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An exploratory study on the perception of the importance of executive functions in nursing

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Date: 24/05/2023

Total words: 9884

Abstract

In this paper, the discrepancies between the perceptions of the importance of executive functions in Dutch vocational education were examined, with the ultimate goal being to find possible inefficiencies in the country's educational system regarding the perception of executive functions in nursing in vocational education during a time of teacher shortages. Those possible discrepancies were examined in the nursing field in three schools in the north of the Netherlands. The methodology used to examine those discrepancies is qualitative content analysis on the qualification dossiers issued by the government and interviews and surveys for students and teachers alike. Those different data sources were analysed through various *t*-tests, Kendall's tau-b tests, and comparisons of the sum of differences between different subcategories of the importance of executive functions. From those analyses, it became clear that there is a significant difference between the perceptions of the importance of executive functions for teachers, students, and the governing bodies. The strongest and only significant correlation between those groups was on ranks of overall importance between students and teachers. Therefore this paper concludes that there is a significant difference in perceptions and that further research on a more extensive scope is recommended to explicate how this impacts efficiency and where these discrepancies can be changed.

Keywords: Executive function, Vocational Education, QCA, Mixed methods.

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1. Introduction

Executive Functions (EFs), despite taking place in fractions of seconds, are critical to school success and readiness for maths and reading comprehension, job success in terms of productivity and retention, and transferring knowledge between subjects more efficiently (Bailey, 2007; Borella et al., 2010; Dawson & Guare, 2013; Diamond, 2013; Duncan et al., 2007; Quilici & Mayer, 2002). Alongside their importance, Dutch education is facing a lack of resources in the form of teacher shortages (Ministerie van Onderwijs, Cultuur en Wetenschap, 2022b), an increase in burnouts (Algemene Vereniging Schoolleiders, 2020), educational shrinkage (Heest, 2022; Ministerie van Onderwijs, Cultuur en Wetenschap, 2022a), and the lingering effects of a pandemic that has caused delays for students and fuller classrooms (Hornstra et al., 2021; Veldhuis, 2022). This lack of resources takes time to resolve and is reported by news sources to last longer (EenVandaag, 2022; Kompeer, 2020; NOS, 2022). Therefore, using the available resources as efficiently as possible is crucial. This research aims to uncover potential discrepancies in the perception of (the use of) EFs in the Netherlands, as EFs may help increase the efficiency of learning on many counts (Borella et al., 2010; Duncan et al., 2007; Bailey, 2007; Quilici & Mayer, 2002).

This exploratory research paper focuses on the perceived differences in the skill level of EFs, the need for usage of EFs, and the amount of teaching done in EFs between teachers, students, and the primary document used as final learning outcomes (Kwalificaties MBO-verpleegkundige, 2020) in three participating schools. Those participating schools are Vocational Education (VE) schools in the North of The Netherlands, all teaching Nursing. This particular scope was chosen for two reasons. Firstly, there is a distinct lack of research regarding EFs in vocational education in the Netherlands, creating a knowledge gap that is filled in other areas of the education system. Currently, sources based on the Dutch system either primarily aim at higher education, secondary education, or executive function. If vocational education is mentioned, it is never in combination with executive function or the perception thereof. Secondly, teachers in MBO especially face the increased pressure of a lack of resources, with one in three teachers reporting burn-out symptoms in 2020 (Algemene Vereniging Schoolleiders, 2020), which is higher than in higher education and primary education.

The research question for this paper is: *"To what extent is there a perceived difference between students, teachers, and governing bodies when it comes to the importance of EFs in vocational education within Nursing in the Netherlands?"* The null hypothesis for this paper states that there is no perceived difference between student and teacher awareness of using

EFs in vocational education within Nursing in the Netherlands, including the subtopics of perceived skill level, the perceived need for usage, and the perceived amount of explicit teaching. The reason for choosing to measure the perception of the importance of EFs (in terms of perceived skill, the perceived need for usage, and the perceived amount of teaching) instead of measuring the actual skill levels of executive function is that it allows this research to be conducted on a larger scale with minimal resources and time, encompassing multiple schools rather than just one. That is because this research aims to establish a platform for raising awareness among teachers and students, which requires a broader scope that demonstrates differences across multiple locations rather than just one class in one school. To be able to answer and contextualise the research question within academia and the specific context, it is necessary to define EFs, recognise the importance of perception concerning EFs, identify what EFs may look like for Nursing, and examine how the Vocational Education system in the Netherlands is structured, with particular attention to the final learning outcomes document.

1.1 The Used Definition of EFs

Executive functions (EFs) are well-researched examples of transferable skills that help transfer knowledge from one subject to another (Bailey, 2007; Borella et al., 2010; Duncan et al., 2007). Transferability of learning itself is defined as the ability to utilise skills acquired in one subject in another, as Quilici and Mayer (2002) described. However, EFs have gotten many different definitions throughout the years. Roebbers (2017) describes EFs as higher-order cognitive processes that undergo steady improvement during childhood and are relevant to various domains, including academic achievement.

Other researchers say that EFs enable individuals to mentally manipulate ideas, think before acting, face unforeseen challenges, resist temptations, and maintain focus (Burgess & Simons, 2005; Espy & Bull, 2005; Miller & Cohen, 2001). Core EFs comprise response inhibition (self-control), interference control (selective attention and cognitive inhibition), working memory, and cognitive flexibility. Their definition of EFs, or executive control or cognitive control, is a set of top-down mental processes required for concentration, attention, and decision-making, as automatic or instinctive responses may not be appropriate or sufficient in certain situations.

There are multiple ways to organise those core EFs, but this paper adopts the definition proposed by Dawson and Guare (2003). They describe EFs as a neuropsychological concept that refers to cognitive processes necessary for planning and directing activities, including task initiation and follow-through, working memory, sustained

attention, performance monitoring, inhibition of impulses, and goal-directed persistence. That definition adequately bridges the gap between Roebbers' (2017) definition and other researchers' (Burgess & Simons, 2005; Espy & Bull, 2005; Miller & Cohen, 2001). Finally, the eleven EFs this paper recognises and uses (see Appendix A) as separate processes are based on the model of Schrier et al. (2011), adapted from Dawson and Guare (2003), as they are compatible with the descriptions provided in the qualification dossiers, as explained in section 1.3 and use terms that are simple enough to explain for students and teachers to answer questions about them in interviews and surveys (See Appendices C and D). After all, feeling competent about the perception of performing a certain task makes it more likely for someone to complete it successfully (Pajares, 1996).

1.2 The Importance of Perception of EFs

In education, students may be uninformed of the transferability of their knowledge and skills across subjects and unaware of the similar strategies required by different tasks (Ben-Eliyahu & Bernacki, 2015). When higher-order cognitive processes, such as executive functions (EFs), must be used to pass a course, teachers must recognise when students use these skills between different subjects. Failure to do so may result in redundant instruction of the same skill, leading to a lack of motivation among students, as repetition fails to engage them in their zone of proximal development (Murphy, 2022). An example of repetition not engaging the zone of proximal development can be explicated through an unconstructive cognitive load (Paas & Van Merriënboer, 2020). This unproductive cognitive load is any load on the working memory that does not actively help with learning. If a student already knows something, any load that does not explicitly serve as purposeful repetition may be considered an unproductive cognitive load. Working memory and executive function have further overlap, according to McCabe et al. (2010), which shows evidence for a common attentive construct. In this construct, there is a strong correlation between executive function and working memory capacity and a similar correlation between attention and working memory, indicating a further correlation between these concepts from a neuropsychological perspective.

In the previous paragraph, working memory follows the definition of Logie and Cowan (2015), who says working memory creates structures on paper to prevent overload at later stages of task execution. In addition, repeated instruction of the same skill may consume valuable time that could otherwise be spent on necessary preparation or other required tasks. Given the current pressures teachers face, it is imperative to avoid such inefficiencies. Through definitions such as those given by Dawson and Guare (2003) but also research like

those done by Ger and Roebers (2023), it becomes clear that overlap between constructs in working memory and EFs exists and that the perception of EFs is vital for learning in terms of capacity but also motivation. Studies indicate links between executive functions and self-efficacy (Pajares, 1996; Rike et al., 2015). Reciprocal determinism, a concept related to self-efficacy, as stated by Pajares (1996), occurs when students interpret the results of their performance attainments and inform and alter their environments and self-efficacy, which in turn inform and alter their subsequent performances. A student that perceives an EF as manageable is more likely to succeed. Pajares (1996) also states that assessment of said self-efficacy is often done through questions of perceived skill level, which are used in this research for that reason.

The importance of adequate perception of EFs in Vocational Education (VE) thus stems from multiple lines of thought. The first is the practical problem of a lack of resources regarding teaching (Ministerie van Onderwijs, Cultuur en Wetenschap, 2022b); Increasing efficiency is difficult without knowing the status quo. The second line of thought stems from the motivational and cognition theories that state that unproductive cognitive load and a sense of self-efficacy when it comes to the use of EFs impact the capacity of the use thereof (Murphy, 2022; Paas & Van Merriënboer, 2020; Pajares, 1996; Rike et al., 2015). The third is that without awareness of transferability (Ben-Eliyahu & Bernacki, 2015), there is an increased chance of inefficiency, impacting the first and second lines of thought. The fourth and final line of thought is that of the nursing students, who might be unaware of the existence of EFs altogether. Their futures might benefit significantly from learning about how their brain functions and seeing those functions, in this case, EFs, as trainable skills or tools in providing healthcare. As will be further explicated in 1.4, after the context for VE is given in 1.3, nursing students might benefit from learning about EFs in themselves and their clients.

1.3 Vocational Education and Qualification Dossiers

The Dutch Vocational Education (VE) system is integral to the country's education system, providing secondary education to students who have completed their compulsory education (*Dynamic TVET Country Profiles*, n.d.). VE, also known as Middelbaar Beroepsonderwijs, aims to equip students with the necessary skills and knowledge to be employed in various trades and professions (KiesMBO.nl, n.d.). VE offers a diverse range of programs, covering almost all fields of work, such as healthcare, technology, business, and agriculture (KiesMBO.nl, n.d.). The programs are available at four levels, ranging from level one, the lowest, to level four, the highest (Ministerie van Algemene Zaken, 2022b). Each level corresponds to the work's complexity and the required level of responsibility. The VE

system prioritises practical learning over theoretical learning, allowing students to gain hands-on experience in their chosen field of study. Soft skills like communication and teamwork are also essential in the workplace (Ministerie van Algemene Zaken, 2022a).

A unique aspect of the VE system is the qualification dossier, which outlines the specific competencies necessary for each trade (Ministerie van Algemene Zaken, 2022a). These competencies are known as can-do statements and form the foundation of the assessment process. Before graduating, students must demonstrate competence in each area.

1.4 EFs in Context of Nursing

Lenz and Shortridge-Baggett (2002) state that self-efficacy is vital in nurturing patients to total health and recovery. If those patients believe that they can, for instance, change their clothes, they are more likely to recover faster. However, self-efficacy regarding developing and utilising EFs is also crucial for nursing students as they prepare for the multifaceted and intricate nursing fields. EFs, as described by Dawson and Guare (2003), encompass essential cognitive processes, such as working memory, attention, inhibition, problem-solving, critical thinking, and decision-making, which are used by nursing students to competently assess patients, manage care plans, and communicate with their families and colleagues and self-efficacy may play a role in that (Lenz & Shortridge-Baggett, 2002). Additionally, nursing students must learn to multitask, prioritise, and make swift decisions while maintaining high cognitive control. All of that becomes clear from reading the government-issued learning outcomes (Kwalificaties MBO-verpleegkundige, 2020) where, for example, one of the requirements reads “can apply reflection skills”, which directly refers to the practice of metacognition (See Appendix B).

EFs, according to the definition of Dawson and Guare (2003) and further explication in Appendix A, are critical in nursing practice, with working memory essential for remembering patient information and medication schedules, while attention is crucial for monitoring changes in patient conditions and detecting potential complications. Inhibition is vital for controlling impulses and emotions, mainly when dealing with challenging patients or stressful situations, while problem-solving and critical thinking skills help identify and resolve issues during patient care. Additionally, timely and accurate decision-making impacts patient outcomes.

With the (importance of the perception of) EFs defined and contextualised in VE and the field of Nursing, this exploratory paper has explicated the necessary literature to find potential discrepancies between student, teacher, and governing body views of the importance of EFs in VE. It uses mixed methods to analyse both the qualification dossiers

and the perceptions of students and teachers to determine whether those possible discrepancies exist to shed light on the problem of inefficiency in teaching during a time of shortages.

2. Methodology

This paper aims to demonstrate the differences in perception between teachers and students regarding the importance of Executive Functions (EFs) for VE. It aims to identify the focus of these EFs within the qualification dossiers of Nursing (Kwalificaties MBO-verpleegkundige, 2020) and surveys and interviews at different schools. Hence the methods have been split into three subsections: Qualification dossiers, Surveys and Interviews and the comparison thereof. Another reason for that split is that each section could function as its research with the same theoretical framework and research question. That choice has been made to triangulate outcomes better, which helps with the credibility and validity of the research (Rossi et al., 2019; Shadish et al., 2001). Qualification dossiers are the first section chronologically, the qualification dossiers were analysed before the interviews were conducted. The subgoal of demonstrating the differences between perceptions of importance is to explicate (the differences between) the subcategories of importance used for this research (perceived need of usage, perceived skill level, and perceived amount of teaching) for both teachers and students (see 2.2) as that is required to answer the research question ultimately.

2.1 Method for Qualification Dossiers

As mentioned previously, the qualification dossiers of Nursing were the main source of comparison for this research (Kwalificaties MBO-verpleegkundige, 2020). For this section, they are considered part of the sample population since there are many different qualification dossiers, and only this one was used. That is because there is only one qualification dossier for this level of nursing education, and other fields of vocational education are irrelevant to this research. The other levels' qualification dossiers were not included since the students selected for the surveys (as will be made explicit in 2.2) do not follow that level of study. The researcher selected initial data on the 26th of October 2022 through the official website for qualification dossiers (Kwalificaties MBO-verpleegkundige, 2020). The available qualification dossiers on that website made the can-do statements explicit (See Appendix A). The generic part of the qualification dossiers was excluded since it does not provide information about the EFs present in the nursing field itself but instead towards skills that anyone in any VE field should learn, and would only serve to dilute data

with information that cannot be contrasted with the sample population of teachers. The job-centric part of the qualification dossiers contains can-do statements about nursing, and the researcher has removed some elements within this group of can-do statements, as shown in Table 1 below and Appendix B.

Table 1

Inclusion and exclusion criteria data selection qualification-dossier

Inclusion criteria	Exclusion criteria
Sentence starting with: <i>The can-do statement</i>	
describes (the use of) EFs.	is part of the Generic part of the qualification dossiers.
Is from the nursing qualification dossiers.	Has the exact wording of previously included items.
is from the job-centric part of the qualification dossiers.	pertains only to “Possessing knowledge”.
	Has no EFs present in the statement.

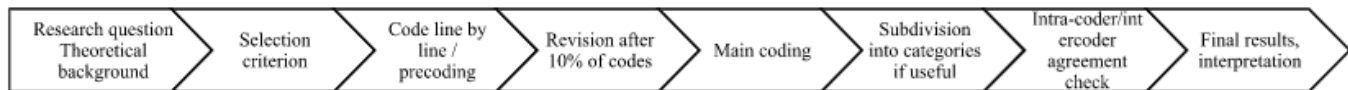
Qualitative Content Analysis (QCA) was used in this study to describe the meaning of the can-do statements. That was done by classifying material within a coding frame, as QCA is a suitable research method when there is rich data where interpretation is required (Schreier, 2012).

QCA has many beneficial elements for this research (Schreier, 2012). First, It is suitable for reducing data by including it in a classification of the coding scheme, which distinguishes QCA from other qualitative data analysis methods. Most qualitative data analysis methods enrich data and combine it in new ways. Second, within QCA, both case-oriented and variable-oriented data can be present. Quantitative research is usually variable-oriented, looking at different variables that can take on a value (Shadish et al., 2001). Qualitative research is usually case-oriented, which takes a closer look at the meaning and influence of variables on one or more cases (Shadish et al., 2001). With QCA (Schreier, 2012), combining these orientations is possible, which is beneficial when using both types of orientations, such as in this research. Finally, QCA is appropriate for this research due to its systematic but flexible nature. That means that data can be deductively reasoned with and worked with inductively. The researcher deductively matched the coding scheme to the material and the data and could improve again if further data arose. That was necessary to

ensure the validity of the coding scheme. For more insight into the eight steps of QCA, see Figure 1.

Figure 1

Qualitative Content Analysis Plan



So, for the qualification dossiers, a precoding scheme (See Appendix A) has been developed based on the model of Dawson and Guare as adapted by Schrier et al. (2011) and QCA as described by Schreier (2012). That coding scheme was initially concept-driven as it used pre-existing concepts of EFs. A margin of 20% of the data, as Schreier (2012) described, was used for the initial coding of the qualification dossiers. That entails that out of 121 items, 24 have been coded, split equally across the subsections of the qualification dossier (See Appendix B). After precoding, the researcher did not change the coding scheme with data-driven concepts and codes because none were relevant or linked to EFs, as described in 1.1. Additionally, no new categories arose during this precoding, so the remaining items were coded using the same scheme.

Because of the need to translate each item from Dutch to English, the researcher manually coded and counted the remainder of the 121 items using the previously mentioned coding scheme. During that, no new codes revealed themselves either; The coding scheme remained the same. The researcher then measured inter-rater reliability using Krippendorff's (2004) Alpha, as when it adequately shows agreement (when it is over .667), the coding may be considered reliable enough to conclude from.

The first step in analysing the codes was creating a frequency table where each instance of a code found in the qualification dossiers counted as one. The sum thereof was displayed in one column next to the EF that the code represented. The sums of each code were then given a rank from one through eleven, with the most frequent code being given the number one and the least frequent code being given the number eleven. The goal of that frequency table is to show the focus of EFs in the qualification dossiers. The analysis of said frequency table created by coding the data occurred according to QCA as described by Schreier (2012). That fell under the final step of the cycle: Final results/ Interpretation. This analysis was done by providing the relevant descriptives (e.g. mean and standard deviation)

before giving examples of each EF found in the qualification dossiers and then discussing the interpretation thereof in the context of nursing.

2.2 Method for Surveys and Interviews

The study was conducted in three separate schools for validity, triangulation and better representation of the actual research population in the sample whilst not exceeding allocated resources and timeframe. Within these schools, two groups were considered for insights: Teachers and students. For teachers to be included in the sample population, they had to teach a job-centric subject in the field of nursing to the group of students since the questions in the interview directly targeted teacher's students. Said data was collected through interviews (for the teachers) and surveys (for the students), as seen in Appendices C and D, from three schools in the North of the Netherlands. The participants are from the nursing field and cover at least 10 participants per class and one teacher. Students were required to follow an MBO-4 course in the nursing field and correspond with the already qualified teacher. These students must also be from a school in the North of the Netherlands and be at least sixteen years old, though eighteen is preferred due to being able to give their consent without permission of the parents (See 2.4).

For the interviews and surveys, the researcher used structured interviews and surveys (see Appendices C and D). Examples of questions from those interviews and surveys are: “On a scale from one to five, how often do you think you will need to plan in your job?” for students and “On a scale from one to ten, where would you rate the student that rates themselves the highest on social thinking?” for teachers. Questions like those and structured interviews were chosen due to the questions needing to deliver numerical data to be used for comparison. By asking different questions per interview, such as with unstructured interviews, comparing data as described in the analysis would have been impossible. The numerical data from the interviews and surveys have not been coded according to QCA but analysed. Ultimately the dataset consists of three classes of students labelled Dataset 1, Dataset 2, and Dataset 3 (DS1, DS2, DS3), with a total of 41 students. Each dataset has a corresponding teacher (T1, T2, and T3) who teaches nursing-specific skills to the students. In the dataset, the first line of data corresponds to T1, the second to T2, and the third to T3. T1 is the teacher for DS1, T2 is the teacher for DS2, and T3 is the teacher for DS3. For most analyses, these two datasets have been combined into the mean of students (\bar{x}_1) and mean of teachers (\bar{x}_2).

The first step in analysing the interviews and surveys was creating a frequency table

where each mean of scores on a particular EF on a particular aspect of perceived importance (perceived need for usage, perceived skill level, and perceived amount of teaching) gets a row. The columns consist of the groups of students and teachers, and in the cases of perceived need for usage and perceived amount of teaching, the rank from the frequency tables from the analysis in 2.1. These tables help explicate the differences between the subcategories and support the main research question. For those frequency tables, relevant descriptives are shown, and then an Independent paired *t*-test is conducted after the assumptions for such are verified. The groups of teachers and students are independent as the questions were conducted separately, their scores are normally distributed using the Shapiro-Wilk test, and the homoscedasticity was tested using Levene's test. Since the null hypothesis states that there is no perceived difference between student and teacher awareness of the use of EFs in vocational education within Nursing in the Netherlands, including the subtopics of perceived skill level, the perceived need for usage, and perceived amount of explicit teaching, a two-tailed analysis was conducted for each of those subtopics. So, the null hypothesis is that the mean dependent variable does not differ between students (μ_1) and teachers (μ_2) in the population; $\mu_1 = \mu_2$ and the alternative hypothesis is that the mean dependent variable differs between students (μ_1) and teachers (μ_2) in the population; $\mu_1 \neq \mu_2$. Since the samples for each mean will be 11 per subtopic (the amount of EFs), the df will be 20 for each test, and the standard α of .05 is selected. The critical value for all of these tests is thus 1.725.

2.3 Method of Comparison

The second step of the analysis was done through a nonparametric measure of association based on the number of concordances and discordances in paired observations (Kendall's tau-b). That was made possible by finding the importance score of students and teachers. That was found by ranking the mean of each subcategory's score from high (1) to low (11). Then afterwards, the mean of those rankings was taken per EF and ranked in the same manner to find the perceived importance score for students and teachers. The pairs checked at this level with Kendall's tau-b were students and teachers, students and qualification scores and teachers and qualification scores. After that, students and teachers were made one overall importance rank through the same method of finding the mean and ranking means. The combined student and teacher ranks were compared to the qualification dossiers with Kendall's tau-b.

Further analysis of the different ranked frequency tables was done by calculating the differences between pairs of EFs in a set (e.g. flexibility for student skill level and

qualification dossiers) and repeating that for each EF. The sum of those differences was then calculated and compared to one another to see which sum difference was the lowest. This was done to help triangulate the findings of Kendall's tau-b tests. If the most significant and correlating results were in accordance with the lowest sum of differences, that would help increase validity.

2.4 Ethical Considerations

The first part of this research required no input from the ethics council because the qualification dossiers were found and downloaded from a public website (Kwalificaties MBO-verpleegkundige, 2020). The second part requires input from the ethics council as it deals with participants. As this is a VE school, some of the students may be below the age of 18. Parents would have needed to permit those students to participate. To avoid that, the researcher has asked for classes from later years of the study. If students are unwilling or incapable of getting permission from parents, they have been cut from the dataset. Like the younger students, older students and teachers must also give written permission to participate. A form of consent with a signature to the interview and survey (see Appendices C and D) was added so that filling out the form also gives consent.

3. Results

3.1 Results from the Qualification Dossiers

Below is a table showing the frequency of found EFs within the items in the qualification dossiers (see Table 2) with the corresponding rank in the column to their right. Items marked with an asterisk in Table 2 and any future tables share a rank and can be placed interchangeably at the ranks they share. Out of 121 coded items, 100 were deemed eligible per the inclusion and exclusion criteria in Table 1.

For the definitions of EFs, the model of Schrier et al. (2011) was used. Both raters agreed upon examples from the qualification dossiers can be found there also. The data in Table 2 has been checked with Krippendorff's (2004) alpha for interrater reliability at .73 using ReCalc2 (Freelon, n.d.), which is considered adequate. For the items agreed upon and disagreed upon, see Appendix E.

Table 2

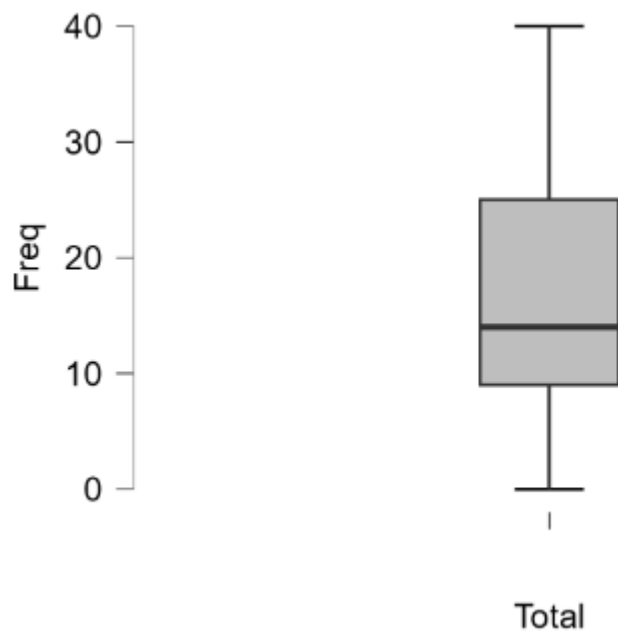
Frequency of presence of EFs and rank per EF in the qualification dossiers.

EF	Frequency	Ranked (1 most common / 11 least common)
Flexibility	25	3/4/5*
Goal-directed persistence	31	2
Metacognition	25	3/4/5*
Organization	25	3/4/5*
Planning	14	6
Regulation of Affect	8	9
Response inhibition	4	10
Social thinking	40	1
Sustained attention	0	11
Take initiation	11	7
Time management	10	8

The range of the frequency is 40 as Sustained attention (EF9) was not found in any of the items of the qualification dossiers. In contrast, social thinking (EF8) was found in 40 out of 100 eligible items. The mean of this data ($M = 17.55$) is higher than six out of eleven EFs (planning, regulation of affect, response inhibition, sustained attention, take initiation, and time management), and two of those (response inhibition and sustained attention) are more than one standard deviation ($S = 12.44$) lower than the mean. On the other hand, two EFs (Goal-directed persistence and Social thinking) scored more than one standard deviation higher than the mean. As shown in the boxplot ($Q1 = 9$, $Q2 = 14$, $Q3 = 23$) in Figure 2, the EF frequencies of the EFs have a positive skew but no outliers exceeding $1.5 * IQR$ ($IQR = 16$).

Figure 2

Boxplot of Table 2: Frequency of presence of EFs and rank per EF in the qualification dossiers.



3.2 Results from Interviews and Surveys

3.2.1 Perceived skill level

Table 3 depicts the mean self-perceived student skill score (\bar{x}_{SS}) and teacher-perceived skill score (\bar{x}_{TS}). These scores could be between 1 and 10 and stem from questions asked in the surveys (for students) and interviews (for teachers). The blank interviews and surveys are found in Appendix C and D. Do note that the interviews and surveys were conducted in Dutch rather than in English.

Table 3*Mean perceived $\bar{x}SS$ and $\bar{x}TS$ per EF*

EF	$\bar{x}SS$	$\bar{x}TS$
Flexibility	8.42	6.67
Goal-directed persistence	8.02	6.67
Metacognition	7.75	7
Organization	7.59	6.67
Planning	7.90	6
Regulation of Affect	7.37	6
Response inhibition	8.02	6.67
Social thinking	8.55	7
Sustained attention	7.22	6.67
Take initiation	8.03	6.67
Time management	7.61	6

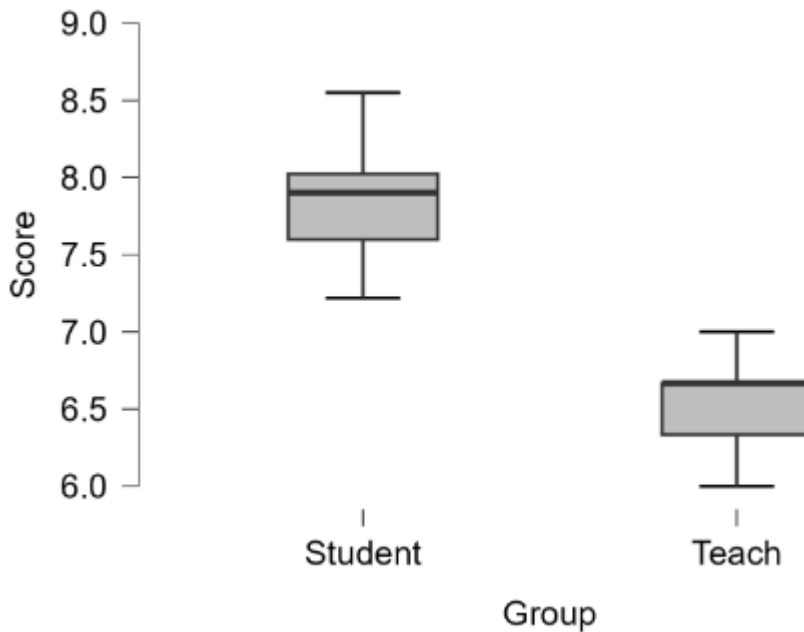
The range of the means is 1.33 for the students and 1 for the teachers. Sustained attention scores the lowest for students (7.22) and Social thinking the highest (8.55), which matches the ranks of the frequencies given in Table 2. For teachers, the lowest score is shared among planning, regulation of affect, and time management (6), whilst metacognition and social thinking score the highest (7). That is a repeat of social thinking scoring the highest. The mean score for students is 7.86, whereas that of the teachers is 6.54. So, on average, students rate themselves 1.32 points out of 10 higher than teachers rate them.

For students, only flexibility and social thinking scored more than a standard deviation ($S = .41$) higher than the mean and regulation of effect and sustained attention scored more than a standard deviation lower. For teachers, any skill that has not scored 6.67 is either more than a standard deviation ($S = .37$) higher or lower.

As shown in the student boxplot ($Q1 = 7.6$, $Q2 = 7.9$, $Q3 = 8.02$) in Figure 3, the frequencies of the EFs have a slight negative skew but no outliers that exceed $1.5 * IQR$ ($IQR = .43$). In the teacher boxplot ($Q1 = 6.33$, $Q2 = 6.67$, $Q3 = 6.67$) in Figure 3, the frequencies of the EFs have a heavy negative skew but no outliers that exceed $1.5 * IQR$ ($IQR = .33$).

Figure 3

Boxplots of Table 3: Mean perceived $\bar{x}SS$ and $\bar{x}TS$ per EF



An independent *t*-test was conducted to determine whether there was a significant difference between students' and teachers' perceived skill level of students in 11 EFs (see Table 3). Due to there being 11 EFs, *N* was 11 for each group. The first group (students) was surveyed using the survey in Appendix D, and the second group (teachers) was interviewed using the interview in Appendix C. Preliminary data screening showed that scores in the student group met the assumption of normality using a Shapiro-Wilkes test ($p = .84$). In contrast, the teacher group did not ($p = .005$). Levene's homogeneity test was insignificant for both groups ($F = .072$, $p = .79$), indicating that that assumption has been met. The groups did differ significantly, $t(20) = 7.88$, $p < .001$, 95% CI [2.01, 4.67], $d = .83$. The mean for the student group ($M = 7.86$, $SD = .41$) was significantly different from the teacher group ($M = 6.55$, $SD = .37$), with a large Cohen's *d* effect size ($d = .83$).

3.2.2 Perceived need of usage

Table 4 depicts the mean student-perceived need of usage ($\bar{x}SI$), the mean teacher-perceived need of usage ($\bar{x}TI$), and the rank according to frequency as explicated in 3.1. These scores could be between 1 and 5 and stem from questions asked in the surveys (for students) and interviews (for teachers).

Table 4*Mean perceived $\bar{x}SI$ and $\bar{x}TI$ per EF*

EF	$\bar{x}SI$	$\bar{x}TI$	Rank
Flexibility	4.39	4.33	3/4/5*
Goal-directed persistence	4.49	3	2
Metacognition	4.63	4.33	3/4/5*
Organization	4.61	3.67	3/4/5*
Planning	4.52	3.33	6
Regulation of Affect	4.24	4	9
Response inhibition	4.42	4	10
Social thinking	4.5	4.67	1
Sustained attention	4.39	3.67	11
Take initiation	4.51	4.67	7
Time management	4.54	3.33	8

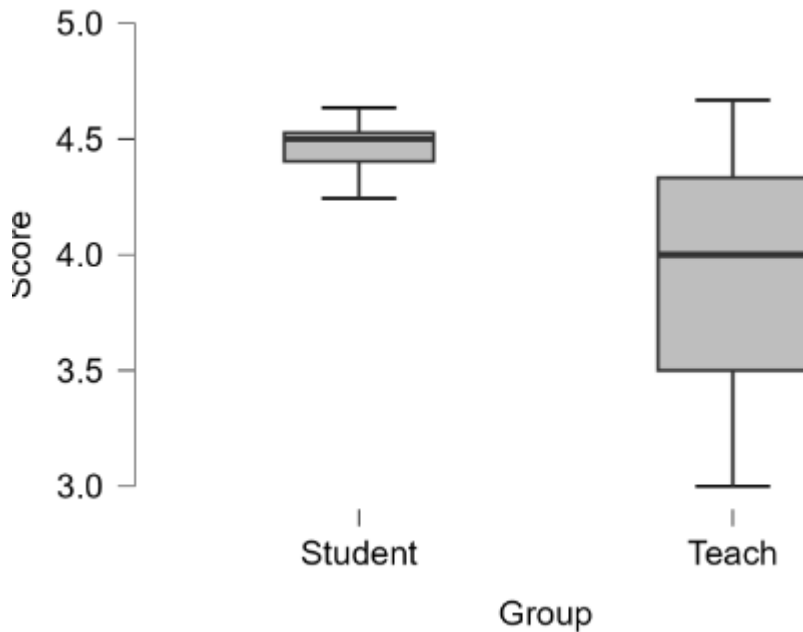
The range of the means is .39 for the students and 1.67 for the teachers. Regulation of affect's scores were the lowest for students (4.24), and metacognition was the highest (4.63). For teachers, the lowest score is goal-directed persistence (3), whilst Social thinking scores the highest alongside taking initiation (4.67). The mean score for students is 4.48, whereas that of the teachers is 3.91. So, on average, students rate the need for EFs .57 points out of 5 higher than teachers rate it.

For students, only metacognition and organisation score more than a standard deviation ($S = .11$) higher than the mean and regulation of affect scores lower than a standard deviation. For teachers, Social thinking and taking initiation score more than a standard deviation ($S = .56$) higher than the mean, whilst time management, planning, and goal-directed persistence score a standard deviation lower than the mean.

As shown in the student boxplot ($Q1 = 4.4$, $Q2 = 4.5$, $Q3 = 4.53$) in Figure 4, the frequencies of the EFs have a negative skew but no outliers exceeding $1.5 * IQR$ ($IQR = .12$). In the teacher boxplot ($Q1 = 3,5$ $Q2 = 4$, $Q3 = 4.33$) in Figure 4, the frequencies of the EFs have a slight negative skew but no outliers that exceed $1.5 * IQR$ ($IQR = .83$).

Figure 4

Boxplots of Table 4: Mean perceived $\bar{x}SI$ and $\bar{x}TI$ per EF



An independent *t*-test was conducted to determine whether there was a significant difference between students' and teachers' perceived need for using 11 EFs (see Table 4). Due to there being 11 EFs, *N* was 11 for each group. The first group (students) was surveyed using the survey in Appendix D, and the second group (teachers) was interviewed using the interview in Appendix C. Preliminary data screening showed that both groups met the assumption using a Shapiro-Wilkes test ($p = > .58$). Levene's test for homogeneity was significant for the groups ($F = 19.2, p = < .001$), indicating that that assumption has not been met. The groups did differ significantly, $t(20) = 3.3, p = .004, 95\% \text{ CI } [.45, 2.33], d = 1.41$. The mean for the student group ($M = 4.48, SD = .11$) was significantly different from the teacher group ($M = 3.91, SD = .56$), with a large Cohen's *d* effect size ($d = 1.41$).

3.2.3 Perceived amount of teaching

Table 5 depicts the mean of student-perceived having been taught ($\bar{x}ST$), the mean amount of perceived explicit teaching ($\bar{x}TT$), and the rank according to the frequency as explicated in 3.1. These scores could be between 1 and 5 and stem from questions asked in the surveys (for students) and interviews (for teachers).

Table 5*Mean perceived \bar{x}_{ST} and \bar{x}_{TT} per EF*

EF	\bar{x}_{ST}	\bar{x}_{TT}	Rank
Flexibility	3.86	2	3/4/5*
Goal-directed persistence	4.02	3	2
Metacognition	4.29	2.33	3/4/5*
Organization	3.78	2	3/4/5*
Planning	4	3	6
Regulation of Affect	3.49	2.33	9
Response inhibition	3.95	2.33	10
Social thinking	3.93	3.33	1
Sustained attention	3.72	2.67	11
Take initiation	4.02	2.67	7
Time management	3.71	2.33	8

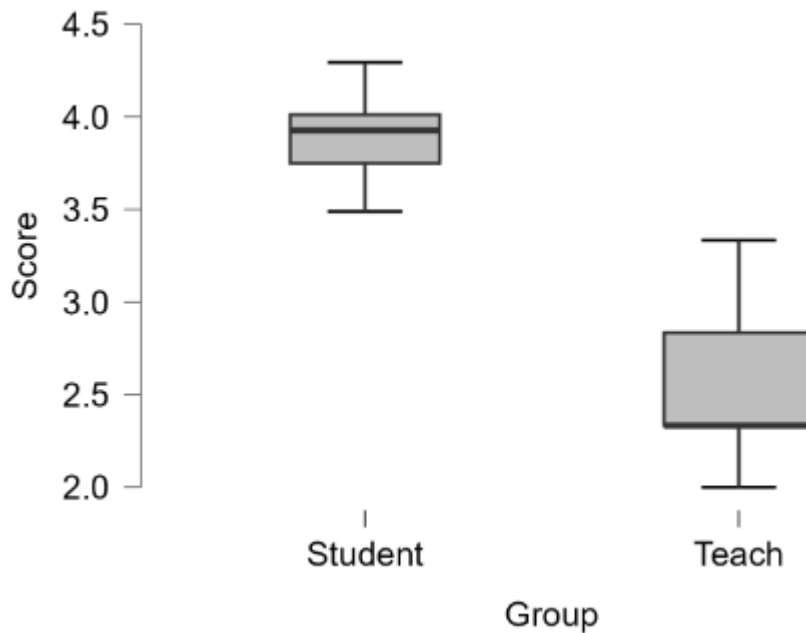
The range of the means is .81 for the students and 1.33 for the teachers. Regulation of affect scores the lowest for students (3.49) and Metacognition the highest (4.29). For teachers, the lowest score is shared among flexibility and organisation (2), whilst Social thinking scores the highest (7). That is a repeat of social thinking scoring the highest. The mean score for students is 3.89, whereas that of the teachers is 2.55. So, on average, students rate the amount of teaching of EFs 1.34 points out of 5 higher than teachers rate it.

For students, only metacognition scores more than a standard deviation ($S = .21$) higher than the mean and regulation of affect scores more than a standard deviation lower. Teachers planning and goal-directed persistence score more than a standard deviation ($S = .43$) higher than the mean, whilst organisation and flexibility score a standard deviation lower than the mean.

As shown in the student boxplot ($Q1 = 3.75$, $Q2 = 3.93$, $Q3 = 4.01$) in Figure 5, the frequencies of the EFs have a slight negative skew but no outliers that exceed $1.5 * IQR$ ($IQR = .26$). In the teacher boxplot ($Q1 = 2.33$, $Q2 = 2.33$, $Q3 = 2.83$) in Figure 5, the frequencies of the EFs have a heavy positive skew but no outliers that exceed $1.5 * IQR$ ($IQR = .5$).

Figure 5

Boxplots of Table 5: Mean perceived $\bar{x}ST$ and $\bar{x}TT$ per EF



An independent *t*-test was conducted to determine whether there was a significant difference between students' and teachers' perceived amount of teaching of 11 EFs (see Table 5). Due to there being 11 EFs, *N* was 11 for each group. The first group (students) was surveyed using the survey in Appendix D, and the second group (teachers) was interviewed using the interview in Appendix C. Preliminary data screening showed that both groups met the assumption using a Shapiro-Wilkes test ($p = > .31$). Levene's test for homogeneity was significant for the groups ($F = 6.3$, $p = .021$), indicating that that assumption was not met. The groups did differ significantly, $t(20) = 9.3$, $p = < .001$, 95% CI [2.47, 5.43], $d = 3.97$. The mean for the student group ($M = 3.89$, $SD = .21$) was significantly different from the teacher group ($M = 2.55$, $SD = .43$), with a large Cohen's *d* effect size ($d = 3.5$).

3.3 Comparison of combined frequency tables

The scores of students and teachers on perceived (student) skill level, the perceived need for usage, and perceived amount of teaching were each ranked from one through eleven (See Appendix F), and the sum differences between the pairs were calculated as described later in this paragraph. The mean of these ranks, $\bar{x}S$ for students and $\bar{x}T$ for teachers were then calculated per EF, as displayed in Table 6. These means were then ranked again into perceived importance, RS for students, and RT for students, per EF (See Table 6). The sum of the differences per pair was then measured to see which pair lines up best with one another

before conducting Kendall's tau test also to show correlation. The sum difference was measured by turning the highest rank (1 is highest, 11 is lowest) out of a pair of ranks on an EF negative and then adding them up (See Appendix G). The sum of the results thereof is the sum difference for a pair. When ranks shared a spot, the highest rank was taken to calculate the sum difference. If they were equal, one of the ranks was turned negative. The pair RS-RT had the lowest sum difference of 22, The pair RS-QD the second lowest with 30, and the sum difference between RT and QD was the highest at 36.

Table 6

Mean ranks of student and teacher of perceived importance, corresponding rank thereof and rank in QD

EF	Mean of student Ranks (\bar{x}_S)	Corresponding rank students (RS)	Mean of teacher Ranks (\bar{x}_T)	Corresponding rank teachers (RT)	Rank (QD)
Flexibility	6.11	7	6.33	7	3/4/5*
Goal-directed persistence	4.67	4/5*	6.17	6	2
Metacognition	3	1	4.17	3	3/4/5*
Organization	6.33	8	7.67	9/10*	3/4/5*
Planning	4.67	4/5*	7.33	8	6
Regulation of Affect	10.67	11	7.67	9/10*	9
Response inhibition	5.83	6	6.03	5	10
Social thinking	4.33	3	1.33	1	1
Sustained attention	9.83	10	5.67	4	11
Take initiation	3.5	2	3.67	2	7
Time management	7	9	9	11	8

The corresponding ranks of \bar{x}_S (RS), \bar{x}_T (RT), and QD in Table 6 were checked for normality using a Shapiro-Wilk test. None were significant ($p_{RS} = .72$, $p_{RT} = .88$, $p_{QD} = .32$), and all are thus normally distributed. A Kendall's Tau test on RS vs RT shows a significant positive relation between ranked perceptions of the importance of executive functions as seen by students and ranked perceptions of the importance of executive functions as seen by teachers, $\tau_b(10) = .5$, $p = .034$.

A second Kendall's Tau test on RS vs QD shows a non-significant positive relation between ranked perceptions of the importance of executive functions as seen by students and ranked frequency of executive functions in qualification dossiers, $\tau_b(10) = .43, p = .07$.

A third Kendall's Tau test on RT vs QD shows a non-significant positive relation between ranked perceptions of the importance of executive functions as seen by teachers and ranked frequency of executive functions in qualification dossiers, $\tau_b(10) = .17, p = .48$.

The correlation of these three scores is in line with the sum differences, with the stronger correlations being present in pairs with the lowest sum difference, the middle pair falling in the middle, and the weakest correlation being found in the pair with the largest sum difference.

Table 7

Mean ranks of corresponding student and teacher ranks of perceived importance, ultimate sample rank versus rank in QD.

EF	Mean of Ranks (\bar{x}_{ST})	Rank of mean of ranks (RST)	Rank (QD)
Flexibility	7	7/8*	3/4/5*
Goal-directed persistence	5.25	4	2
Metacognition	3	3	3/4/5*
Organization	8.75	9	3/4/5*
Planning	6.25	6	6
Regulation of Affect	10.25	11	9
Response inhibition	5.5	5	10
Social thinking	2	1/2*	1
Sustained attention	7	7/8*	11/3
Take initiation	2	1/2*	7
Time management	10	10	8

Table 7 shows the mean of the ranks RS and RT in Table 6 (\bar{x}_{ST}). Those mean scores were then ranked among students and teachers combined (RST) in the final EF ranking. The sums of the differences per pair were then measured to see which pair lines up best with one another before conducting Kendall's tau test also to show correlation. The sum difference

was measured by turning the highest rank (1 is highest, 11 is lowest) out of a pair of ranks on an EF negative and then adding them up (See Appendix G). The sum of the results thereof is the sum difference for a pair. When ranks shared a spot, the highest rank was taken to calculate the sum difference. The sum difference between RST and QD is 31.

The corresponding ranks of \bar{x} ST (RST) and QD in Table 7 were checked for normality using a Shapiro-Wilk test. None were significant ($p_{RST} = 0,7$, $p_{QD} = .32$), and all are thus normally distributed. A fourth and final Kendall's Tau test on RST vs QD shows a non-significant positive relation between ranked perceptions of the importance of executive functions as seen by students and teachers and ranked frequency of executive functions in qualification dossiers, $\tau_b(10) = .34$, $p = .15$). When this correlation is compared to the other correlations made for Table 6 it is the third strongest. When the sum of differences is compared to the other table, it too is the third highest difference.

4. Discussion

To what extent is there a perceived difference between students, teachers, and governing bodies regarding the importance of EFs in vocational education within Nursing in the Netherlands? It seems likely that there is a significant difference in the perceptions of these three groups in the population when it comes to EFs in vocational education within Nursing in the Netherlands, and the null hypothesis of there not being any difference may be rejected. Those findings met the expectations of accepting the alternative hypothesis. The study demonstrates a statistically significant positive correlation between students and teachers when it comes to the order of perceived importance of EFs in the field of nursing, whilst neither students nor teachers (even combined) correlate significantly with the qualification dossiers in nursing (Kwalificaties MBO-verpleegkundige, 2020). As well as that, all three *t*-tests conducted on the chosen subcategories of perceived importance of EFs were significantly higher for the students. Overall, this indicates that whilst students' and teachers' order of importance of each EF correlates, students also indicate themselves to be more skilled than teachers see them, students think each EF is more likely to be used than teachers do, and students think that they are being taught about these EFs more than teachers think they are teaching them.

It must be noted, though, that only one definition of EFs has been taken into account (Dawson & Guare, 2003) for this research and that those of other researchers (Burgess & Simons, 2005; Espy & Bull, 2005; Miller & Cohen, 2001; Roebbers, 2017) have not been taken into account. That is not to say that those definitions are incorrect, but instead that other

angles may approach this research that might provide different results. Hence also the importance of defining EFs: There are many different correct definitions, and no real agreement exists on one definition.

Despite that, this paper's findings should be considered when designing future qualification dossiers and VE curricula, as they imply a difference in perception between all three main parties. As Murphy (2022), McCabe et al. (2010), and Paas and Van Merriënboer (2020) stated, a failure to recognise student skill levels may result in redundant instruction of the same skill, leading to a lack of motivation among students, as repetition fails to engage them in their zone of proximal development and to produce unproductive cognitive load. The found discrepancy between student and teacher perceptions in all three subcategories of importance; need of usage, skill level, and amount of teaching, especially with students scoring significantly higher in all three counts, implies that those negative effects might already be ongoing in the field of Nursing. Furthermore, this has implications for the practical issue of a lack of resources in teaching (Ministerie van Onderwijs, Cultuur en Wetenschap, 2022b). Proper use of EFs can increase the efficiency of learning (Bailey, 2007; Borella et al., 2010; Duncan et al., 2007; Quilici & Mayer, 2002), and due to the discrepancies, it seems more unlikely than before this research that EFs are being taught efficiently. It might be possible that by reshuffling the EFs that are being focused on in teaching, fewer resources will have to be used for teaching in general.

An example of the discrepancies in qualification dossiers can, for instance, be found in Appendix F between goal-directed persistence's perceived amount of teaching, which is relatively high-ranking for both students (second) and teachers (second), and the perceived amount of use needed of the same EF in both counts, which scores a lot lower (seventh for students and last for teachers). Whereas the amount of teaching aligns with the qualification dossiers' result (second), neither students nor teachers find it to be used much in practice. This implies that the amount of teaching aligns with what the qualification dossiers demand, not what the practice might demand. Similar discrepancies exist regarding overall importance, as shown in Table 7, where teachers and students rate taking the initiative a shared first, but the qualification dossiers only have it come seventh. When looking at the sum differences between measured ranks, the largest sum difference was found between the perceived amount of teaching done and the qualification dossiers. (See Appendix G). That implies that the perceived focus of teaching, out of all things measured, is the least in line with the qualification dossiers presented. With the teachers and the students overall having the strongest correlation with one another and having the lowest sum of differences, it seems

to imply that what teachers and students find important depends more on each other than on the qualification dossiers. Interestingly, though, the smallest sum of differences between the subcategories and the qualification dossiers is between it and the student's self-perceived skill score. That is not smaller than the difference between student and teacher importance but does seem to imply that the student's skills are best in line with what the qualification dossiers show.

In a broader sense, this might imply that since there is a difference between the perception of governing bodies, teachers, and students, there is also a difference between applications. The teachers disagree with the governing bodies and teach what they think is important (as seen in the disagreement in ranks of importance between the pair). The students mostly disagree with the teachers, so they apply what they think is important in the work field. The work field then likely has nurses with different priorities than the priorities the government prescribes, ultimately widening the gap between the data-backed qualification dossiers and the practice-backed work field. Theoretically, that also implies that despite research being done into the optimal use of EFs and the meaning thereof and how it relates to the rest of the brain functions, if there is a difference of perception in the population regarding such, any such research becomes hardly useable in practice. Those, of course, are possible implications but are worth being wary of.

4.1 Limitations

This study has a couple of limitations. Firstly, the generalizability is limited due to the sample size of students and especially the teachers ($N = 3$). Any inferences made about the general population are possibly invalid and unreliable. This particular limitation stems from the limited scope of the research due to a lack of resources, especially time. The research had a deadline to be met, and a larger scope was implausible given said deadline. Another issue that stems from the scope is the lack of normality in one of the t -tests and a failure of the assumption of homoscedasticity in the two others. With a sample population of three, it is more unlikely to get a normal result than with a larger sample. Those limitations from scope do not take away much from the significance of the results of the t -tests as the smallest Cohen's d found was .83, which translates to at least 80% of the control group (teachers) scoring below the experimental group (students) and is still considered a large effect size. Further support of the significance still mattering is found in the critical scores of the t -tests (which is 1.73 at $df = 20$), with the smallest t -score being almost double that ($t(20) = 3.3$).

Further limitations caused are found in the possible confounding factor of social desirability of students wanting to say they rate things higher than they actually may have.

This is not necessarily a large issue with the perceived need of usage but might play a role in the perceived amount of teaching or self-assessed skill levels. Attempts to mitigate this were made by making the survey anonymous, by forcing a choice (there was no “I do not know” or “no answer” option), and by keeping questions as indirect as possible without making the survey too long. A lack of resources causes that limitation as it is beyond the scope of this research to measure actual skill level in executive functions and use that as a control group for the *t*-tests instead. That would have given a more grounded perception, but again a lack of time and resources prevented that from being possible.

4.2 Recommendations

Perhaps unsurprisingly, the recommendation for future research increases the scope. That can be done in four ways. Firstly, this research can be repeated in a different branch of vocational education to see if there are differences between nursing and other branches. Secondly, this same research can be conducted in more schools and with more classes, so the $N \neq 3$ for the teachers. That might better show whether the population is truly not normally distributed or that the assumption of homoscedasticity truly is broken for the *t*-tests conducted. Thirdly, different definitions of EFs can be used to check if similar results are found or if these results only come up with this definition. Lastly, it is recommended to conduct this research with control groups in which the skill level in the different EFs is measured. Ideally, the last two are combined and both done first and then the first recommendation is followed up on. That follow-up would also need a larger scope and a better control group. By following up on the research at a larger scale, the problem of possible disparities causing inefficiencies in teaching during a time of shortages might be better yet explicated, and strides to start alleviating the problem might be taken.

Further recommendations of researching a different angle would measure which of the found results aligns best with Nursing in practice. Questions such as “*Which EFs truly are the most important in nursing*” with subquestions such as “*Which group’s scores best line up with that?*” could be central in such research. A combination of this research, that research, and the recommendation this section started with could help explicate where either group might need to change their working ways to use the already scarce resources more efficiently.

Practically, it is advisable to look critically at what students already know as a teacher and what they might need more emphasis on learning. The best comparison is to see for which EFs the students rank themselves low in skill but high in need of usage, where the qualification dossiers rank it high, and where the teachers and students rank low in explicit

teaching. An example of such an EF is organisation. Supporting the development of such EFs could benefit nurses in the Netherlands, given the importance of using EFs in the field.

5. Conclusion

To bring light to the ongoing situation of shortages in the Dutch world of education and its possible inefficiencies, the following question has been researched and answered: *“To what extent is there a perceived difference between students, teachers, and governing bodies regarding the importance of EFs in vocational education within Nursing in the Netherlands?”* Based on mixed methods research using QCA (Schreier, 2012) as a baseline, it seems likely that there is a significant difference in the perceptions of these three groups in the population when it comes to EFs in vocational education within Nursing in the Netherlands, and the null hypothesis of there not being any difference may be rejected.

Whilst the scope limits the generalisation of the results, this research has provided new insights into the perception of EFs in vocational education in nursing. It has shown discrepancies between students and teachers and between those two groups and the qualification dossiers that the governing bodies use to guide vocational education. Those discrepancies, especially between the perceived amount of teaching and the skill level of students and teachers, imply that students are generally more capable than teachers think them to be and that what is being taught lines up poorly with what the qualification dossiers indicate to be important for Nurses. There is a clear discrepancy that might be causing inefficiencies in teaching. It is for that reason that the recommendations in 4.2 have been made. However, vocational education schools in the North of the Netherlands and the people making the qualification dossiers should also self-criticize and look at what EFs are often used in practice and adapt their teaching or dossiers accordingly. In that way, the possible discrepancies between work and education and the discrepancies between the schools and governing bodies should eventually be alleviated.

This research has made the first important strides in explicating the blind spots between the different parties (students, teachers, and governing bodies) and has filled the knowledge gap of whether there is a perceived difference. This exploratory research can help serve as a foundation for further research. It challenges the status quo by pointing out the differences in views of parties, two of which (Teachers and governing bodies) should at the very least be in agreement, and helps solve the problem of educational shortages by shining a spotlight onto an aspect of education that seems likely to be working sub-optimally.

References

- Algemene Vereniging Schoolleiders. (2020, November 5). *Meeste burn-out klachten in het onderwijs* - Algemene Vereniging Schoolleiders. <https://avs.nl/actueel/nieuws/meeste-burn-out-klachten-in-het-onderwijs/>
- Bailey, C. E. (2007). Cognitive accuracy and intelligent executive function in the brain and in business. *Annals of the New York Academy of Sciences*, 1118(1), 122–141. <https://doi.org/10.1196/annals.1412.011>
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9), 1175–1184. <https://doi.org/10.1037/0003-066x.44.9.1175>
- Ben-Eliyahu, A., & Bernacki, M. L. (2015). Addressing complexities in self-regulated learning: A focus on contextual factors, contingencies, and dynamic relations. *Metacognition and Learning*, 10, 1-13. <https://doi.org/10.1007/s11409-015-9134-6>
- Borella, E., Carretti, B., & Pelegrina, S. (2010). The specific role of inhibition in reading comprehension in good and poor comprehenders. *Journal of Learning Disabilities*, 43(6), 541–552. <https://doi.org/10.1177/0022219410371676>
- Burgess, P. W., & Simons, J. S. (2005). Theories of frontal lobe executive function: clinical applications. In *Oxford University Press eBooks* (pp. 211–232). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198526544.003.0018>
- Dawson, P., & Guare, R. (2003). *Executive Skills in children and adolescents: A practical guide to assessment and intervention (The Guilford Practical Intervention in the Schools Series)* (First Edition, (Lay-Flat Paperback)). The Guilford Press.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64(1), 135–168. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P. K., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H. R., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446. <https://doi.org/10.1037/0012-1649.43.6.1428>
- Dynamic TVET Country Profiles*. (n.d.). Retrieved May 1, 2023, from <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=NLD>

- EenVandaag. (2022, April 13). *Professionalisering van leerkrachten gaat nog wel even duren: "Eerst lerarentekort oplossen."*
<https://eenvandaag.avrotros.nl/item/professionalisering-van-leerkrachten-in-het-onderwijs-gaat-nog-wel-even-duren-eerst-lerarentekort-oplossen/>
- Espy, K. A., & Bull, R. (2005). Inhibitory processes in young children and individual variation in short-term memory. *Developmental Neuropsychology*, 28(2), 669–688.
https://doi.org/10.1207/s15326942dn2802_6
- Freelon, D. (n.d.). *ReCal2: Reliability for 2 Coders – Deen Freelon, Ph.D.* Retrieved March 29, 2023, from <http://dfreelon.org/utills/recalfront/recal2/>
- Ger, E., & Roebers, C. M. (2023). The relationship between executive functions, working memory, and intelligence in kindergarten children. *Journal of Intelligence*, 11(4), 64.
<https://doi.org/10.3390/jintelligence11040064>
- Heest, F. van. (2022, June 13). Het hbo krimpt sneller dan verwacht, de universiteiten blijven wel groeien. *ScienceGuide*. <https://www.scienceguide.nl/2022/05/het-hbo-krimpt-snelser-dan-verwacht/>
- Hornstra, L., van den Bergh, L., Denissen, J. J. A., Diepstraten, I., & Bakx, A. (2021). Parents' perceptions of secondary school students' motivation and well-being before and during the COVID-19 lockdown: the moderating role of student characteristics. *Journal of Research in Special Educational Needs*, 22(3), 209–220.
<https://doi.org/10.1111/1471-3802.12551>
- KiesMBO.nl. (n.d.). *Bladeren door alle opleidingen - KiesMBO*. KiesMBO. Retrieved October 26, 2022, from <https://www.kiesmbo.nl/opleidingen>
- Krippendorff, K. (2004). *Content analysis: An introduction to its methodology*. SAGE.
- Kwalificaties MBO-verpleegkundige*. (2020, August 1). Beroepsonderwijs Bedrijfsleven.
<https://kwalificaties.s-bb.nl/Details/Index/5113?type=Kwalificatie>
- Kompeer, L. S. E. J. (2020, January 30). Waarom het lerarentekort voorlopig nog niet voorbij is. *NOS*. <https://nos.nl/artikel/2320971-waarom-het-lerarentekort-voorlopig-nog-niet-voorbij-is>

- Lenz, E. R., & Shortridge-Baggett, L. M. (2002). Self-efficacy in nursing: research and measurement perspectives. *Choice Reviews Online*, 40(04), 40–2206.
<https://doi.org/10.5860/choice.40-2206>
- Logie, R. H., & Cowan, N. (2015). Perspectives on working memory: introduction to the special issue. *Memory & Cognition*, 43(3), 315–324. <https://doi.org/10.3758/s13421-015-0510-x>
- McCabe, D. P., Roediger, H. L., McDaniel, M. A., Balota, D. A., & Hambrick, D. Z. (2010). The relationship between working memory capacity and executive functioning: Evidence for a common executive attention construct. *Neuropsychology (Journal)*, 24(2), 222–243. <https://doi.org/10.1037/a0017619>
- Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, 24(1), 167–202.
<https://doi.org/10.1146/annurev.neuro.24.1.167>
- Ministerie van Algemene Zaken. (2022a, July 12). *Beroepskwalificaties: basis van het mbo*. Middelbaar Beroepsonderwijs (Mbo).
<https://www.rijksoverheid.nl/onderwerpen/middelbaar-beroepsonderwijs/beroepsgericht-mbo>
- Ministerie van Algemene Zaken. (2022b, December 15). *Uit welke mbo-opleidingen kan ik kiezen?* Rijksoverheid.nl. <https://www.rijksoverheid.nl/onderwerpen/middelbaar-beroepsonderwijs/vraag-en-antwoord/uit-welke-mbo-opleidingen-kan-ik-kiezen>
- Ministerie van Onderwijs, Cultuur en Wetenschap. (2022, November 22). *Aanpak Lerarentekort*. <https://www.aanpaklerarentekort.nl/>
- Ministerie van Onderwijs, Cultuur en Wetenschap. (2022a, November 21). *Prognose aantal studenten VE*. Middelbaar Beroepsonderwijs | OCW in Cijfers.
<https://www.ocwincijfers.nl/sectoren/middelbaar-beroepsonderwijs/studenten/prognose-aantal-studenten-VE>
- Murphy, C. (2022). *Vygotsky and science education* (1st ed. 2022). Springer.

- NOS. (2022, December 13). Lerarentekort op basisscholen gestegen tot bijna 10 procent. *NOS*. <https://nos.nl/artikel/2456228-lerarentekort-op-basisscholen-gestegen-tot-bijna-10-procent>
- Paas, F., & Van Merriënboer, J. J. G. (2020). Cognitive-load theory: methods to manage working memory load in the learning of complex tasks. *Current Directions in Psychological Science*, 29(4), 394–398. <https://doi.org/10.1177/0963721420922183>
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543–578. <https://doi.org/10.3102/00346543066004543>
- Quilici, J. L., & Mayer, R. E. (2002). Teaching students to recognize structural similarities between statistics word problems. *Applied Cognitive Psychology*, 16, 325–342. <https://doi.org/10.1002/acp.796>
- Rike, P., Johansen, H. C., Ulleberg, P., Lundqvist, A., & Schanke, A. (2015). Exploring associations between self-reported executive functions, impulsive personality traits, driving self-efficacy, and functional abilities in driver behaviour after brain injury. *Transportation Research Part F-traffic Psychology and Behaviour*, 29, 34–47. <https://doi.org/10.1016/j.trf.2015.01.004>
- Roebers, C. M. (2017). Executive function and metacognition: Towards a unifying framework of cognitive self-regulation. *Developmental Review*, 45, 31–51. <https://doi.org/10.1016/j.dr.2017.04.001>
- Rossi, P. H., Lipsey, M. W., & Henry, G. T. (2019). *Evaluation: A systematic approach*. SAGE Publications, Incorporated.
- Schreier, M. (2012). *Qualitative content analysis in practice* (1st edition). SAGE Publications
- Schrier, K. & Gibson, D. (2011). *Designing games for ethics: Models, techniques and frameworks*. 10.4018/978-1-60960-120-1. (Adaptation of Dawson and Guare model from 2004)
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2001). *Experimental and quasi-experimental designs for generalized causal inference*.
- Veldhuis, P. (2022, November 17). Onderzoek wijst uit: de leervertraging door de schoolsluitingen loopt op. *NRC*. <https://www.nrc.nl/nieuws/2022/11/17/onderzoek-wijst-uit-de-leervertraging-door-de-schoolsluitingen-loopt-op-a4148607>

Appendix A
Coding scheme used for qualification dossier

Name	Code	Definition	Example from Dossier
Flexibility	EF1	The capacity to improvise, shift approaches, and be adaptable	can apply conversation techniques and guidance methods with different target groups
Goal-directed persistence	EF2	The ability to sustain ongoing effort and attention to complete a goal	formulates measurable, challenging and achievable points for improvement for its work and shows responsibility in achieving these;
Metacognition	EF3	The ability to self-monitor and observe one's behaviour	uses feedback purposefully to develop further;
Organization	EF4	The capacity to arrange elements into a functioning whole	organizes the required (personnel) capacity for the work in a timely manner;
Planning	EF5	The ability to develop a roadmap or set of strategies to achieve a goal.	takes into account available material and financial resources for the care recipient when formulating goals, required resources and planning;
Regulation of Affect	EF6	The ability to manage one's feelings effectively to make decisions	consistently uses professional boundaries, and her own boundaries and feelings during and after the crisis situation;

Response inhibition	EF7	The ability to delay or stop action and use reflective rather than impulsive behaviour	acts quickly and adequately in crisis situations on the basis of clinical reasoning, according to the prescribed procedures, legal guidelines and agreements of the organisation;
Social thinking	EF8	The ability to label and understand the needs of others and take their perspective	conduct motivational conversations tailored to the caregiver and social network;
Sustained attention	EF9	The ability to maintain one's focus and attention in the presence of distractions	N/A (Not found)
Take initiation	EF10	The ability to initiate activity without procrastination	proactively keeps abreast of professional developments and changing legislation and regulations in the sector;
Time management	EF11	The ability to respond to things in a timely fashion.	invests in a timely manner in building contacts at different levels within and outside the organisation.

Appendix B

List of all tasks in the qualification dossiers per Code

Dossier: Nursing VE-4				
B1-K1: Bieden van zorg en ondersteuning in het verpleegkundig proces				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1	1	Has broad knowledge of anatomy, physiology, pathology, and pharmacology relevant to the chosen field and target population.		Excluded. Fails on one or more of the criteria.
B1-K1	2	has broad knowledge of health risks associated with the target group		Excluded. Fails on one or more of the criteria.
B1-K1	3	has broad knowledge of general concepts and theories of behavioral sciences relevant to professional practice		Excluded. Fails on one or more of the criteria.
B1-K1	4	has specialist knowledge of work fields and target groups in relation to professional practice		Excluded. Fails on one or more of the criteria.
B1-K1	5	has industry-specific knowledge according to the additional information in the accounting information		Excluded. Fails on one or more of the criteria.
B1-K1	6	has specialist knowledge of industry-specific methodologies		Excluded. Fails on one or more of the criteria.

B1-K1	7	has broad knowledge of different views on health	EF1	
B1-K1	8	has specialist knowledge of protocols, professional guidelines, professional code and standards		Excluded. Fails on one or more of the criteria.
B1-K1	9	has broad knowledge of the financing of healthcare		Excluded. Fails on one or more of the criteria.
B1-K1	10	has specialist knowledge of the prevention of transgressive behavior and misunderstood behaviour		Excluded. Fails on one or more of the criteria.
B1-K1	11	has broad knowledge of methods for risk assessment, early detection, problem recognition, intervention and monitoring	EF4 EF8	
B1-K1	12	has specialist knowledge of chain care (ketenzorg)		Excluded. Fails on one or more of the criteria.
B1-K1	13	has broad knowledge of preventive care		Excluded. Fails on one or more of the criteria.

B1-K1	14	has broad knowledge of palliative care		Excluded. Fails on one or more of the criteria.
B1-K1	15	has broad knowledge of community care/primary care		Excluded. Fails on one or more of the criteria.
B1-K1	16	has broad knowledge of dual diagnosis/comorbidity		Excluded. Fails on one or more of the criteria.
B1-K1	17	has broad knowledge of self-management and strengthening self-management	EF1 EF5 EF3 EF6 EF7	
B1-K1	18	has broad knowledge of the possibilities, risks and ethical dilemmas of technological tools, social media and the internet	EF8	
B1-K1	19	has broad knowledge of nutrition and dietetics and nutritional issues relevant to professional practice		Excluded. Fails on one or more of the criteria.
B1-K1	20	has specialist knowledge of joint decision-making process		Excluded. Fails on one or more of the criteria.

B1-K1	21	has broad knowledge of building, maintaining and restoring a social network	EF5 EF4 EF8	
B1-K1	22	has specialist knowledge of diagnosis treatment combinations		Excluded. Fails on one or more of the criteria.
B1-K1	23	can deploy and use technological tools and instruments, including e-health	EF1 EF2	
B1-K1	24	can provide remote care	EF2	
B1-K1	25	can recognize behavioral patterns, syndromes (ziektebeelden) and functional disorders	EF8	
B1-K1	26	can apply all aspects of nursing with regard to care in hospitals, nursing homes and home care, mental health care and care for the disabled	EF1 EF2	
B1-K1	27	can recognize emotional problems	EF8	

B1-K1	28	can recognize signs of social problems	EF8	
B1-K1	29	can apply observational methods and techniques to retrieve information	EF2 EF8	
B1-K1	30	can apply diagnostic/clinical reasoning	EF2 EF3	
B1-K1	31	can act methodically and systematically during professional practice	EF4	
B1-K1	32	can apply current approaches in dealing with relevant target groups	EF1	
B1-K1	33	can deal with professional ethical issues	EF8	
B1-K1	34	can contribute to patient safety	EF2	

B1-K1	35	can apply specialist knowledge of group dynamics	EF2 EF8	
B1-K1	35	can apply the (organisation-specific) vision of care in her daily work	EF2 EF4	
B1-K1	36	can act according to the standards of responsible care	EF2	
B1-K1	37	can apply conversation techniques and guidance methods with different target groups	EF1	
B1-K1	38	can apply negotiation methodologies and support methodologies	EF2 EF8	
B1-K1	39	can assist with common household accidents	EF2	
B1-K1	40	can resuscitate	EF2	

B1-K1	41	can apply tools and methods with regard to acting in crisis situations	EF2	
B1-K1	42	can apply knowledge of current legislation and regulations	EF2	
B1-K1	43	can record basic financial and administrative data	EF2	
B1-K1	44	can perform administrative actions relevant for the target group	EF2	
B1-K1-W1: Onderkent bestaande of dreigende gezondheidsproblemen (Gezondheidsbevorderaar)				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1-W1	1	Adequately collects data from information and signals from care recipients, the social network and other care providers;	EF3 EF8	

B1-K1-W1	2	responds adequately to the (non-)verbal signals of the care recipient;	EF3 EF8	
B1-K1-W1	3	shows active attention to the perception of safety and well-being by the care recipient and the social network;	EF3 EF8	
B1-K1-W1	4	chooses the right materials and resources tailored to the target group;	EF3 EF4 EF8	
B1-K1-W1	5	explains subjects clearly and comprehensibly at the knowledge and language level of the care recipient and their social network;	EF1	
B1-K1-W1	6	conduct motivational conversations tailored to the caregiver and social network;	EF1 EF8	
B1-K1-W1	7	reports findings accurately and completely and, if necessary, adjusts the care provided in consultation.	EF1 EF3 EF10 EF11 EF8	

B1-K1-W2: Stelt de verpleegkundige diagnose en stelt het individuele plan van de zorgvrager op (Zorgverlener)

Section	No.	Task starting with: "The novice practitioner..."	Codes	Notes
B1-K1-W2	1	listens actively to the care needs, health and living situation of the care recipient and the social network;	EF8	
B1-K1-W2	2	accurately analyzes the collected data for the nursing diagnosis and makes connections	EF3	
B1-K1-W2	3	processes the data obtained from the nursing diagnosis correctly and accurately;		
B1-K1-W2	4	actively and effectively collects relevant information for the care recipient's plan from various sources, observations and own experiences;	EF2 EF3 EF5	
B1-K1-W2	5	formulates clear goals, conditions and interventions that are desirable for the care to be provided;	EF5	
B1-K1-W2	6	draws up the care plan in such a way that continuity of care and prospects for it are guaranteed;	EF2 EF5 EF4	

B1-K1-W2	7	takes into account available material and financial resources for the care recipient when formulating goals, required resources and planning;	EF1 EF5 EF4	
B1-K1-W2	8	assesses adequately and in consultation with the care recipient whether the evaluation of interventions leads to an adjustment in the plan.	EF1 EF5 EF4	
B1-K1-W3: Voert interventies uit (Zorgverlener)				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1-W3	1	actively takes into account the possibilities, wishes and habits of the care recipient and the social network;	EF1 EF3 EF8	
B1-K1-W3	2	offers goal-directed, motivating or activating guidance aimed at maintaining or increasing the care recipient's self-management;	EF2 EF5 EF8	
B1-K1-W3	3	handles the individuality and privacy of the care recipient and the social network with care, in accordance with applicable laws and regulations;	EF1 EF7	

B1-K1-W3	4	deliberately motivates the care recipient and the social network to perform feasible activities that improve the health and living situation of the care recipient;	EF2 EF8	
B1-K1-W3	5	pays careful attention to the behaviour and well-being of the care recipient;	EF2 EF8	
B1-K1-W3	6	discusses their findings in a clear manner with the care recipient and the social network;	EF8	
B1-K1-W3	7	takes care of the transfer carefully and completely.	EF2 EF4	
B1-K1-W4: Voert verpleegtechnische handelingen uit (Zorgverlener)				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1-W4	1	performs nursing procedures for which she is competent. Insofar as these nursing technical acts are reserved in the BIG Act, they only perform these acts on behalf of and provided they are competent;	EF3	

B1-K1-W4	2	is capable of accurate nursing calculations;		Excluded. Fails on one or more of the criteria.
B1-K1-W4	3	Uses materials and resources used for performing nursing procedures effectively, efficiently, carefully and safely;	EF2 EF3	
B1-K1-W4	4	provides an optimal checking system for the nursing procedures to be performed;	EF5 EF3	
B1-K1-W4	5	performs the nursing procedures expertly in accordance with safety regulations, protocols, powers and legal frameworks, including the BIG act.	EF3	
B1-K1-W4	6	takes into account the specific characteristics and perception of the care recipient;	EF1 EF3 EF8	
B1-K1-W4	7	notices changes and acts appropriately.	EF1 EF3 EF8	
B1-K1-W5: Communiceert met de zorgvrager en het sociale netwerk (Communicator)				

Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1-W5	1	listens actively and shows understanding for the attitude of the other person;	EF3 EF8	
B1-K1-W5	2	adequately attunes her communication and behaviour to the level of the care recipient and the social network;	EF1 EF3 EF6 EF8	
B1-K1-W5	3	uses communication methods and techniques effectively;	EF8	
B1-K1-W5	4	responds adequately to (non)verbal signals from the care recipient;	EF8	
B1-K1-W5	5	invests in a timely manner in building contacts at different levels within and outside the organization.	EF10 EF11	
B1-K1-W6: Organiseert en coördineert de zorgverlening van de zorgvragers (Organisator)				

Section	No.	Task starting with: "The novice practitioner..."	Codes	Notes
B1-K1-W6	1	plans the activities in a logical order;	EF5 EF4	
B1-K1-W6	2	organizes the required (personel) capacity for the work in a timely manner;	EF10 EF11 EF5 EF4	
B1-K1-W6	3	ensures that everyone's role in the team is clear and is optimally coordinated and deployed;	EF2 EF4 EF8	
B1-K1-W6	4	consults in a timely and clear manner about care agreements made;	EF10 EF11 EF4	
B1-K1-W6	5	provides clear and relevant information for colleagues and the social network;	EF4	
B1-K1-W6	6	uses materials, resources and/or equipment effectively and cost-consciously in the provision of care;	EF5 EF4	

B1-K1-W6	7	effectively monitors the progress of the work.	EF2 EF4	
B1-K1-W7: Reageert op onvoorziene en crisissituaties (Organisator)				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K1-W7	1	pays close attention to the (non-)verbal signals of the care recipient(s);	EF8	
B1-K1-W7	2	notices in a timely manner whether there is a danger to the care recipient, the group, colleagues and/or himself;	EF11 EF3 EF6 EF8	
B1-K1-W7	3	communicates clearly and unambiguously with others, even in unclear or stressful situations;	EF4 EF6 EF7	
B1-K1-W7	4	acts quickly and adequately in crisis situations on the basis of clinical reasoning, according to the prescribed procedures, legal guidelines and agreements of the organization;	EF10 EF11 EF4 EF6 EF7	

B1-K1-W7	5	consistently uses professional boundaries, and her own boundaries and feelings during and after the crisis situation;	EF2 EF3 EF6 EF8	
B1-K1-W7	6	discusses the crisis situation constructively afterwards with the care recipient(s), colleagues and other involved parties.	EF6 EF8	
B1-K2: Werken aan organisatie- en professiegebonden taken				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K2	1	has specialist knowledge of protocols, professional guidelines, professional code and standards		Excluded. Fails on one or more of the criteria.
B1-K2	2	has knowledge of quality frameworks within the organization		Excluded. Fails on one or more of the criteria.
B1-K2	3	has broad knowledge of the tasks and roles of other disciplines in the industry and knows when to call on whom		Excluded. Fails on one or more of the criteria.

B1-K2	4	can deal with professional ethical issues	EF8	
B1-K2	5	can apply conversation techniques and guidance methods with different target groups	EF1 EF8	
B1-K2	6	can apply reflection skills	EF3 EF6	
B1-K2	7	can apply feedback skills	EF3 EF8	
B1-K2-W1: Werkt aan professionele ontwikkeling (Reflectieve EBP professional)				
Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K2-W1	1	proactively keeps abreast of professional developments and changing legislation and regulations in the sector;	EF1 EF2 EF10 EF11	

B1-K2-W1	2	proactively looks for technological developments that make work easier;	EF1 EF2 EF10 EF11	
B1-K2-W1	3	transfers own knowledge and expertise in a comprehensible manner;	EF8 EF10	
B1-K2-W1	4	uses feedback purposefully to develop further;	EF1 EF2 EF3	
B1-K2-W1	5	formulates measurable, challenging and achievable points for improvement for its work and shows responsibility in achieving these;	EF1 EF2 EF4	
B1-K2-W1	6	tailors the guidance specifically and actively to the person and the situation;	EF1	
B1-K2-W1	7	Gives clear instructions	EF8	

B1-K2-W2: Werkt samen met andere beroepsgroepen in de keten (Samenwerkingspartner)

Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K2-W2	1	proactively and expertly shares information with other professionals and informal caregivers;	EF11 EF10	
B1-K2-W2	2	consults involved disciplines in a timely manner;	EF10	
B1-K2-W2	3	has an open and connecting attitude towards other parties involved and in the collaboration around the care recipient;	EF1 EF8	
B1-K2-W2	4	adequately translates the advice of the experts into the daily life, wishes and needs of the care recipient;	EF1 EF4	
B1-K2-W2	5	conducts timely consultations with those involved about the coordination of the activities and the use of technological tools;	EF10 EF11	
B1-K2-W2	6	can adequately use her qualities in the coordination of organisations.	EF4 EF5	

**B1-K2-W3: Draagt bij aan goede kwaliteit van zorg
(Professional en kwaliteitsbevorderaar)**

Section	No.	Task starting with: “The novice practitioner...”	Codes	Notes
B1-K2-W3	1	is accurate in following protocols, procedures and legal guidelines;	EF4	
B1-K2-W3	2	uses its own expertise in a targeted manner to improve work and care;	EF1	
B1-K2-W3	3	thoroughly analyzes new insights and working methods in order to be able to translate these into healthcare provision;	EF1 EF2 EF3 EF5	
B1-K2-W3	4	speaks to colleagues about the (correct) use of quality regulations;	EF4 EF8	
B1-K2-W3	5	deviates substantiated and in consultation with prescribed protocols and procedures;	EF1 EF4	

B1-K2-W3	6	actively passes on identified shortcomings in the working method to the right person;	EF3 EF4	
B1-K2-W3	7	makes suggestions for improvement with persuasiveness.	EF8	

Appendix C

Blank Interview Teacher

Please note that this interview was translated into Dutch when conducted and that some phrasing might be different.

This interview is completely anonymous and will not be able to be traced back to you. The goal is to eventually help improve the use of these skills by showing the discrepancy between teacher and student. Do you agree to the use of this data?

1. Plenary

- a. What standards are held for reaching the items in the Qualification dossiers, and if you use a different system which standards exist for them?

2. Flexibility

- a. How important is Flexibility for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Flexibility
 - ii. Where would you rate the student that is the least good at Flexibility
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Flexibility
 - i. On a scale from 1/5?

3. Goal-directed persistence

- a. How important is Goal-directed persistence for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Goal-directed persistence
 - ii. Where would you rate the student that is the least good at Goal-directed persistence
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Goal-directed persistence
 - i. On a scale from 1/5?

4. Metacognition

- a. How important is Metacognition for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Metacognition
 - ii. Where would you rate the student that is the least good at Metacognition
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Metacognition
 - i. On a scale from 1/5?

5. Organization

- a. How important is Organization for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Organization
 - ii. Where would you rate the student that is the least good at Organization
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Organization

- i. On a scale from 1/5?

6. Planning

- a. How important is Planning for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Planning
 - ii. Where would you rate the student that is the least good at Planning
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Planning
 - i. On a scale from 1/5?

7. Regulation of Affect

- a. How important is Regulation of Affect for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Regulation of Affect
 - ii. Where would you rate the student that is the least good at Regulation of Affect
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Regulation of Affect
 - i. On a scale from 1/5?

8. Response inhibition

- a. How important is Response inhibition for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Response inhibition
 - ii. Where would you rate the student that is the least good at Response inhibition
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Response inhibition?
 - i. On a scale from 1/5?

9. Social thinking

- a. How important is Social thinking for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Social thinking
 - ii. Where would you rate the student that is the least good at Social thinking
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Social thinking
 - i. On a scale from 1/5?

10. Sustained attention

- a. How important is Sustained attention for nursing according to you on a scale from 1/5?
- b. Ranking
 - i. Where would you rate the student that is the best at Sustained attention
 - ii. Where would you rate the student that is the least good at Sustained attention
 - iii. Where would you rate the average of this class?
- c. How often have you explicitly taught or mentioned Sustained attention
 - i. On a scale from 1/5?

11. Take initiation

- a. How important is Take initiation for nursing according to you on a scale from

1/5?

b. Ranking

- i. Where would you rate the student that is the best at Take initiation
- ii. Where would you rate the student that is the least good at Take initiation
- iii. Where would you rate the average of this class?

c. How often have you explicitly taught or mentioned Take initiation

- i. On a scale from 1/5?

12. Time management

a. How important is Time management for nursing according to you on a scale from 1/5?

b. Time management according to you?

- i. Where would you rate the student that is the best at Time management
- ii. Where would you rate the student that is the least good at Time management
- iii. Where would you rate the average of this class?

c. How often have you explicitly taught or mentioned Time management

- i. On a scale from 1/5?

Appendix D

Survey for students

Please note that this survey was translated into Dutch when conducted and that some phrasing might be different.

This survey is completely anonymous and cannot be traced back to you. The goal is to eventually help improve the use of these skills by showing the discrepancy between teacher and student.

If you agree with the use of the data from this interview and are above the age of consent (18), kindly fill out this survey. If you are not and do not, please do not fill out this survey.

1. Flexibility

- a. For my study, I must be capable of Flexibility (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Flexibility
- c. I have been taught flexibility (Likert scale eens oneens)

2. Goal-directed persistence

- a. For my study, I must be capable of Goal-directed persistence (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Goal-directed persistence
- c. I have been taught how to Goal-directed persistence (Likert scale eens oneens)

3. Metacognition

- a. For my study, I must be capable of Metacognition: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Metacognition:
- c. I have been taught how to Metacognition: (Likert scale eens oneens)

4. Organization

- a. For my study, I must be capable of Organization: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Organization:
- c. I have been taught how to Organization: (Likert scale eens oneens)

5. Planning

- a. For my study, I must be capable of Planning: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Planning:
- c. I have been taught how to plan: (Likert scale eens oneens)

6. Regulation of Affect

- a. For my study, I must be capable of Regulation of Affect: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Regulation of Affect:
- c. I have been taught how to Regulation of Affect: (Likert scale eens oneens)

7. Response inhibition

- a. For my study, I must be capable of Response inhibition: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Response inhibition:
- c. I have been taught how to Response inhibition: (Likert scale eens oneens)

8. Social thinking

- a. For my study, I must be capable of Social thinking: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Social thinking

- c. I have been taught how to Social thinking (Likert scale eens oneens)

9. Sustained attention

- a. For my study, I must be capable of Sustained attention: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Sustained attention:
- c. I have been taught how to Sustained attention: (Likert scale eens oneens)

10. Take initiation

- a. For my study, I must be capable of Take initiation: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Take initiation:
- c. I have been taught how to Take initiation: (Likert scale eens oneens)

11. Time management

- a. For my study, I must be capable of Time management: (Likert scale eens oneens)
- b. On a scale from 1 - 10 (1 poor - 10 great) this is where I score on Time management:
- c. I have been taught how to Time management: (Likert scale eens oneens)

Appendix E
Scores for Interrater Reliability

[Krip Alfa](#)

	Percent Agreement	Scott's Pi	Cohen's Kappa	Krippendorff's Alpha (nominal)	N Agreements	N Disagreements	N Cases	N Decisions
Variable 1 (cols 1 & 2)	95.1%	.73	.73	.73	408	21	429	858

Appendix F

Ranks of each subcategory of perceived importance versus ranks QD for students and teachers

Table 8

Ranks of student means per subcategory of perceived importance and rank in QD

EF	Rank (\bar{x}_{SS})	Rank (\bar{x}_{SI})	Rank (\bar{x}_{ST})	Rank (QD)
Flexibility	2	9/10*	7	3/4/5*
Goal-directed persistence	4/5*	7	2/3*	2
Metacognition	7	1	1	3/4/5*
Organization	9	2	8	3/4/5*
Planning	6	4	4	6
Regulation of Affect	10	11	11	9
Response inhibition	4/5*	8	5	10
Social thinking	1	6	6	1
Sustained attention	11	9/10*	9	11
Take initiation	3	5	2/3*	7
Time management	8	3	10	8

Table 9

Ranks of teacher means per subcategory of perceived importance and rank in QD

EF	Rank (\bar{x}_{TS})	Rank (\bar{x}_{TI})	Rank (\bar{x}_{TT})	Rank (QD)
Flexibility	3-7*	3/4*	10/11*	3/4/5*
Goal-directed persistence	3-7*	11	2/3*	2
Metacognition	1/2*	3/4*	6- 9*	3/4/5*
Organization	3-7*	7/8*	10/11*	3/4/5*

Planning	9/10/11*	9/10*	2/3*	6
Regulation of Affect	9/10/11*	5/6*	6- 9*	9
Response inhibition	3-7*	5/6*	6- 9*	10
Social thinking	1/2*	1/2*	1	1
Sustained attention	3-7*	7/8*	4/5*	11
Take initiation	3-7*	1/2*	4/5*	7
Time management	9/10/11*	9/10*	6- 9*	8

Appendix G

Tables of sum differences between pairs of scores per EF and link to sheet.

RT	QD	
7	-3	4
6	-2	4
3	-3	0
9	-3	6
8	-6	2
9	-9	0
-5	10	5
1	-1	0
-4	11	7
-2	7	5
11	-8	3
		36

RT	RS	
7	-7	0
6	-4	2
3	-1	2
9	-8	1
8	-4	4
-9	11	2
-5	6	1
-1	3	2
-4	10	6
-2	2	0
11	-9	2
		22

RS	QD	
7	-3	4

4	-2	2
-1	3	2
8	-3	5
-4	6	2
11	-9	2
-6	10	4
3	-1	2
-10	11	1
-2	7	5
9	-8	1
		30

RST	QD	
7	-3	4
4	-2	2
-3	3	0
9	-3	6
-6	6	0
11	-9	2
-5	10	5
1	-1	0
-7	11	4
-1	7	6
10	-8	2
		31

Rank (\bar{x}_{SS})	QD	
-2	3	1
4	-2	2
7	-3	4
9	-3	6

6	-6	0
10	-9	1
-4	10	6
1	-1	0
-11	11	0
-3	7	4
8	-8	0
		24

Rank (\bar{x}_{SI})	QD	
9	-3	6
7	-2	5
-1	3	2
-2	3	1
-4	6	2
11	-9	2
-8	10	2
6	-1	5
-9	11	2
-5	7	2
-3	8	5
		34

Rank (\bar{x}_{ST})	QD	
7	-3	4
2	-2	0
-1	3	2
8	-3	5
-4	6	2
11	-9	2
-5	10	5
6	-1	5

-9	11	2
-2	7	5
10	-8	2
		34

Rank (\bar{x}_{TS})	QD	
3	-3	0
3	-2	1
-1	3	2
3	-3	0
9	-6	3
9	-9	0
-3	10	7
1	-1	0
-3	11	8
-3	7	4
9	-8	1
		26

Rank (\bar{x}_{TI})	QD	
3	-3	0
11	-2	9
-3	3	0
7	-3	4
9	-6	3
-5	9	4
-5	10	5
1	-1	0
-7	11	4
-1	7	6
9	-8	1
		36

Rank (\bar{x}_{TT})	QD	
10	-3	7
2	-2	0
6	-3	3
10	-3	7
-2	6	4
-6	6	0
-6	10	4
1	-1	0
-4	11	7
-4	7	3
-6	8	2
		37