Malaysia, Sintok, Malaysia	amrita@uum.edu.my

* Corresponding author

ABSTRACT

Aim/Purpose	The quality, degree of effort and persistence required in doctoral studies can be sustained through intrinsic motivation. Despite the critical role of motivation, studies that examine ways to promote doctoral students' motivation are lacking. This study, drawing on the self-determination theoretical (SDT) framework, aims to offer advice for supervisory practices to facilitate the satisfaction of three basic psychological needs- autonomy, competence and relatedness of doctoral students' motivation. The focus was on the experiences of the doctoral candidates who participated in this study.
Background	Prior studies have established that creating environment and ways that lead to satisfaction of three basic psychological needs are capable of producing optimal outcomes. Based on that assumption the current study explores the ways in which supervisory practices lead to satisfaction of the three needs.
Methodology	The study adopted a qualitative approach and used the experience sampling method to collect data from 11 full-time doctoral students from a research-intensive university in New Zealand. In total, 72 entries that captured students' real-time psychological experience of supervision in a repeated manner were used to analyse the data.
Contribution	It proposes theory driven practices/guidelines for supervisors to adopt for effective supervisory practices for intrinsic motivation of doctoral students.
Findings	Thematic analysis guided by the research question revealed that to have students experience autonomy support the supervisors must respect students' research

interest, encourage self-initiation, and be amenable to changes suggested by the students. To have students experience the feeling of competence, the supervisors carefully need to consider the quality, mode and time of feedback and provide students with optimal challenge level. Finally, to facilitate students' need for relatedness, the supervisors should offer personal and professional support to students and look after their emotional well-being.

Recommendations for Practitioners	This study highlights the need for supervisors to acknowledge the role of need satisfaction and mindfully adopt the practices to facilitate the satisfaction of the three needs for the intrinsic motivation of the doctoral students.
Recommendation for Researchers	The researchers should consider the psychological health and well-being of doctoral students for persistence and successful completion of their studies.
Impact on Society	The study can help improve doctoral studies completion rates as well as produce doctoral candidates with a positive and healthy disposition for future workforce.
Future Research	The current study relies only on students' self-report data. In future inclusion of data from supervisors of their own practices would enhance the quality of findings. Additionally, an analysis to chart changes in students' experiences over time would provide a deeper understanding of the effect of supervisory practices.
Keywords	higher education, supervisory practices, doctoral studies, motivation, self-determination theory

INTRODUCTION

Supervising postgraduate students is undoubtedly a complex craft to be practised in teaching and learning in higher education since it requires synergy between multiple components for effective outcomes (Seagram, Gould, & Pyke 1998; Pearson & Brew 2002). Traditionally, competencies and skills' gain, degree completion on time, students' satisfaction with the doctoral experience and overall well-being of doctoral students are attributed to the quality of doctoral supervision (Pyhältö, Stubb, & Lonka 2009; Scaffidi & Berman 2011). Other factors attributed to effective supervision include good communication, approachability and rapport, listening skills, appreciation of individual differences and supervisors being a mentor for life (Lee, Dennis, & Campbell, 2007; Janssen, 2005; Kiley, 1993). Conversely, supervisory practices characterised by lack of communication and interest, unrealistic expectations, interpersonal friction and poor supervisory relationship are associated with low levels of well-being, poor quality of doctoral experiences, extended degree completion time and most importantly, high dropout rates (Dysthe, Samara, & Westrheim 2006; Hasrati, 2005).

A particularly interesting finding from studies on effective supervision is that candidates value the psychological dimensions the most (e.g., support, availability, interest and enthusiasm) rather than the mere technical dimensions in supervision (Kiley, 1993). Hence, psychological support in supervisory practices significantly determines the success of doctoral studies. The underlying mechanism of the relationship between quality supervision and successful degree completion is explained by the quality of students' experiences and degree of effort they have invested in doctoral studies. In other words, effective supervision practices are those incorporating psychological dimensions that offer quality motivational experiences to enable doctoral students to persist and invest quality effort to accomplish the degree successfully.

Evidence suggests that despite positive factors, such as intellectual or material support, doctoral students' ability to persist in their studies and engage with dedication, enthusiasm and absorption against the challenges associated with it is considered a key to success in doctorate studies (Vekkaila, Pyhältö, & Lonka, 2013). As a result, a significant number of investigations on doctoral education have fo-

cused on finding ways to enhance doctorate students' persistence and engagement (e.g., Hoskins & Goldberg, 2005; Stubb, Pyhältö, & Lonka 2014 Vekkaila et al., 2013). Among various predictors of students' persistence and engagement, the most common variable is motivation, which has been comprehensively investigated in a variety of educational contexts and has been consistently found associated with positive learning experiences (Orsini, Binnie, & Tricio, 2018), improved learning outcomes (Cerasoli & Ford, 2014), effort (Miller, Ramirez, & Murdock, 2017), engagement (Cheon, Reeve, & Song, 2016), student satisfaction (Wach, Karbach, Ruffing, Brünken, & Spinath, 2016) and enhanced well-being (Duineveld, Parker, Ryan, Ciarrochi, & Salmela-Aro, 2017). In-depth and focused studies exclusively on the role of motivation are not common in doctoral studies (Sverdlik, Hall, McAlpine, & Hubbard 2018), despite the critical role of motivation. Supervisory practices exhibit a close link with doctoral students' motivation; however, a nuanced understanding of the kind of supervisory practices that can support motivational dynamics of doctorate students' towards effective functioning, persistence and engagement is largely missing in the literature. It has been reported that in doctoral studies, attrition rates are high and challenges to psychological and physiological well-being result in high levels of depression, stress, anxiety and other negative emotions (Hyun et al., 2006; Virtanen, Taina, & Pyhältö, 2016) and affect physical well-being adversely (Kernan, Bogart, & Wheat, 2011). Acknowledging the relevance of psychological well-being for doctoral students' persistence in degree completion and dearth of focus on this area in doctoral education, the current study adopts a psychological approach to address motivational dynamics by utilizing the self-determination theory (SDT) framework to identify the supervision practices that can support basic psychological needs for motivational dynamics of doctoral students. We envisage that theory driven practices would encourage superiors to mindfully provide support for students' psychological needs satisfaction to replace the prevalent arbitrary methods employed by them in regular supervisory practices.

BASIC NEED SATISFACTION: MOTIVATIONAL NUTRIENTS

The underlying assumption of motivation in SDT concerns energy, direction and persistence towards an endeavour (Ryan & Deci 2000). SDT is a theory of motivation and well-being with a premise that the satisfaction of three basic psychological needs—autonomy, competence and relatedness—is pivotal and inherent to all human beings. The fulfilment of these needs creates an energising effect on individuals for experiencing subjective vitality, positive energy and arousal, which, in turn, motivate human beings for optimal functioning and high-quality performance (Deci & Ryan, 2000).

In educational contexts, 'autonomy' need satisfaction refers to the sense of volition and psychological freedom, being heard and acknowledged and a sense of choice with respect to deciding and pursuing learning goals. In relation to supervision, this may indicate that a candidate is able to exercise own choice, be less reliant and take control of the project. 'Competence' need satisfaction involves feelings of self-efficacy, ability to undertake and master challenging tasks and opportunity to exercise one's capacity. As in doctoral studies, this may indicate that candidates feel efficacious and assertive about the project. 'Relatedness' need satisfaction concerns ability to interact and connect, and experience warmth, care and belongingness with significant others. In the doctoral supervision context, this may indicate a bond and a sense of connection established between the supervisor and the candidate. These three psychological needs are innate to all individuals across cultures, age and genders and are considered inner motivational resources whose satisfaction leads to higher quality of engagement with the task (Reeve & Jang, 2006).

SDT also proposes distinct types of motivations on the basis of locus of causality (internal or external), which may range from impersonal to extrinsic and intrinsic (see Ryan & Deci, [2000]). The two main types, at the end of both sides of the continuum, are extrinsic and intrinsic motivation. Extrinsic motivation refers to performing an activity for external reasons or because of coercion. In contrast, intrinsic motivation refers to performing activities for their inherent satisfaction. Each of these motivations has distinctive outcomes for learning, performance and well-being; therefore, intrinsic

pursuits are high in quality, self-determined, long lasting and more productive compared with extrinsic pursuits because they are rooted in inherent satisfaction with the activities (Deci & Vansteenkiste, 2004). For example, some doctoral students may engage in tasks superficially for various extrinsic reasons, such as merely for the purpose of attaining a degree or fulfilling a course requirement. Individuals' behaviours driven by extrinsic motivation lack persistence and are largely characterised by maladaptive outcomes, such as boredom (Ntoumanis, 2001), unhappiness (Standage, Duda, & Ntoumanis 2005), anxiety and less effective time management (Senécal, Julien, & Guay, 2003), poor achievement and less creativity (Soenens & Vansteenkiste, 2005). The SDT literature presents compelling evidence that satisfaction of the three basic psychological needs—autonomy, competence and relatedness—through central psychological processing facilitates intrinsic motivation and intrinsic goal pursuits, which, in turn, result in optimal functioning.

Doctoral studies require a higher level of cognitive engagement than other studies in terms of capacity to think creatively for original academic thought, to contribute new knowledge, expand boundaries of knowledge, behave autonomously and self-regulate behaviour to be productive. Enthusiasm, curiosity and persistence coupled with the desire to struggle for excellence are the key characteristics of an ideal doctoral student (Hockey, 1996a). However, the challenges associated with doctoral studies that emanate from a variety of sources ranging from personal attributes, to cognitive, physical, psychological, financial, social factors, and university environment (Pitchforth et al., 2014) may lead students towards frustration and resentment towards their studies. Consequently, as motivation wanes, it eventually leads students to poor performance or dropping out. Hence, the ultimate objective for supervisors is to enhance students' intrinsic motivation for self-regulation and self-determination to continue the momentum required by a long arduous journey towards successful degree completion.

According to SDT, as a function of environmental factors, each type of motivation (extrinsic or intrinsic) can be developed, sustained or undermined (Ryan & Deci, 2000). In other words, the contextual factors can either facilitate or thwart the inner motivational resources, that is, need satisfaction and interest, for an activity that an individual undertakes. Likewise, studies into doctoral students' engagement also suggest that motivational dynamics of students are 'regulated by a complex, dynamic interplay between the student and the environment' (Vekkaila et al., 2013). Therefore, students' interaction with the environment significantly determines the degree and direction of their effort towards their studies. Supervisory practices have significant potential to shape those environments to develop and sustain intrinsic motivation of the students by providing conditions for the satisfaction of the three basic needs as motivational nutrients.

In conclusion, the SDT position that humans have a natural tendency towards growth and integration is evident in the fact that individuals aspire to achieve the highest degree (PhD) and that dynamic requires both proximal and distal conditions of nurturance (Reeve, Nix, & Hamm, 2003), which can be nurtured by supervisors providing basic psychological need satisfaction through their supervisory practices.

SDT MOTIVATIONAL PRINCIPLES INTO PRACTICE

Several studies suggest ways to incorporate motivational principles from SDT into practice to nurture inner motivational resources of students (Assor, Kaplan, & Roth, 2002; Patall, Vasquez, Steingut, Trimble,& Pituch 2017; Reeve et al., 2003). Of particular relevance is Reeve and Jang's (2006) study that by presenting a dialectic framework, explicitly enumerates teachers' actions, behaviours and even utterings, which in an interactive way are capable of influencing students' motivational dynamics. For example, the dialectic framework suggests that students proactively engage in a task because of their inherent needs, preferences and interest, which are identified as inner motivational resources. Their engagement is sustained by providing conditions such as providing autonomy support, rationale for doing uninteresting tasks, not using controlling language, communicating values and acknowledging students' perspectives to nurture those inner motivational resources. Recently, these implicit guide-

lines have facilitated design of many interventions to train teachers at schools and coaches in physical education to enhance their motivating styles for academic and personal gains, such as enhanced engagement, motivation and learning achievement as well as psychological well-being (Cheon, Reeve, & Jang, 2014; Cheon et al., 2016; Cheon & Reeve, 2015). However, these interventions and studies to date remain mainly focused on autonomy need satisfaction and are limited to school settings.

Evidence suggests that studies have significant effort in exploring social-contextual factors that either facilitate or inhibit the satisfaction of the three basic needs in field of physical education (e.g., Curran, Standage, Ng, & Lubans 2017), workplace and organization (e.g., Van Den Broeck, Ferris. Chang, & Rosen 2016), and parenting (e.g., Aunola, Viljaranta, Lehtinen, & Nurmi, 2013) to gain deeper understanding on the role of need satisfaction. Given the significance of psychological need satisfaction and its beneficial outcomes, it is meaningful to explore and identify supervision practices that can lead to need satisfaction of students at the tertiary level. Hence, this inquiry was guided by the research question:

In what ways do supervisory practices support satisfaction of three basic psychological needs—autonomy, competence and relatedness—for doctoral students during doctoral studies?

RESEARCH DESIGN AND PROCEDURE

Experience sampling method was employed (Qualitative design) to obtain students' experiences of autonomy, relatedness and competency need satisfaction during the supervision. ESM is a research procedure that allows capturing participants' context and momentary experiences associated with it in natural occurring situations. Data is collected repeatedly in real time and is focused on subjective experiences of the context given (Courvoisier, Eid, & Lischetzke 2012). In general, ESM is a regarded as a reliable and robust technique to investigating psychological states. It minimizes the recall bias hence maintain accuracy of information, and it facilitates micro processing of complex interactions as the information is obtained at across multiple time and space and demonstrate high ecological validity (Csikszentmihalyi & Larson 1987).

For the current study, data were collected by means of an online qualitative survey (see Appendix). A link to an online survey was embedded in an invitation letter were sent to several doctoral candidates in a department at a research-intensive university in New Zealand.

At the time of the study, 15 full time doctoral students were enrolled in the department. Students were not asked to identify their supervisors' name, to encourage honest reflections of their supervision practices. The invitation letter explained the voluntary nature of the study and assured anonymous participation. For the final study eleven full-time students (73%), both domestic and international, agreed to participate in this study. Five of the participants were females and six were males. Their age ranged from 24 to 43 years.

The exploratory type of survey, which included open-ended and structured questions, was designed to collect students' experiences of their interaction with their supervisors during the supervision. The interactions refer to the scheduled supervisory meetings.

In line with the principles of the experience sampling method, where participants are signaled to respond after every occurrence of an event, we adopted the event-contingent sampling method (Hektner, Schmidt, & Csikszentmihalyi, 2007). In this method, our participants responded and recorded their responses electronically to our survey questions (see Appendix) after every face-to-face meeting with their supervisors.

In this context, the event of interest was students' face-to-face interaction with their supervisors during supervisory meetings. Since the participation required considerable time and commitment, the participants were occasionally sent reminders by the researchers to continue recording their experiences over a period of six months. The data collection continued for the period of six months and in the end, a total of 72 entries of students' experiences were considered for analysis.

The central focus of the analysis was to identify specific supervisory practices in the form of behaviours, actions and other forms of conduct that led students to experience autonomy, competence and relatedness. In the first step, the data from semi-structured questions were organised under each category of needs—autonomy, competence and relatedness. In the second step, the data under each category were subjected to traditional thematic analysis following Braun and Clarke's (2006) guidelines. Initially, the researchers individually assigned codes to identify behaviours for each need, and later came together to compare codes and categorise observed behaviours into final themes. Trustworthiness of the findings was established using an audit trail (Lincoln & Guba, 1985) and triangulation between repeated responses of individual participants.

FINDINGS

In the following section, we present supervisors' practices that led to students experiencing satisfaction of the three psychological needs examined in this study. We present students' reported behaviours of their supervisor under major categories as practices.

AUTONOMY SUPPORTIVE PRACTICES

Across all the entries for autonomy need satisfaction students reported the three major practices as summarized in Table 1. The three practices are respecting research interest, encouraging self-initiation, and being amenable to changes. The codes within each practice demonstrate specific supervisory behaviours that promote self- endorsement, volition, and choice among doctoral students.

Table 1. Autonomy supportive practices

PRACTICES	NUMBER OF PARTICIPANTS	CODES (E.G.)
Respecting research interest	9	Ask research interest Direct to resources Assist in shaping ideas Provide freedom to choose methods and ideas Listen and acknowledge
Encouraging self-initiation	11	Encourage: decision-making, independence, self-help, self-study, ownership, taking lead and taking charge
Being amenable to changes	6	Open to changes and dialogue Listen and acknowledge challenges, do not coerce Accept with scientific justification

The three supervisory practices that demonstrated respect for students' research ideas, promoted self-initiation and accommodated student-proposed changes in the study facilitated students' experiences of volition and ownership for their studies. For example:

They emphasise that this research is led by me and they're there to help me shaping my research and to keep me on track. I am also given freedom to develop my topic, choose case studies, methods, etc. In the conversation, they give suggestions but not push them. (S4)

Power and coercion can be the two dissuasive elements for doctoral students' progress and make them feel controlled and alienated from their study. Having students think and choose for themselves is an effective way to progress. As S3 experienced, 'They kept on reinforcing it was my thesis and that I had to do what I felt was right, not what I thought they wanted'. Further, by adopting a less structured but more intellectually stimulating approach, the right direction and self-initiation for students to feel autonomous can be fostered. For example, S1 reported, 'by constantly asking "what I did" or

"will do" and following up with "why" and "how" questions always allowing me to lead and take charge'. Holding meaningful and engaging sessions that allow students the freedom to express themselves and develop their own ideas helped them become intrinsically involved in their studies. S2 expressed a similar notion:

through constructive interaction with my ideas/conclusions, suggestions of further research directly related to issues raised during our meeting, general casual pace to the meeting (I never felt rushed to finish) and a general positive demeanour (i.e., interested, focussed attention, encouraging words) during our meeting.

Additionally, the data indicated that to feel autonomous, students seek acquiescence with their ideas, particularly for changes they proposed after commencement of the study. Considering the scientific rigour required in doctoral studies, dealing with this issue while maintaining feelings of autonomy can be challenging. However, listening to their perspective, acknowledging the challenges associated with it and inviting them to substantiate their argument with evidence can resolve the challenge. For example, S3 stated:

During my interaction with her, I feel that she is taking my perspectives into consideration if I provide a scientific argument and strong justification on the things I have chosen, which makes me feel I have a self-choice during my study.

Similarly, S10 expressed that, 'Considering the acquisition of participants, I decided to change my participants from teachers to students, and I told my second supervisor and she allowed me to change provided I had an appropriate alternative for the new design'.

COMPETENCE SUPPORTIVE PRACTICES

Two major supervisory practices across data suggested fulfilment for the need of competence as reported in Table 2. The practices referred to the quality, mode, and time of the feedback and the challenge level that supervisors posed to the doctoral students. The specific practices under these themes conveyed confidence and assurance to students about their ability to pursue their study.

Table 2. Competence supportive practices

PRACTICES	NUMBER OF PARTICIPANTS	CODES (E.G.)
Quality, mode and time of feedback	11	Constructive, positive, meaningful, timely, appreciation, unambiguous, illustrative, verbal and written
Optimal challenge level	8	Challenging my ideas, belief in capability, empowering, minding ability level and frustration

Doctoral studies require enthusiasm to produce high-quality academic knowledge. To this end, students require autonomy to express their ideas freely and should be provided opportunities to target their thinking in the right direction. Quality feedforward, that is information provided to assist students to revise, and reflective feedback, which challenges and encourages them to revisit their ideas, will further shape their thoughts. The extent to which students appreciated receiving both feedforward and feedback that were meaningful, constructive, clear and positive is evident throughout the findings. For example, S6 reported, 'Today my supervisor told me that she was happy with my progress and hopes to see a final version of my draft that gave me confidence that I can complete my task on time'. In addition, S3 said, 'My supervisor appreciates my effort, whether it's good or bad. That encouraging and constructive feedback gives me positive vibes and I feel confident'. S1 said, 'The supervisors' continuous and instant feedback on what I have done and levels of quality helps the most'. S7 said, 'Yes, her verbal feedback means a lot as well as written, especially in my thesis

drafts if she comments "good" I feel very happy; it reminds me of my school days where I use to perform well to receive remarks like this'.

Another important manner in which the supervisors could make students feel competent was by establishing the right environment for meaningful discourses. Students expressed feeling empowered when supervisors posed challenging questions to them, contested their ideas and sought more explanation. For example, S9 reported. 'During interaction, I felt like I'm interacting with my examiners during discussion; their questions on what I do or on what I write make me more critical of my work'. S4 stated, 'Those engaging discussion, exchange of information, and exchange of critiques is all about intellectual discussion that provides confidence for our skills'. However, students also expressed caution should be practised while challenging students. Doctoral students are fairly vulnerable to stress; stretching the challenge too far can cause distress. As S8 says, 'Whenever possible, they drew out what I know and encourage me to think, but at times it leads me to the point of frustration'. Similarly, S9 reported, 'Pushing me to go beyond my boundaries was positive for my growth, yet uncomfortable and annoying'. Hence, providing optimal challenges that were achievable and within students' intellectual abilities is essential to prevent students losing confidence in themselves.

RELATEDNESS SUPPORTIVE PRACTICES

Two central practices, as illustrated in Table 3 below, emerged from the data that helped students satisfy their relatedness need. The two practices referred to personal and professional support and support for emotional well-being that can enhance students' sense of belongingness and have them feel valued.

Table 3: Relatedness supportive practices

PRACTICES	NUMBER OF PARTICIPANTS	CODES (E.G.)
Personal and professional support	10	Sharing references; providing support material; suggesting workshops; helping to establishing network; spending time, effort and energy; and providing constructive feedback
Emotional well-being	7	Informal meetings Personal concerns: family; adjustment Pat on back, counselling and mindful of pressures

Students' experiences of being valued, and cared for, by their supervisors provide them a sense of connectedness not only with the supervisors, who function as contextual factors in facilitating students' motivation, but also with the study they are undertaking with them. In doctoral studies, supervisory practices that facilitate students' personal and professional development in their concerned field were perceived as a valuable support to nurture connectedness (Hockey 1996b). S6 reported, 'The supervisor would provide at times helpful reminders or links to supportive sites that can help with the work or provides guidance and motivation'. Another student added:

My supervisor is reminded of my topic all the time. While doing her own readings, she sends relevant material and support information that I may need in my study and I feel with her that there is someone really care about me and my work.

In several instances, students were appreciative of the fact that the supervisors often helped them establish important networks. For example, S8 stated, 'When they write referral or introduce you to their network for professional reasons, you feel valued'. Students also acknowledged the fact that despite having multiple roles, supervisors made an effort to share their time and expertise to guide stu-

dents the way they did. For example, S5 reported, 'As always the quality of feedback and their time and support and makes me feel my efforts are worthy for this study'.

Another way to establish connectedness was to support students' emotional well-being. The findings demonstrate a variety of students' expressions that show how supervisors could support students' emotional well-being. For example, S1 reported, 'YES! There were days we'd go for coffee, or they'd pay attention to my family and partner. When that genuinely happens, you feel a sense of belonging'. Some added that 'positive verbal phrase indicating "you're doing well" followed up by a reason why and physical indicators such as a smile or confident pat on the back' (S4) enhanced the feeling of belongingness. The participants also shared ways in which adjustment issues were occasionally addressed by the supervisors. For instance: 'He provides counselling in response to my personal struggling; as I am staying here alone, I have emotional ups and downs besides studying. He tries to connect with me now and then to ensure I am fine.'(S5). The supervisors' expression of empathy and acknowledgment of students' challenges added a sense of warmth and contributed to their well-being, as S8 said, 'They are mindful of our workload and the pressures of seeking information and acknowledge it, always is a sense of relief'.

DISCUSSION

The findings are grounded in the SDT need satisfaction principles, and yet are novel, original and substantively grounded in the context of doctoral students. For example, when supervisors demonstrate respect for students' research interest pertaining to their topic of investigation or choice of method, do not coerce them into doing something else and, in fact, support their interest and preferences, students feel that due regard is given to their right to choose and the work of their choice. Doctoral students commonly cited autonomy-threatening ethical issues, whereby they are coerced into choosing a specific topic or method, which can significantly undermine their feeling of autonomy (Löfströma & Pyhältöa, 2014. Similar to the concern of students' ethical right to autonomy was their right to make desired amendments to their studies. Supervisors' behaviours that are open, flexible and responsive to students' suggestions were also perceived as supportive of autonomy (Reeve & Jang, 2006).

Nevertheless, if required, supervisors were able to persuade students into the desired direction by providing a scientific rationale, which is considered a vital component of autonomy supportive behaviours (Assor et al., 2002). The findings of this study indicate that behaviours that initiated self-choice and decision-making promoted experiences of ownership among students and feelings that they could exercise their own will to shape their work. Doctoral students' competency beliefs drive their progress and determine the quality of their study. The findings indicate that one exclusive source for nurturing competence lies in supervisors' feedback practices. High-quality feedback, which is positive, constructive, unambiguous and timely, can provide students an immense sense of self-efficacy to undertake challenging tasks (Kumar & Stracke, 2007). Providing students challenging tasks and demonstrating trust in their ability to accomplish those tasks is certainly a way of enhancing their competence beliefs (Miller et al., 2017).

However, according to the findings, it is necessary to maintain an appropriate level of challenge and not stretch them too far to avoid frustrating students. Negative behaviours from supervisors, such as consistent criticism, or holding unrealistic expectations can leave students feeling inefficacious, exhausted and disengaged (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002). Further, students expressed that supervisors' behaviour that were directed towards their personal and professional development concerns demonstrated care and thoughtfulness towards them. These actions are grounded in supervisors being sensitive and attuned to students' immediate needs (Reeve & Jang, 2006), which are seeking personal and professional guidance for their studies. In addition, the findings suggest that the supervisory relationship should move beyond academic guidance and extend emotional support as and when needed (Derounian, 2011). Despite the fact that supervision is a duty of a supervisor, students can sense and appreciate when supervisors exhibit warmth and attention to make this prac-

tice meaningful for students. Thus, supervision practice that may support autonomy and competence, but fails to foster relatedness may not motivate students optimally.

The related literature has enumerated several strategies that supervisors can use for effective supervision (Hockey, 1996b; Manathunga, 2007; Vilkinas, 2008), or a specific aspect of supervision, such as relationship (Derounian, 2011). However, the current findings in their entirety go beyond that attempt and explain, with an empirically grounded argument, how and why those proposed practices via basic psychological need satisfaction develop and maintain intrinsic motivation of doctoral students. The identified behaviours not only highlight 'what to do' but also advise supervisors to ensure 'what not to do' to thwart these needs.

The central focus of doctoral studies is to generate new knowledge under the supervision of an expert and/or within the framework yet produce creative work. Hence, the supervisor who remains in a more powerful position should ensure that forces exerted in form of instructions and guidelines are valuable and meaningful as well as congruent with students' initiative for autonomous motivation and self-determination (Ryan & Deci, 2000). Supervision is a partnership between student and supervisor to generate new knowledge, which may, at times, result in intense discussion with agreements and disagreements. Hence, it is likely that both the parties may have to function in a pressured atmosphere. However, proximal feeling of belongingness and the desire to feel connected with the supervisor would promote students' willingness to endorse values and behavioural regulation held by the supervisors. In other words, by providing relatedness support, supervisor can persuade students into regulating their behaviour towards completion of the study (Ryan & Deci, 2000).

Considering the intellectual and cognitive challenge associated with doctoral studies, the role of competence need satisfaction becomes vital. Doctoral students' perceived competence beliefs mediate their motivational processes and affect their achievement behaviours, such as persistence, commitment to progress, challenge, interest, curiosity, effort and resilience to failure (Bandura, 1997). Thus, supervisors should ensure that their interactions reinforce students' competency beliefs.

IMPLICATION FOR SUPERVISION PRACTICES

Supervision is a complex craft that needs to be practised mindfully since it determines success and quality of doctoral experiences. The complexities of this craft are weaved into 'criticism and assistance which practitioners can find difficult to disentangle' (Hockey, 1994, 1997). This craft is inherently enveloped into issues of hierarchy, power and agency as a pedagogic practice (Manathunga, 2007). We believe that the findings of this study illustrate appropriate, robust, and theoretical-based motivating styles for supervisors to (a) disentangle power and hierarchy issues by providing autonomy to students, understanding their challenges and valuing their perspective; (b) foster a healthy, collegial bond that would encourage open, honest discussions between both the agents about each other's expectations; (c) enhance students' competency beliefs with constructive feedback and optimal challenges for intellectual growth; (d) provide support for coping and adjustment challenges that go beyond students' study needs and (e) overall, be mindful of actions that may thwart any of these psychological needs.

CONCLUSION

Intrinsic motivation, which is an individual's desire to undertake a task for its own value, interest and gratification, has a robust association with motivated learning behaviour (Cheon et al., 2016; Miller et al., 2017; Orsini et al., 2018). The SDT postulates that favourable social contextual behaviours have the potential to interact with the student and nurture three psychological needs—autonomy, competence and relatedness—to promote intrinsic motivation (Ryan & Deci 2000). Equally significant is having intrinsic motivation for doctoral studies, in particular, for the absorption, engagement and persistence that doctoral students require. This study, in the context of doctoral students, reveals the nature of supervisory practices that can facilitate satisfaction of psychological needs.

The objective of the current study was to identify the supervisory practices that can facilitate satisfaction of three basic psychological needs as postulated in SDT. The study utilised the experience sampling method to collect qualitative data in real time to capture students' psychological and experiential experience of supervision in a repeated manner. The findings revealed several effective supervisory practices, such as providing autonomy need satisfaction by respecting students' research interest, encouraging self-initiation and becoming amenable to changes in studies as suggested by the students. Doctoral students' need for competence can be fulfilled by constructive, positive and timely feedback and by providing optimal challenges. Further, the need for relatedness can be satisfied by providing personal and professional development support for students and ensuring their emotional well-being. Although these are meaningful findings, we concede that the types of supportive motivating behaviours for doctoral supervision is not limited to these findings. There are other complex issues that we are aware of may contribute the quality of motivation experienced by the doctoral students. For example, that at times, doctoral students sometimes also form a bond with their topic and this might be proven to be a strong sustaining motivation. Additionally, attaining the degree itself is a powerful motivation which will benefit them and their family and yet could be the source of damaging tensions. Moreover, the limited sample size and single-university context are limitations of this study, Nevertheless, we believe that since the needs in SDT are common across cultures, age and gender (Deci & Ryan 2000), the findings of this study would be applicable to varying extents in other countries. In this regard, a future study could seek to extend this study's findings by considering supervision data from supervisors reporting on their relationship with their students and aspects of supervision relationship from a student perspective. In addition, longitudinal studies could be conducted to ascertain other supportive motivating behaviours and also to chart changes in students' comments over time.

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APPENDIX

Prompts for experience sampling method

Take a few minutes to reflect and give a detailed account on:

1. How do you think your interaction with your supervisor motivated you towards your study?

2. Did your interaction with supervisor or his/her verbal or written feedback indicate that your supervisor provides you enough autonomy, such as through options; allows you to choose; gives the rationale (provides usefulness) for doing certain things that you may not like to do; encourages you to take initiative; listens to you and takes your perspective into consideration; and allows you to work in your own way? If yes, state how. If no, why?

3. Did your interaction with supervisor or his/her verbal or written feedback indicate that your supervisor makes you feel capable, competent and good about yourself and your work and competent If yes, state how. If no, why?

4. Did your interaction with supervisor or his/her feedback indicate that your supervisor cares about you in terms of physical, emotional and psychological well-being and your progress? If yes, state how. If no, why?

BIOGRAPHIES
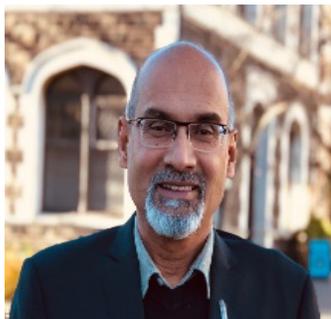
Dr Vijay Kumar Mallan is the Acting Head of Department of the Higher Education Development Centre at the University of Otago in New Zealand. Vijay has extensive experience in both teaching and academic development specializing in doctoral supervision through consultancies in research -intensive universities in the Asia-Pacific and European regions. His research interest are doctoral examination, doctoral support, and feedback practices. He serves as an editorial board member of Innovation in Education and Teaching International. He is a founding member of the International Doctoral Education Research Network (IDERN).

Dr. Amrita Kaur is a senior lecturer at the School of Education and Modern Language at Universiti Utara Malaysia (UUM). She teaches postgraduate courses in Educational Psychology and Educational Research Methodology at the School of Education and Modern Languages, UUM. Her research interests include teaching, learning, and assessment in higher education, students as partners, learning motivation and engagement with a special focus on the self-determination theory. She serves as the editorial member of Malaysian Journal of Learning and Instruction and International Journal of Students as Partners.