

Deepening our understanding concerning PhD candidates learning and risk of burnout while doing thesis work

Telle Hailikari and Henna Asikainen

Centre for University Teaching and Learning (HYPE), University of Helsinki, Helsinki, Finland

Reijo Sund

School of Medicine, Faculty of Health Sciences, Institute of Clinical Medicine, University of Eastern Finland, Joensuu, Finland, and

Anna Parpala

Centre for University Teaching and Learning (HYPE), University of Helsinki, Helsinki, Finland

Abstract

Purpose – Previous research has focused on exploring factors that influence PhD candidates' experiences of exhaustion and burnout. However, there has been less focus on exploring PhD candidates' learning processes, that is, approaches to learning, and their relation to burnout. The purpose of this study is to examine the interrelations between PhD candidates' approaches to learning and burnout.

Design/methodology/approach – The participants were 418 PhD candidates from four different doctoral schools in Finland. They answered the HowULearn questionnaire which was contextualised to the PhD context. Confirmatory factor analysis was performed to explore how well the expected factor models for approaches to learning and study-related burnout fitted the data on PhD candidates. Regression analysis was performed to explore the relationship between learning processes and study-related burnout.

Findings – The analysis showed that the confirmatory factor analysis models fitted the data well. The results of this study revealed three different approaches to learning among PhD candidates, which were labelled "approaches to learning in thesis work". The results also demonstrated that these approaches were associated with study-related burnout.

Originality/value – This research presents a new perspective on understanding PhD candidates' learning while doing thesis work and the difficulties they may experience during their PhD journeys. This study indicates that approaches to learning are identifiable in the thesis writing process, and they offer valuable insights to understand PhD candidates' risk of burnout.

Keywords Approaches to learning, PhD candidates

Paper type Research paper



Introduction

Studying for a PhD can be stressful which can contribute to some PhD candidates experiencing exhaustion and burnout (Hermann, 2021). There is evidence that PhD candidates are a high risk population who experience substantial stress during their studies (Evans *et al.*, 2018). Thus, investigating candidates' well-being is important because PhD candidates' sense of distress, cynicism and inefficacy are also central components of their disengagement (Pyhältö *et al.*, 2023a, 2023b, 2023c; Virtanen *et al.*, 2017). Previous research has focused on exploring the factors that influence PhD candidates' experiences of exhaustion and burnout and has successfully identified many central factors, such as the research community and supervisory support (Peltonen *et al.*, 2017), lack of interest (Cornér *et al.*, 2021), experiences of inadequate supervision (Cornér *et al.*, 2017; Vekkaila *et al.*, 2013), personal life (more precisely life–work) relations (McAlpine *et al.*, 2020), as well as lack of sense of belonging in scholarly communities (Pyhältö *et al.*, 2024). Moreover, work and organisational context have been found to exert an important effect on PhD candidates' well-being (Levecque *et al.*, 2017), as has the COVID-19 pandemic and its consequences (Pyhältö *et al.*, 2023b). However, there is still a gap in our knowledge about the relationship of PhD candidates' learning processes and their experiences of burnout, and to our knowledge, no study has explored this relationship. This is surprising, as among undergraduates, there is growing research indicating that students' learning processes are clearly related to their experiences of burnout (Asikainen *et al.*, 2022; Kok *et al.*, 2024; Sjöblom *et al.*, 2024). It is evident that a similar relationship can be expected to exist in the PhD context. In addition, although learning is central to the PhD process, only a small number of studies have focused on exploring PhD candidates' learning processes (Cantwell *et al.*, 2012; Cantwell *et al.*, 2017; Vekkaila and Pyhältö, 2016). Thus, we still lack clear evidence of the PhD candidates' learning as such and, further, their relations to experiences of burnout (Sverdlík *et al.*, 2018). Therefore, it is important to focus on PhD candidates' different learning processes and to explore these in a larger sample.

PhD candidates' learning processes

The lack and need for studies focusing on PhD candidates' learning processes has already been acknowledged several years ago (Vekkaila and Pyhältö, 2016). Previous studies have, for example, focused on PhD candidates' writing processes which have been widely examined, especially from a sociocultural perspective (Inouye and McAlpine, 2019). Another study by Cantwell *et al.* (2017) focused on PhD candidates' metacognition and found that PhD candidates differed in their understanding of the complexity of doctoral studies and how they accepted that complexity. Moreover, they differed in how they assumed ownership of the task by accepting their own responsibility for progress. Cantwell *et al.* (2017) found that those candidates with an inability to perceive the abstractness and complexity of knowledge struggled with their studies or viewed them as unmanageable. These studies provide an interesting perspective on PhD candidates, but there is still a need to provide a wider perspective on candidates' learning as PhD studies are a multidimensional learning process.

One way to examine learning processes is the approaches to learning framework (Asikainen and Gijbels, 2017). Approaches to learning theory share the same, basic assumptions as cognitive psychology that students' prior experiences, expectations and beliefs influence how they approach learning in different situations (Heikkilä and Lonka, 2006). Moreover, they have been detected in several educational and working life contexts (Kirby *et al.*, 2003; Janeiro *et al.*, 2017; Moreira *et al.*, 2021). Thus, it may be expected that similar approaches emerge in PhD contexts.

Many studies exploring learning have detected three different approaches to learning (Biggs, 2001; Entwistle *et al.*, 2006; Entwistle, 1988, 2009; Janeiro *et al.*, 2017). A *deep approach to learning* refers to the intention to analyse and understand information through comprehending the bigger picture, focusing on underlying meanings and integrating new information into previous knowledge. By contrast, a *surface approach* is characterised by a focus on memorisation, often resulting in a fragmented knowledge base where information is seen as atomised and unrelated (Entwistle, 2009). Recent research suggests that the core of the surface approach is unreflective study, which consists of the experience of a fragmented knowledge base, difficulty in reflecting on one's own learning and, instead, a focus on memorisation and repetition of knowledge. Therefore, today, the concept of an *unreflective approach* is preferred to that of a surface approach (Lindblom-Ylänne *et al.*, 2018). A third approach is *organised studying* – a term currently used to refer more to students' everyday practices of managing and organising their studies and time and effort than to their achievement orientation. Consequently, it is also considered more of an approach to studying than an approach to learning (Entwistle, 2009; Entwistle and McCune, 2004), but it is related to learning processes, as the ability to regulate and reflect on one's own learning is crucial for effective use of learning processes and student achievement (Magno, 2009; Tuononen *et al.*, 2023). Previous research has found that undergraduates with high scores on measures of the deep and organised approach have less burnout (Asikainen *et al.*, 2022), whereas those with an unreflective approach (previously surface approach) are more likely to have study-related burnout (Asikainen *et al.*, 2022). Thus, it could be expected that disorganised and unreflective PhD candidates also experience more study-related burnout.

Approaches to learning have hardly been studied among PhD candidates. Only one small interview study by Vekkaila and Pyhäntö (2016) focusing on PhD candidates' learning patterns suggests that candidates representing the passive producer approach, that is, using surface approach for managing concrete learning outcomes such as measures and analyses, emphasise performance and mastery of different tasks related to research and studies but are unable to affect and change the conditions in which they operate. These PhD candidates also appear to experience problems in regulating and controlling their learning processes (Vekkaila and Pyhäntö, 2016). These different learning patterns strongly resemble approaches to learning. For example, the passive producer approach resembles the surface approach to learning detected among undergraduates. Thus, we can expect to find similar kinds of learning patterns among PhD candidates.

Study-related burnout

Burnout in the context of work has been defined as emotional exhaustion, cynicism and reduced professional efficacy (Maslach *et al.*, 2001). A similar definition of burnout has emerged in school and university contexts, where study-related burnout has been defined through three different components: study-related exhaustion, cynicism and lack of study-related efficacy (Salmela-Aro *et al.*, 2009; Salmela-Aro and Kunttu, 2010; Schaufeli *et al.*, 2001). Study-related exhaustion refers to feelings of being burdened or exhausted resulting from overtaxing work; cynicism refers to lack of interest and a cynical or indifferent attitude toward studying generally and in relation to others; and lack of professional efficacy refers to feelings of incompetence and poor achievement in studying (Salmela-Aro *et al.*, 2009).

All these aspects of study-related burnout have been found to affect students' engagement with or dedication to their studies (Salmela-Aro and Upadyaya, 2017), also in the PhD context (Vekkaila *et al.*, 2013). Previous review studies have explored the aspects that influence PhD candidates' well-being (Schmidt and Hansson, 2018; Sverdlík *et al.*, 2018). For example, Schmidt and Hansson's (2018) review study has found many aspects which

affect candidates' well-being including external factors such as the quality of the supervision, fit between supervisors and supervisees, personal and social lives, financial opportunities as well as internal factors comprising motivation, writing skills and regulatory strategies in writing and academic identity. However, these reviews do not report a single study exploring PhD candidates' learning when doing thesis work.

Experiences of burnout can be understood through the demand-resources model (Salmela-Aro and Upadyaya, 2017; Schaufeli and Bakker, 2004), which indicates that an imbalance between experiences of demands and resources can lead to burnout if experiences of demands exceed experiences of resources. Previous studies with undergraduate students have shown that students' scoring high on unreflective approach to learning can experience more negative emotions in studying and have more negative perceptions of the teaching-learning environment than students applying a deep approach to learning (Kuittinen and Meriläinen, 2011; Trigwell *et al.*, 2012). A clear positive relationship between unreflective approach and experiences of burnout has been found among undergraduates (Asikainen *et al.*, 2022; Parpala *et al.*, 2021). However, the relation can also be bidirectional, that is, unreflective may lead to burnout and vice-versa (Kok *et al.*, 2024). Thus, we suggest that there is a relationship between PhD candidates' learning approaches and their burnout. More precisely, we suggest for PhD candidates applying the unreflective approach to learning can lead to a more demanding experience of the doctoral work and, thus, lead to experiences of burnout. In addition, we suggest that applying a deep approach to learning can lead to a more comprehensive understanding and act as a personal resource and through interest, lower the risk of burnout. However, this relation can also be bidirectional.

The purpose of this study is to examine what kind of approaches to learning can be detected among PhD candidates in the contexts of doing thesis work and to determine how these approaches are related to candidates' study-related burnout. The specific research questions are the following:

- RQ1. What kind of approaches to learning can be detected among PhD candidates while doing thesis work?
- RQ2. How are approaches to learning related to the risk of burnout among PhD candidates while doing thesis work?

Methods

This study applied a mixed methodology by combining survey data with interview data to complement the findings. The study followed the ethical principles of research with human participants and ethical review in the human sciences in Finland by following Finnish National Board on Research Integrity guidelines 2019.

The participants

The survey data for this study were collected from four doctoral schools at a large Finnish university. An open invitation to participate in the study was sent to all of the doctoral school candidates via doctoral school coordinators. The study subjects consist of 418 PhD candidates. The sample represents about 10% of all of the doctoral candidates of the university. Informed consent was obtained from all subjects involved in the study. Of the respondents, 293 were female, 122 were male and 3 not specified. Moreover, 246 respondents were from the humanities and social sciences, 62 from natural sciences, 65 from health science and 35 from environmental, food and biological sciences. In all, 12 PhD candidates did not specify their field of study. A total of 9.5% were first-year PhD students,

20% second-year students, 15% were third-year PhD students, 15.7% were fourth year students and 39.8% had started their studies five years ago or more. In the questionnaire, the candidates were offered the possibility of participating in an interview and leaving their contact information after completing the inventory. A total of 93 candidates were contacted and interviewed to gather the interview data for the project.

Measures and procedures

The data was gathered using the HowULearn questionnaire (Parpala and Lindblom-Ylänne, 2012), which was contextualised to PhD candidates to measure their approaches to learning in thesis work. This was important, as studying in Finland to be a PhD is very different from being an undergraduate student. The Finnish PhD education has a strong emphasis in conducting research and writing their thesis work instead of having courses (Pyhältö *et al.*, 2012). The studies involved in PhD education are mainly methodological courses and international conferences. Moreover, the candidates participate in research seminars. Linking research training and professional development is not very typical for Finnish doctoral education.

In the present study, we used two sections of the questionnaire: the part concerning students' approaches to learning and the part related to study-related burnout. Concerning approaches to learning, three different approaches were measured: a deep approach, an unreflective approach and organised studying with a five-point Likert type scale (1 = totally agree, 5 = totally disagree). The section measuring learning approaches (Parpala and Lindblom-Ylänne, 2012) has been used and validated in many university contexts for many years (Broseghini *et al.*, 2024; Cheung *et al.*, 2020; Herrmann *et al.*, 2017; Asikainen *et al.*, 2022; Postareff *et al.*, 2018; Ruohoniemi *et al.*, 2017). The section concerning study-related burnout originated from the instrument SBI-9 (Salmela-Aro *et al.*, 2009), developed and validated for measuring study-related burnout in a university context (Salmela-Aro and Read, 2017). The measure consisted of nine Likert-type items (1 = disagree and 5 = agree) measuring three dimensions of study-related burnout: cynicism, inadequacy and exhaustion. Moreover, HowULearn has previously been used to measure the relation between approaches to learning and study-related burnout among undergraduate students (Kok *et al.*, 2024; Sjöblom *et al.*, 2024; Yin *et al.*, 2024).

The contextualisation of the HowULearn questionnaire to the PhD context consisted of multiple different phases. Firstly, the contextualisation of HowULearn began with a team of experts in university pedagogy adapting items to PhD candidates. The most significant change in the new inventory was related to the focus of the items. Instead of concentrating on study processes, PhD candidates were asked to consider their experiences of researching and writing their doctoral thesis, as completing a thesis represents a concrete learning process that is mandatory for PhD candidates in their studies. Secondly, several focus group interviews were organised in different disciplines to validate the questionnaire before data collection. A sample of PhD candidates from each doctoral school was invited to the focus group interview. They completed the questionnaire and marked the questions they did not understand; afterwards, these questions were discussed together with the first author. After this, these items were discussed within a team of university experts and modified according to the comments.

In the next phase, data was collected with the contextualised questionnaire, and an exploratory factor analysis was conducted. As a consequence, two items were removed because they had extremely low communalities (below 0.25) or they loaded on many factors. One item from scale deep approach: "In my PhD thesis, I try to form a coherent whole of its contents" was removed. In addition, the item initially measuring an unreflective approach

“Often I have to repeat things to learn them” was removed. After these changes, the scale deep approach focused especially on searching for evidence and analysing and understanding information through comprehending the bigger picture (Entwistle, 2009). Moreover, the scale unreflective approach focused especially on difficulties on relating ideas, therefore resulting in a fragmented knowledge base (Lindblom-Ylänne *et al.*, 2019). These dimensions are crucial elements in both deep and unreflective (previously termed surface) approaches (Entwistle and McCune, 2004; Lindblom-Ylänne *et al.*, 2019), ensuring that the theoretical foundation of the instrument remained solid and consistent with the approaches to learning theory (see Appendix 1 for the final items).

In the final phase, after the questionnaire data collection, participants were invited to individual interviews to discuss the different dimensions of approaches to learning. The procedure was done as follows: The candidates were asked to explain their answers to the questions on “approaches to learning in thesis work”. The interviewees were shown their own answers to the questionnaire and were asked to reflect retrospectively on those answers and explain why they answered the way they answered. The interviewees did not know the dimension of the items; rather, they focused solely on single items. The interviews lasted from 30 to 90 min. This data provided descriptions of the different dimensions of approaches to learning.

After the interviews, the researchers identified candidates from the survey data who had scored high on a particular approach (e.g. a deep approach). Descriptions of the dimensions were read from students who scored $\geq M = 4.33$ for the unreflective approach ($n = 16$), students who scored $M = 5.00$ for organised studying ($n = 19$) and for deep approach, from the students who scored $M = 5.00$ ($n = 66$) to reach a similar proportion of interviews as with the other approaches. Then these candidates’ descriptions of their learning were carefully read through and compared to the survey results. The same procedure was repeated for each approach. The interview data provided support for the dimensions detected in the survey data, and the differences in the descriptions between the three dimensions were evident. For example, participants who scored high on deep approach described the use of such learning processes that aim at deeper understanding of their own research and how it relates to a wider research area. Oppositely, the participants scoring high on unreflective approach described challenges with forming a coherent understanding of their own thesis topic. These various descriptions were in line with candidates’ answers to the items measuring dimensions of the learning processes in the inventory and provided further support for the different dimensions (for excerpts, please see Appendix 2).

Analysis

The initial analysis for missing values showed that ten items measuring PhD candidates’ approaches to learning contained one missing value. These were replaced with means. Firstly, confirmatory factor analysis (CFA) was performed to explore the factor structure of items measuring learning approaches and study-related burnout using R 4.2.2 with the package Lavaan 0.6–12. CFA is a statistical technique used to test whether a set of observed variables represent the underlying latent constructs (factors) that they are theoretically supposed to measure. It is commonly used in psychometrics, social sciences and behavioural research to validate measurement models. Confirmatory analysis is considered a good method for testing a theoretical model (Brown, 2014), and thus, it is suitable for this study aiming to test whether approaches to learning can be detected among PhD candidates. After the CFA, sum variables of the different scales were formed, and their interrelations were initially measured with Pearson correlations.

The relationship between approaches to learning in thesis work and different factors of study-related burnout and starting year were then examined by linear regression. Three different regression analyses were performed using approaches to learning in thesis work and starting year as dependent variables and factors of study-related burnout as independent variables.

Results

The CFA performed with the items measuring approaches to learning in thesis work indicated that the three-factor model fitted the data well. The fit indexes showed adequate fit ($\chi^2 = 139.9$, $df = 41$, $p < 0.001$, CFI = 0.913 and RMSEA = 0.076), indicating that the three-factor solution was valid in the data. The first factor consisted of items measuring an unreflective approach to learning (M = 2.46, SD = 0.85, sk = 0.414 and ku = -0.299) and slightly more than 30% of the respondents received a score of at least 3 (on a scale of 1–5). This factor focused on candidates’ difficulties in forming a coherent whole from their doctoral thesis and consisted of four items (e.g. “I have trouble forming a coherent whole from my PhD thesis”). The second factor emphasised candidates’ deep approach to learning (M = 4.11, SD = 0.62, sk = -0.739 and ku = 0.244), such as relating ideas and forming a coherent whole from their own research; this factor consisted of four items (e.g. “While writing my thesis, I try to make use of different viewpoints on the subject matter as much as possible”). The organised studying factor (M = 3.56, SD = 0.80, sk = -0.256 and ku = -0.510) consisted of four items measuring PhD candidates’ time and effort management (e.g. “On the whole, I work on my PhD thesis in a systematic and organised way”). The descriptives can be seen in [Table 1](#).

The CFA concerning study-related burnout was performed with three dimensions measuring different aspects of burnout – Exhaustion (M = 2.67, SD = 1.03, sk = 0.449 and ku = -0.549), cynicism (M = 2.15, SD = 1.06, sk = 0.882 and ku = 0.025) and inadequacy (M = 3.22, SD = 1.16, sk = -0.234 and ku = -0.865) – that have been successfully used by previous research ([Salmela-Aro et al., 2009](#)). This three-dimensional model fitted the data adequately ($\chi^2 = 123.5$, $df = 24$, CFI = 0.941 and RMSEA = 0.100).

Based on the skewness and kurtosis of the scales measuring approaches to learning and study-related burnout, the normal distribution assumption was met ([Kim, 2013](#)), and parametric tests were decided to be used. Next, we explored whether there were differences in participants’ approaches to learning and study-related burnout based on their starting year. Our ANOVA analysis showed that there were no differences between the students’ starting year and their approaches to learning ($p = 0.442$ – 0.597 and $\eta^2 = 0.007$ – 0.009). Thus, we analysed the data as a whole. Concerning study-related burnout, we found that exhaustion did not differ between the starting years, but there was a statistically significant difference in

Table 1. Descriptive statistics of the measured scales

Scale	M	SD	SK	KU
DE deep	4.11	0.62	-0.739	0.244
UN unreflective	2.46	0.85	0.414	-0.299
Or organised	3.56	0.80	-0.256	-0.510
EX exhaustion	2.67	1.03	0.449	-0.549
CY cynicism	2.15	1.06	0.882	0.025
INA inadequacy	3.22	1.16	-0.234	-0.865

Source(s): Authors’ own

cynicism ($p = 0.005$ and $\eta^2 = 0.035$) and inadequacy ($p = 0.006$ and $\eta^2 = 0.034$). Tukey's test showed that the first-year students differed from the fifth- and further-year students concerning both cynicism and inadequacy.

PhD candidates' approaches to learning in thesis work and study-related burnout

Firstly, correlations between the PhD candidates' burnout scales and approaches to learning in thesis work were explored (Table 2). All the correlations between the scales were statistically significant. The deep approach was positively related to the organised approach, and they were both negatively related to the unreflective approach. The different burnout scales – Exhaustion ($M = 2.67$, $SD = 1.03$, $sk = 0.449$ and $ku = -0.549$), cynicism ($M = 2.15$, $SD = 1.06$, $sk = 0.882$ and $ku = 0.025$) and inadequacy ($M = 3.22$, $SD = 1.16$, $sk = -0.234$ and $ku = -0.865$) – were strongly and positively related to unreflective learning and negatively related to the deep approach and organised studying. The analysis revealed a relationship between approaches to learning in thesis work and different dimensions of study-related burnout. The unreflective approach was strongly related to two dimensions of study-related burnout. The opposite pattern was true for the deep approach and organised studying.

Next, we analysed how approaches to learning and starting year explained components of the study-related burnout. Regression analyses were first performed to predict exhaustion based on candidates' approaches to learning in thesis work and starting year. A statistically significant model was found [$F(4, 415) = 13.07$ and $p < 0.0001$] with an R^2 of 0.10. The results showed that unreflective approach and the starting year were both negatively associated with exhaustion, but there was no statistically significant association with the deep approach and organised studying. In addition, a model where cynicism was predicted by all the three approaches to learning in thesis work and starting year was found statistically significant [$F(4, 415) = 47.48$ and $p < 0.0001$] with an R^2 of 0.31. Unreflective approach and starting year were positively associated, and the deep approach and organised studying were negatively associated with cynicism. Finally, a statistically significant model was found when examining how inadequacy was predicted by the approaches to learning in thesis work [$F(4, 415) = 36.11$ and $p < 0.0001$] with an R^2 of 0.25. Inadequacy was positively and statistically significantly associated with the unreflective approach and starting year and negatively associated with organised studying. Results can be seen in Table 3.

Discussion

The first aim of the study was to explore the approaches to learning that can be detected among PhD candidates. On the basis of previous research among PhD candidates (Janeiro *et al.*, 2017; Moreira *et al.*, 2021; Vekkaila and Pyhältö, 2016), we expected to find many

Table 2. Correlations between the scales

Scale	DE	UN	OR	EX	CY	INA
DE deep	1					
UN unreflective	-0.25**	1				
Or organised	0.43**	-0.30**	1			
EX exhaustion	-0.13**	0.30**	-0.11**	1		
CY cynicism	-0.34**	0.43**	-0.40**	0.45**	1	
INA inadequacy	-0.21**	0.43**	-0.35**	0.61**	0.59**	1

Note(s): * $p < 0.05$; ** $p < 0.01$

Source(s): Authors' own

Table 3. Approaches to learning predicting the dimensions of study-related burnout

Dimensions of study-related burnout: dependent	Unreflective approach, β	Deep approach, β	Organised studying, β	Starting year, β
Exhaustion	0.29***	-0.06	0.01	0.14**
Cynicism	0.32***	-0.14**	-0.23***	0.17***
Inadequacy	0.35***	-0.02	-0.23***	0.14**

Note(s): * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. In each cell, standardised beta coefficients are reported
Source(s): Authors' own

similarities between undergraduates' approaches to learning and PhD candidates' learning patterns. We used CFA to determine whether the data from PhD candidates supports the theory and factor structure of approaches to learning. Importantly, the results of this study show that the dimensions that emerged from the instrument were consistent with the research on undergraduates' approaches to learning, that is, with the deep, unreflective and organised approaches identified in different contexts (Entwistle, 2009; Lindblom-Ylänne *et al.*, 2018; Asikainen *et al.*, 2022). Moreover, the correlation structure between the scales was also consistent with the previous literature on approaches to learning (Parpala *et al.*, 2013), providing more support for the results. Interestingly, the approaches of PhD candidates did not differ based on their year of study. The participants' years of study ranged from 1 to over 5 years, suggesting that learning approaches can be observed consistently throughout the various stages of PhD studies, from the initial to the advanced phases. Furthermore, the PhD candidates' interviews and descriptions of their learning while doing thesis work were also in line with the dimensions and theories behind each scale measuring approaches to learning among undergraduate students (Entwistle, 2009).

The quantitative results showed that PhD candidates scored the highest on the deep approach to learning and second highest on organised studying. The candidates scored lowest on the unreflective approach, which is not surprising, as it measures undesirable learning patterns compared to deep and organised approaches (Richardson, 2012). Still, a particularly interesting finding was that the scale for the unreflective approach, which measures learners' fragmented knowledge base and inability to form a coherent whole (Lindblom-Ylänne *et al.*, 2018), emerged clearly as a separate and clear dimension. The original scale, used among undergraduates, included item measuring repetition of knowledge, but during the contextualising the instrument, this particular item was removed because of low communalities. Therefore, the scale unreflective approach is measuring mainly the PhD candidates inability to form a coherent whole from their thesis work which has shown to be one of the crucial elements of the unreflective (surface) approach to learning (Entwistle and McCune, 2004; Lindblom-Ylänne *et al.*, 2019). PhD candidates' own descriptions during the interviews provided explanations for their answers to the survey items measuring this approach. These candidates described not only difficulties in forming a coherent whole from their thesis but also unclear aims and an inability to reflect on their choices while researching and writing their PhD theses. By contrast, when PhD candidates explained their answers to the scales measuring the deep approach, they highlighted the importance of argumentation and critical thinking in increasing their in-depth understanding of their own research. Finally, the participants' explanations for their answers to the items measuring organised studying included descriptions of planning time and effort. For some participants, this occurred in a disorganised manner, where setting clear aims, goals and schedules was experienced as difficult. These descriptions indicated differences in PhD

candidates learning processes although the data was just used for questionnaire development purposes. Future research should focus more deeply on the qualitative learning processes of the PhD candidates.

Similar to studies among undergraduate students (Salmela-Aro and Upadyaya, 2017), we were able to detect three different dimensions (exhaustion, cynicism and inadequacy) of PhD candidates' study-related burnout. Of these three dimensions, candidates in our study exhibited the highest mean level in inadequacy. Previous research on candidates' well-being has focused, for example, on exhaustion and cynicism (Hunter and Devine, 2016; McAlpine *et al.*, 2020). Consequently, this study highlights the need to examine PhD candidates' sense of inadequacy when focusing on their well-being. This is partly in line with a recent study which shows that many PhD students can have an impostor syndrome (Nori and Vanttaja, 2023). Moreover, we found more variation in the dimensions of study-related burnout than in the dimensions of learning processes (deep, unreflective and organised). This suggests that, in the future, person-oriented research on PhD candidates' well-being is important to reveal the individual differences in the dimensions of burnout.

The second aim was to explore the relationship between the approaches to learning in thesis work and the risk of burnout among PhD candidates. Here, again, our correlation results were in the line with findings among undergraduate students (Asikainen *et al.*, 2019): the unreflective approach was positively and significantly related to the dimensions measuring the risk of burnout, more precisely to exhaustion, cynicism and inadequacy. Furthermore, the deep and organised approaches were negatively and statistically significantly related to all the dimensions regarding the risk of burnout. This finding also resembles the results produced by Stubb *et al.* (2011) that the ability to relate ideas supports the well-being of PhD candidates. Our study implies that also the organised approach, that is, time and effort management, plays an important role in PhD candidates' well-being. Time and effort management can hinder experiences of burnout, but lower well-being might also cause difficulties in time and effort management. In addition, our regression analyses supported that the unreflective approach exhibited a systematic positive association with all dimensions of study-related burnout. All the approaches to learning in thesis work were significantly associated with cynicism in the multivariable model: the unreflective approach positively and both the deep and organised approach negatively. The results, thus, imply that, among PhD candidates, organised studying and a deep approach to learning (and, conversely, low adherence to the unreflective approach) discourages cynicism in the process of writing the thesis although causal relationship cannot be assumed. Thus, an unreflective approach to learning in thesis work is an unfavourable learning pattern in the light of risk of burnout in PhD process. However, more research on these relationships is required. Furthermore, the regression analyses showed that the starting year was significantly and positively associated with all the aspects of study-related burnout. Thus, it seems that the risk of study-related burnout is smaller in the beginning of studies. Similar results have also been found among undergraduates suggesting that exhaustion increases during studies (Räsänen *et al.*, 2020).

Practical implications

In both the inventory data and interviews, three different learning approaches were detected which resembled the learning dimensions emerging also among undergraduates (Entwistle, 2009). It is particularly important to acknowledge that many PhD candidates may struggle with an unreflective approach to learning. One might assume that inability to perceive the connection between various elements of a PhD thesis is an inevitable aspect of the process of writing a thesis and becoming a researcher. This study shows that this is something which occurs even in every phase of the PhD studies, and thus, PhD candidates need support in

constituting a whole of their studies. Supervisors can support this, for example, by asking PhD candidates to keep a learning diary, drawing a mind map or other figures of the core concepts in their studies, discussing with them about their experiences and prior knowledge on their thesis, make them to consider what is the main aim of their study and asking them to speak it out loud and reminding them of those aims and research questions and how their thesis is in line with them. Tools such as Research Canvas could also be used to support forming a coherent whole of the thesis (Ketchen *et al.*, 2019). In addition, it would be beneficial to make PhD candidates acknowledge and monitor their approaches to learning which could be done, for example, by completing an inventory regarding their approaches to learning (Backhaus and Liff, 2007) and discussing the results together with the supervisors. This is important as an unreflective approach to learning is related to feelings of inadequacy and cynicism, as the present study demonstrates. Candidates' ability to reflect on their learning and critical thinking could be fostered using, for example, literature assignments (Turner, 2013). An interesting approach would be to ask PhD candidates to read or discuss a fictional book or story, as it could help them change their thought patterns, encouraging critical thinking and leading them to reject previously held assumptions (Gouthro and Holloway, 2018). Most importantly, the candidates should be encouraged to notice their approaches to learning in thesis work and understand the effect they have on their well-being. With the supervisors, the candidate may find different ways to organise the thesis learning process and reflect the aims and choices made during the process.

Methodological reflections

This study had some limitations. Firstly, the data was self-report data and cross-sectional in nature, and thus, causal relationships could not be explored. Thus, in this study, the purpose was to explore students' experiences about the learning approaches and study-related burnout. Future research should also consider using objective measures of well-being and conducting longitudinal research on the relationship of approaches to learning in thesis work and study-burnout risk. This would also make it possible to examine the possible bi-directional relationship between these measures. Secondly, it should be noted that the unreflective approach was in this study measured only with three items as mentioned in the theory. Thus, the repetition or memorisation in learning was not included in the measurement. It may be possible that the scale, thus, measured the struggling in the learning processes more. In other words, the dimension of a fragmented knowledge base, which is a core element of an unreflective and surface approach to learning, is emphasised in PhD studies (Entwistle and McCune, 2004). However, this has also been the case in higher education contexts more generally (Nieminen *et al.*, 2019).

Thirdly, this study did not take the study programs and their differences into account, even though the participants represented various fields of study. This might affect the generalizability of the results. However, recent research has shown that the dimensions of the approaches to learning emerge similar in different disciplines although there might be differences in how they are emphasised in different learning contexts (Asikainen *et al.*, 2022). Moreover, there could be disciplinary variation in the PhD candidates' risk of burnout, as previous research implies that PhD candidates' social support is related both to discipline and burnout (Peltonen *et al.*, 2017).

Finally, the study focused only on the dimensions of approaches and study-related burnout, although there is evidence of the individual variation in how candidates combine the different dimensions and thus suggests a person-oriented focus on approaches to learning to be more fruitful (Asikainen *et al.*, 2019; Asikainen *et al.*, 2022; Kymäläinen *et al.*, 2023; Mendoza *et al.*, 2022; Yin *et al.*, 2023). This is also supported by the low correlations

between the deep and unreflective approach in this study which imply that these two approaches are not mutually exclusive. Therefore, more research is needed on the different individual combinations of PhD candidates' approaches to learning in thesis work in different disciplines. Our study offers a reliable instrument to continue examining PhD learning processes in more detail.

Conclusions

Exploring PhD candidates' approaches to learning in thesis work offers a promising new perspective to explore factors influencing candidates' well-being. This study emphasises that PhD candidates' experiences of high workload and burnout could be partly explained by their approaches to learning in thesis work. Especially difficulties in forming a coherent understanding of own thesis and an inability to reflect one's own choices appear to be a crucial element and clearly related to all dimensions of burnout. The supervisors have an important role in supporting their PhD candidates in forming a coherent understanding of their thesis work.

References

- Asikainen, H. and Gijbels, D. (2017), "Do students develop towards more deep approaches to learning during studies? A systematic review on the development of students' deep and surface approaches to learning in higher education", *Educational Psychology Review*, Vol. 29, pp. 205-234.
- Asikainen, H., Nieminen, J.H., Häsä, J. and Katajavuori, N. (2022), "University students' interest and burnout profiles and their relation to approaches to learning and achievement", *Learning and Individual Differences*, Vol. 93, pp. 102-105.
- Asikainen, H., Salmela-Aro, K., Parpala, A. and Katajavuori, N. (2019), "Learning profiles and their relation to study-related burnout and academic achievement among university students", *Learning and Individual Differences*, Vol. 78, pp. 1-29.
- Backhaus, K. and Liff, J.P. (2007), "Cognitive styles and approaches to studying in management education", *Journal of Management Education*, Vol. 31 No. 4, pp. 445-466.
- Biggs, J. (2001), "The reflective institution: Assuring and enhancing the quality of teaching and learning", *Higher Education*, Vol. 41 No. 3, pp. 221-238.
- Broseghini, A., Lööke, M., Brscic, M., Raffaghelli, J., Cardazzo, B., Lotti, A., Cavicchioli, L. and Marinelli, L. (2024), "Exploring the effectiveness of Problem-Based learning in an international undergraduate program in veterinary sciences: students' satisfaction, experience and learning", *Veterinary Sciences*, Vol. 11 No. 3, p. 104.
- Brown, T. (2014), *Confirmatory Factor Analysis for Applied Research*, Guildford Press, New York, NY.
- Cantwell, R.H., Scevak, J.J., Bourke, S. and Holbrook, A. (2012), "Identifying individual differences among doctoral candidates: a framework for understanding problematic candidature", *International Journal of Educational Research*, Vol. 53, pp. 68-79.
- Cantwell, R.H., Bourke, S.F., Scevak, J.J., Holbrook, A.P. and Budd, J. (2017), "Doctoral candidates as learners: a study of individual differences in responses to learning and its management", *Studies in Higher Education*, Vol. 42 No. 1, pp. 47-64.
- Cheung, K., Yip, T.L., Wan, C.J., Tsang, H., Zhang, L.W. and Parpala, A. (2020), "Differences in study workload stress and its associated factors between transfer students and freshmen entrants in an Asian higher education context", *Plos One*, Vol. 15 No. 5, p. e0233022.
- Cornér, S., Löfström, E. and Pyhältö, K. (2017), "The relationship between doctoral students' experiences of supervision and burnout", *International Journal of Doctoral Studies*, Vol. 12, pp. 91-106.

- Cornér, S., Pyhältö, K., Peltonen, J. and Löfström, E. (2021), "Interest, burnout and drop-out intentions among Finnish and Danish humanities and social sciences PhD students", *International Journal of Doctoral Studies*, Vol. 16, pp. 593-609.
- Entwistle, N. (1988), "Motivational factors in students' approaches to learning", in Schmeck, R.S. (Ed.), *Learning Strategies and Learning Styles*, Plenum Press, New York, NY, pp. 21-51.
- Entwistle, N. (2009), *Teaching for Understanding at University*, Palgrave Macmillan, Hampshire.
- Entwistle, N. and McCune, V. (2004), "The conceptual bases of study strategy inventories", *Educational Psychology Review*, Vol. 16 No. 4, pp. 325-346.
- Entwistle, N., McCune, V. and Scheja, M. (2006), "Student learning in context: understanding the phenomenon and the person", in Verschaffel, L., Dochy, F., Boekaerts, M. and Vosniadou, S. (Eds), *Instructional Psychology: Past, Present and Future Trends*, Elsevier, Oxford, pp. 131-148.
- Evans, T.M., Bira, L., Gastelum, J.B., Weiss, L.T. and Vanderford, L. (2018), "Evidence for a mental health crisis in graduate education", *Nature Biotechnology*, Vol. 36 No. 3, pp. 282-284.
- Gouthro, P.A. and Holloway, S.M. (2018), "Learning to be critically reflective: exploring fiction writing and adult learning", *Studies in Continuing Education*, Vol. 40 No. 2, pp. 133-148.
- Heikkilä, A. and Lonka, K. (2006), "Studying in higher education: students' approaches to learning, self-regulation, and cognitive strategies", *Studies in Higher Education*, Vol. 31 No. 1, pp. 99-117.
- Hermann, K.J. (2021), "Quality in the PhD process. A survey among PhD students at Aarhus University", available at: <https://phd.au.dk/strategy-and-collaboration/quality-in-the-phd-process/> (accessed 30 October 2023).
- Herrmann, K.J., Bager-Elsborg, A. and Parpala, A. (2017), "Measuring perceptions of the learning environment and approaches to learning: validation of the learn questionnaire", *Scandinavian Journal of Educational Research*, Vol. 61 No. 5, pp. 526-539.
- Hunter, K. and Devine, K. (2016), "Doctoral students' emotional exhaustion and intentions to leave academia", *International Journal of Doctoral Studies*, Vol. 11, pp. 35-61.
- Inouye, K. and McAlpine, L. (2019), "Developing academic identity: a review of the literature on doctoral writing and feedback", *International Journal of Doctoral Studies*, Vol. 14 No. 1, pp. 1-31.
- Janeiro, IN., Duarte, A.M., Araújo, A.M. and Gomes, A.I. (2017), "Time perspective, approaches to learning, and academic achievement in secondary students", *Learning and Individual Differences*, Vol. 55, pp. 61-68.
- Ketchen, D.J., Bergh, D.D. and Boyd, B.K. (2019), "The research design canvas: a tool for creating better studies", in Boyd, B., Crook, R., Lê, J. and Smith, A. (Eds), *Standing on the Shoulders of Giants*, Emerald Publishing, Bingley, Vol. 11, pp. 63-76.
- Kim, H.Y. (2013), "Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis", *Restorative Dentistry and Endodontics*, Vol. 38 No. 1, p. 52.
- Kirby, J.R., Knapper, C.K., Evans, C.J., Carty, A.E. and Gadula, C. (2003), "Approaches to learning at work and workplace climate", *International Journal of Training and Development*, Vol. 7 No. 1, pp. 31-52.
- Kok, X.F.K., Puah, S., Pua, C.Y., Devilly, O.Z., Lim, S., et al. (2024), "Students' approaches to learning (SAL) and their relations to burnout among university freshmen in Singapore", *Discover Psychology*, Vol. 4 No. 1, doi: [10.1007/s44202-024-00218-2](https://doi.org/10.1007/s44202-024-00218-2).
- Kuittinen, M. and Meriläinen, M. (2011), "The effect of study-related burnout on student perceptions", *Journal of International Education in Business*, Vol. 4 No. 1, pp. 42-62.
- Kymäläinen, H.R., Häsä, J.I.A. and Södervik, I. (2023), "Factors related to study progress among first-year agriculture students", *International Journal of Teaching and Learning in Higher Education*, Vol. 35 No. 2, pp. 11-16.
- Levecque, K., Ansee, F., De Beuckelaer, A., Van der Heyden, J. and Gisle, L. (2017), "Work organization and mental health problems in PhD students", *Research Policy*, Vol. 46 No. 4, pp. 868-879.

- Lindblom-Ylänne, S., Parpala, A. and Postareff, L. (2018), "What constitutes the surface approach to learning in the light of new empirical evidence?", *Studies in Higher Education*, Vol. 23 No. 4, pp. 1-13.
- Lindblom-Ylänne, S., Parpala, A. and Postareff, L. (2019), "What constitutes the surface approach to learning in the light of new empirical evidence?", *Studies in Higher Education*, Vol. 44 No. 12, pp. 2183-2195.
- Magno, C. (2009), "Investigating the effect of school ability on self-efficacy, learning approaches, and metacognition", *Online Submission*, Vol. 18 No. 2, pp. 233-244.
- McAlpine, L., Skakni, I. and Pyhältö, K. (2020), "PhD experience (and progress) is more than work: life-work relations and reducing exhaustion (and cynicism)", *Studies in Higher Education*, Vol. 47 No. 2, pp. 1-15.
- Maslach, C., Schaufeli, W.B. and Leiter, M.P. (2001), "Job burnout", *Annual Review of Psychology*, Vol. 52 No. 1, pp. 397-422.
- Mendoza, L., Lindblom-Ylänne, S., Lehtonen, T. and Hyytinen, H. (2022), "Writing a master's thesis: Associations between the grade, self-efficacy, approaches to writing, and experiences of the thesis as a teaching and learning environment", *Journal of Writing Research*, Vol. 14 No. 2, pp. 257-286.
- Moreira, P.A., Inman, R.A., Rosa, I., Cloninger, K., Duarte, A. and Robert Cloninger, C. (2021), "The psychobiological model of personality and its association with student approaches to learning: integrating temperament and character", *Scandinavian Journal of Educational Research*, Vol. 65 No. 4, pp. 693-709.
- Nori, H. and Vanttaja, M. (2023), "Too stupid for PhD? Doctoral impostor syndrome among Finnish PhD students", *Higher Education*, Vol. 86 No. 3, pp. 675-691.
- Parpala, A. and Lindblom-Ylänne, S. (2012), "Using a research instrument for developing quality at the university", *Quality in Higher Education*, Vol. 18 No. 3, pp. 313-328.
- Parpala, A., Lindblom-Ylänne, S., Komulainen, E. and Entwistle, N. (2013), "Assessing students' experiences of teaching-learning environments and approaches to learning: validation of a questionnaire in different countries and varying contexts", *Learning Environments Research*, Vol. 16 No. 2, pp. 201-215.
- Parpala, A., Katajavuori, N., Haarala-Muhonen, A. and Asikainen, H. (2021), "How did students with different learning profiles experience 'normal' and online teaching situation during COVID-19 spring?", *Social Sciences*, Vol. 10 No. 9, p. 337.
- Peltonen, J.A., Vekkailla, J., Rautio, P., Haverinen, K. and Pyhältö, K. (2017), "Doctoral students' social support profiles and their relationship to burnout, drop-out intentions, and time to candidacy", *International Journal of Doctoral Studies*, Vol. 12, pp. 157-173.
- Postareff, L., Mattsson, M. and Parpala, A. (2018), "The effect of perceptions of the teaching-learning environment on the variation in approaches to learning-between-student differences and within-student variation", *Learning and Individual Differences*, Vol. 68, pp. 96-107.
- Pyhältö, K., Tikkanen, L. and Anttila, H. (2023a), "Relationship between doctoral supervisors' competencies, engagement in supervisory development and experienced support from research community", *Innovations in Education and Teaching International*, Vol. 61 No. 3, pp. 1-15.
- Pyhältö, K., Tikkanen, L. and Anttila, H. (2023b), "The influence of the COVID-19 pandemic on PhD candidates' study progress and study wellbeing", *Higher Education Research and Development*, Vol. 42 No. 2, pp. 413-426.
- Pyhältö, K., Tikkanen, L. and Anttila, H. (2024), "Relationship between doctoral supervisors' competencies, engagement in supervisory development and experienced support from research community", *Innovations in Education and Teaching International*, Vol. 61 No. 3, pp. 555-569.
- Pyhältö, K., Vekkailla, J. and Keskinen, J. (2012), "Exploring the fit between doctoral students' and supervisors' perceptions of resources and challenges vis-à-vis the doctoral journey", *International Journal of Doctoral Studies*, Vol. 7, pp. 395-414.

- Pyhältö, K., Peltonen, J., Anttila, H., Frick, L.L. and de Jager, P. (2023c), "Engaged and/or burnt out? Finnish and South African doctoral students' experiences", *Studies in Graduate and Postdoctoral Education*, Vol. 14 No. 1, pp. 1-18.
- Räisänen, M., Postareff, L., Mattsson, M. and Lindblom-Ylänne, S. (2020), "Study-related exhaustion: first-year students' use of self-regulation of learning and peer learning and perceived value of peer support", *Active Learning in Higher Education*, Vol. 21 No. 3, pp. 173-188.
- Richardson, J.T. (2012), "The role of response biases in the relationship between students' perceptions of their courses and their approaches to studying in higher education", *British Educational Research Journal*, Vol. 38 No. 3, pp. 399-418.
- Ruohoniemi, M., Forni, M., Mikkonen, J. and Parpala, A. (2017), "Enhancing quality with a research-based student feedback instrument: a comparison of veterinary students' learning experiences in two culturally different European universities", *Quality in Higher Education*, Vol. 23 No. 3, pp. 249-263.
- Salmela-Aro, K. and Kunttu, K. (2010), "Study burnout and engagement in higher education", *Unterrichtswissenschaft*, Vol. 38, pp. 318-333.
- Salmela-Aro, K. and Read, S. (2017), "Study engagement and burnout profiles among Finnish higher education students", *Burnout Research*, Vol. 7, pp. 21-28.
- Salmela-Aro, K. and Upadyaya, K. (2017), "Co-development of educational aspirations and academic burnout from adolescence to adulthood in Finland", *Research in Human Development*, Vol. 14 No. 2, pp. 106-121.
- Salmela-Aro, K., Kiuru, N., Leskinen, E. and Nurmi, J. (2009), "School burnout inventory (SBI): reliability and validity", *European Journal of Psychological Assessment*, Vol. 25 No. 1, pp. 48-57.
- Schaufeli, W.B. and Bakker, A.B. (2004), "Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study", *Journal of Organizational Behavior*, Vol. 25 No. 3, pp. 293-315.
- Schaufeli, W.B., Bakker, A., Hoogduin, K., Schaap, C. and Klavier, A. (2001), "On the clinical validity of the Maslach burnout inventory and the burnout measure", *Psychology and Health*, Vol. 16 No. 5, pp. 565-583.
- Schmidt, M. and Hansson, E. (2018), "Doctoral students' well-being: a literature review", *International Journal of Qualitative Studies on Health and Well-being*, Vol. 13 No. 1, p. 1508171.
- Sjöblom, A., Inkinen, M., Salmela-Aro, K. and Parpala, A. (2024), "Transitioning from bachelor's to master's studies—examining study burnout, approaches to learning and experiences of the learning environment", *Journal of Applied Research in Higher Education*, Vol. 17 No. 7, pp. 1-15.
- Stubb, J., Pyhältö, K. and Lonka, K. (2011), "Balancing between inspiration and exhaustion: PhD students' experienced socio-psychological well-being", *Studies in Continuing Education*, Vol. 33 No. 1, pp. 33-50.
- Sverdlik, A., Hall, N.C., McAlpine, L. and Hubbard, K. (2018), "The PhD experience: a review of the factors influencing doctoral students' completion, achievement, and well-being", *International Journal of Doctoral Studies*, Vol. 13 No. 1, pp. 361-388.
- Trigwell, K., Ellis, R.A. and Han, F. (2012), "Relations between students' approaches to learning, experienced emotions and outcomes of learning", *Studies in Higher Education*, Vol. 37 No. 7, pp. 811-824.
- Tuononen, T., Hyytinen, H., Räisänen, M., Hailikari, T. and Parpala, A. (2023), "Metacognitive awareness in relation to university students' learning profiles", *Metacognition and Learning*, Vol. 18 No. 1, pp. 37-54.
- Turner, L.M. (2013), "Encouraging professional growth among social work students through literature assignments: narrative literature's capacity to inspire professional growth and empathy", *British Journal of Social Work*, Vol. 43 No. 5, pp. 853-871.
- Vekkaila, J. and Pyhältö, K. (2016), "Doctoral student learning patterns: learning about active knowledge creation or passive production", *International Journal of Higher Education*, Vol. 5 No. 2, pp. 222-235.

- Vekkaila, J., Pyhältö, K. and Lonka, K. (2013), "Experiences of disengagement - a study of doctoral students in the behavioural sciences", *International Journal of Doctoral Studies*, Vol. 8, p. 61.
- Virtanen, V., Taina, J. and Pyhältö, K. (2017), "What disengages doctoral students in the biological and environmental sciences from their doctoral studies?", *Studies in Continuing Education*, Vol. 39 No. 1, pp. 71-86.
- Yin, Y., Parpala, A. and Toom, A. (2023), "The relationship between international higher education students' writing conceptions and approaches to learning", *Journal of Writing Research*, Vol. 14 No. 3, pp. 421-446.
- Yin, Y., Parpala, A. and Toom, A. (2024), "International students' burnout and self-efficacy profiles and their relation to writing conceptions", *Research in Comparative and International Education*, Vol. 19 No. 2, p. 17454999241232241.

Further reading

- Baeten, M., Kyndt, E., Struyven, K. and Dochy, F. (2010), "Using student-centred learning environments to stimulate deep approaches to learning: factors encouraging or discouraging their effectiveness", *Educational Research Review*, Vol. 5 No. 3, pp. 243-260.
- Barry, K., Woods, M., Warnecke, E., Stirling, C. and Martin, A. (2018), "Psychological health of doctoral candidates, study-related challenges and perceived performance", *Higher Education Research and Development*, Vol. 37 No. 3, pp. 468-483.
- Biggs, J., Kember, D. and Leung, D.Y. (2001), "The revised two-factor study process questionnaire: r-SPQ-2F", *British Journal of Educational Psychology*, Vol. 71 No. 1, pp. 133-149.
- Coertjens, L., Vanthournout, G., Lindblom-Ylänne, S. and Postareff, L. (2016), "Understanding individual differences in approaches to learning across courses: a mixed method approach", *Learning and Individual Differences*, Vol. 51, pp. 69-80.
- Cornér, S., Pyhältö, K., Peltonen, J. and Bengtson, S. (2018), "Similar or different? Comparison on researcher community and supervisory support experiences among Finnish and Danish social sciences and humanities PhD students", *Studies in Graduate and Postdoctoral Education*, Vol. 9 No. 2, pp. 274-295.
- Koster, A.S. and Vermunt, J.D. (2020), "Longitudinal changes of deep and surface learning in a constructivist pharmacy curriculum", *Pharmacy*, Vol. 8 No. 4, pp. 1-6.
- Lara, M.C., Badia, M.C. and Lonka, K. (2019), "A picture of the research field of doctoral education from the students' perspectives: Studies using questionnaires and scales", in Machin, T.M., Marc, C. and Danahein, P.A. (Eds), *Traversing the Doctorate*, Palgrave Macmillan, Cham, pp. 75-89.
- Lietz, P. and Matthews, B. (2010), "The effects of college students' personal values on changes in learning approaches", *Research in Higher Education*, Vol. 51 No. 1, pp. 65-87.
- Pyhältö, K. (2018), "Function of supervisory and researcher community support in PhD and post-PhD trajectories", in Bizer, E., Frick, L., Fourie-Malherbe, M. and Pyhältö, K. (Eds), *Spaces, Journeys and New Horizons for Postgraduate Supervision*, Sun Press, K. Stellenbosch, pp. 205-222.
- Pyhältö, K. and Keskinen, J. (2012), "Doctoral students' sense of relational agency in their scholarly communities", *International Journal of Higher Education*, Vol. 1 No. 2, pp. 136-149.
- Räisänen, M., Postareff, L. and Lindblom-Ylänne, S. (2021), "Students' experiences of study-related exhaustion, regulation of learning, peer learning and peer support during university studies", *European Journal of Psychology of Education*, Vol. 36 No. 4, pp. 1135-1157.
- Salmela-Aro, K. (2017), "Dark and bright sides of thriving - school burnout and engagement in the Finnish context", *European Journal of Developmental Psychology*, Vol. 14 No. 3, pp. 337-349.
- Weiden, I., Meijer, I., van der Ven, I., Beukman, J., Farzand, A.R. and de Gelder, E. (2017), "The mental well being of Leiden University PhD candidates", CWTS Policy Report. Leiden: Centre for Science and Technology Studies, Leiden University.

Appendix 1. HULPhD inventory

Approaches to learning in the PhD context

Unreflective approach

- I often have trouble forming a coherent whole of my PhD thesis.
- Many themes related to the contents of my thesis remain disconnected from each other.
- The contents of my PhD feel so complicated that I often have trouble understanding them.

Deep approach

- While doing my PhD thesis, I often contemplate the ideas and their connections from multiple perspectives.
- I carefully look for evidence to reach my own conclusions while doing my PhD thesis.
- While writing my thesis, I try to make use of different viewpoints on the subject matter as much as possible.

Organised studying approach

- I put a lot of effort into my PhD thesis.
- On the whole, I work on my PhD thesis in a systematic and organised way.
- I organise the time reserved for my PhD thesis carefully to make the best use of it.
- I have made a schedule so that I can complete my PhD thesis as planned.

Burnout in the PhD context

- I feel overwhelmed by my PhD studies.
- I feel a lack of motivation in my PhD studies and often think of giving up.
- I often have feelings of inadequacy in my PhD studies.
- I often sleep badly because of matters related to my PhD studies.
- I feel that I am losing interest in my PhD studies.
- I constantly wonder whether my PhD studies have any meaning.
- I brood over matters related to my PhD studies a lot during my free time.
- I used to have higher expectations of my PhD studies than I do now.
- The pressure of my PhD studies causes me problems in my close relationships with others.

Source(s): Authors' own creation

Appendix 2. The interviews excerpts from each dimension measuring approaches to learning in a PhD context

The following interview excerpt describes a typical way in which PhD candidates scoring high on the deep approach described their learning process:

I constantly think about how the content of my thesis is related to the wider context. I want to be careful and sure that all my arguments are supported by the theory and research in my own field and lead to a deeper understanding of my own research.

The high scores on organised approach were in line with the PhD candidates' own descriptions of their time and effort management skills. Candidates who had received high scores on the organised studying dimension described how they attempted to make the best use of their time by planning carefully, setting deadlines and prioritising and using different ways to manage and regulate their own learning. The following excerpts demonstrated good time and effort management skills:

It goes quite nicely so that when I'm at work, I'm at work and when I'm home with the kid and my husband, I focus on that.... So I try to be careful in dividing my time between work and free time.... I have a semi-flexible schedule where I have planned when to finish what, so for example during the next two months, I want to finish the empirical part and create the skeleton for the manuscript, finish the pictures and tables – I always have in mind what I should finish. And then I just look through all the things I need to do and when I have time to do them.

I always write in my online calendar all the things I need to do. If I can't finish all the things I was supposed to during one day, I put it to the next day or wherever I think I can finish it to keep up with all the things I should do and all the deadlines. It works well for me and what are the priorities and what I need to do quickly and what is the top priority I need to do. I have found a way to manage it.

Finally, when candidates were explaining their answers to items measuring the unreflective approach, they described difficulties in forming a coherent whole and reflecting on their learning, which is in line with the theory of an unreflective approach (Lindblom-Ylänne *et al.*, 2018):

I have had trouble forming any kind of whole [of my thesis] [...] I don't know what to do with it. I should have begun much earlier to think about what I am aiming at with my thesis.

Well my motivation decreased when I didn't understand what I was doing and what, for example, the aims and hypothesis of my thesis are [...] I haven't had a chance or time to think why I'm doing what I'm doing and why this should be explored [...] So now I'm wondering what to do next so that the thesis themes would be linked to each other.

Source(s): Authors' own creation

Corresponding author

Telle Hailikari can be contacted at: telle.hailikari@hamk.fi