Meaningful Jobs – A balancing act

A diagnostic qualitative research aimed at the relation between the job design and meaningful work of a Doctor of Philosophy (PhD) at the Human Technology Interaction department of the Eindhoven University of Technology

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Abstract

One of the core values of the Eindhoven University of Technology (TU/e) is meaningful minds. However, since its PhD's conduct research on their own, the Human Technology Interaction (HTI) department of the TU/e struggles to determine the level of meaningfulness of its PhD's. Due to rumours that the PhD's are not able to do their job properly, the concerns about the degree of meaningful minds increase. The goal of this research is to make recommendations to improve the level of meaningful work of PhD's by adjusting the design of the job, via the job characteristics skill variety, task identity and task significance. In order to achieve the goal, a gap-analysis was performed.

The main finding of this research is that the PhD's are unable to find the required balance between the dimensions of meaningful work. This disables the PhD's to perceive their job as meaningful. The PhD's are able to develop themselves, unite with others and express their needs, but are unable to clearly identify the practical relevance of their work, which the PhD's valued more than the scientific relevance. This was also visible in the design of the job characteristics. Although the skill variety is high, the PhD's are unable to identify which task eventually contributes to which part of their dissertation, which resulted in a lack of task identity. This also applied for the task significance. Therefore, better insight in the practical relevance is recommended for HTI department of the Eindhoven University of Technology which can be achieved via assigning organizations to PhD's or creating more practice oriented topics. Furthermore, it is recommended to create task descriptions to increase the task identity of the PhD's. In order to improve the balance between the dimensions, reflection meetings between supervisors and PhD's are recommended.

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Chapter 1: Introduction

1.1 Case introduction

The Eindhoven University of Technology (TU/e) aims for creating future technologies by mastering complexities. Although the university focuses on technological applications and developments, the university also aims for a significant contribution for the society and their employees. Therefore, the TU/e uses the concept of ‘meaningful minds’ which can be found in the recruitment specifics which apply for the whole university and all functions (for example; scientific personnel, PhD’s and support staff). This central concept forms a core value of the TU/e (Appendix 1) (Tue.nl, n.d.a). According to the TU/e, ‘meaningful minds’ refer to a great intrinsic passion and a purpose to provide a better future for the global society via science. In order to enable the employees to contribute to this core value, the TU/e gives them the required freedom (Tue.nl, n.d.a). This provides an important insight in the TU/e since the concept of ‘meaningful minds’ relates to the concept of meaningful work which can be defined as the acknowledgement of the employees that they believe that their work serves an important purpose (Pratt and Ashforth, 2003, p. 311). For the TU/e, the purpose is a better future for the global society.

At every university, there is the opportunity to become a Doctor of Philosophy (PhD), which entails promoting in a certain scientific field of knowledge by generating a publishable study (dissertation) during four years (Tinkler & Jackson, 2000, p. 169). Being a PhD requires a substantial investment of time, energy and resources along side with intrinsic motivation (Naylor, Chakravarti & Baik, 2016, p. 351). The TU/e mentions the following required characteristics for a PhD: ability to work autonomously, a more than common interest in science, analytic intellect and persistence (Tue.nl, n.d.b). The same characteristics are mentioned by the university of Amsterdam (Universiteit van Amsterdam, 2019). Therefore, it is expected that the PhD’s are intrinsically motivated to do their job and would perceive their job as meaningful. However, despite having ‘meaningful minds’ as the TU/e’s core value, the TU/e struggles to determine whether the PhD’s perceive their work as meaningful. This is due to the fact that PhD’s more or less work in isolation since they do research on their own (Haksever and Manisali, 2000, p. 19). Moreover, PhD’s tend to face several challenges during their PhD trajectory, like; maintaining motivation, coping with stress and a lack of adequate supervision (Naylor et al., 2016, p. 363). Several of these challenges are also visible at the HTI department of the TU/e (Appendix 1). Due to these challenges, the PhD’s might lose sight on the goal or value of their PhD trajectory and therefore not perceive their job as meaningful. Furthermore, due to a shortage of professors the PhD’s need to take over more educational tasks (Appendix 1). Moreover, due to rumours about some PhD’s who are not able to do the job properly, concerns about the level of meaningfulness increase, since the TU/e does not know how to improve the current situation and whether it is even necessary to do so.

A job design can be defined as identifying the relevant tasks and activities and allocating them across employees (Foss, Minbaeva, Pedersen & Reinholt, 2009, p. 873). This concept derives from the Scientific Management school. A commonly used framework within this school is the job characteristics model of Hackman and Oldham (1976), which includes three job characteristics which contribute to the experienced meaningfulness of the job: skill variety, task identity and task significance. In short, skill variety refers to the degree of different activities of the job and to the extent of the different skills and talents which are needed to complete all activities (Oldham & Hackman, 2010, p. 464). Task identity refers to the degree to which the job concerns the completion of a whole task, while task significance is defined as the degree to which a job has a certain impact on the lives or work of others (Hackman & Oldham, 1976, p. 257). According to this school, the problems can relate to the job design. For example, the problem of 'not being able to do the job properly' might relate to the job characteristic of skill variety which refers to the amount of skills needed to perform the job (Hackman & Oldham, 1976, p. 250). Therefore, these three job characteristics will be taken into account in this research.

1.2 Goal of the research

Regarding the current situation at the HTI department a diagnostic gap analysis will be conducted to examine the desired and the actual situation. This enables the researcher to structurally determine whether the design of the PhD function might falls short.

In general, most researches on meaningful work demonstrate that meaningful work can contribute to several aspects, like greater feelings of psychological well-being (for example: Arnold, Turner, Barling, Kelloway & McKee, 2007, p. 195; Humphrey, Nahrgang & Morgeson, 2007). However, this research tries to investigate, with the help of the relevant job characteristics (the ones contributing to meaningful work), how the PhD jobs at the TU/e can be redesigned in order to improve the feeling of meaningful work. Since most literature (for example: Steger & Dik, 2010; Tummers & Knies, 2013) is concerned about the added value of meaningful work, this research is aimed at job characteristics as enablers for meaningful work. Although several studies have indicated other enablers for meaningful work, like motivation and job-engagement (see for example: Rosso et al., 2010, p. 92; Wrzesniewski, McCauley, Rozin & Schwartz, 1997; May, Gilson & Hart, 2004), the researcher decided to only take the job design into account due to HTI's own preliminary assessment of causes for a possible decrease in the perceived level of meaningfulness of the job. Furthermore, this research has some limitations in terms of time and the size of the research which makes it undoable to research more possible factors. Therefore, based on the case description, the goal of the research is the following:

Making recommendations to improve the design of the skill variety, task identity and task significance of the PhD function at the HTI department of the TU/e, for the purpose of improving the level of meaningful work by generating insight in the similarities and differences between the desired and the actual situation concerning meaningful work and the design of skill variety, task identity and task significance.

1.3 Research question

The corresponding research question is the following: Wherein differs the desired situation with the actual situation with respect to the skill variety, task identity and task significance of the PhD's of the HTI department of the Eindhoven University of Technology and their perceived level of meaningful work?

The corresponding sub-questions are the following:

- What is, according to the literature, the desired situation regarding skill variety, task identity and task significance and meaningful work?
- What is the actual situation at the HTI department of the TU/e regarding skill variety, task identity and task significance of the PhD's and their perceived level of meaningful work?
- What is the difference between the desired and the actual situation regarding skill variety, task identity and task significance of the PhD's and their perceived level of meaningful work?

These sub-questions help to structurally answer the research question. Moreover, the first and the second sub-question make it easier to find and describe the gap between the desired and the actual situation which forms the answer on the third sub-question. This makes it clearer for the reader to understand and grasp the meaning of the answer to the research question.

1.4 Approach

This research will be conducted with the help of qualitative methods. Furthermore, this research is a diagnostic and single case-study. A gap-analysis will be performed which means that the desired situation (according to the literature) and the actual situation will be compared in order to assess the gap. The actual situation concerning the job design of PhD's at the HTI department and their perceived level of meaningful work will be described by the data which is collected via interviews and a documentation analysis at the HTI department of the TU/e. Therefore, this research uses a deductive approach. The methodological specifics will be further elaborated and clarified in the third chapter.

1.5 Relevance

The social contribution of this research is that it can help the HTI department of the TU/e to redesign its PhD jobs in order to improve the feeling of meaningful jobs of the PhD's. Furthermore, this research can provide more insight in the current job design at the HTI department regarding the skill variety, task identity and task significance. Moreover, the findings of this research can contribute to the improvement of the design of the job in order to improve the degree of meaningful work. According to the job design theory of Hackman and Oldham (1976) every job consists of their job characteristics. However, every job has designed these characteristics differently. Therefore, this theory is pre-eminently appropriate to create recommendations to improve the design of these characteristics. The recommendations of this research can contribute to the concept of meaningful minds, which is the core value of the TU/e. Therefore, the recommendations are aimed at improving the perceived meaningfulness of the job, via adjustments in the job design. Besides, this research can be valuable for other organizations which are working with PhD's and are striving for or interested in meaningful work.

The scientific contribution of this research is that it aims at the relationship between skill variety, task identity and task significance and meaningful work, while most researchers investigate the relation of job satisfaction and meaningful work (for example; Michaelson, 2011; Allan, Dexter, Kinsey & Parker, 2018) or the relation of job engagement and meaningful work (for example; Jung & Yoon, 2016; Hoole & Bonnema, 2015). Furthermore, this research can provide more insight in the perceived meaningfulness of work of PhD's. The current literature about meaningful work only aims at students, not PhD's (see for example: Kass, Vodanovich and Khosravi, 2011). Moreover, the literature on meaningful work in knowledge intensive organizations is nihil. Although there seems to be some literature about job designs in knowledge intensive organizations, these mainly address the relation between job design and knowledge sharing (see for example: Foss et al., 2009). The work of Cockburn-Wootten (2012) did an attempt to examine the relation between meaningful work and professionalism, but did not aim its research on a particular job. Therefore, this research can contribute to both fields of literature by examining the relation between meaningful work and a knowledge intensive job; a PhD function.

1.6 Outline of this research

The structure of this research is to first discuss the existing literature on meaningful work and skill variety, task identity and task significance, in order to describe the desired situation. Thereafter, the methodology of the research will be discussed in chapter 3 followed by chapter 4 which describes the results of the data collection. Next, the conclusion of this research will be presented which is followed by the discussion chapter.

Chapter 2: Theory

2.1 Introduction

This chapter discusses the central concepts of this research: meaningful work and job design. Thereafter, the relation between both concepts will be described. This is followed by answering the first sub-question. Finally, the conceptual model will be presented which graphically shows the relation between meaningful work and the three characteristics of job design; skill variety, task identity and task significance.

2.2 Meaningful Work

Meaningful work can be perceived from two approaches: management studies and the humanities literature. These two approaches will be discussed below in order to create a more complete view on meaningful work.

Management studies perceive meaningful work as a method to enhance employee motivation and engagement (May, Gilson & Harter, 2004, p. 14). Furthermore, meaningful work is considered as an indicator for understanding employee well-being (Lips-Wiersma & Wright, 2012, p. 656). Therefore, the management studies mainly focus on providing and managing meaningful work (Lips-Wiersma & Morris, 2009, p. 491). This kind of literature assumes that the organization should design conditions to provide employees with meaningful work (Lips-Wiersma & Morris, 2009, p. 492). In other words, management studies assume that everything is controllable (Law, Wong & Song, 2004). Findings within the management studies, proof that meaningful work contributes to employee satisfaction, engagement and commitment (Geldenhuys, Laba & Venter, 2014).

Another approach on meaningful work is the humanities literature which stands in contradiction with the management studies and considers meaningful work as an intrinsic value within people (Klinger, 2013). This entails that meaningfulness does not need to be motivated or managed because people have an intrinsic 'will to meaning.' In other words, people have a certain intrinsic motivation for meaningful work by nature. Lips-Wiersma and Morris (2009, p. 492) elaborate on this idea by explaining a 'will to meaning'; someone who wants to find and fulfil meaning and purpose in life. This approach reckons the fact that meaningfulness is not a great concern for everyone in everyday life, but states that when someone is performing too many activities which are not valuable for him or her, it might become a concern. Within the literature, there are various domains like *authentic living*, *moral living* and *dignified living* which treat meaningfulness as a central human concern (Lips-Wiersma & Morris, 2009, p. 493). The humanities literature perceives meaningfulness as intrinsic values which cannot easily be managed (Lips-Wiersma & Morris, 2009).

As described in chapter 1, this research aims at the characteristics of job design of PhD's in order to determine how these jobs should be adjusted to contribute to meaningful work. As a result, this research made the assumption that organizational factors can influence the experience of meaningful work. Hence, meaningful work is considered to be manageable. Therefore, this research aligns with the management approach of meaningful work.

2.2.1 Definition: Meaningful work

A distinction can be made between perspectives on meaningful work. Hackman and Oldham (1976) tend to take a more objective approach by stating that meaningful work is realized when certain job characteristics are met. However, their definition of meaningful work, which is "the degree to which the individual experiences the job as generally meaningful, valuable and worthwhile," does not seem very objective (Hackman & Oldham, 1976, p. 256). Moreover, this definition does not explain what meaningful means. Michaelson (2008, p. 337) mentions that meaningful work consists of subjective aspects like self-esteem, as well as objective aspects like the contribution to someone's work. Therefore, meaningful work is more or less about finding the best fit between the employee and the job (Michaelson, Pratt, Grant & Dunn, 2014).

Furthermore, most studies tend to state that meaningful work is subjective. For example, May, Gilson and Harter (2004, p. 14) define a meaningful job as the goal or purposes of the job which are valued by the individuals own ideals or standards. Arnold et al. (2007, p. 195) define meaningful work as finding a purpose in work which is greater than the extrinsic outcomes of the job. Extrinsic outcomes of the job are for example wages, while the intrinsic outcomes of the job are for example self-development (Arnold et al., 2007, p. 195).

Cheney and Ashcraft (2007, p. 162) follow this line of thinking and define work as meaningful when the job contributes to a personally important purpose. This personally important purpose can be seen as a positive feeling employees have about their job. This is supported by Rosso, Dekas and Wrzesniewski (2010) who state that work can be perceived as meaningful when the job has a positive meaning for individuals. Both definitions are based on Pratt and Ashfort (2003, p. 311) who defined meaningful work as the acknowledgement of the employees that their work serves an important purpose. This purpose can be personal, but can also affect other people. While Pratt and Ashfort (2003) mention an acknowledgement, Lips-Wiersma and Morris (2009, p. 492) mention an experience and define meaningful work as 'the subjective experience of a significant life or purpose of life.' According to the discussed definitions, meaningful work can be seen as the acknowledgement of employees that their work contributes to someone's job and to the personal important purposes of the employee, like self-development. This limited overview of definitions is summarized in the framework of meaningful work of Lips-Wiersma and Wright (2012). This framework includes the aspects of the earlier discussed definitions like the personal aspect (May et al., 2004), the self-development aspect (Arnold et al., 2007) and the service to others aspect (Pratt & Ashfort, 2003; Michaelson, 2008). Since Lips-Wiersma and Wright (2012) do not provide a clear definition of meaningful work, this will be based on the dimensions of their framework which results in the following definition of meaningful work: work that enables employees to find a balance between the unity with others, service to others, the expressing of full potential and developing and becoming self. This theoretical definition will be used in the remainder of this research. In order to understand this definition, the dimensions will be explained in the next section.

2.2.2 The framework of meaningful work

In order to get a greater understanding of the concept of meaningful work, it will be explained according to the dimensions of the theory of Lips-Wiersma and Wright (2012). Their theory divides meaningful work into four content dimensions; developing and becoming self, unity with others, service to others and expressing full potential (Lips-Wiersma et al., 2012). This theory results in a framework, which makes meaning more visible and contributed to the making of more conscious choices in relation to meaningful work (Lips-Wiersma & Morris, 2009, p. 496).

Besides, the framework also includes the dimensions ‘self’ and ‘others’. These dimensions refer to the tension between the urgency to meet the needs of the self (the needs of the employee) and the urgency to meet the needs of the others (the colleagues of the employee) (Lips-Wiersma et al., 2012, p. 661). Another dimension is the tension between ‘being’ and ‘doing’. ‘Being’ refers to the need for reflection, while ‘doing’ refers to the need for action. Besides, the fact that the dimensions need to be present, the key is to find a balance between the four dimensions (Lips-Wiersma, 2002). Only then the employees will be able to define what is meaningful for them.

The first dimension, developing and becoming self, depends on the worldview of the employee. This can for example entail to ‘be the best’ or to ‘always speak the truth’ (Lips-Wiersma et al., 2012, p. 673). This happens in the mind and is not expressed to others. The developing and becoming self relates to the concepts of integrity, personal growth and self-knowledge (Lips-Wiersma, 2002, p. 389). Integrity refers to the ability to make a distinction between right and wrong and to be able to be reliable. Personal growth refers to the development of the employees and whether this development is desired (Lips-Wiersma, 2002, p. 390). Self-knowledge refers to in what sense the employee can be him- or herself at the job. The second dimension, unity with others, refers to meaningfulness through working with other employees. This dimension refers to a sense of belonging to a group and sharing values (Lips-Wiersma, 2002, p. 391). A sense of belonging is important for employees because it gives them the feeling that they are taken care of. Sharing values is also an important activity for employees since it enhances the feeling of meaningful work. If employees act right according to their values and they can share their values with others, then employees experience more meaningful work (Rosso et al., 2010, p. 111). The third dimension, expressing full potential, refers to meaningfulness via creating, achieving and influencing (Lips-Wiersma, 2002, p. 392). Creating refers to physically making things or to shaping their work environment in a sense of determining how to work, which is expressed via creativity. Achieving refers to the ability to reach personally important goals, while influencing refers to expressing one's own thoughts in order to get something done or to let others do something. This is action driven and outward directed. The fourth dimension, service to others, refers to meaningfulness by contributing to the well-being of other employees, but also by contributing to the rest of the world (Lips-Wiersma et al., 2012, p. 673). Lips-Wiersma (2002, p. 390) refers to this as making a difference.

These dimensions are shown in the figure below and show the content and process dimensions of meaningful work (Lips-Wiersma et al., 2012, p. 659).

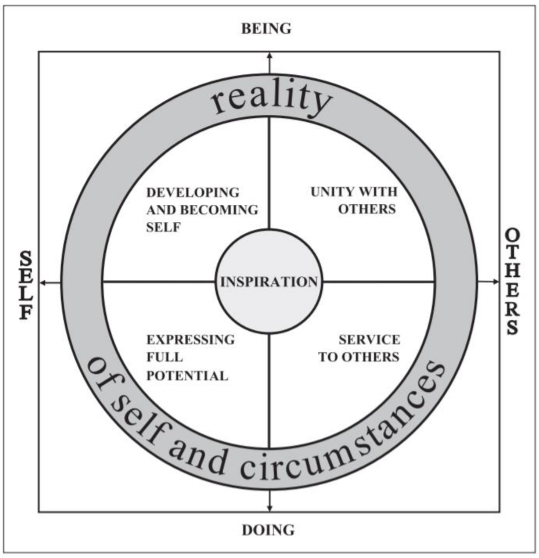

Figure 1: Framework of meaningful work Reprinted from "Measuring the Meaning of Meaningful Work: Development and Validation of the Comprehensive Meaningful Work Scale (CMWS)" by M. Lips-Wiersma and S. Wright, 2012, *Group & Organization Management, 37*(5), p. 660. Copyright 2012 by SagePub.

Lips-Wiersma (2002, p. 389) mentions that employees desire to enact to all dimensions, but still want to maintain an equilibrium. This means that every dimension is equal. Thus, when an employee devotes more time to, for example, unity with others, the equilibrium gets disrupted which means that the employees cannot define what is meaningful for them (Lips-Wiersma, 2002). Therefore, the dimensions of meaningful work need to be balanced. It is not possible to have meaningful work when one of the dimensions has the ascendancy. Lips-Wiersma (2002, p. 395) states that reflection methods help employees to maintain or create a balance. If an employee reflects on its own, the employee is able to determine whether there is a balance or not.

Referring back to the definition of meaningful work, it means that an employee experiences meaningful work when he or she is able to find a balance between activities of working with others (unity with others), contributing to others (service to others), activities of creating, achieving and influencing at work (expressing full potential) and activities of personal growth and self-evaluation (developing and becoming self). Since the prioritization of the four dimensions is likely to fluctuate over time, it is important to pay attention to the balance between the dimensions (Lips-Wiersma & Morris, 2009, p. 505).

2.3 Job design

The concept of job design derives from the Scientific Management school and is even believed to be the most prominent element within this school (Taylor, 1919). Within this school, the idea is to design jobs and organizations as efficiently as possible in order to enhance the performance of the organization (Taylor, 1914). Other relatable concepts within the Scientific Management school are job enrichment and job engineering (Garg & Rastogi, 2006, p. 572). A job design can be defined as the creation of a collection of tasks which need to be performed by one employee (Grant, 2007, p. 395). If well designed, a job design can enhance motivation, satisfaction and performance of employees (Morrison, Cordery, Girardi & Payne, 2005). Within the Scientific Management school there are several classical theories which are devoted to explain relationships between certain job characteristics and behavioral responses of employees (Kiggundu, 1981, p. 499). The first major contribution to this field of knowledge was the work of Herzberg, Mausner and Snyderman (1957) who demonstrated that it is effective to enrich jobs in order to increase the performance of employees, rather than to simplify jobs. Moreover, their work consisted of internal (*motivators*) and external (*hygiene*) factors which determine whether employees tend to stay or leave the organization. This theory was followed by another classical theory, the theory of Hackman and Oldham (1976), which consisted of five core job characteristics. These characteristics contribute to experienced meaningfulness, experienced responsibility and knowledge. Based on these two classical theories, Karasek (1979) developed a job-demand-control framework to determine whether a job is passive or active. Nowadays, the theory of Wrzesniewski and Dutton (2001), which is aimed at the motivators of job crafting, is widely accepted within the Scientific Management school. This short introduction about job design, shows the continuous developments within this field of knowledge and the ongoing relevance of job design.

This research uses the theory of Hackman and Oldham (1976) to describe a job design. Although the theory seems to be outdated, it is perceived as the founding father of the relation between meaningful work and job design. Therefore, their study is considered as a classic study. Moreover, several studies confirm the current relevancy of the theory and state that it is still commonly used to design jobs (Liere-Netheler, Vogelsang, Hoppe & Steinhüser, 2017, p. 38). However, some criticasters mention that the authors have focused on a narrow set of motivational job characteristics and therefore neglected other work characteristics (Parker, Wall & Cordery, 2001). Morgeson and Humphrey (2006, p. 1321) even state that ignoring other work characteristics can make a research deficient. However, this criticism does not apply for this research since not all work characteristics are included in this research. This was a deliberate choice since only a subset of the work characteristics of Hackman and Oldham's theory contribute to the perceived level of meaningfulness.

More recently, Oldham and Hackman (2010) have published another article concerning their job design. The authors acknowledge the fact that businesses, and consequently the employees, have changed. For example, during their first publication, there were more specialized jobs which were independently performed in stand-alone organizations (Oldham & Hackman, 2010, p. 465). Nowadays, there is more telecommunication causing more employees to work at home. Moreover, employees tend to bear more responsibility for a greater variety of tasks. Furthermore, most employees work in teams or do not even have a boss. According to the authors, these developments have made it harder to research job design. Therefore, the call to extend the job design model becomes more relevant. For example, Oldham and Hackman (2010, p. 467) suggest to include social job characteristics in their job design model. Despite the call for a more extensive model, this research only focuses on the initial model because the original job characteristics do not change. Therefore, the job characteristics aimed at the contribution to meaningful work still remain relevant.

2.3.1 Definition: Job design

Job design can be defined as identifying the relevant tasks and activities and allocating them across employees (Foss et al., 2009, p. 873). According to Oldham & Hackman (2010, p. 463), jobs should be designed and managed in order to foster responsibility, achievement and growth. Therefore, the authors developed a job design theory, the job characteristics model. This model discusses five core characteristics of jobs which contribute to better psychological states of employees. According to Hackman and Oldham (1976, p. 255), there are three psychological states; experience meaningfulness of the work, experienced responsibility for the outcomes of the work and knowledge of the results of the work activities. Knowledge about the outcomes of work activities enables the employee to learn if he or she (the experienced responsibility) has performed well on tasks he or she cares about (experienced meaningfulness) (Hackman & Oldham, 1976, p. 256). Thus if a job meets these core characteristics, it will result in a higher level of job satisfaction,, meaningful work, intrinsic motivation and quality performance (Kiggundu, 1981, p. 499; Allan, Duffy & Collisson, 2018, p. 1).

The five job characteristics are: skill variety, task identity, task significance, autonomy and feedback (Hackman and Oldham, 1976). The first three characteristics contribute toward experienced meaningfulness and will be discussed in the next sections. The characteristic of autonomy contributes toward the experienced responsibility, while the characteristic of feedback contributes toward the knowledge of results. Autonomy refers to the degree to which the job provides freedom and independence in scheduling the work and determining the procedures to be carried out (Hackman & Oldham, 1976, p. 258). The last job characteristic, feedback, refers to the degree of clear and direct information about the effectiveness of the performance of an employee (Hackman and Oldham, 1976, p. 258).

Although the job characteristics model is more than the five job characteristics and the psychological states, this research only elaborates on a small part of the model; the job characteristics concerning experienced meaningful work. The figure (Figure 2) below shows what part of the model (outlined in blue) is relevant for this research.

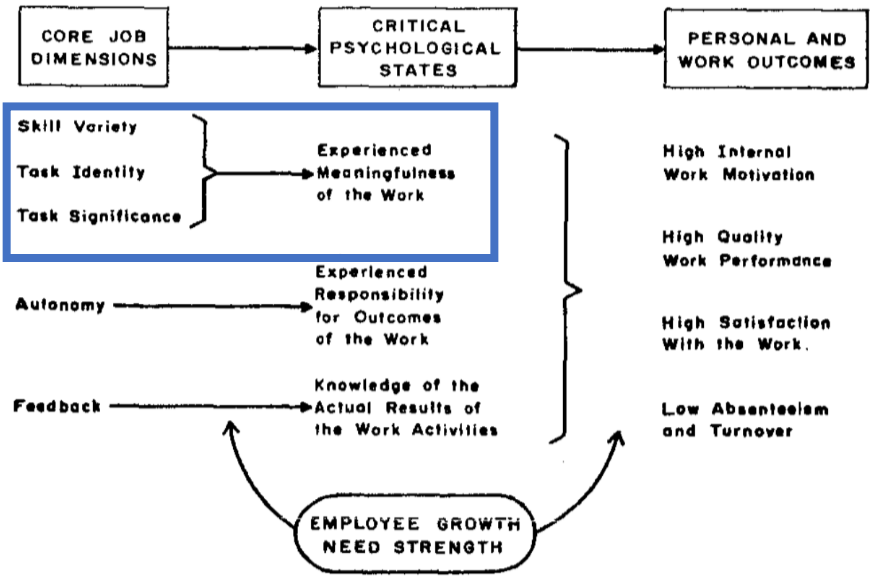

Figure 2: The job characteristics model of work motivation. Adjusted from " Motivation through the Design of Work: Test of a Theory" by J. R. Hackman and G. R. Oldham, 1976, *Organizational Behavior and Human Performance*, *16*(2), p. 256. Copyright 1976 by Academic Press. Inc.

2.3.2 Job characteristic: Skill variety

Skill variety refers to the degree of different activities of the job and to the extent of the different skills and talents which are needed to complete all activities (Oldham & Hackman, 2010, p. 464). When the activities are challenging for an employee, more skills might be needed (Rosso et al., 2010, p. 110). The amount and specifics of the skills needed are determined by the job specification because several activities within the job require specific skills. Moreover, the complexity of the tasks determines the required skills and talents (Singh, Singh & Khan, 2016, p. 694). The activities of a job can be categorized in operating activities and regulating activities. Operating activities related to the production of the product, while regulating activities are aimed at coping with disturbances (De Sitter et al., 1997, p. 508). When both types of activities are identified, it becomes possible to determine the required skills to perform the tasks. Moreover, additional soft skills, like communication skills or reflection skills, can also be important to perform the job.

Another aspect related to skill variety is the authenticity of the job. This entails that the skills of the employee should be in line with the demanded skills of the job. Moreover, when other colleagues acknowledge the skills of the employee, the employee will feel recognized which also makes the job more personal and gives the employee his own authenticity which contributes to the level of meaningful work (Rosso et al., 2010, p. 109). The balance between challenging tasks and the competences of the employee, can result in intrinsic motivation (Foss et al., 2009, p. 888). Therefore, the skill variety should be high, which forms the desired situation (Hackman & Oldham, 1976, p. 258).

2.3.3 Job characteristic: Task identity

Task identity refers to the degree to which the job concerns the completion of a whole task; from beginning to a visible output (Hackman and Oldham, 1976, p. 257). This means that an employee has the opportunity to complete an entire task with tangible outcomes (Debnath, Tandon & Pointer, 2007, p. 814). The literature regarding this concept is very limited and other researchers, who use the concept of task identity, use the same definition as Hackman and Oldham (1976). To create a greater understanding of this concept, consequences of a high level of task identity will be discussed.

Task identity enables the employee to obtain a better understanding of the activities related to the tasks and how these should be ordered to complete a piece of work (Pierce, Jussila & Cummings, 2009, p. 486). Moreover, this allows the employees to take greater pride in their work because it contributes to the understanding how activities contribute to the tangible outcomes of their task (Lambert, Hogan, Dial, Jiang & Khondaker, 2012, p. 16). This encourages the employees to work smart (Coelho & Augusto, 2010). Besides, task identity can create the feeling of more familiarity with the job (Pierce et al., 2009, p. 484). This entails that employees have the feeling of 'being home' while they are at work.

Therefore, the feeling of belonging to a job increases (Rosso et al., 2010). Therefore, the task identity should be high, which forms the desired situation (Hackman & Oldham, 1976, p. 258).

<u>2.3.4 Job characteristic: Task significance</u>

Task significance refers to the degree to which a job has a certain impact on the lives or work of others (Hackman & Oldham, 1976, p. 257). This includes colleagues as well as people outside the organization and can for example concern the well-being of another (Oldham & Hackman, 2010, p. 464). For employees it is important to have a certain perception about the significance, or importance, of their job. The significance of the job can be measured via serving or experiencing a sense of purpose through the work efforts of the job (Rosso et al., 2010, p. 111). This also relates to the level of responsibility of the job because responsibility means that people rely on one another (Rosso et al., 2010).

Moreover, jobs can affect other jobs because they are related to each other. According to Rosso et al. (2010, p. 100), close relationships between jobs can often influence others job because employees tend to look for other employees for cues about how to behave and work. This becomes possible if the relation is close enough to share values and ideas. Furthermore, collaborations between jobs can impact work of others, for example via assisting and contributing to the work of colleagues (Rosso et al., 2010, p. 110). Therefore, task significance should be high, which forms the desired situation (Hackman & Oldham, 1976, p. 258).

<u>2.4 Relation between meaningful work and skill variety, task identity and task significance</u>

This relation will be described according to the relevant job characteristics of Hackman and Oldham (1976) and the framework of meaningful work of Lips-Wiersma and Wright (2012). This means that skill variety, task identity and task significance will be related to the framework of meaningful work.

<u>2.4.1 Skill variety and meaningful work</u>

The job characteristic of skill variety refers to the amount of different activities and skills needed in order to complete activities. When the skill variety of a job is high and the task challenges the employee, it contributes to the perceived meaningfulness of the job (Hackman and Oldham, 1976, p. 257). This is because the tasks test the skills of an employee which makes the tasks more personal and valuable. The task can even be perceived as meaningful although it has no great significance for the organization.

This characteristic concerns the individual and therefore relates to the 'self' dimension of the framework of meaningful work. This dimension can be subdivided in the dimensions 'developing and becoming self' and 'expressing full potential'. Skill variety can be related to both dimensions. As described earlier, 'developing and becoming self' relates to the worldview of the employee to enhance itself by, for example, being the best (Lips-Wiersma & Wright, 2012, p. 637). This relates with the right skill variety for the job. A job needs certain skills in order to fulfil its tasks (Hackman & Oldham (1976). If an employee does not have the required skills, the employee needs to develop these. If this happens intrinsically, the employee develops himself which contributes to the experienced level of meaningful work.

Skill variety also relates to the dimension 'expressing full potential.' Expressing full potential refers to the activities of creating, achieving and influencing (Lips-Wiersma & Wright, 2012, p. 392). These activities can be considered as skills (Lips-Wiersma & Wright, 2012, p. 673). Therefore, these skills can become part of the skill variety of the job. According to Hackman and Oldham (1976, p. 257), a more personal job as a consequence of challenging activities which requires certain skills, contributes to more meaningfulness of the job. Therefore, when the job consists of challenging activities, which require the skills of creating, achieving and influencing, the job contributes to more meaningfulness of the job.

Moreover, since skill variety not only concerns hard skills, but also soft skills, it can contribute to the reflection skills of employees. These reflections skills allow the employee to better understand its balance between the four dimensions (Lips-Wiersma, 2002, p. 395). Therefore, skill variety contributes to restoring or maintaining a balance.

2.4.2 Task identity and meaningful work

The second job characteristic is task identity, which refers to the completion of a whole task. According to Hackman and Oldham (1976, p. 257), task identity is related to the perceived meaningfulness of the job. If an employee produces a complete product it perceives the job more meaningful than when the employee only produces a small part of the whole job (Hackman & Oldham, 1976, p. 257). This is because the employee has a greater contribution to the organization when it fulfills a complete task. This job characteristic relates to the contribution to others, as well as the organization, and therefore relates to the 'others' dimension of the framework of meaningful work. Task identity relates to both dimensions of 'others.' 'Unity with others' is the first dimension and refers to sharing values and the feeling of belonging to a group and organization (Lips-Wiersma & Wright, 2012, p. 391). When employees are able to complete whole activities or tasks it enhances their self-esteem and gives them the feeling of a valuable contributor to their group and organization, which increases the feeling of belonging (Rosso et al., 2010, p. 110). If the contribution is only small, the level of self-esteem and feeling of being a valuable contributor will be less (Rosso et al., 2010). Since the employees contribute with a whole task to the organization, their feeling of belonging increases which contributes to 'unity with others' and therefore contributes to meaningful work.

Furthermore, task identity relates to the dimension 'service to others.' As mentioned before, if an employee is able to perform and complete a whole task, it contributes to the group and organizations which can affect the work and lives of others (Hackman and Oldham, 1976). Therefore, task identity contributes to meaningful work via 'service to others.'

2.4.3 Task significance and meaningful work

The third job characteristic is task significance which refers to the impact of the job on the lives or work of other people. This characteristic is aimed at other people and therefore relates to the 'others' dimension of the framework of meaningful work. The job characteristic suits the dimensions 'unity with others' and 'service to others.' According to Hackman and Oldham (1976, p. 257), if an employee acknowledges that the outcomes of the job may have an effect on others, for example on the well-being of others, the meaningfulness of the job increases. This also relates to the level of responsibility of the job. When an employee perceives the job as one with a high level of responsibility, it contributes to the perceived level of meaningfulness (Rosso et al., 2010, p. 106). This is due to the fact that responsibility means that people rely on one another.

'Unity with others' refers to working with other employees and sharing values for a sense of belonging to a group (Lips-Wiersma & Wright, 2012, p. 391). When employees perceive that their job not only impacts the organization, but also the work and even lives of others, it creates the feeling of being a value contributor to the group and organization (Rosso et al., 2010, p. 110). As mentioned before, this results in a strong feeling of belonging which contributes to meaningfulness. Therefore, task significance contributes to unity with others.

Task significance also relates to 'service to others.' This dimension refers to contributing to the well-being of other employees and the rest of the world. As described before, task significance relates to the impact of the job on others (Hackman & Oldham, 1976). Therefore, if the job contributes to others, it can contribute to the well-being of other employees. Moreover, when the job has more responsibility, it affects more people which makes a job more important and meaningful in the eyes of the employee (Rosso et al., 2010, p. 106). Therefore, the task significance of a job contributes to the perceived meaningfulness of work.

2.5 Answering sub-question 1: What is, according to the literature, the desired situation regarding skill variety, task identity and task significance and meaningful work?

Since both concepts are theoretically described, it becomes possible to answer the first sub-question which was the following. The theory of Lips-Wiersma (2002) described that in order to experience meaningful work, all four dimensions should be present and equally balanced. Only then it is possible to determine whether an employee perceives its job as meaningful. Regarding three job characteristics, the desired situation is that all three job characteristics are high. Only then the job characteristics can contribute to meaningful work and the balance between its four dimensions.

2.6 Conceptual Model

In in the ideal situation all four dimensions are present and in balance with each other. As mentioned in the previous section, in the ideal situation the relation between meaningful work and skill variety, task identity and task significance is to some extent positive which means that the job characteristics contribute to the level of meaningful work. However, this line of reasoning only counts when all three job characteristics are high. If the skill variety is high, it enables PhD's to develop and express themselves, which both contribute to meaningful work. Moreover, if the task identity and task significance are high it means that the PhD's are able to service others and unite with others, which contributes to meaningful work. However, if the job characteristics are low, it does not necessarily mean that meaningful work also decreases. This is because meaningful work can be influenced by several other factors which are not included in this research. This results in the following conceptual model:

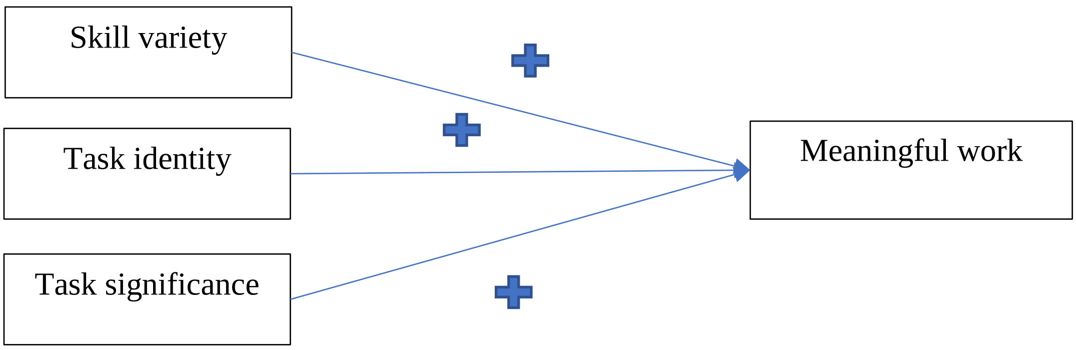

Figure 3: Conceptual model

Chapter 3: Method

3.1 Introduction

In this chapter the methodological specifics of the research will be discussed. In the next section the research strategy will be discussed. This section will further explain the reason behind conducting a qualitative deductive single case-study. Thereafter, in section 3.3, the case of the TU/e will be described. This is followed by section 3.4 concerning the data collection which discusses the qualitative research methods and data sources. Next, meaningful work, skill variety, task identity and task significance will be operationalized in section 3.5. Thereafter, the data analysis method will be discussed, followed by the quality criteria of this research in section 3.7. Finally, the research ethics will be discussed.

3.2 Research strategy

The aim of this research is to make recommendations to improve the design of the skill variety, task identity and task significance of the jobs of PhD’s in order to improve meaningful work. In order to do so, this is a diagnostic, deductive, qualitative single-case study. This is explained and substantiated in the next paragraphs.

Diagnostic research is concerned with the analysis of the causes of a certain phenomenon in an organization (Bleijenbergh, 2015, p. 23). This approach was appropriate for this research due to the fact that it could clarify the problem the HTI department is facing. Therefore, a theoretical framework had been created which elaborates on the existing literature (Bleijenbergh, 2015, p. 51). This enabled the researcher to theoretically operationalize the concepts in order to make them empirically measurable. The researcher has chosen a deductive approach because it provided the researcher more guidelines to construct the research. Moreover, since a lot of research has been done on job design as well as meaningful work and the relation between both concepts, the existing literature entailed sufficient concepts to construct a theoretical framework. Furthermore, this research is a gap-analyses which requires a theoretical framework. Therefore, a deductive approach was necessary.

As mentioned in chapter 1, the goal of this research is to generate insight in the desired and actual situation concerning meaningful work and the job characteristics. Therefore, a qualitative approach is chosen as a method to collect rich data. Moreover, a qualitative approach enabled the researcher to ask additional questions for more clarification during the interviews (Blijenbergh, 2015). This was done if an answer was unclear or insufficient. Moreover, due to the complexity of meaningful work a qualitative approach was more appropriate because it enabled the researcher, if needed, to clarify his questions. Furthermore, speaking about meaningful work can be hard because it is very personal. Face to face interviews enabled the researcher to identify facial cues which could be helpful for the interpretation of the data. Moreover, the researcher could more easily determine whether the respondent understood the question or not.

A case-study can be defined as an empirical research which investigates a phenomenon in depth and within its real-world context, especially when the boundaries between the phenomenon and context may not be clear (Yin, 2013, p. 16). In this research, the level of meaningful work of the PhD's of the HTI department of the TU/e forms the case. A single case-study is appropriate when it concerns a critical, unusual, common, revelatory or longitudinal case (Yin, 2013, p. 52). In this research a single case-study was appropriate because the expected lack of perceived meaningfulness of the PhD's of the HTI department derives from common challenges the PhD's face, which could be considered as a common situation.

3.3 Case description

This research was conducted at the Eindhoven University of Technology (TU/e). The TU/e is one of the thirteen universities in the Netherlands and was founded in 1956. The HTI department belongs to the faculty of Industrial Engineering & Innovation Science (IE&IS) and aims at the interaction between people and technology. Within the HTI department, there are more or less 70 employees who can be divided into professors/researchers, PhD's, teachers and supporting staff (see Appendix 1 for more details).

At the HTI department there are several PhD's who are conducting research for a specific research area. Usually, the PhD's mainly conduct their research and perform some educational tasks. Every PhD at the HTI department spends more or less 40 hours a week at their office. The main task of a PhD is to execute several studies to eventually write a dissertation (Appendix 1). However, in the last months, due to a shortage of professors and teachers, the PhD's performed more educational tasks. As a consequence, the PhD's allocated more time to the educational tasks and ended up with less time to perform their main tasks (Appendix 1).

As mentioned in chapter 1, meaningful minds are the core value of the TU/e. According to the TU/e meaningful minds entail that employees are enthusiastic to use science and technology to create solutions for societal challenges (Tue.nl, n.d.a). Moreover, the TU/e advocates that the job contributes to the development as a excellent and independent researcher. Therefore, this concept relates to meaningful work, since it corresponds with the 'self' and 'others' dimensions of the framework of Lips-Wiersma and Wright (2012). Developing as a excellent and independent researcher relates to the 'self' dimension, while creating solutions for societal challenges relate to the 'others' dimension.

3.4 Data collection

For this research ten random PhD's at the HTI department of the TU/e have been interviewed. Since the HTI department is a relatively small department, the amount of PhD's is also limited. Therefore, there were no further specifications for the selection of PhD's. This resulted in the selection of full-time and part-time PhD's. According to a staff member of the HTI department, the only difference between a full- and part-time PhD is the length of their contract and their working hours (Appendix 1). A part-time PhD has a longer contract. During this research no documents were collected.

In order to collect the data, semi-structured interviews have been used which can be found in Appendix 2. This type of interview allowed the researcher to ask additional questions during the interview for clarification purposes. Moreover, a semi-structured interview more or less assured that every respondent was asked the same basic questions. The interview items regarding meaningful work were based on the survey of Lips-Wiersma and Wright (2012). Since the authors did quantitative research, the questions were reformulated into qualitative questions in order to make the questions applicable for this research.

Regarding the recent developments concerning the coronavirus it was not possible to conduct the interviews face to face at the TU/e. This was due to a lock-down of the TU/e which meant that students nor personnel were allowed on the campus. Therefore other interview possibilities, like Skyping or calling, were considered. If possible, the use of Skype was preferred by the researcher, because face to face interviews allowed the researcher to identify impressions and facial cues of the respondent (Deakin & Wakefield, 2014). This enable the researcher to determine whether the respondent understood the question, without creating an awkward silence. Moreover, since all PhD's returned to their homes, Skype and phone calls allowed the researcher to reach respondents across the whole country and beyond (Lo Iacono, Symonds & Brown, 2016, p. 1). However, if needed to, conducting the interview over the phone was also an option. Conducting interviews over the phone allowed the researcher to give the respondent more anonymity and even flexibility regarding the time and place to conduct an interview (Drabble, Trocki, Salcedo, Walker & Korcha, 2016, p. 119). Eventually, both methods were used.

3.5 Operationalization

3.5.1 Operationalization of Meaningful work

The theoretical definition of meaningful work was: 'work that enables employees to find a balance between the unity with others, service to others, the expressing of full potential and developing and becoming self.' The operational definition of meaningful work was: 'work that enables the PhD's of the HTI department of the TU/e to find a balance between the unity with others, service to others, the expressing of full potential and developing and becoming self.'

The operationalization of meaningful work was based on the theory and framework of Lips-Wiersma and Wright (2012). This meant that 'developing and becoming self', 'unity with others', 'service to others' and 'expressing full potential' are the dimensions of meaningful work. The indicators were based on Lips-Wiersma (2002, p. 389-392). Lips-Wiersma (2002) described several aspects of each dimension, which were already discussed in chapter 2. This meant that the indicators for 'developing and becoming self' were; (1.A) personal growth, (1.B) self-knowledge and (1.C) maintaining integrity. (1.A) Personal growth referred to how the employees develop due to the job and whether this development is desired. An example question for this indicator is: To what extent do you have the feeling that your work contributes to your own development? (1.B) Self-knowledge referred to in what sense the employee can be his or herself at the job. (1.C) Integrity referred to the ability to make a distinction between right and wrong. For the dimension 'unity with others' the indicators were (2.A) sharing values and (2.B) belonging. The third dimension, 'service to others', consisted of the indicator: (3.A) making a difference. The dimension 'expressing full potential', had the following indicators; (4.A) creating, (4.B) achieving and (4.C) influencing. The items of the indicators were based on the quantitative survey of Lips-Wiersma and Wright (2012, p. 675-677). In order to use their survey in this research, the quantitative questions were transformed into qualitative questions. An example is question 15 in the interview protocol (Appendix 2). The original question/statement was: 'What we do is worthwhile' (Lips-Wiersma & Wright, 2012), which was transformed in 'Do you perceive your work as worthwhile? Why do you have that idea?'. The operationalization is visualized in figure 4.

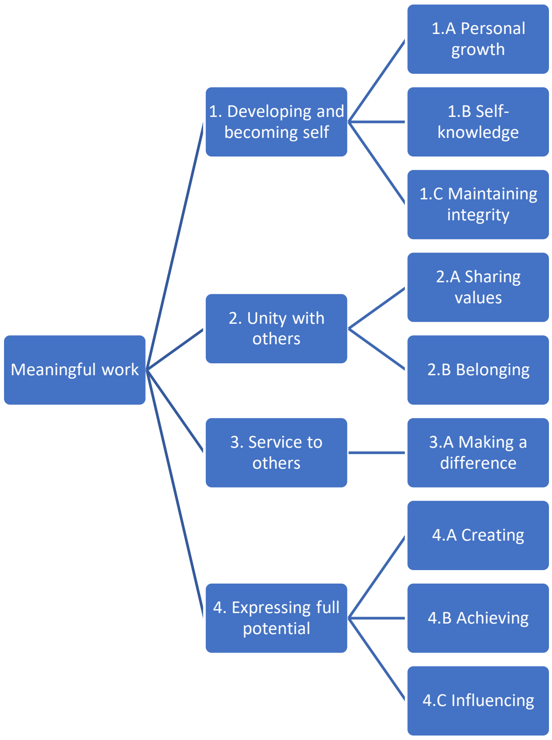

Figure 4: Operationalization of meaningful work

In order to determine whether the respondent balanced between the several dimensions, two additional questions were asked after all the dimensions were discussed. An example of such a question was the following: 'Given the aspects of expressing creativity, helping others, developing yourself and creating a feeling of belonging to the organization, do you have the feeling that these four aspects are in balance with each other?' This was followed up by the question: 'Or has one of these aspects more attention during your work?' This question gave an indication of which concept may be emphasized by the employee, while others may be suppressed which would indicate an imbalance (Lips-Wiersma & Wright, 2012). An important remark; if an employee states that all concepts receive less attention and time, it still means an equal distribution which refers to a balance between the concepts. Besides, an additional question was formulated, which was based on an original question of Lips-Wiersma & Wright, 2012, p. 677) and was as follows: To what extent are you able to find a balance between getting your work done while keeping an eye on your colleagues (Question 19).

3.5.2 Operationalization of Skill variety

The theoretical definition of skill variety was: the degree of different activities of the job and the amount of different skills and activities are needed to complete all activities (Oldham & Hackman, 2010, p. 464). Hackman and Oldham (1976) used a quantitative definition since they refer to a certain 'degree.' Therefore, the definition was reformulated into a qualitative definition. This means that the operational definition was as follows: the use of different activities and skills of the job of a PhD at the HTI department of the TU/e which are needed to complete all activities.

The operationalization of skill variety was based on the definition of Oldham and Hackman (2010) and common sense. The definition provided the dimensions of the variable. This resulted in the following dimensions: 'differences in activities' and 'differences in required skills and talents.' The indicators of each dimension were based on common sense. In order to determine the amount of different activities the distinction between activities of De Sitter, Den Hertog and Dankbaar (1997) was made. They mentioned that there are operating and regulating activities. Operating activities related to the production of the product, while regulating activities are aimed at coping with disturbances (De Sitter et al., 1997, p. 508). Therefore, the two indicators for amount of different activities were: (5.A) operating activities and (5.B) regulating activities. The indicator for the second dimension is based on common sense which was: (6.A) job specifications. (6.A) The job specifications can outline whether a job requires many or less differentiated skills. The operationalization is visualized in Figure 5.

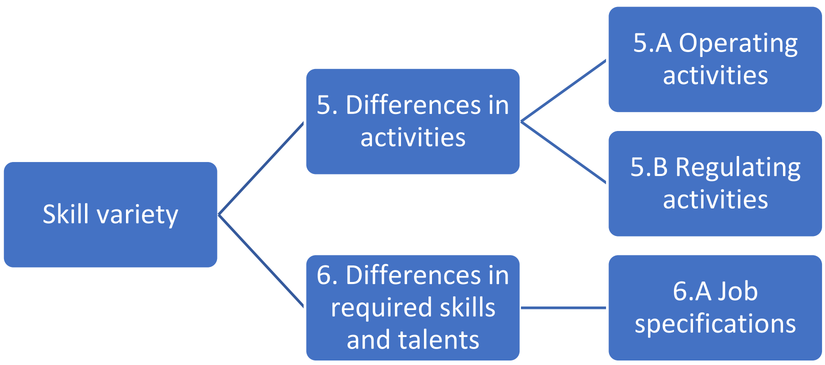

Figure 5: Operationalization of skill variety

3.5.3 Operationalization of Task identity

The theoretical definition of task identity was: the degree to which the job concerns the completion of a whole task; from beginning to visible output (Hackman and Oldham, 1976, p. 257). Hackman and Oldham (1976) used a quantitative definition since they refer to a certain 'degree.' Therefore, the definition was reformulated into a qualitative definition. This means that the operational definition was as follows: the completion of a whole task, from beginning to visible output, concerning the job of a PhD of the HTI department of the TU/e.

The operationalization of task identity was based on the definition of Hackman and Oldham (1976) and common sense. The definition provided the dimensions of the variable. This resulted in the following dimensions: 'visibility of output' and 'completion of a whole task.' The first dimension referred to how results of the activities related to the task, could be seen in the final product or service. The second dimension referred to the creation of a finished task from beginning to end. The indicator of 'visibility of output' was based on common sense which was: (7.A) tangible output. This indicator referred to output which could be held and thus could be seen by the employee. The indicator of the dimension 'completion of a whole task' was based on the job diagnostic survey of Hackman and Oldham (1974, p. 46) which was: (8.A) 'obvious beginning and end.' With an obvious beginning is meant some kind of input which results in output (an obvious end). The employees complete a whole task when it is involved in both processes. The operationalization is visualized in Figure 6.

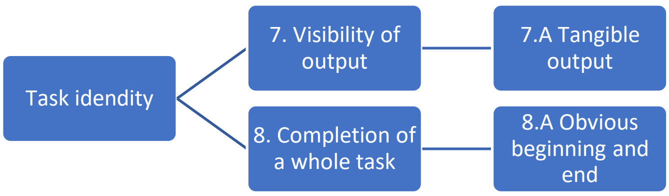

Figure 6: Operationalization of Task identity

3.5.4 Operationalization of Task significance

The theoretical definition of task significance was: the degree to which a job has a certain impact on the lives or work of others (Hackman & Oldham, 1976, p. 257). Hackman and Oldham (1976) used a quantitative definition since they refer to a certain 'degree.' Therefore, the definition was reformulated into a qualitative definition. This means that the operational definition was as follows: the impact of the function of a PhD at the HTI Department of the TU/e on others lives or work.

The operationalization of task significance is based on the definition of (Hackman & Oldham, 1976) and theory of Rosso et al. (2010). The definition provided the dimensions of the variable. This resulted in the following dimensions: 'impact on others lives' and 'impact on others work.' The indicators of each dimension were based on common sense. The indicator for 'impact on others lives' was based on the job diagnostic survey of Hackman and Oldham (1974, p. 49) which was: (9.A) well-being of others. This indicator refers to how the job affects the well-being of others inside, as well as outside, the organization. The indicators for the dimension ‘impact on others work’ were: (10.A) collaborating and (10.B) close relationships. These indicators were based on the theory of Rosso et al. (2010). According to the theory, jobs can influence each other on the aspect of collaborating with each other and via close relationships. Collaborating means that employees can impact others work via assisting the work of colleagues (Rosso et al., 2010, p. 110). Close relationships refers to tight interpersonal contact with colleagues which enables employees to express their values and ideas concerning their work which can influence the work of others (Rosso et al., 2010, p. 100). Moreover these relationships can influence others on how to work and how to behave. Therefore, the indicators for ‘impact on others work’ were: collaborating and close relationships. The operationalization is visualized in Figure 7.

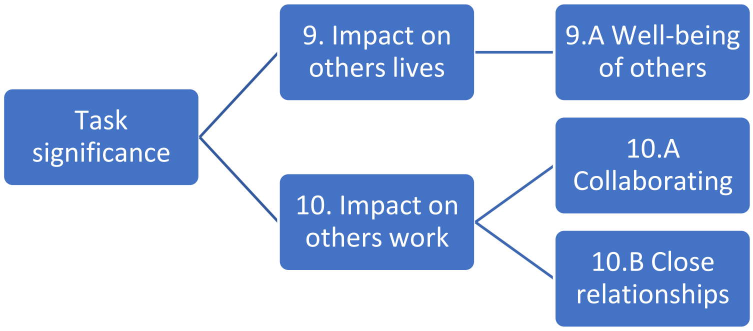

Figure 7: Operationalization of task significance

<u>3.6 Data analysis</u>

The transcribed interviews were analysed via descriptive-thematic-pattern codes. This meant that the existing literature provided the pattern and thematic codes of each concept. The thematic codes were the dimensions of the operationalizations, while the descriptive codes were based on the indicators of the operationalizations (Clarke, 2006, p. 18). The researcher has chosen this type of data analysis because it is an accessible and understandable method for other researchers and readers. Moreover, this method enabled the researcher to highlight similarities and differences across the data set. Furthermore, this method ensured a certain amount of consistency in the data analysis. By using the code tree in Appendix 3 the researcher used the same codes for every verbatim transcript. If new codes were found during the analysis of the interviews, these were collected in a separate sheet (named ‘new codes’). The same applied for quotes regarding relations between concepts. These were collected in a sheet named ‘relationships between job characteristics and meaningful work.’ This eventually resulted in a final code scheme which included all new codes (Appendix 3).

<u>3.7 Quality criteria</u>

Relevant criteria for qualitative research in organizations are internal validity, reliability and transferability (Justesen & Mik-Meyer, 2012, p.38). Internal validity refers entails the extent whether the outcomes of the research actually answer the research question. In order to reach an acceptable level of internal validity, a semi-structured interview format was used which enabled the researcher to ask for clarification to ensure the data provides an answer to the research question. Furthermore, some items were based on the Job Diagnostic Survey of Hackman and Oldham (1975). Moreover, the survey of Lips-Wiersma and Wright (2012) was used as a source of inspiration in order to formulate questions regarding meaningful work. By doing this, the researcher tried to stick close to the theory in order to adequately measure the concepts. Reliability entails the extent whether the study can be performed again and results in the same findings. In order to reach an acceptable level of reliability, all choices were elaborated and discussed. Moreover, all the data had been transcribed in a verbatim transcript. Therefore, the interpretations of the research can be checked. Besides, in the interview format (Appendix 2) some decisions regarding the structure of the interview can be found. Moreover, the code tree and final template are included in Appendix 3 which allows the reader to understand how the data was analysed. Although the researcher aimed for validity and reliability, two different data collection methods were used; phone calls and Skype calls. This might impact the validity and reliability. Finally, the transferability forms an important criterium. In order to contribute to this criterium, the recommendations are practice-oriented which makes it understandable for the organization.

3.8 Research ethics

In order to conduct research in line with the research ethics the researcher decided to maintain and respect the privacy of the respondent. Due to the small amount of PhD’s at the HTI department, the identity of the respondents would be easy to determine. Therefore, no names were registered during the interviews and informal conversations. Moreover, the researched mentioned to no include any names in the verbatim transcripts. Before the start of the interview, the respondent was told what he or she could expect and was given the option to withdraw from this research. This also included the researcher question for permission to n to record the interview. Furthermore, the respondents were given the opportunity to decide when and how to conduct the interview. This provided the respondent some autonomy, which is considered as a ethical principle in qualitative research (Orb, Eisenhauer & Wynaden, 2001, p. 95). In order to guarantee the anonymity of the respondent, the respondent was given the opportunity to receive the verbatim transcript to report whether the respondent agrees with the transcript. Moreover the member checks ensured the researcher whether the data was well interpreted and documented. These member checks, resulted in one adjusted verbatim transcript. The adjustments concerned several quotes which could reveal the respondent’s identity.

Recently, there are more concerns about the confidentiality of the internet. Klinefelter (2011, p. 3) highlights that online tracking happens more often than before, leaving researchers unaware of the fact that their online activities may be tracked. For a researcher, this knowledge is valuable to protect the respondents identity since storing on an online database can also be sensitive to online tracking (Rady, Abdelkader & Ismail, 2019, p. 275). Therefore, the data was not stored online, but offline on a laptop, encrypted with a nine digit password. Moreover, no data was shared with others, except for the supervisor of this research.

Since the interviews were conducted via Skype and over the phone, these conversations could be monitored by a third party, for example by the ECHELON company (Lo Iacono, Symonds & Brown, 2016). When certain words were used during the interviews, words which could be relevant for intelligence services, the system could get triggered to monitor the telephone calls or Skype calls (Lo Iacono et al., 2016, p. 9). However, since the interviews did not concern any sensitive issues or relevant issues for intelligence services, this did not form a real threat for the interviews. In order to protect the anonymity of the respondents, all conversations or phone calls via Skype were deleted after the interviews. Although this did not provide any guarantees, it was an attempt of the researcher to carefully handle the data.

Chapter 4: Results

4.1 Introduction

This chapter discusses the results per concept. This allowed the researcher to answer the sub-questions. New codes, which were discovered during the data collection, will be discussed with the corresponding concept. In this chapter, citations are incursive and denoted with quotation marks.

4.2 Answering sub-question 2: What is the actual situation at the HTI department of the TU/e regarding skill variety, task identity and task significance of the PhD's and their perceived level of meaningful work?

In order to answer the second sub-question, the actual situation concerning meaningful work is discussed, by discussing each dimension separately. Thereafter, the actual situations concerning job characteristics are discussed. This is done by describing each job characteristic individually. These descriptions will result in the answer to the second sub-question.

4.2.1 Actual situation meaningful work

The actual situation of meaningful work depends on the presence of the four dimensions and whether these dimensions are equally balanced. This will be determined by assessing each dimension separately. Thereafter, it will be determined whether the PhD's are able to balance the four dimensions.

4.2.1.1 Actual situation: Developing and becoming self

In order to assess the actual situation regarding the dimension 'developing and becoming self' (1), the output of the descriptive codes (1.A) personal growth, (1.B) self-knowledge and (1.C) maintaining integrity, was analysed. Each indicator will be discussed separately to eventually result in a conclusion about the dimension.

According to the data, it can be concluded that the PhD's do have the feeling that they develop themselves during their PhD trajectory. Respondents 1, 8, 9 and 10 (Appendices 4 and 11 until 13) mention that the PhD trajectory contributes to their development in a broad sense; *"(...) to become smarter"* (Appendix 12) and "*to constantly develop yourself"* (Appendix 13). The PhD's mention that they are able to develop themselves on different aspects, which can be divided into two categories: development of research skills and the development as a person. The last category corresponds more or less with social skills. To start with the development of research skills, respondent 1 mentions that the PhD trajectory enables the PhD to acquire new skills, like writing journals or papers (Appendix 4). This is supported by respondent 4 who adds that the PhD trajectory also contributes to the development of research qualities like conducting research and organising (Appendix 7). As respondent 6 states, it can also help with tasks like programming (Appendix 9). Eventually, all these skills help the PhD's to *"become an expert on a certain field of knowledge"* (Appendices 6 and 13).

Besides the research oriented skills, the PhD trajectory also contributes to the development as a human. As respondent 5 notices; *"I have the feeling that I develop myself as a person"* (Appendix 8). Respondent 3 is more precise and mentions that the PhD trajectory contributes to the ability to cope with criticism and develop persistence (Appendix 6). Moreover, respondent 8 adds the development of discipline (Appendix 11), while respondent 7 mentions that it also contributes to the ability to cope with misfortunes and feedback (Appendix 10). Respondent 6 even considers a PhD trajectory as *"not only doing research, but also to develop yourself as a human being"* (Appendix 9). Respondent 5 shares this idea and mentions that the acquired knowledge and skills during the PhD trajectory are more valuable than the collected data of the research (Appendix 8).

The data provides evidence that the PhD's acquire a sufficient level of self-knowledge in their job. All respondents indicate that they can be themselves (Appendices 4 until 13); "*yes, I can be myself at work"* and *"yeah I very much feel like myself"* (Appendix 4 and 9). Some respondents try to explain why they have that feeling. For example, respondent 2 feels accepted for who she is (Appendix 5). Moreover, respondent 5 indicates that the function suits her preferences and that the respondent *" (…) feels the trust of its supervisors"* (Appendix 8). Respondent 6 and 7 also mentioned to be themselves at work, *"so, I can be myself"* (Appendices 9 and 10). During the coding process, the work climate appears to be an important element regarding the self-knowledge of the PhD's. For example, respondent 1 argues that the ambience in the HTI department contributes to the feeling of being yourself (Appendix 4). Respondent 5 agrees and says that *"nobody will look weird if you wear a t-shirt to work"* (Appendix 8). Moreover, respondents 1 and 3 mention to value the open work climate, since it allows them to be themselves which makes it easier to approach someone and to focus on their work (Appendices, 4 and 6). Other respondents mention the value of colleagues when talking about self-knowledge (1.B). Respondent 6 agrees and mentions that the feeling of being yourself, depends on the colleagues at the HTI department, which she perceives as the work climate (Appendix 9). Moreover, respondent 9 even states to see his colleagues as friends and is therefore able to be himself.

Finally, the respondents indicate to maintain a certain level of integrity. Most respondents mention that they do not perform tasks they normally would not do (Appendices 7, 8, 11 and 12), while some respondents mention that they do perform these tasks because it is *"part of the job"* (Appendices 9, 10 and 13). Respondent 1 and 4 mention that they do not feel obligated or forced to perform tasks they normally would not do (Appendices 4 and 7). Respondent 7 disagrees and states, *"yes, you are forced* *to do something"*, but does not mention performing tasks against her will (Appendix 10). Although some respondents do mention performing tasks without any relevance for themselves, it is not considered as something negative (Appendices 4 and 13). Respondent 6 agrees and mentions performing tasks *"which I would rather not do, because it concerns tasks which are not directly related to my own research"* (Appendix 9). Respondent 9 shares the same feeling, but explains that additional tasks can be useful and does not experience these tasks as negative (Appendix 12). Respondent 5 describes the same as respondent 5 *"(...) you leave your comfort zone"*, and as a consequence the respondent is *"further developed as a researcher"* (Appendix 8). Finally, respondent 8 explains that it is possible to informally indicate which tasks you want to perform, therefore, the respondent seldom performs irrelevant tasks (Appendix 11). Therefore, the PhD's are able to indicate which tasks they would like to perform and which not.

Regarding the analyses of the three indicators, it can be concluded that the dimension 'developing and becoming self' is present in a positive way. The PhD's have the ability to develop themselves in their research area as well as on their personal skills and mention to stay themselves at the job. Moreover, the PhD's have the integrity to assess the value of their tasks.

4.2.1.2 Actual situation: Unity with others

In order to assess the actual situation regarding the dimension 'unity with others' (2), the output of the descriptive codes (2.A) sharing values and (2.B) belonging, was analysed. Each indicator will be analysed separately to eventually result in a conclusion about the dimension.

According to the data, it can be concluded that the PhD's are able to share their values with others at the HTI department. Almost all respondents claim that they are able to share work-related topics as well as personal related topics (Appendices 4, 7 until 10 and 12). Respondent 4 mentions to share information with supervisors as well as with colleagues (Appendix 7). This is supported by respondent 5 who adds that *"if I have something on my mind, I can approach my supervisors"* (Appendix 8). This is supported by respondent 9, who explains *"you can contact them [the supervisors] for personal stuff, like if you are stressed out or have doubts"* (Appendix 12). These quotes show that the respondents share their values about helpfulness, openness and feel safe to approach each other. Respondent 7 is more precise and states that she personally does not confront her supervisors with really personal details, but does talk about personal stuff on a general basis. Respondent 1 explains that sharing important values often happens in an informal way, *"we always lunch together (...) and talk about personal stuff"* (Appendix 4). Moreover, respondent 5 mentions that every formal meeting often starts with a personal update like, *"hey, how are you?"* (Appendix 8). According to respondent 9, sharing personal important values is even considered as an important strength which *"contributes to my* *satisfaction"* (Appendix 12). Therefore, the respondents and their supervisor share the values of helpfulness, openness to a certain degree safety.

Based on the collected data, it can be concluded that the PhD's have the feeling that they belong to the HTI department. All respondents indicate that they have the feeling of belonging (Appendices 4 until 13). As respondent 1 explains, *"a majority of the tasks we perform contributes to the goal of the HTI, (...) you really belong to the HTI"* (Appendix 4). Respondent 4 adds that the PhD's are included in *"brown-bag meetings, (...) and mails with information about updates"* (Appendix 7). Furthermore, respondent 5 mentions to do *"(...) group trips and lunches together"* (Appendix 8). For both respondents, these aspects give them a feeling of belonging to the HTI department. This is confirmed by respondents 6 and 8 (Appendices 9 and 11). Respondent 7 noticed a feeling of belonging since, *"you write something in name of the HTI department,"* which creates the feeling of belonging (Appendix 10). Finally, respondent 4 brings in some nuance by stating that the PhD's are not included in all discussions or meetings, but *"it does not matter because those are often administration related"* (Appendix 7). Moreover, respondents 5 and 9 make a difference between socially belonging and professionally belonging (Appendices 8 and 12). Respondent 9 explains that his topic is *"slightly detached"* from the HTI department, but that he feels that he belongs to the HTI department in a social way, since he is included in all kinds of meetings or activities (Appendix 12). This is supported by respondent 5 (Appendix 8). For respondent 10 it is the other way around, since her topic is *"very HTI"*, but since the respondent recently joined the HTI department, the social belonging is less present because she has not yet be in touch with many other colleagues (Appendix 13).

However, some PhD's question whether their job contributes to their feeling of belonging (Appendices 6 and 8). For example, respondent 3 says *"I feel part of the HTI, but not necessarily due to the job"* (Appendix 6). From the data arises a possible explanation: the work climate. This was not included in the theoretical framework, but can be an important factor for belonging. Respondent 5 explicitly mentions that the feeling arises due to *"the people and the work environment"*, this relation is confirmed by respondent 3 and 6. Respondent 4 also mentions that *"the work environment at the HTI is really good, it really feels like home"* (Appendix 7).

Regarding the analyses of the two indicators, it can be concluded that the dimension 'unity with others' is present in a positive way. The PhD's are able to share values with their colleagues and supervisors, and have the feeling that they belong to the HTI department.

4.2.1.3 Actual situation: Service to others

In order to assess the actual situation regarding the dimension 'service to others' (3), the output of the descriptive code (3.A) making a difference, was analysed to eventually result in a conclusion about the dimension.

According to de data, it can be concluded that the PhD's do not always have the feeling that their work has a practical impact. Based on the analysed data the utility of the researches can be classified in scientific-related and practical-related impact. To start with the scientific-related impact, respondent 3 explains that the PhD mainly contributes to *"the people who are also working on the same research topic"* (Appendix 6). Respondent 4 agrees and mentions to have a very indirect effect, *"I cannot state that my research saves lives"* (Appendix 7). Besides, respondent 6 mentions that its research will probably only be useful in her research field. The same applies for respondent 9 who states that his work will probably *"only have an impact on the debate in this field"* (Appendix 12). For most PhD's the practical impact is hard to describe. For example, respondent 4 explains *"the [practical] impact is still unclear"* (Appendix 7). However, respondents 1, 2 and 10 have a clear practical impact due to topics which are directly related to organizations (Appendices 4, 5 and 13). As respondent 7 confirms, *"it depends on your research topic, to what extent you perceive your PhD as practical"* (Appendix 10). Nevertheless, respondent 8 explains that the funding related to doing research at an organization is hard to acquire (Appendix 11), which makes a practical relevance more complicated. For the other PhD's, the practical value is much more abstract. For example, respondent 5 mentions to research only a very small part of the research field which leaves the respondent wondering *"what is the impact [of the research]?"* (Appendix 8). Respondent 3 even states to sometimes question out loud whether her research is worthwhile, because *"what is its concrete contribution?"* (Appendix 6). Respondent 5 elaborates further on these doubts by using the comparison with a nurse: *"a nurse has a direct impact, we [the PhD's] do not have that direct impact"* (Appendix 8). Respondent 6 also admits to have had thoughts like *"what is the use [of the research]"* (Appendix 9).

This short analysis shows that the PhD's strongly value the practical impact of their research. As respondent 7 states: *"work is worthwhile due to any form of practical implementation"* (Appendix 10). For example, respondent 5 indicates to next time choose a research which is aimed at a specific target group to give the research more practical value (Appendix 8). Several PhD's also suggest more practical relevance of their research, when they are asked to improve something about their PhD trajectory. As respondent 6 explains, *"more focus on the practical aspects, what do these numbers mean in real life?"* (Appendix 9). This is supported by respondent 8 who adds that *"the effect you research is so small, is it still so meaningful?"*, which brings her to the point to perhaps choose another topic with more practical relevance (Appendix 11).

Finally, several PhD's do not always perceive the relevance of their tasks. As respondent 10 says, *"they can force you to take another course, which has no relevance to you"* (Appendix 13). Respondent 9 agrees and mentions to have the feeling that *"the skills I have available (…) are not perfectly situated for what people should learn at this department"*, which makes him doubt whether the task is relevant to him (Appendix 12). The same applies for respondents 1, 5, 6 and 7 (Appendices 4, 8, 10 and 11). Although these tasks concern educative tasks, the PhD's do not always perceive the added value of these tasks, which makes them question whether they are making a difference with these tasks in terms of a practical relevance

As it becomes clear, the PhD's do consider their work as worthwhile in a scientific sense, but find it hard to identify the practical relevance of their work. Therefore, they miss the feeling that their work has a direct impact on others. Since the PhD's strongly value the practical relevance of their work, this aspect outweighs the scientific aspect. As a result, it can be concluded that the dimension 'service to others' is partly present.

4.2.1.4 Actual situation: Expressing self

In order to assess the actual situation regarding the dimension 'expressing self' (4), the output of the descriptive codes (4.A) creating, (4.B) achieving and (4.C) influencing, was analysed. Each indicator will be analysed separately to eventually result in a conclusion about the dimension.

According to the data, it can be concluded that the PhD's are able to create and apply new ideas during their PhD trajectory. All PhD's mention that they have the feeling that there is sufficient space to create and apply new ideas, like respondents 1 and 4 mention: *"there is enough space"* and *"there is a lot of room for creativity"* (Appendices 4 and 7). This mainly entails the design of their research. As respondent 4 explains: *"you need to create your own research (…) at he beginning there is no clear plan, you need to create that yourself"* (Appendix 7). Respondent 7 calls this the creation of your own *"roadmap"* which demonstrates how the research will be designed. According to respondent 5, the PhD's are also allowed to be creative with the tasks they need to perform; *"we can decide when to conduct studies"* (Appendix 8). This is supported by respondent 4, who mentions that it is possible to *"switch between tasks and rearrange them regarding deadlines or own preference"* (Appendix 7). Besides, the respondents have the creativity to decide which studies and how to conduct these, as respondents 2 and 10 explain: *"the online research was my own idea"* (Appendix 5) and *"all my experiments were based on my own ideas"* (Appendix 13). Respondent 6 even mentions that it is required and expected from the PhD's to come up with own ideas and input (Appendix 9). This is confirmed by respondent 2 who also mentions that the supervisors are very open to new ideas

(Appendix 5). Respondent 9 adds that it is even encouraged to come up with own ideas (Appendix 13). Although the PhD's are given the opportunity to express their creativity, they need to be aware of certain guidelines concerning their new ideas. As respondent 5 states that it is possible as long as *"we have convincing reasons"* (Appendix 8). Other PhD's add, *"is it of scientific relevance?", "is it achievable?"* and *"it needs to be in line with your research"* (Appendices 7 and 9).

The collected data provides evidence that the PhD's are able to achieve their goals during their PhD trajectory. All respondents indicate that their job contributes to achieving their personal goals (Appendices 4 until 13). The personal goals of the respondents can be categorized into: transferring knowledge, completing the PhD, personal development, preparing for a job in academia and preparing for a career in the industry. Respondent 1 mentions by performing educational tasks, she becomes able to achieve her goal of transferring knowledge (Appendix 4). Respondent 2 mentions that her main goal is to *"complete the PhD"* (Appendix 5). Respondent 5 shares the same goal, but also has the goal to pursue a career in academia (Appendix 8). The educational tasks of the PhD contribute to this goal. Respondent 3 mentions that the PhD trajectory can contribute to personal development, *"you are able to follow courses about, for example, research ethics"*, which forms her goal. Respondent 7 also mentions that the PhD contributes to her personal development which concerns, *"improving writing skills, designing studies and be better at the creative think process"* (Appendix 11). Finally, respondents 6 and 10 claim that the PhD trajectory contributes to preparing the PhD's for jobs in the industry (Appendices 9 and 13). Although, respondent 6 admits that the PhD trajectory is mainly focussed at pursuing a career in academia (Appendix 9), respondent 10 states that an internship at an organization during the PhD trajectory, helps the PhD more to be prepared for work in the industry (Appendix 13). Moreover, respondent 7 later on adds that the skills which are learned during a PhD trajectory are helpful to prepare the PhD for work in the industry (Appendix 10).

Based on the collected data, it can be concluded that the PhD's are able to influence others in the organization. Respondent 1 mentions that it is possible to express own ideas and to eventually make those ideas happen (Appendix 4). This is supported by respondent 8 who adds that it is also possible to *"indicate what I like to do and how I would handle it"* (Appendix 11). The other PhD's mention to be able to influence others to do something for them. Except for respondent 4 who explains that *"it is not applicable for me"* (Appendix 7). For the other PhD's it was considered as applicable. Respondent 4 explains *"if I mail them this and that or I announce it in a certain way, I know they [the supervisors] provide me in what I need"* (Appendix 7). This is supported by respondent 5 who even mentions to, in case of a deadline, *"mail them [the supervisors] daily or sit half an hour in front of their office"*, in order to get things done (Appendix 8). Respondent 7 is more careful and tries to find a balance since *"I do not want to become annoying"* (Appendix 10). Respondent 6 also mentions to be *"proactive"* in order to let others perform activities for you (Appendix 9). This is supported by respondent 7 who says *"you need to actively go after your supervisors"* (Appendix, 10).

Regarding the analyses of the three indicators, it can be concluded that the dimension 'expressing full potential' is present in a positive way. The PhD's have the ability to express their creativity, achieve personal goals and are able to influence others to get something done.

4.2.1.5 Actual situation: Balance between the dimensions

In order to determine whether the PhD's consider their job as meaningful, the four dimensions need to be balanced. This is determined by assessing the answers on the two questions devoted to the balance.

Based on the collected data, it can be stated that there is division in the group of PhD's. There are PhD's who experience a balance between the four dimensions and there are PhD's who do not experience a balance. Respondent 1 mentions to experience a balance between the four dimensions and states *"I like the diversity [of the PhD trajectory]"*, which she perceives as gratifying (Appendix 4). Respondent 2 shares the same opinion and warns to not take too many responsibilities (Appendix 5). Respondents 4 and 6 join respondent 2 (Appendices 7 and 9). Although respondents 7 and 9 state to balance the four dimensions equally, they both explain that they used to help others too much (Appendices 10 and 12). Respondent 4 acknowledges the struggle and states to be *"egoistic sometimes"* in order to perform her own activities (Appendix 7). Respondent 3 also mentions discipline as a measure to overcome the threat of taking on too much workload at the expense of her own work (Appendix 6).

However, respondent 3 mentions that especially the dimensions 'expressing full potential' and 'developing and becoming self' are in balance with each other, while *"helping others could be more"* (Appendix 7). Although respondent 10 states to be able to balance the dimensions, she later on mentions that the dimension 'service to others' is unbalanced (Appendix 13). Respondent 5 neither has a balance and states that *"self development and serving others are in balance"*, while the creativity and creating a feeling of belonging are not getting that much attention (Appendix 8). This is the same balance as respondent 8 (Appendix 11). A possible explanation could be that the respondent does *"too many educational tasks"* (Appendix 8). This demonstrates that belonging, helping others and expressing creativity are not equally balanced for these respondents. These respectively correspond with the dimensions: 'unity with others' (2), 'service to others' (3) and 'expressing full potential' (4).

Based on this analysis a slight majority of the respondents claims to be able to balance the four dimensions and thus experience their work as meaningful. However, since this is not a convincing result, and with the upcoming results in mind, the researcher states that the PhD's, in general, do not perceive their job as meaningful.

4.2.2 Actual situation skill variety, tasks identity and task significance

In order to determine the actual situation concerning the job characteristics, each characteristic will be discussed separately.

4.2.2.1 Actual situation: Skill variety

In order to assess the actual situation regarding skill variety the dimensions 'differences in activities' (5) and 'differences in required skills and talents' (6) were examined. This examination can be found in the following sub-sections. Based on these sub-sections it can be concluded that the skill variety of the job is high. The PhD's need to perform various activities and are required to possess a certain set of skills. This together eventually contributes to the meaningfulness of the job, since it enhances the ability of the PhD's to (1) develop themselves and to (4) express their own potential. However, the required skills do not include any reflection skills. Therefore, the skill variety does not contribute to the balance of the four dimensions of meaningful work.

4.2.2.1.1 Actual situation: differences in activities

In order to asses the actual situation concerning 'differences in activities' (5), the output of the descriptive codes (5.A) operating activities and (2.B) regulating activities, was analysed. Each indicator will be analysed separately to eventually result in a conclusion about the dimension.

Based on the collected data, it can be concluded that the PhD's considered their operating activities as variated. Respondents 4 and 5 state that the main tasks of a PhD is doing research (Appendices 7 and 8). This is supported by respondents 1, 2 and 8 (Appendices 4, 5 and 11). Respondent 6 is more concrete and mentions, *"doing research independently"* (Appendix 9). As respondent 7 mentions, *"becoming a kind of mini specialist in your own field of research"* (Appendix 10). Respondent 1 mentions that a PhD does valuable research for the university (Appendix 4). Respondent 3 explains in general what a PhD does during the PhD trajectory, *"A PhD performs four major researches concerning one theme, these are bundled in a dissertation in which you answer a certain research question"* (Appendix 7). The data reveals that PhD's have two types of operating activities, research-related activities and education-related activities. The research-related activities are extensive. Respondent 1 mentions the following research-related activities, *"formulating research questions, searching for literature, collecting data, analysing data, registering data and designing experiments and surveys"* (Appendix 4). Respondent 4 also mentions to *"build up connections"* which can be helpful during and after the PhD trajectory (Appendix 7). Another important activity is publishing

(Appendices 8 and 10). Respondent 7 calls this the *"outreach"*, which essentially entails *(...) presenting and visiting congresses"* to promote the research of the PhD (Appendix 10). Finally, respondents 6 and 8 mention an additional activity which is attending meetings with supervisors or colleagues (Appendices 9 and 11). The respondents mention that every PhD needs to devote 10-20 percent of their time to educational activities (Appendices 7, 8, 9 and 13). However, not every PhD needs to perform educational tasks. This depends on whether a PhD works fulltime or part-time. Part-time PhD's tend to have fewer to none educational tasks (Appendices 6 and 7). The education-related activities are also extensive. Respondent 1 mentions the following educational activities, *"mentoring courses, join tutorials, give instructions, examine assessments and monitor students"* (Appendix 4). This is supported by respondent 4 who adds a few activities *"giving lectures and making assignments"* (Appendix 7).

However, respondent 5 mentions that the educational tasks are not always of any relevance, since the tasks do not always cover the research topic of the respondent (Appendix 8). This is supported by respondent 5 who mentions that the educational tasks *"do not directly contribute to your research"* (Appendix 8). As respondent 6 adds, *"sometimes you only need to watch (...) completely unrelated to your research"* (Appendix 9). This is supported by respondent 10 (Appendix 13). Although the educational tasks are always related to the HTI department, respondent 7 once supported a course which had no relevance for her (Appendix 10).

Although not every PhD has educational tasks or perceives their tasks as relevant, most PhD's mention to value the variety in the tasks. Respondents 1, 2, 4, 5, 7, 8 and 9 mention to have diversified activities (Appendices 4, 5, 7, 8, 10, 11 and 12). Respondent 8 mentions that due to the COVID-19 circumstances the variety is less present (Appendix 11). Respondent 5 highlights that her activities vary, since her studies are variated (Appendix 8). Respondents 1 and 2 explicitly mention to experience the variation in their tasks positively (Appendices 4 and 5).

Based on the collected data, it can be concluded that the PhD's have limited regulating activities. Although all respondents indicate that they are able to solve their daily problems by approaching their supervisors, only a few operators mention to really be able to solve these problems themselves. For example, respondent 9 mentions to be able to solve *"70% of work related problems"* (Appendix 12). Otherwise, respondent 9 admits to approach a supervisor (Appendix 12). Respondent 1 mentions that PhD's have the authority to solve problems themselves, but thinks that it is educational to use the available experience at the HTI department (Appendix 4). Respondent 6 explains that approaching supervisors is also encouraged under the guise of *"dare to ask"* (Appendix 9). Respondent 4 and 6 mention that they are unable to solve everyday problems themselves (Appendices 7 and 9). Both respondents admit to try to solve the problems, but eventually approach their supervisors for help (Appendices 7 and 9). Respondent 5 mentions to have access to certain tools to cope with problems, but mainly addresses that it is *"up to me whether I am able to solve the problem"* (Appendix 8). This is supported by respondent 7 who mentions that it is your own responsibility. As respondent 8 mentions, *"if I do not ask questions, there will be no answers"* (Appendix 11). Therefore, the PhD's cannot solve all the problems themselves, but are expected to approach their supervisors themselves. In other words, it is the PhD's own responsibility to approach supervisors in case of any problem. Therefore, respondent 5 mentions to sometimes try to see the problem in a new perspective, which sometimes enables him to solve the problem herself.

Regarding the analyses of the two indicators, it can be concluded that the dimension 'differences in activities' is present in a positive way which entails that the PhD's consider their activities as variated. Although the regulating activities are limited, the PhD's still assess their overall activities as variated which is perceived as pleasant. The differences in activities, requires the PhD's to obtain and develop certain skills and tasks, which contributes to 'developing and becoming self'. This is confirmed by respondent 4 who mentions to *"learn during my research by applying different techniques"* (Appendix 7). Moreover, respondent 1 adds that the different activities contribute to *"the improvement or development of your own research qualities"* (Appendix 4).

<u>4.2.2.1.2 Actual situation: differences in required skills and talents</u>

In order to assess the actual situation concerning 'differences in required skills and talents' (6), the output of the descriptive code (6.A) job specifications, was analysed to eventually result in a conclusion about the dimension.

According to the data, it can be concluded that a certain set of skills are needed to be able to perform as a PhD. The general idea among the PhD's is that curiosity is an important characteristic, since it *"functions as a motivator"* (Appendix 9). Related to curiosity is that a PhD needs to be ambitious and passionate about the topic of its research (Appendices 6 and 7). Respondent 7 adds that a PhD also needs to be studious (Appendix 10). Moreover, respondent 3 mentions that persistence is important since a PhD needs to cope with a lot of misfortunes (Appendix 7). Furthermore, respondent 5 mentions that a PhD needs to have discipline, since a PhD is mainly *"lonely work"*. This is supported by respondents 6 and 7 who mention that PhD's need to be independent (Appendices 9 and 10). As described in the previous section, the PhD's have their own responsibility to cope with disturbances and therefore, discipline is needed to handle the responsibility well. According to respondent 3, discipline is therefore considered as the most important characteristic a PhD needs to possess (Appendix 6). Therefore, self-regulation is also important (Appendix 7).

Regarding the analysis of the indicator, it can be concluded that the dimension 'differences in required skills and talents' is present and entails different skills. The different skills enable the PhD's to express their needs. For example, due to self-regulation the PhD's are able to achieve personal goals, as respondent 3 demonstrates, *"I am able to freely choose additional courses"* (Appendix 6). Respondent 5 also explains that the PhD's are able to *"decide when and how studies should be executed"* in order to achieve personally important goals (Appendix 8). However, the required skills do not include any reflection skills. Therefore, it cannot contribute to the balance of the four dimensions.

4.2.2.2 Actual situation: Task identity

In order to assess the actual situation regarding skill variety the dimensions 'visibility of output' (7) and 'completion of a whole task' (8) were examined. This examination can be found in the following sub-sections. Based on these sub-sections it can be concluded that the task identity is moderate. Although the PhD's are able to identify a clear end product, they find the process towards the end product unclear. This means that the task identity does not completely contribute to (2) the unity with others and therefore only partly contributes to meaningful work.

4.2.2.2.1 Actual situation: visibility of output

In order to assess the actual situation concerning 'visibility of output' (7), the output of the descriptive code (7.A) tangible output, was analysed to eventually result in a conclusion about the dimension.

Based on the collected data, it can be concluded that the PhD's have a clear tangible output, their dissertation. All the respondents mention that the 'end product' of a PhD is the dissertation at the end of the PhD trajectory (Appendices 4 until 13). As respondent 1 states, *"the research [when it is published] is the end product"* (Appendix 4). Respondent 5 states that it is not possible to complete a PhD without completing the dissertation (Appendix 8). Respondent 9 describes what a PhD trajectory eventually delivers, *"a dissertation (…) that means, four academic papers (…) plus (…) an introduction. Some fluffy write around it to make it one nice book"* (Appendix 12). These for papers can be seen as milestones toward the end product (Appendix 6). Besides the tangible output, respondent 10 also mentions that a PhD trajectory delivers, *"experience in teaching"* (Appendix 13), while respondent 2 values the whole research process more than accomplishing the PhD (Appendix 5).

Regarding the analysis of the indicator, it can be concluded that the dimension 'visibility of output' is clearly present. The PhD's unanimously agree to state that the dissertation forms the end product of their PhD trajectory.

4.2.2.2.2 Actual situation: completion of a whole task

In order to assess the actual situation concerning 'completion of a whole task (8), the output of the descriptive code (8.A) obvious beginning and end, was analysed to eventually result in a conclusion about the dimension.

According to the collected data, it can be concluded that the length of the PhD trajectory is clear for all PhD's. However, the design of the PhD trajectory is not always clear. All respondents mention that their PhD lasts about 4 years, which they consider as a clear begin and end point, *"the endpoint is the end of the contract"* (Appendix 4). This is among others supported by respondent 9 (Appendix 12). According to respondent 4, the endpoint is "the defence of the dissertation" (Appendix 7), while respondent 5 mentions that the definitive endpoint is the completion of the dissertation (Appendix 8). Although the begin- and endpoint are clear for the respondents, the trajectory from beginning to end is fuzzy. Respondent 4 describes her feelings in the beginning of the PhD: *"you have no idea…because you are just messing around and do some reading"* (Appendix 7). As respondent 5 adds, *"especially the first three years are unclear, what they expect from you"* (Appendix 8). Respondent 6 agrees and mentions, *"it is absolute not clear, in the first year you do not know where to look"* (Appendix 9). This is confirmed by respondent 9 who states that he had *"very little idea of where it all would go*" in his first year (Appendix 12). Respondent 7 mentions to create some order in the chaos via *"lists and overviews, in order to maintain a little grip"* (Appendix 10). At the end of the PhD trajectory, the PhD's are better able to understand in what sense their activities relate to their dissertation (Appendices 7, 9 and 12). Although respondent 8 mentions that her research was clear, because it concerned a project at another organization, the other respondents do not share this opinion (Appendix 11).

Regarding the analysis of the indicator, it can be concluded that the dimension 'completion of a whole task' is clear for the PhD's. However, the process towards the end product is not clear for the PhD's. Especially, the first year is unclear. Due to this lack of clarity it can be hard for PhD's to understand to what their activities relate to. Therefore, the PhD's can lose a certain familiarity with the job, which can affect 'unity with others'. However, as described in section 2.3, being able to perform whole tasks contributes to the self-esteem of employees and gives them the feeling of a valuable contributor to their organization, which increases the feeling of belonging. All respondents indicate to be able to complete a whole task. This should contribute to their feeling of belonging. As respondent 2 explains, *"yes, due to my activities, the secretaries always send me an invite (…) I am not forgotten"* (Appendix 5). However, since the collected data may suggest another explanation for a feeling of belonging, the work climate, it cannot fully be stated that the completion of tasks fully contributed to the unity with others. Therefore, the trajectory towards the end product should be more clear, in order to make the effect stronger.

4.2.2.3 Actual situation: Task significance

In order to assess the actual situation task significance the dimensions ‘impact on others lives’ (9) and ‘impact on others work’ (10) were examined. This examination can be found in the following sub-sections. Based on the sub-sections it can be concluded that the task significance is moderate. The PhD’s do have a clear impact on others work, but the impact on others lives is harder to identify. Therefore, not all respondents experience to have a clear impact on others lives, which makes the contribution to (3) service to others less impactful. Consequently, the task significance only has a moderate impact on task significance.

4.2.2.3.1 Actual situation: impact on other lives

In order to assess the actual situation concerning ‘impact on other lives’ (9), the output of the descriptive code (9.A) well-being of others, was analysed to eventually result in a conclusion about the dimension.

According to the collected data, it can be concluded that the work of the PhD’s affects the well-being of others to some extent. However, the respondents indicate that the impact is not always clear and direct. The impact of the PhD’s can be categorized in impact on the research area, on colleagues and on students. Respondent 1 mentions to be privileged since her research is funded by an organization which makes her research more practical, *“I am more or less solving their problems”* (Appendix 4). This is supported by respondent 10 (Appendix 13). Respondent 2 has a topic related to the wellbeing of people and mentions to always receive positive feedback (Appendix 5). Respondent 8, who’s research is also assigned to an organization, mentions to have a clear impact on others, *“the results of my research are easy to translate to the real world”* (Appendix 11). Other respondents mention a less clear and direct impact. For example, respondent 6 who mentions that her research mainly resulted in *“a source of inspiration for a follow-up study”*. Respondent 7 mentions that the published papers *“not really contribute to something”*, yet the respondent has a little bit the feeling to contribute to the HTI department. Respondent 9 states to hope that the research has *“at least an impact on the debate within this field”* (Appendix 12), while respondent 4 mentions that, *“you hope to contribute to them, but the link is sometimes hard to find”* (appendix 7). Respondents 5 and 7 mention to also contribute to other colleagues by helping them via knowledge sharing (Appendices 8 and 10). Finally, respondent 1 mentions that a PhD can also impact other students via the educational tasks, *“eventually it contributes to making students enthusiastic for the topic”*, which relates to *“knowledge transferring”* (Appendix

4). Furthermore respondent 10 mentions to contribute to the knowledge of students via teaching classes (Appendix 13).

Regarding the analysis of the indicator, it can be concluded that the dimension ‘impact on other lives’ is not adequately designed, since the impact of the work of the PhD’s is not always easy to identify. Therefore, this dimension does not adequately contribute to the dimension of ‘service to others’. Although it contributes to some extent, *“the link is sometimes hard to find”* (Appendix 7).

<u>4.2.2.3.2 Actual situation: impact on others work</u>

In order to assess the actual situation concerning ‘impact on others work’ (10), the output of the descriptive codes (10.A) collaborating and (10.B) close relationships, was analysed. Each indicator will be analysed separately to eventually result in a conclusion about the dimension.

According to the collected data, it can be concluded that the PhD’s collaborate mainly with their supervisors and colleagues. Respondent 1 mentions to collaborate tightly collaborate with her supervisors (Appendix 4). This is supported by respondent 4, 5 and 9 (Appendices 7, 8 and 12). Respondent 5 even mentions to have *“great contact”* with her supervisor, which contributes to their collaboration process (Appendix 8). Respondent 4 explains that it is useful to make use of *“their experience”* and therefore collaborates with supervisors and colleagues (Appendix 7). Although the respondents indicate to collaborate with PhD’s, this collaboration only entails providing each other feedback and helping each other (Appendices 4 and 6 until 13). Therefore, collaborating with other PhD’s is focussed at *“the process of the research instead of the content”* (Appendix 7). Respondent 10 mentions that these collaborations can be *“fruitful and bring very nice results”*. This is supported by respondent 1 who mentions that it helps to *“help each other out”* (Appendix 4). Respondent 4 agrees and mentions that it is possible to ask for help, but also vice versa, that she is able to help others (Appendix 7). Moreover, respondent 5 mentions that it is possible to reach colleagues to ask for feedback (Appendix 8). Respondent 6 mentions to only collaborate with colleagues when performing educational tasks (Appendix 9), or the colleague needs to be in the same research project, as respondent 8 explains (Appendix 11).

Regarding the analysis of the indicator, it can be concluded that the PhD’s do collaborate, but only concerning the process of the research. Since, the PhD’s mention to help others with their collaboration, *“we can help each other out”*, this dimension contributes to the dimensions of ‘service to others’ of meaningful work (Appendices 4 and 7).

According to the collected data, it can be concluded that the PhD's have close relationships with their supervisors and colleagues. The relationship with colleagues is sometimes even on a friendly basis. Respondent 1 states to have good connections with the colleagues and indicates that it is possible to *"mention anything"* to her supervisors (Appendix 4). This is supported by respondent 2, *"I can discuss anything with my supervisor"* (Appendix 5). Respondent 3 agrees and adds *"we have meetings in which they are very involved"* (Appendix 6). This is supported by respondent 5, who also mentions to have a good relationship with the supervisors (Appendix 8). Respondents 6, 8 and 10 mention that it is even possible to discuss *"personal matters"* with the supervisors (Appendices 9, 11 and 13). The PhD's also value their relationship with other PhD's. Respondent 6 indicates that the connection with other PhD's is even closer and more personal than with the supervisors, since she shares her office with a few other PhD's (Appendix 9). This is supported by respondent 10 (Appendix 13). For respondent 9 the relationship with other PhD's is clear, *"I would even call them my friends"* (Appendix 11). Respondent 4 mentions that also with colleagues all kinds of things can be discussed (Appendix 7).

Regarding the analysis of the indicator, it can be concluded that the PhD's do have close relationships with their supervisors as well as with their colleagues. Therefore, the PhD's should create a feeling of belonging, since their existence in the organization becomes more valuable. This is supported by respondent 5 who mentions that, because she is able to approach anyone about anything, it generates the feeling of *"one big family"* (Appendix 8), which contributes to meaningful work.

Based on the analyses of the two indicators, it can be concluded that the dimension 'impact on others work' is adequately present, since the PhD's are able to collaborate with others and have close relationships which contributes to meaningful work.

4.3 Answering sub-question 3: What is the difference between the desired and the actual situation regarding skill variety, task identity and task significance of the PhD's and their perceived level of meaningful work?

As discussed in chapter 2, the four dimensions need to be present in order to let the PhD's perceive there work as meaningful. This means that the PhD's need to score positive on every dimension. In short, the PhD's need to be able to develop themselves, unite with others, serve others and express themselves. Thereafter, all four dimensions need to be equally balanced.

The actual situation of the dimension 'service to others' deviates from the desired situation, while the other dimensions are in line with the desired situation. Although the PhD's are able to identify their added value in a scientific sense, they are unable to identify the practical relevance of their work.

Since the practical relevance of their work is strongly valued, this dimension of 'service to others' is only partly present. This is also frequently mentioned by the PhD's. Nevertheless, the PhD's are able to (1) develop themselves, (2) unite with others and (4) express themselves. This means that the PhD's have room for personal growth while staying themselves and maintaining their integrity. Furthermore the actual situation of the dimension 'unity with others' corresponds with the desired situation, which entails that the PhD's are able to share their values and have a feeling of belonging with the HTI department. Finally, the PhD's are able to express their creativity, achieve personal goals and express their own ideas via influencing, which together entail the dimension 'expressing full potential.' However, the PhD's are unable to balance the four dimensions with each other, this applies for the dimensions 'service to others' and 'expressing full potential.' This means that the respondent primarily focus on 'developing and becoming self' and 'unity with others.' Therefore, the respondents do not perceive their job as meaningful.

Since the actual situation of the dimension (3) 'service to others' does not correspond with the desired situation, the literature suggests that this derives due to flaws in the task identity and significance (see section 2.4). This is true since both job characteristics are considered as moderate. This is in contrast with the desired situation, which states that all job characteristics should be high. Although the PhD's have (7) a clear end-product and (8) a clear beginning and end, the PhD trajectory towards the end product is unclear, which makes the task identity moderate. Therefore, the PhD's tend to lose their overview and understanding of where their tasks relate to, which weakens the impact on 'service to others.' Moreover, it can be concluded that the task significance is moderate. Although the PhD's are able to have an impact on (10) others work, via collaborations and close relationships, the impact of their research on (9) the well-being of others remains hard to identify. Therefore, the task significance only has a moderate impact on 'service to others' and thus on meaningful work. Nevertheless, the skill variety is high, which is according the desired situation. A PhD needs to perform (5) diverse activities and is required to possess a (6) certain set of skills, which is in line with the desired situation. Since the skill variety is high it contributes to the meaningfulness of the job because it enables the PhD's to develop themselves and to express full potential.

Since the PhD's are unable to maintain a balance between the four dimensions, the literature suggests that this arises due to a lack of reflection skills in the job characteristic of skill variety (see section 2.4). This is true, since the job of a PhD's does not include any reflection skills. Therefore, the PhD's find it harder to restore or maintain a balance between the four dimensions. Since the task identity and significance deviate from the desired situation, one would expect that the dimension (2) 'unity with others' is also not present. However, as section 4.2.1.2 points out, the work climate of the PhD's may have an effect on the dimension.

Chapter 5: Conclusion & discussion

This chapter provides an answer to the research question and recommendations for the HTI department and further research. This is followed by a discussion section which discusses the practical and scientific relevance and is followed by methodological and theoretical reflections.

5.1 Conclusion

The aim of this research was to make recommendations to improve the design of the skill variety, task identity and task significance of the PhD function at the HTI department of the TU/e, for the purpose of improving the level of meaningful work by generating insight in the similarities and differences between the desired and the actual situation concerning meaningful work and the design of skill variety, task identity and task significance. In order to achieve the research goal, the research question was as follows: 'Wherein differs the desired situation with the actual situation with respect to the skill variety, task identity and task significance of the PhD's of the HTI department of the Eindhoven University of Technology and their perceived level of meaningful work?'

In order to answer the research question, a gap-analysis was performed. This research demonstrated that the PhD's do not experience their job as meaningful. This is because the PhD's are unable to identify the practical relevance of their work. The PhD's do identify the scientific contribution of their work, but tend to value the practical contribution more. Therefore the dimension 'service to others' deviates from the desired situation, while the other dimensions are in line with the desired situation. However, the other dimensions, 'developing and becoming self', 'unity with others' and 'expressing self', are in line with the desired situation. Moreover, the PhD's are unable to equally balance all four dimensions, which is a requirement to be able to experience a job as meaningful (Lips-Wiersma, 2002). At this moment the PhD's are unable to balance 'service to others' and 'expressing full potential' with the other two dimensions.

The skill variety of the job is high, which corresponds with the desired situation. Therefore, the skill variety contributes to the meaningfulness of the job because it enables PhD's to develop themselves and express their own full potential, which refers to the dimension 'developing and becoming self.' The task identity is moderate, which does not correspond with the desired situation. This is due to an unclear process towards the end product of the PhD's. This means that the impact of task identity on meaningful work is moderate. Finally, the task significance of PhD's is moderate, which does not correspond with the desired situation. This is due to unclarities about the impact of their research on others. This means that task significance only partly impacts meaningful work.

5.2 Recommendations

The recommendations mainly focus on the PhD's and their supervisors. This research demonstrated three issues regarding the perceived meaningfulness of the PhD's: a lack of practical relevance, an unclear process towards their end product and an imbalance between the four dimensions. These issues derive from flaws in the job design. Therefore, it is recommended to adjust the three job characteristics: skill variety, task identity and task significance.

The first issue relates to the task significance. A discussed earlier, the PhD's currently lack a perception of significance. Although the findings of their research are not determinable in advance, the PhD's do not find it hard to identify the scientific contribution of their research. Therefore, the findings of their research should not determine the practical contribution of the research. After all, falsifications of theories can also be valuable for organizations. Since, the respondents who are already linked to an organization, tend to be able to identify their practical value, it is recommended to do this for all PhD's. This provides each PhD a practical contribution. If this is not possible, the HTI department should consider to design the topics of the PhD's more practice oriented. For example, a topic designed around a current societal problem.

The second issue relates to the task identity. Although the end-product of the PhD's is clear, the process toward the end is ambiguous. This means that it is unclear for the PhD's to determine which tasks contributes to which part of their research. In order to solve this issue, each activity should contain a clear task description. The task description should at least include answers on questions like 'what?', 'why?' and 'for what goal?', which creates more understanding about the activities and their contribution. This helps the PhD's to value their tasks and to create a better overview of the PhD trajectory. As the PhD's indicate, this is mainly important in the early stages of the PhD trajectory. An example of a task description for the activity 'searching for literature': (what) searching for relevant literature regarding the research topic, (why) for the purpose of creating a better understanding about the research topic to eventually (goal) create the theoretical framework of the dissertation.

Eventually, the issue regarding the imbalance between the four dimensions relates to the skill variety. Since the PhD's have a lack of reflection skills these should be implemented in the function of a PhD. Therefore, the PhD's should create self-awareness which should be provided by the job. Moreover, the supervisors can become an important asset in the sense of stimulating and enhancing the reflection skills of the PhD's. As Calkins, Grannan and Siefken (2020) demonstrated, peer feedback and reflection emphasises the reflection skills of others. For example, a weekly appointment with the supervisor to discusses whether the PhD is able to find a balance between the four dimensions. By discussing this topic it creates more self-awareness, which helps the PhD to restore or maintain a balance. The questions of the interview can support the supervisor to reflect on the balance of the PhD.

5.3 Social contribution

As mentioned in chapter 1, this research contributes to the HTI department of the TU/e in order to improve the meaningfulness of its PhD's via their job design. Furthermore, this research can be valuable for other departments within the TU/e or other universities. Although, situations may differ between departments and universities, the recommendations of this research are universalistic enough to apply in other situations. Besides, this research is applicable for organizations which are working with PhD's and encounter the same problem or also value meaningful work. Moreover, the recommendations from section 5.2 can be valuable for as well as the TU/e as other organizations. Finally, this research provides recommendations to improve the job characteristics skill variety, task identity and task significance and can therefore contribute to organizations which struggle with these three job characteristics. This mainly applies for the recommendations regarding task significance and the balance between the four dimensions.

5.4 Scientific relevance

This research more or less tested the job design theory of Hackman and Oldham (1974). This theory claims that the three job characteristics contribute to meaningful work. This research entails evidence for these relations. Moreover, this research adds on to the literature about the meaningfulness of a job as PhD, since research on meaningful work only aimed at students (Foss, Minbaeva, Pedersen & Reinholt, 2009) and knowledge intensive organizations in general (Cockburn-Wootten, 2012). Moreover, this research has created a qualitative measuring instrument for the theory of Lips-Wiersma (2002) on meaningful work. Earlier researches on meaningful work contained a quantitative approach (see for example; Lips-Wiersma, M., 2002; Lips-Wiersma & Morris, 2009; Lips-Wiersma & Wright 2012). The same applies for the job design theory of Hackman and Oldham (1976). Their studies are also quantitative oriented. Since this is a qualitative research this research has created a qualitative measuring instrument for the theory of Hackman and Oldham (1976). Moreover, since the definitions of Hackman and Oldham (1976) were considered as poor, the researcher combined several insights in order to create a more complete perspective on the three job characteristics. This can help other researchers to better understand the job characteristics.

5.5 Discussion

In this section the researcher reflects on the methodology, theory and its own role during this research.

5.5.1 Methodologic reflection

In order to achieve an acceptable level of internal validity the researcher used existing theories in order to operationalize the concepts. By doing so, the researcher tried to stick as close as possible to the theoretical concepts during the data collection. Moreover, the researcher asked for permission to record each interview. This enabled the researcher to precisely notate all collected data, which ensured that no data got lost. Nevertheless, the researcher had to be careful no data got lost during translation, since most of the interviews were in Dutch, while the quotes were translated to English. Moreover, member checks have been performed which led to one adjustment (see Appendix 3).

To realize an acceptable level of reliability the researcher described all the collected data in verbatim transcripts. Moreover, the made choices were explained during the report and in memo's (Appendix 14). Furthermore, the researcher tried to explain his interpretations throughout chapter 4. In order to ensure the transferability of this research, the researcher provided the readers with recommendations which are practice oriented. Moreover, the recommendations are not only applicable for the HTI department of the TU/e, but also for other organizations who are interested or involved in the concept of PhD's and meaningful work.

Furthermore, during the interviews, the researcher noted that several questions were very similar. This applied for the questions regarding the dimension 'service to others' and the concept of 'task significance'. Although it forms an indication that both concepts are related to each other, it sometimes made it hard for the researcher to keep both questions separated. Moreover, the researcher noted during the coding process of the collected data, that there was an error in the operationalization of meaningful work, since the code scheme did not include anything about the balance. Therefore, the researcher decided to list the quotes regarding the balance, as a new code. By doing so the quotes could be included in the result section. These two point make clear that the methodological part of the research might not have been ready yet when the data collection started. Nevertheless, the researcher was able to solve these issues.

Besides, it was the first time for the researcher to conduct interviews in English. Therefore, the researcher felt it sometimes hard to transform his intentions. As a consequence, the researcher noticed, during the analysis of the data, that not all questions were asked. Although it had an impact on the data collection, this did not had a major impact since it only concerned two respondents. Moreover, the other respondents were able to answer these questions.

Finally, the study of Lips-Wiersma and Wright (2012) included a survey concerning meaningful work. This gave the researcher an indication on how to formulate questions regarding meaningful work. Although these questions were quantitative it helped the researcher.

5.5.2 Theoretical reflection

The theoretical framework of Hackman and Oldham (1976) formed the theoretical basis for job design in this research. However, as indicated in chapter 2, the descriptions of Hackman and Oldham's job characteristics were poor. Moreover, since their work is cited many times, corresponding researches kept using the same poor descriptions. This made the framework less easy to describe and to eventually operationalize. Several other researches contributed to complete the definitions. Nevertheless, the job characteristics were relatively easy to operationalize.

In this research the theory of Lips-Wiersma and Wright (2012) formed the basis for meaningful work. As mentioned before in chapter 4, the data analysis yields some new codes which could be an extension for the theoretical framework of meaningful work. For example the new code 'work climate' was considered to have an effect on the feeling of belonging. Additional research confirmed this. For example, the study of Stebleton, Soria, Huesman and Torres (2014, p. 198) who demonstrated that a campus climate, which is comparable to a department within a university, is an important predictor for a sense of belonging for employees. This is supported by the study of Ruppel and Harrington (2000). Moreover, a work climate was also considered as a contributor to self-knowledge of PhD's, which gives the PhD's the feeling that they can be themselves at work. This is confirmed by the research of Ghorbani and Watson (2006). The authors demonstrate that a work climate can enhance the self-esteem of employees which contributes to the feeling of being yourself (Ghorbani & Watson, 2006, p. 728). This is recently supported by the study of Cassam (2017) which proved that a work climate positively contribute to self-knowledge. Nevertheless, the framework of Lips-Wiersma was considered as appropriate for this research. Moreover, the article of Lips-Wiersma & Wright (2012) provided the researcher a survey which give an indicator on how to formulate the questions regarding meaningful work.

5.5.3 Reflection on role as researcher

Since the researcher is an Organizational Development and Design student, the researcher was biased in the sense to approach the situation at the HTI department as that the problem lied in the structure. In this case, the job design. However, other part outside the job design may play an important role in the situation. Therefore, several enablers of meaningful work have been neglected. For example, studies on job satisfaction, motivation and job engagement demonstrated an effect on meaningful work (Rosso et al., 2010, p. 92; Wrzesniewski, McCauley, Rozin & Schwartz, 1997; May, Gilson & Hart, 2004).

Moreover, the researcher sometimes found it hard to conduct the interviews since several times his internet connection got lost. Consequently, the researcher needed to ask the respondent to repeat the question. Although all respondents showed empathy, it could have an impact on the respondent, for example irritation.

Finally, the researcher had the presupposition that the rumours about the PhD's were valid. In other words, the researcher was only focussed on the job design as an enabler for meaningful work. As described in section5.5.2, other factors might also impact the level of meaningful work. However, due to the propose problem at the HTI department of the TU/e, the researcher did not considered any other enablers. Therefore, this study only gives an indication of the impacts on meaningful work.

5.6 Further research

For further research it is recommended to take into account more predictors for meaningful work at the HTI department. As described in section 5.5.2, more predictors of aspects of meaningful work were discovered during this research. Therefore, it cannot be fully stated that the job design of the PhD's completely contributes to their perceived meaningfulness of their jobs. This means that additional research is required in order to better understand what affects the perceived meaningfulness of the PhD's. Moreover, it eventually provides the HTI department more tools to monitor meaningful work of its PhD's.

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<u>Appendix 2: Interview protocol</u>

As mentioned before, this research includes a semi-structured interview (see below). The researcher is expected to listen closely to the respondent and if necessary to react or to ask an additional question. It is important for the researcher to behave and react professionally to the respondent. This applies to both verbal as non-verbal communication.

The interview includes an introduction, introducing questions, items regarding the concepts of this research and a word of gratitude. Behind every question the code of the indicator related to the item is given (For example, A.1). These codes can be found in the operationalization figures.

The researcher decided to first ask questions regarding the job characteristics because these were expected to be easier for the respondent to answer. Moreover, to begin with th complex questions about meaningful work could scare the respondents or make them insecure. Furthermore, questions about the dimensions of task significance were asked deliberately in order to determine if the tasks have an impact on factor which are outside the boundaries of this research.

The phrases which are in cursive or bold were not actually said to the respondent. These were in bold or cursive to give the researcher a better overview of the interview.

Edits

In order to extract the appropriate answers, some questions have been adjusted during the first three interviews. These edits made it easier for the respondent to understand and to answer the question. The edits are shown below in bold.

- *Question 1: What are the activities you need to perform as a PhD?* ***Do you perceive this as a broad selection of activities?*** *(5.1)*
- *Question 6: In what way do you think your work ~~contributes to the well-being of others~~* ***influences others? Are these influences positive or negative?*** *(9.1)*
- *Question 21: If you could change anything within your function to make your work more meaningful, what would it be?*

Beste meneer/mevrouw,

Hartelijk dank voor uw medewerking aan dit onderzoek. Ik ben een Organizational Development & Design masterstudent aan de Radboud Universiteit te Nijmegen. Op dit moment doe ik onderzoek naar de kenmerken van een PhD functie en in hoeverre de vormgeving hiervan de PhD in staat stelt om zijn of haar taken uit te voeren en zijn of haar werk als betekenisvol ervaart. Dit betekent dat er vragen gesteld worden die ingaan op uw functioneren en of u uw werk als betekenisvol ervaart. Het interview bestaat uit twee delen: het eerste deel heeft betrekking op de kenmerken van het werk en het tweede deel heeft betrekking op hoe betekenisvol u uw werk ervaart. Het interview bestaat uit 19 vragen en zal ongeveer 45 minuten in beslag nemen. Alle gegevens zullen in volledige anonimiteit verwerkt worden. Heb ik toestemming om het interview op te nemen? Aangezien er van dit interview een verbatim transcript zal worden gemaakt. U heeft ten alle tijden het recht om het onderzoek te verlaten. Als u verder geen vragen meer heeft dan kan het interview gestart worden.

Inleidende vragen

"Hoe zou u de functie van een PhD kort omschrijven?"

"Hoe lang bent u werkzaam binnen deze functie?"

Vragen met betrekking op de kenmerken van het werk

Het interview start met een aantal vragen die ingaan op de vormgeving van uw werk.

Vragen met betrekking op skill variety:

1. Wat zijn volgens u de activiteiten die u moet uit voeren om aan uw taak als PhD te voldoen? Vindt u dit een breed takenpakket? (5.A)
2. Als u moeite ondervindt bij het uitvoeren van een taak, of zelfs de taak helemaal niet kunt uitvoeren, hoe lost u dat dan op? Is deze oplossing een onderdeel van uw werk? (5.B)
3. Wat zijn volgens u de kenmerken van uw functie als PhD? Welke vaardigheden zijn nodig om als PhD te beginnen? (6.A)

Vragen met betrekking op task identity:

4. Wat zijn de uitkomsten van uw werkzaamheden? Levert dit tastbaar materiaal op? (7.A)
5. In hoeverre bestaat uw taak uit een duidelijk begin en eindpunt? Heeft u een duidelijk overzicht? Met andere woorden, levert uw taak een compleet eindproduct op of is het slechts een onderdeel van een groter geheel? (8.A)

Vragen met betrekking op task significance:

6. Op welke manier heeft u het idee dat uw werk invloed heeft op anderen? Is dit positief of negatief? (9.A)
7. In hoeverre werkt u in uw werk samen met collega's? Beïnvloedt dit het werk van anderen? (10.A)
8. In hoeverre heeft u het idee dat u hechte relaties heeft met uw collega's? (10.B) Heeft u het idee dat u alles kunt delen met deze mensen (*waarmee de respondent een hechte relatie heeft*) zoals het bespreken van onderwerpen die belangrijk zijn voor jullie? (2.A) Beïnvloedt dit het werk van anderen? (Bijvoorbeeld in de manier hoe zij hun werk uitvoeren)
9. Op welke manier heeft u het idee dat uw werk bijdraagt aan het werk van anderen? (10.B)

Vragen met betrekking op Meaningful Work

Dit was het eerste deel van het interview. De volgende vragen gaan in op hoe betekenisvol u uw werk ervaart.

Vragen met betrekking tot 'Developing and becoming self':

10. Heeft u het gevoel dat u uw zelf kan zijn op het werk? Waar blijkt dat uit? (1.B)
11. In hoeverre heeft u het idee dat uw werk bijdraagt aan uw ontwikkeling? Met andere woorden, helpt het werk u te ontwikkelen en te worden wie u wilt zijn? (1.A)
12. In hoeverre doet u dingen op uw werk die u buiten uw werk om niet zou doen, en andersom? Kunt u dit toelichten met een voorbeeld? (1.C) (In hoeverre bent u tijdens uw werk in staat om onderscheiden te maken tussen wat goed en fout is. Bijvoorbeeld iets betreffende ethische kwesties in uw werk)

Vraag met betrekking tot 'Unity with others':

13. Op welke manier heeft u het idee dat uw werk bijdraagt aan uw gevoel dat u onderdeel van de organisatie bent? Met andere woorden: heeft u het gevoel dat u erbij hoort, bij de "HTI-familie"? (2.B)

Vraag met betrekking tot 'Service to others':

14. Heeft u het idee dat het werk dat u doet de moeite waard is? Waarom heeft u dat idee? (3.A)
15. Op welke manier heeft u het idee dat uw werk bijdraagt aan het welzijn van anderen? (Zowel binnen als buiten de organisatie) (3.A)

Vragen met betrekking tot 'Expressing full potential':

16. In welke mate is het voor u mogelijk om nieuwe ideeën toe te passen? Met andere woorden, heeft u de ruimte om creatief met uw werk om te gaan? (4.A)
17. Heeft u het gevoel dat uw werk u in staat stelt om persoonlijk belangrijke doelen te bereiken? Waaruit blijkt dat? (4.B)
18. Lukt het jou om anderen het werk op jouw gewenste manier uit te laten voeren? Hoe doe je dat en waar blijkt dat uit? (4.C)

Vragen met betrekking tot de balans

19. In hoeverre bent u in staat om een balans te vinden tussen het voor elkaar krijgen van taken en oog hebben voor collega's?
20. Gegeven de aspecten als het uiten van creativiteit, het helpen van anderen, het ontwikkelen van uzelf en het creëren van een gevoel dat u bij de organisatie hoort, in hoeverre ligt dat voor u in balans met elkaar? Heeft een van deze aspecten de nadruk binnen uw werk?

Afsluitende vraag

21. Als u iets in de functie zou kunnen veranderen om uw werk betekenisvoller te maken, wat zou dit dan zijn?

Afsluiting

Dit is het einde van het interview. Heeft u nog opmerkingen of vragen? Zoals eerder aangegeven worden de gegevens in anonimiteit verwerkt en zullen genoemde namen weggelaten worden uit het verslag. Mocht u achteraf nog met vragen zitten of mocht u nog iets te binnen schieten, dan kunt u mij altijd contacteren via het volgende mailadres: yannickreket@gmail.com. Nogmaals hartelijk dank voor uw deelname en medewerking aan dit onderzoek.

Since some respondent only spoke English the interview was translated in English, see below.

Dear Miss/Mister,

Thank you for your participation with this research. I am a master student at the Radboud University of Nijmegen for the master: Organizational Design and Development. At the moment I am conducting a master thesis. I want to conduct this research at the TU/e and I have chosen the HTI department as a research object. The research concerns the characteristics of an PhD function and to what extent you experience your work as meaningful. Therefore, the questions will concern these two topics. The interview consists of 21 questions and will approximately lasts for 45 minutes. All data will be processed in full anonymity. Do I have your permission to record the interview, since this interview will be transcribed in a verbatim transcript. At all times during the interview you have the right to withdraw from the research. If there are no further questions, the interview can start.

Introduction

"How would you describe the function of a PhD?"

"How long do work as a PhD?"

Questions concerning the characteristics of the work

The interview starts with a set of question concerning the design of your work.

Questions concerning the skill varietyy:

1. According to you, what are the activities you need to perform as a PhD? Do you perceive this as a broad selection of activities***?*** (5.A)
2. If you encounter some troubles with performing certain tasks, how do you solve this? Is this solution part of your job? (5.B)
3. According to you, what are characteristics of your function as a PhD? What skills or personalities are needed to start as a PhD? (6.A)

Questions concerning the task identity:

4. What are the results of your tasks? Does this result in tangible material? (7.A)
5. To what extent does your tasks have a clear beginning and end? Do you have a clear overview? In other words, result your tasks in a complete finished product or is it a part of a greater whole? (8.A)

Questions concerning the task significance:

6. In what way do you think your work influences others? (Within the organization as well as outside the organization) Are these influences positive or negative? (9.A)
7. To what extent do you work together with colleagues? Does this influences the work of others? (10.A)
8. Do you have the feeling that you have a close relationship with your colleagues and supervisors? (10.B) To what extent do you have the feeling that you are able to share everything with your colleagues? (2.A) Does this influence the work of others? For example in the way the do their research?
9. In what sense do you have the feeling that your work contributes to the work of others within the organization? (10.B)

Questions concerning Meaningful Work

That was the first part of the interview. The following questions will concern to what extent you perceive your work as meaningful.

Questions concerning 'Developing and becoming self':

10. Do you have the feeling that you can be your self at your work? Why do you think so? (1.B)
11. To what extent do you have the feeling that your work contributes to your own development? In other words, does your work helps you to develop yourself in becoming who you want to become? (1.A)
12. To what extent do you perform activities which you would not perform outside your work? Could you explain yourself with an example? (1.C)

Questions concerning 'Unity with others':

13. In what way do you have the feeling that your work contributes to the feeling that you are a part of the organization? In other words, do you have the feeling that you belong tot he HTI-family? (2.B)

Questions concerning 'Service to others':

14. Do you perceive your work as worthwhile? Why do you have that idea? (3.A)

15. How do you think that your work contributes to the well-being of others? Within the organization as well as outside the organization? (3.A)

Questions concerning 'Expressing full potential':

16. To what extent is it for you possible to apply new ideas? In other words, do you have the space to express creativity in your job? (4.A)
17. Do you have the feeling that your work enables you to achieve personally important goals? Why do you have that feeling? (4.B)
18. Are you able to let others perform their work according to your likes? How do you realize this? (4.C)

Questions concerning the balance

19. Are you able to find a balance between realizing your own tasks while being available for your colleagues?
20. Given the aspects of expressing creativity, helping others, developing yourself and creating a feeling of belonging to the organization, do you have the feeling that these four aspects are in balance with each other? Or has one of these aspects more attention during your work?

Concluding question

21. If you could change anything within your function to make your work more meaningful, what would it be?

Ending

This is the end of the interview. Do you have any remarks or questions? As mentioned before, the data will be processed in anonymity and names will not be mentioned in the paper. In case you think of something which might be relevant for my research you can always contact me via my email: yannickreket@gmail.com. Once again I would like to thank you for your time and effort by participating with this research.

Appendix 3: Code schemes

The transcripts of the interviews and the collected documents were analysed with the use of code schemes (see below). A code tree includes pattern, thematic and descriptive codes. The pattern codes refer to the concepts of this research; meaningful work, skill variety, task identity and task significance. The thematic codes were the dimensions of the concepts, while the descriptive codes were the indicators of the dimensions. Once a phrase in an interview represents one of the indicators, the phrase is copied and posted in the code tree. Thereafter, the relevant code is noted behind the copied phrase.

Initial Code Scheme

Pattern code	**Thematic code**	**Descriptive code**
Meaningful work	1. Developing and becoming self	1.A Personal growth
		1.B Self-knowledge
		1.C Maintaining integrity
	2. Unity with others	2.A Sharing values
		2.B Belonging
	3. Service to others	3.A Making a difference
	4. Expressing full potential	4.A Creating
		4.B Achieving
		4.C Influencing

Pattern code	**Thematic code**	**Descriptive code**
Skill variety	5. Differences in activities	5.A Operating activities
		5.B Regulating activities
	6. Differences in required skills and talents	6.A Job specifications

Pattern code	**Thematic code**	**Descriptive code**
Task identity	7. Visibility of output	7.A Tangible output

	8. Completion of a whole task	8.A Obvious beginning and end
Pattern code	**Thematic code**	**Descriptive code**
Task significance	9. Impact on others lives	9.A Well-being of others
	10. Impact on others work	10.A Collaborating
		10.B Close relationships

Relationships between job characteristics and meaningful work

New codes

Final code scheme

Pattern code	**Thematic code**	**Descriptive code**
Meaningful work	1. Developing and becoming self	1.A Personal growth
		1.B Self-knowledge
		1.C Maintaining integrity
	2. Unity with others	2.A Sharing values
		2.B Belonging
	3. Service to others	3.A Making a difference
	4. Expressing full potential	4.A Creating
		4.B Achieving
		4.C Influencing

Pattern code	**Thematic code**	**Descriptive code**
Skill variety	5. Differences in activities	5.A Operating activities
		5.B Regulating activities
	6. Differences in required skills and talents	6.A Job specifications

Pattern code	**Thematic code**	**Descriptive code**
Task identity	7. Visibility of output	7.A Tangible output
	8. Completion of a whole task	8.A Obvious beginning and end

Pattern code	Thematic code	Descriptive code
Task significance	9. Impact on others lives	9.A Well-being of others
	10. Impact on others work	10.A Collaborating
		10.B Close relationships

Relationships between job characteristics and meaningful work

Relationship between *Differences in activities* (5) and *Developing and becoming self* (1)	
Relationship between *Differences in activities* (5) and *Expressing full potential* (4)	
Relationship between *differences in skills and talents* (6) and *Developing and becoming self* (1)	
Relationship between *Completion of a whole task* (8) and *Unity with others* (2)	
Relationship between *Impact on other lives* (9) and *Service to others* (3)	
Relationship between *Impact on other lives* (10) and *Unity with others* (2)	
Relationship between *Impact on others work* (10) and *Service to others* (3)	

New codes

Feeling with the job	
Guidance during the PhD	
Relevance of tasks	
Work climate	
Balance between performing tasks and being available for colleagues	
Balance between expressing creativity, helping others, developing yourself and a feeling of belonging	