Individualized Education Plans during the Covid-19 school lockdown in Norway

A quantitative study on teachers' self-reported success of online teaching

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Abstract

The Covid-19 pandemic in 2020 forced all schools to close as an infection control regulation. This resulted in all teaching to shift to online, a shift which was done almost overnight and abruptly. Although most schools were equipped to handle this shift, and reports showed generally positive feedback from teachers, many struggled to facilitate teaching for students with special needs and individualized education plans. This thesis aimed to identify how primary and secondary school teachers rated their own ability to uphold Individualized Education Plans (IEP) for students with special needs during the lockdown in Norway and find factors which had an impact on their self-reported success.

Erling Lars Dale's three levels of competencies for meaningful teaching was used as the framework to identify factor which might have had an impact on the teachers ability to uphold the IEPs. The data was collected through a self-administered survey utilizing a 4-point Likert scale, asking the respondents to rate statements about the teaching situation during the lockdown from *strongly disagree* to *strongly agree*. The statement "You feel you were able to uphold IEPs during the school lockdown in spring 2020" functioned as the dependent variable which all other variables were paired and analyzed for a correlation. Correlations between variables were identified using Spearman's rho correlation matrix for the ordinal level variables and Mann-U Whitney independent *t*-test for the ratio scale variables. These analyses yielded four significant correlations. The teachers self-reported success was positively correlated with having students with IEPs who could use ICT ($p < .001$, $\rho = .43$) and LKT ($p < .001$, $\rho = .46$) efficiently in their education. It was also positively correlated with having good access to human resources ($p = .001$, $\rho = .40$), and having enough time to successfully adapt the teaching for students with IEPs ($p = .001$, $\rho = .45$).

The results suggest that the challenges of upholding IEPs during an online teaching situation for this sample, are situated in the practical realms of the situation. An increase in digital literacy for students with IEPs, more people to support the teachers in their teaching, and more time to plan and prepare would benefit teachers in their work of upholding IEPs in a digital teaching situation.

Keywords: *Individualized Education plans, IEP, Covid-19, online teaching, special needs education.*

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Liv Jorunn Sætra

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1 INTRODUCTION

This introduction chapter outlines firstly the background and motivation for this project, along with a specification of the thesis' focus area. Secondly, the research question with its objectives is stated, followed by a description of central terms used in the thesis. Lastly, a paragraph of the outline of the thesis is presented.

1.1 Background and motivation

To prevent the spread of the Covid-19 virus, all schools in Norway closed on March 12th, 2020. Most schools were closed until mid-April 2020, with all instruction taking place online in the interim (Gilje, Thuen, & Bolstad, 2020, p. 13). Despite most teachers' lack of prior experience in online teaching, statistics from the time show generally positive outcomes (Federici & Vika, 2020). Schools were technologically prepared for an abrupt shift to online teaching, with the majority of schools having 1:1 student coverage of tablets or computers, as well as digital literacy as a core element in the national curriculum (Utdanningsdirektoratet, 2017) (The Norwegian Directorate of Education). Regardless of technological readiness, 43% of teachers in Federici and Vika's (2020) study reported being only partially able to follow up students with *individualized education plans* (IEP), with 6 percent reporting "no" on the same question (p. 39). Additionally, the Norwegian Ministry of Health (Helsedirektoratet, 2020) raised concerns whether children with special educational needs received the adapted teaching they had the right to during the lockdown. This, alongside Federici and Vika's (2020) report and news articles supporting this concern (Ertesvåg, 2020), motivated me to investigate this further. Why was it difficult for teachers to follow up students with IEPs when teaching was done digitally? What factors influenced their ability to follow up the students with IEPs? Although there are several reports and statistics on the period (Federici & Vika, 2020; Fjørtoft, 2020; Gilje et al., 2020, pp. 15–16; Udir, 2020), none of them attempt to explain why the teachers were unable to fully follow up the students with IEPs. This thesis aims to fill that void, as well as giving teachers a voice to express what they need to be better prepared to care for students with special educational needs in a similar situation.

Focus area

In Federici and Vika's report, the question about teachers' ability to follow up students with IEPs during the lockdown was phrased as follows: "Given the situation you are in after

March 12th, are you able to..."[1] (Federici & Vika, 2020, p. 39). As a result, the data from this question is highly subjective and may not accurately reflect whether they were able to do it from the perspective of a student. The students' perspectives on this matter are beyond the scope of this study, and my research is based solely on the teachers' subjective perceptions of the situation. Higher or lower levels of self-reported success needed to be linked to specific factors within and around the teaching situation to fill the gap of *why* they feel they were unable to follow up the students with IEPs.

Thus, *the aim* of this study is to map primary school teachers' and middle school teachers' self-reported success in upholding IEP's during the school lock-down and identify factors influencing the level of success.

The goal of this study is to present specific factors that influenced the feeling of success positively and specific factors that influenced the feeling of success negatively. Teachers, special needs teachers, school leaders, policymakers, politicians, and researchers may find these factors useful. These factors can contribute to improving opportunities for teachers and school leaders to ensure that students with special needs have their needs met, also through online teaching.

1.2 Research question and objectives

The study was planned, conducted, and written based on a research question and two research objectives. The research question is as follows:

How do primary and middle school teachers rate their own success in upholding IEPs during the school lock-down in Norway from March 12th-medio April 2020?

The research objectives are:

- *What factors can be linked to higher self-reported success in upholding IEPs among primary and middle school teachers?*
- *What factors can be linked to lower self-reported success in upholding IEPs among primary and middle school teachers?*

[1] Translated from Norwegian. Original quote: "Gitt situasjonen du er i etter 12. mars, klarer du å…?"

1.3 Description of terms

Three terms are central in this study: *uphold IEP* and *curriculum*. An *IEP* is an Individualized Education Plan, which shows the goals and content of the students' education and how it is to be conducted. This is an official document which must be developed for all students who receive special needs education (Opplæringslova, 1998 §5-5). The school must prepare a written overview of the pupil's education as well as an assessment of the students' development on a yearly basis. The student's development will be evaluated according to the goals established in the student's individual education plan. To *uphold* the IEP refers to the ability to use and follow the plan in the teaching to ensure the students with the IEP have received teaching in line with its contents.

Curriculum refers to the document which specifies the goals and learning outcomes of the teaching. In this paper, *curriculum* refers to both wide and overarching curriculum such as the Norwegian national curriculum, the local curriculum or the class curriculum developed by the individual teacher. This paper also regards the IEP as a personalized curriculum.

1.4 Outline of the Thesis

This thesis consists of 5 chapters. The first chapter is an introduction to the background of the topic, my motivation, the goals and aims of the thesis and the research question and objectives. The second chapter presents the theoretical framework and literary background, which is divided into three parts: K1, K2 and K3. The third chapters outline the methods used in this thesis and how the data was collected, followed by chapter 4 which presents the analysis of the data. The fifth and final chapter in this thesis presents a discussion on the findings in chapter 4, along with its implications, limitations, and recommendation for further research.

2 THEORETICAL FRAMEWORK AND LITERARY BACKGROUND

This chapter consists of three sub-chapters: *introduction, the framework,* and *summary.* The *introduction* justifies the choice of using Erling Lars Dale's (1999) theories as the theoretical framework of this study. *The framework* presents the theoretical framework and literary background. The *summary* presents a list of the hypothesized factors derived from the *framework* sub-chapter.

2.1 Introduction and justification of Dale

Erling Lars Dale's (1999) theories on how to ensure meaningful teaching is used as the theoretical framework of the thesis. Dale did not explicitly use this framework to ensure meaningful teaching for students with special needs or IEPs, yet the aspects of meaningful teaching are relevant for all kinds of teaching. The aspects seek to enable the teacher to have time, resources and the knowledge to see and cater for all kinds of learners. Although this framework is not explicitly directed towards special needs and IEP, adapted education and education for all learners was still a relevant topic in his work (Dale, 2008; Dale & Wærness, 2003). Despite the existence of the more specified literature, his theories of meaningful teaching were chosen because it offers three valuable attributes within the context for this thesis. Firstly, it takes the *teachers' perspectives*, which is the same perspective of this study. Secondly, it *identifies several aspects needed for teachers to plan and conduct meaningful teaching*, which would work as a benchmark on how to measure success in upholding IEPs. Thirdly, these *aspects were contextualized on three different levels*: the teaching situation (K1), the planning time (K2) and the teachers' knowledge and education (K3). This could offer a balanced view of the situation, and would allow to easier see *where* the difficulties of upholding IEPs are located: is it connected to the interaction with the students (K1), restraints concerning planning the teaching (K2), or could it be issues lying on a system level such as the organization of the school or the teacher education (K3)?

2.2 Three competence levels for successful teaching

The following part presents the theoretical framework and literary background of this thesis. It is divided into three parts: *K1 - The teaching situation, K2 - The Construction of the teaching program* and *K3 - Communication in and construction of didactical theory*. All parts follow the same structure: First, a presentation of Dale's theories. Second, a justification of the theories' relevance in special needs education though recent research. Third, the theories

and recent literature are contextualized within the frames of the teaching situation before and during the lockdown. Lastly, based on the three parts, factors possibly influencing the teachers self-reported success is hypothesized and presented.

All three levels within the framework are centered around how teachers can ensure successful teaching. Successful teaching is *meaningful teaching* (Dale, 1999)**.** *Meaningful teaching* is activities that lead to learning. For the activities to be meaningful, Dale (1999, p. 35) argues that the activities and teaching need to be intentional and planned. Intentional and planned activities are activities which are carefully chosen to reach the learning goals and aims within the relevant curriculum, to ensure the activities are relevant to the students' knowledge and needs.

2.2.1 K1 - The teaching situation

The K1 level is the actual teaching situation, in other words, the time the teacher is in the classroom with the students. It is where the activities that lead to learning happens. Dale (1999) highlights two aspects crucial for teaching to be meaningful: *targeted teaching*[2] and *communication.*

Targeted teaching

Targeted teaching means teaching where the activities done are directly connected to a learning goal (Dale, 1999). Activities which are not connected to goals become pastime activities, and do not lead to meaningful teaching. Thus, the teacher needs to have a clear understanding of what the goals are and secure a tight relationship between them and the activities. Moreover, the student needs to have a clear understanding of this relationship too. To achieve this, the teacher and student needs to have a mutual agreement of the purpose of the activities, and a clear understanding of how the activities are related to the learning goals addressed. This agreement and understanding are not limited to exist between the teacher and the single student, but also between the teacher and the class as a whole and between the students as a collective learning community (Dale, 1999). Agreement and understanding can be enhanced by developing the teaching plan and its content together with the student. Within a special needs education context, this can be students participating in the development of their own IEP.

[2] Translated from Norwegian. Original wording: *Målrettet læring.*

Student participation is not only a term within pedagogics, but is also laid down as a right in the UN Convention of the Right of The Child ('Convention on the Rights of the Child', 1989, secs 12, 29), in the Norwegian Education Act (Opplæringslova, 1998 § 1-1), and is a ground principle for education in the Norwegian national curriculum (Kunnskapsdepartementet, 2017, pt. 1.6). Students, with their families, who need an IEP have the right to participate in the development of their IEP. They have the right to influence the goals, content and evaluations of the IEP (Lie, 2020; Opplæringslova, 1998 § 5-4). Previous research has shown positive effects of involving students in this process. It has shown to give students a better understanding of their own IEP (Martin, Greene, & Borland, 2004), students have become more invested in the goals of the IEP (Arndt, Konrad, & Test, 2006) and they generally have higher goal achievement than students who are not involved in the development (Powers et al., 2001). Nordahl et al. (2018) report that *student participation* makes students more active participants in school. Additionally, involving students in their own IEP can contribute to a better adaptation of the goals and activities for the individual students, by bringing them and their parents in as experts on their case (Lie, 2020; NOU 2019:23, n.d.). Not surprisingly, students who were involved in the development of their own IEP showed better overall, long-term achievement in school (Barnard-Brak & Lechtenberger, 2010). However, several studies show that students and parents are involved in this process to a lesser degree, or not at all (Barneombudet, 2017; Garrels, 2018; Lie, 2020; Nordahl et al., 2018).

As a result, there is reason to believe that *student participation* can be a factor in upholding an IEP.

Communication

Dale (1999) argues teaching cannot exist without *communication*. If there is no communication, the relevance of the content and activities cannot be conveyed to the students. Communication can be both *verbal* and *non-verbal.* Dale argues the *verbal communication* lies on the teacher as the "knowledge mediator" (p.37). The knowledge mediator acts as the bridge between the activity and the learning goals, creating and mediating a common understanding of the relevance to all students. This requires the content to be adapted to the individual and to the teaching situation as a whole.

Adapting content to both individuals and groups requires what Dale (1999, p. 84) calls *sensitive presence*[3]. This means interpretation and analysis of *non-verbal communication* such as facial expressions, gesticulations, body language and the atmosphere within the group to make the relevant adaptations to the teaching situation, and thus securing meaningful teaching.

An *ongoing expectation* of a verbal and non-verbal discourse between both the teacher and the students is crucial (Dale, 1999, p. 37). In its simplest form, this can mean a yes or no answer to a question, either through a verbal or a non-verbal response. If this is repeatedly lacking in the teaching situation, teachers might fall into what Dale defines as pathological teaching (p. 38). Simply put, this is teaching where lack of communication has led to demotivated teachers who stopped expecting a discourse, and the teaching has stopped being meaningful.

An online teaching situation poses different challenges than classroom teaching related to communication. Ongoing expectation of verbal and non-verbal communication, the ability to act as a knowledge mediator with sensitive presence, depends on the ability to continuously see and hear the students. An unstable internet connection can restrict visual and auditory outputs, such as cameras and microphones. A cornerstone for communication in an online teaching situation is *internet connection* and *digital literacy.*

Internet connection

Most of us are probably familiar with the difficulty of maintaining consistency and momentum in a Zoom or Teams meeting when the internet is unstable. Being a knowledge mediator and engaging in conversations will most likely be difficult if the internet is slow or drops out frequently.

Although 99% of all households with children had a PC in 2020 (SSB, 2020) and many schools had 1:1 iPad coverage, only 46% of the teachers in their study reported their students had a stable internet connection during the school lockdown (Federici & Vika, 2020; Fjørtoft, 2020). Students' ability to hear and see the teacher and other students, as well as engage in conversations, may have been impacted. Reversed, it could have affected the teachers' ability

[3] Translated from Norwegian. Original wording: *sensitiv tilstedeværelse.*

to hear, see, and engage in conversations with the students. Some students had their microphones and cameras turned off during class, though it is unclear whether this was due to poor internet connection (Fjørtoft, 2020, p. 8). The loss of nonverbal and spontaneous communication in the classroom reduced the ability for *sensitive presence* and *maintaining an ongoing expectation* of discourse (Fjørtoft, 2020, p. 8). This might explain why a report from the school lockdown by Gilje et al (2020, pp. 15–16) depicts a situation in which teachers were unsure whether the content and instructions had been clearly communicated to the students. Nonverbal communication was difficult to interpret due to a lack of visual communication. Maintaining verbal communication was also challenging because they did not have the freedom to move around the classroom, allowing for immediate one-on-one conversations.

Lack of visual and auditory communication puts the students in a position where they must actively speak up if they do not understand the instructions or the content. Students with special educational needs, on the other hand, frequently become passive in class, remaining quiet and withdrawn. They often do not speak up and, as a result, tend to be overlooked by the teacher (Nilsen, 2020, pp. 19–20; Vedvik, 2018). Consequently, they may not understand what they need to do, and the activities may lose meaning.

As a result, there is reason to believe that a *stable internet connection* can be a factor in upholding an IEP.

Digital literacy

Digital literacy is a core element in the Norwegian national curriculum, and it includes the ability to communicate and interact using information and communication tools (ICT), as well as the ability to use and understand digital resources, find and critically evaluate information from digital sources, produce and process digital products, and execute digital judgment (Utdanningsdirektoratet, 2017). As a result, digital literacy is essential for students to navigate, operate, and communicate in an online teaching environment.

Spurkland and Blikstad-Balas (2016) and Nordahl (2018), on the other hand, discovered that students lack digital literacy. Students may have grown up with digital devices and have seen or interacted with them on a daily basis, but digital literacy cannot be assumed. They may be

aware of aspects of ICT, such as email, but are unsure how to use it. This is supported by school lockdown reports. Students struggled to navigate various aspects of the online environment, such as opening links, correctly saving work, and handing in their work (Fjørtoft, 2020). As a result, one teacher stated, *"Spent [...] a lot of time the first weeks teaching [the students] to use digital tools and not subjects.*[4]*" (Fjørtoft, 2020, p. 44).* Consequently, this would reduce the time spent on targeted teaching if the lesson's goals were not to teach students how to use digital tools. This demonstrates that digital literacy is a skill that must be learned. Additional evidence for this can be found in Fjørtoft (2020, p. 42), where teachers stated that they saw significant benefits from spending a lot of time teaching students how to use digital tools and using digital teaching methods prior to March 2020. Fjørtoft (2020, p. 45) discovered that students with IEPs benefited from familiarity with the digital software and hardware used during the lockdown. However, many teachers began to use digital tools that they had not previously used Fjørtoft (2020, p. 42). This could explain why students with IEPs who received parental assistance performed better, regardless of their level of digital literacy. It also implies that a knowledge mediator with a sensitive presence is required to bridge the gap between digital tools and learning outcomes (Spurkland & Blikstad-Balas, 2016).

Because digital literacy is a skill that must be learned, it is important to consider how grade level may affect digital literacy. Lower grades have had less time in school than higher grades to learn how to use digital tools. According to Fjørtoft (2020), students in grades 1-2 required more parental assistance, and teachers in grades 1-4 found it more difficult to assist and guide students in using digital tools than teachers in higher grades. This could explain why primary school teachers found it more difficult to follow up students with IEPs than middle school teachers (Federici & Vika, 2020, p. 41).

As a result, there is reason to believe that digital literacy may have an impact on the ability to uphold an IEP.

Summary

Based on the first competence level in Dale's framework, this chapter presented, discussed,

[4] Translated from Norwegian. Original quote: *"Gikk derfor veldig mye tid de første ukene på å lære å bruke digitale hjelpemidler og ikke fag."*

and derived hypothesized factors that may have impacted the teacher's ability to uphold IEPs during the school lockdown. Four major factors have been identified through more recent research and reports from the lockdown period:

- *Student involvement* in the development process of their IEP
- Having a *stable internet connection*
- The student's level of *digital literacy*

2.2.2 K2 - Construction of the teaching program

The K2-level refers to the teachers' planning time. It is time away from the teaching situation but is directly linked to K1. K2 is the *construction of the teaching program.* It is the consideration and organization of elements such as *the purpose, goals, procedures,* and *strategies* of the activities within K1. These elements are derived from a broader curriculum, such as a national, regional, local curriculum, or the IEP within a special needs educational setting. It is the *why* and *how* behind the *what* within the teaching situation. Dale (1999, pp. 42–50) outlines five aspects important in constructing the teaching program: *goal considerations, planning, collegial collaboration, evaluation,* and *time.*

Goal considerations require the teachers to analyze and interpret the goals within the broader curriculum to decide what is and is not to be prioritized within it. Once this has been decided, the teacher needs to *plan how* the students will reach the prioritized goals. Moreover, the prioritizations made within *the goal considerations* and *the planning* is influenced by opportunities and restraints offered by the resources available (Dale, 1999, p. 44).

The planning needs to consider both horizontal and vertical planning and the interaction between the two depends on *collegial collaboration.* Collaboration is important to ensure a continuity of subjects, and integration into other subjects to ensure their relevance and meaningfulness.

Evaluation is the teachers' internal control system between the curriculum and the teaching situation. It requires reflection on how well the intention of the teaching was realized in the teaching situation. Reflection is a necessity in order to adapt the teaching to ensure its meaningfulness.

Time is an overarching resource which impacts the *goal consideration, the planning, the collegial collaboration,* and *the evaluation* of and within the construction of the teaching program. Lack of time results in lack of quality of the teaching program and subsequently the teaching situation.

Out of the five aspects above, three categories that might influence a teacher's ability to uphold an IEP within this competence level have been derived: *Resources, collaboration,* and *time.*

Resources

Dale wrote that available resources and choices made in the construction of the teaching program are intricately connected (1999, p. 44). Although he did not define what is meant by resources, *material* and *human resources* comes to mind. Material resources are for example equipment, visuals, and tools. In a digital setting, *digital tools and resources,* such as ICT (Information and Communication Technology) and LKT (Learning and Knowledge Technology) (Gómez-Trigueros, Ruiz-Bañuls, & Ortega-Sánchez, 2019, p. 1) are relevant. *Human resources* are other teachers, special needs teachers, resource teachers and assistants (Nordahl et al., 2018). Constructing a teaching program requires knowledge about what resources are available, as they impact the organization of the teaching situation, the methods, and the activities to choose from.

Digital resources

Digital resources can be divided in two: ICT (Information and Communication Technology) and LKT (Learning and Knowledge Technology). ICT includes digital resources to find and communicate information through a range of channels and platforms (Senter for IKT i utdanningen, 2015, p. 7). LKT includes digital resources which promote learning and teaching (Gómez-Trigueros et al., 2019, p. 2).

Due to the digital readiness of the Norwegian school, many teachers had access to digital resources such as Padlet, Kikora, OneNote, Showbie, Discord and Kahoot. The majority of teachers used platforms or digital resources for which their school had a license or subscription, but many teachers began using digital tools that they had not used before the schools closed (Fjørtoft, 2020, p. 42). Consequently, several teachers reported that schools

need to invest more money in licenses for different resources than what they already had. A reason for this might be that some apps are available for free but are either limited in usage or time-consuming to use in the free version. One example of this is the quiz-program Kahoot ('Kahoot', 2021). The program gives the user the opportunity to create, distribute and use quizzes. The free version only offers basic opportunities, and using the upgraded, paid version is more flexible, offers more features and takes less time to create a quiz.

Good and reliable software is a necessity in a digital education setting (Spurkland & Blikstad-Balas, 2016). Moreover, reliable and appropriate software can provide an arena for better-adapted teaching (Nordahl et al., 2018). Many apps offer accessibility features such as text-to-speech, enlarged content, writing support such as spelling checks and adjustment of fonts and colours, allowing for better adapted content. However, adapting the teaching was reported as challenging for the majority of teachers (Federici & Vika, 2020, p. 39). The background for this result might be twofold. On one hand, it might suggest a lack of access to software with appropriate accessibility features. On the other hand, it might be connected to students' level of digital literacy. However, a resource the student cannot use on their own, might not be the appropriate resource to use.

Therefore, there is reason to believe that access to appropriate and reliable apps, and the students' ability to use them, might be a factor contributing to the ability to uphold an IEP.

Human resources

Access to human resources is imaginably as important in a digital classroom as in a physical classroom. According to numbers from *Primary and Secondary School Information System*[5] (GSI) (Utdanningsdirektoratet, 2020), 54.2% of the students with special educational needs were organized in groups or alone outside the mainstream classroom before the lockdown in 2019/2020. This type of co-teaching and collaborative teaching is beneficial for students with special needs (Knudsmoen, Forfang, & Nordahl, 2015; Mulholland & O'Connor, 2016; Nilsen, 2020; Statped, 2016). The numbers from GSI indicate there *are* human resources available in most schools. However, most schools still needed to stay open to cater to the students whose parents had critical functions in society and could not stay at home (Midlertidig forskrift om tilpasninger i reglene om barnehager, grunnskoler og videregående

[5] Translated from Norwegian. Original name: *Grunnskolens Informasjonssystem*

opplæring som følge av utbrudd av covid-19, 2020, § 3a-a). This organization caused challenges in terms of resources according to Federici and Vika (2020, p. 34). Although the report is not explicit whether this challenge was due to human resources, it might suggest reallocations of staff, and teachers might not have had as many human resources available.

Therefore, there is reason to believe that limited access to human resources might be a factor contributing to the ability to uphold an IEP.

Collaboration

Dale (1999, pp. 24, 27, 50, 70–73, 195–200) calls for *collegial collaboration.* This means close collaboration between teachers, and with the leadership. The quality of the teaching is enhanced when teachers collaborate on the content and goals in the teaching program. Lack of collaboration is a hindrance to creating meaningful teaching for several reasons: collaboration keeps the content relevant, teachers develop and extend their identity as *pedagogues*, expands the opportunities to evaluate one's own teaching, ensures horizontal and vertical planning, it can reduce the individuals work, expand their own repertoire of resources, ideas and strategies, develop solidarity, and strengthen the overall identity of the school as a holistic learning arena (Dale, 1999, pp. 194–196).

Successful collaboration between teachers, Dale argues, requires a common understanding of both vocabulary, culture and the overall goal of the teaching. With this common frame of reference, all the individual actions and contributions within the collaboration will be seen considering the overall goal (1999, p. 202). Establishing the common frame of reference needs to come from the leadership, as leaders of the school as a holistic learning arena. Not only do they need to lay down organizational structures for collaboration to happen, but they should also choose topics for meetings to ensure a common understanding among all teachers (1999, p. 71). Moreover, the leadership should lay down didactic and pedagogical prioritizations for the teaching, methods, content and ways to evaluate to ensure a common frame of reference (1999, p. 71).

Lastly, collaboration with external institutions is also needed in order to construct a meaningful teaching program (Dale, 1999, p. 172). Teachers often need specialized skills and knowledge which are not represented by the staff, to further improve their own skills and

knowledge. The following sections presents recent literature supporting Dale's theories, starting with *collaboration with teachers,* then *collaboration with leadership* and lastly *collaboration with external institutions.*

Collaboration with other teachers

Collaboration between teachers is identified as one of the five pillars in the teacher profession (OECD, 2020, p. 13). The benefits of teacher collaboration outlined by Dale is supported by more recent literature (Ronfeldt, Farmer, McQueen, & Grissom, 2015; Vangrieken, Dochy, Raes, & Kyndt, 2015). Additionally, benefits such as improved technological skills, improved instructions and more student centered instruction strategies are outlined, and improved student performance and work as a support system in difficult environments (OECD, 2020, p. 148; Vangrieken et al., 2015, p. 28).

These benefits mentioned above are also true for collaboration on IEPs (Ní Bhroin & King, 2020, pp. 39, 43–44). Additionally, collaboration between the general teacher and the special needs teacher has been identified as a key factor for successful special needs education (Gillespie, 2016, pp. 26–29; Nilsen, 2020, pp. 13–14). A teacher alone or a special needs teacher alone cannot provide sufficient learning outcomes for students with special needs. The general teacher contributes with subject knowledge and a whole class perspective, while the special needs teacher contributes with knowledge of adapting the content to the individual students' needs. They can create a more holistic education for students with IEPs by complementing each other's skills (Kostøl, 2012).

Although 36% of the teachers report on more collaboration between other teachers during the lockdown, 37% report on less or no collaboration at all with special needs teachers (Federici & Vika, 2020, p. 80). As mentioned under *human resources,* one reason for this could be that schools needed to disperse their resources to accommodate both online and physical teaching. Although not clearly indicated, there seems to be reason to believe that during the lock-down, some special needs teachers were reallocated or stepped in as general teachers (Udir, 2020).

Consequently, there is reason to believe that a lack of collaboration between the general teacher and the special needs teacher may be a factor influencing the ability to uphold an IEP.

Collaboration with the leadership

Collaboration between staff and leadership is vital for successful teacher collaboration. According to research, school leaders' leadership activities are strong predictors of teacher collaboration, and frameworks for systematic collaboration needs to be established (Ní Bhroin & King, 2020, p. 42). In addition to establishing a framework for systematic collaboration, the leadership needs to establish a common frame of reference, which is closely corroborated with successful teacher collaboration (Morris et al., 2020, pp. 802–805; OECD, 2020, pp. 163–165). The common frame of reference needs to include a whole-school approach to special needs education, ensuring a common understanding of how this is done (Nilsen, 2020, pp. 26–27; Rabi, Ghazali, Rohaizad, & Zulkefli, 2018, p. 202), in order to address and shape attitudes relating to special needs education (Pit-ten Cate, Markova, Krischler, & Krolak-Schwerdt, 2018, pp. 53–54). Moreover, a common frame of reference is vital for collaboration and coteaching between the classroom teacher and the special needs teacher. Carter et al. (2009) discovered that a lack of a shared philosophy on how to teach students with special needs resulted in the cessation of collaboration between general and special needs teachers.

The importance of the school leadership is supported by Astrid Gillespie's (2016, p. 183) Ph.D. dissertation, where she identifies three factors for the lack of collaboration:
1) The school, first and foremost by the leadership, has not established guidelines for collaboration or a timetable that allows subject and special needs teachers to collaborate. 2) No culture of collaboration between subject teachers and special needs teachers in planning has been established. 3) Collaborative work between the teacher and the special needs teacher seems unrealistic or not feasible.

Numbers from Federici and Vika (2020, pp. 72–75) testifies of weekly contact between teachers and the leadership for the vast majority, although 56% says they received no or little guidance from the leadership on how to follow up IEPs and the special needs education. This might indicate that a common frame of reference in terms of IEPs and special needs teaching was not established before the lockdown.

A lack of a common frame of reference of special needs education might be a factor influencing the ability to uphold IEPs.

Collaboration with external institutions

The Education Act §15-8 (1998) requires schools to collaborate with external institutions to evaluate and follow-up students with special needs. It is the point at which teaching staff seek assistance from outside their own ranks to improve their understanding and, as a result, better facilitate an equal and adapted education for the students in question. The collaboration's goal is to create positive, inclusive learning environments for students with special needs. In Norway, these institutions include Pedagogic-Psychological Services (PPT), child protective services (barnevernet) and child and adolescent psychiatric outpatient clinic (BUP). As mentioned earlier, the IEP should be developed in collaboration with all these institutions, if relevant. Johannessen, Skotheim og Holst-Jæger (2019) report on generally positive trends regarding this collaboration. On the other hand, teachers who are new in the profession report challenges with this collaboration, because they lack knowledge about when and how to ask for guidance. When the contact has been established however, research shows that teachers find the collaboration frustrating. Teachers are concerned about individual student challenges, while PPT wants to shift the collaboration toward more system-oriented conditions (Moen, 2013).

Federici and Vika (2020, p. 80) reports that 38% of the teachers, compared with the normal situation, collaborated less or not at all with external institutions, and 22.5% reported poorer access and quality of the collaboration compared with the normal situation (Federici & Vika, 2020, p. 81). Thus, lack of specialized support from external institutions might be a factor which impacted the ability to uphold an IEP during the lockdown.

Time

Throughout his work, Dale (1999) emphasized the significance of time. As previously stated, developing a meaningful teaching program, and collaboration takes time, and is essential for developing meaningful teaching. Dale proposed that teachers' work hours be divided into three categories: teaching, lesson planning, and reflection. This is done to protect the teacher from forced action[6]. Forced action can be thought of as our overlearned, default actions; the baseline actions we would naturally fall back on when we are in a demanding situation that requires innovation but lacks the time to innovate. When this occurs, Dale continues, the

[6] Translated from Norwegian. Original wording: Handlingstvang

teaching becomes colored by routine, with no ability to actually solve the problems at hand, and the teaching can lose its meaning.

Prior to the Covid-19 pandemic, time was a scarce resource, according to research. Because of the large number of students in their classroom, teachers found it difficult to follow up on students with special needs (Nilsen 2020, page 1). Many students in a class usually means a wide range of needs and possibly multiple IEPs in addition to the general class curriculum. Furthermore, as the number of students increases, so would the number of tasks such as reports, evaluations, standardized tests, and other administrative work. According to a class size report, 35% of teachers said that the number of students in their class makes it difficult, if not impossible, to plan and adapt teaching to the needs of different students (Respons Analyse 2017, page 7).

Lack of time is also a reason for poor collaboration between teachers, special needs teachers and the leadership (Gillespie, 2016, p. 30), as well as low levels of collaboration between general teachers and special needs teachers (Gillespie 2016, page 212).

Lack of time might also be a reason why a Norwegian Official Report (NOU 2016:17, p. 62) reports a practice where IEPs act more as an administrative document, and not as a tool to ensure meaningful and targeted education. They often lack adequate descriptions and clear goal statements, and do not meet the requirements stated in the Education Act (Opplæringslova, 1998 § 5-5), which can be a reasoning for not taking the time to use it. This practice is not unique to Norwegian schools (Ní Bhroin & King, 2020, p. 42). Consequently, according to a Norwegian Official Report (NOU 2016:17, p. 62), most contact teachers say they use the IEP to guide their teaching to a small to very small degree. This would cause consequences in ensuring meaningful teaching as discussed in the previous chapter, as the teacher might not have a clear understanding of the goals or needs of the student. The teacher would lack the ability to secure and communicate the relationship between the activities and goals, and the student would not have a clear understanding of this relationship.
Teachers might have had less time during the lockdown to construct teaching programs. Federici and Vika (2020, p. 43) found that only 13% of the primary and middle schools in their study had plans ready for online teaching before the schools closed. In practice, this meant that most teachers had to rethink and reorganize their plans overnight. Furthermore,

most teachers had no prior knowledge of how to teach online (Federici & Vika, 2020, p. 30). As a result, teachers reported a heavier workload than usual (Federici & Vika, 2020, p. 38; Fjørtoft, 2020, p. 43).

Given this context, there is reason to believe that teachers lacked the time to collaborate, plan, and adapt their teaching for an online teaching environment in accordance with the IEP. Time might have been a factor in the ability to uphold an IEP.

Summary

Within the K2 level, 5 factors which might have influenced the ability to uphold the IEP during the lockdown has been identified and presented, and are as follows:

- access to human and material resources
- collaboration between the general teacher and the special needs teacher
- having a common frame of reference of special needs education
- specialized support from external institutions
- time to collaborate, plan, and adapt teaching for an online teaching environment in accordance with the IEP

2.2.3 K3 - Communication in and construction of didactical theory

The third and final competence level in creating meaningful teaching is *communication in and construction of didactical theory*. It is the K2 level's meta-level. It refers to teachers' ability to think about and plan teaching activities based on theoretical concepts. In both didactical and pedagogic theories, the teacher must anchor and justify the t*eaching plans, goal considerations, planning*, and *evaluation*. While pedagogics is the theory and knowledge of the most appropriate teaching techniques or approaches (Tjeldvoll, 2009), *didactics* is a field within *pedagogy*, and is the theory of how to anchor, justify and argue the reasoning of the choices within teaching and its contents, and now to adapt teaching for all learners (Sjøberg, 2009).

Dale uses *third-person competence* and *first-person competence* to demonstrate the importance of this anchoring: if the teacher is unable to anchor, justify, and argue the reasoning for the choices made in K1 and K2, the teacher has *third-person competence*. This is true if the teacher simply accepts someone else's choices and is not a source of the

legitimacy of the plans and activities, as well as their relevance and meaning. *First-person competence*, on the other hand, is established when the teacher is able to critically examine and question the curriculum and teaching, and to provide systematic answers to these questions from a theoretical perspective. Dale contends that first-hand competence stems from teachers' own research and education, as well as collegial collaboration. As a result, education and knowledge about didactics and pedagogy needs to be a necessary element within *pre-service education*, and needs to be provided within the *in-service education*, if teachers are to develop first-person competence in communicating and constructing didactical theories.

Pre-service education

Pre-service education is the education that a teacher receives as the formal training to become a teacher. It includes training in didactics, pedagogy, and subject-specific knowledge, all of which should provide the teacher with first-person competency (Dale 1999, page 26-27). Several studies have found that teacher education has a significant impact on student achievement (Pit-ten Cate et al. 2018, page 51-52). A combination of didactics, pedagogy, and subject-specific knowledge has been shown to be necessary for improved student outcomes (ibid.). The Norwegian Children's Ombudsman (Barneombudet) agrees, stating in their report that teachers with extensive subject knowledge and education can better adapt education for students with special needs (Barneombudet 2017, page 21). However, statistics show that pre-service teachers do not meet the requirement of subject-specific knowledge in the single subjects for which they are responsible (Utdanningsdirektoratet 2020, page 69-70).

Aside from pedagogy, didactics, and subject knowledge, the teacher must also be knowledgeable about special needs education. Classroom teachers frequently feel unprepared to teach a heterogeneous group of students and incapable of facilitating meaningful teaching for students with special needs (Pit-ten Cate et al., 2018, p. 52.). In Norway, the situation is similar. Nilsen (2020), Nordahl (2018), and Antonsen et al. (2020) discovered that teachers struggled to adapt their teaching for students with special needs due to a lack of knowledge about specific learning disabilities, successful practices, and how external institutions worked. According to the findings, the pre-service education did not adequately prepare student-teachers to provide meaningful teaching to students with special needs.

Although there is no requirement for relevant education for assistants or interim staff (Opplæringslova 1998 10-2), the Norwegian Ministry of Education (Utdanningsdirektoratet) has issued a call to ensure that special needs education is provided only by staff who have formal teaching competency (NOU 2016:17, page 17). However, many schools make extensive use of untrained assistants to teach students with special needs (Barneombudet, 2017; Nordahl et al., 2018; NOU 2016:17). According to Nordahl et al. (2018, page 107), the use of assistants results in lower achievement for students with special needs.

As a result, there is reason to believe that the level of education, subject-specific knowledge, and special needs education knowledge of the teachers may be a factor in their ability to uphold an IEP.

In-service education

Prior higher or specialized education is insufficient to create meaningful teaching. In-service education is required for teachers to renew their practice and move away from a third-person competence (Dale 1999, page 57-58). Additionally, school administrations are required by law to provide this to all staff (Opplæringslova 1998 10-8).

Dale (Dale 1999, p. 224) defines in-service education as a time for research and reflection, with two main outcomes: *alienation*[7] and *unification*. *Alienation* refers to expanding teachers' knowledge of didactical and pedagogical theories, resulting in a gap between the teachers' current practice and the new knowledge. This alienation allows for reflection on one's own practices and can help to prevent routine-based teaching practices from losing their meaning. This alienation can also be exposed by problematic or challenging situations that arise in the classroom. In this case, time spent researching and reflecting on how to solve the problem can help bridge the knowledge gap, a *unification* between existing and new practices. It allows the teacher to examine and question the problematic situation while also attempting to find appropriate solutions based on theory, research, and collegial collaboration. As a result, the teacher has gained first-hand competence and can communicate the significance, relevance, legitimacy, and meaningfulness of the choices made in K2 to the students participating in the activities in K1.

[7] Translated from Norwegian. Original wording: Fremmedgjørelse.

According to international research, teachers who participated in internal in-service education developed a more positive attitude toward students with special needs (Pit-ten Cate et al. 2018, page 55). Nordahl et al. (2018, pages 248, 259) agree and believe that in-service education is critical to ensuring meaningful education for all students. It is also backed up by the Norwegian government, which provides free and compensated in-service education for teachers (Ministry of Education and Research 2015).

As a result, there is reason to believe that teachers' access to in-service education may be a factor in their ability to uphold an IEP.

Summary

Within the K3 level, 4 factors which might have influenced the ability to uphold the IEP during the lockdown has been identified and presented, and are as follows:

- Teachers' level of education
- Teachers' subject-specific knowledge
- Teachers' knowledge of special needs education
- Teachers' access to in-service education

2.3 Summary

Through Erling Lars Dale's (1999) framework of three competence levels, this chapter identified several aspects required to plan and conduct meaningful teaching for students. Although Dale did not use this framework explicitly to ensure meaningful teaching for students with special needs or IEPs, the aspects of meaningful teaching are applicable to all learners. Dale's aspects were justified in teaching students with special needs and IEPs by presenting new research demonstrating how the presence or absence of the aspects is correlated with higher and lower levels of student achievement in special educational needs teaching. These findings were then linked to literature, research, and statistics on the teaching situation prior to and during the Covid-19 school lockdown. Hypotheses on factors that might have influenced teachers' ability to plan and conduct meaningful teaching and, ultimately, uphold IEPs during the period were presented. The factors that are thought to have an impact on this are summarized below.

K1 - The teaching situation

- Student involvement in the development process of their IEP
- Having a stable internet connection
- The student’s level of digital literacy

K2 - The construction of the teaching program

- Access to human and material resources
- Lack of collaboration between the general teacher and the special needs teacher
- A lack of a common frame of reference of special needs education
- Lack of specialized support from external institutions
- Time to collaborate, plan, and adapt teaching for an online teaching environment in accordance with the IEP

K3 - Communication in and construction of didactical theory

- Teachers’ level of education
- Teachers’ subject-specific knowledge
- Teachers’ knowledge of special needs education
- Teachers' access to in-service education

These factors laid the foundation in the construction of the survey used to collect data. They also made out the independent variables which were paired with the self-reported success to see which factors had an impact on the success-level. The development of the survey and the collection of the sample is discussed in the following chapter.

3 METHODOLOGY

The project's research question was “How do primary and middle school teachers rate their own success in upholding IEPs during the school lock-down in Norway from March 12th-medio April 2020?”. The research goals were to discover how teachers rated their own success and to identify factors that could be linked to higher or lower self-reported success. A survey was distributed among various groups of teachers on Facebook, as well as via emails and personal messages to previous colleagues and other connections. The survey was divided into three sections, which corresponded to Dale's three levels of competence. Part one asked about the teaching situation, part two about the planning time, and part three about the teacher's own education. Where it asked for numbers, such as years of experience or the number of IEPs in the class, participants were given the option of writing their own answers. Most of the questions required them to take a position on statements such as "I had enough time to adapt my teaching to an online setting." These questions used a 4-point Likert scale with answer options of Strongly disagree, disagree, agree, and strongly agree.

This chapter on methodology is divided into six sections: *study design, population, and sample, developing the survey, survey distribution and data collection, validity and reliability,* and *ethical considerations.*

3.1 Study design

3.1.1 Explanatory cross-sectional design

This study used an explanatory, cross-sectional study design. A cross-sectional study design was chosen because it derives data from a single sample at a specific point in time (Wang and Cheng 2020, page 65) and divides this sample based on a dependent variable (de Vaus 2014, page 110-111). It aims to identify prevalence, what factors influence prevalence, and the population characteristics (Wang and Cheng 2020, page 65). The aim of this study was to identify factors that may influence self-reported success in upholding IEPs during the school lock down. It seeks to collect data from a single sample from a specific point in time and seeks patterns in the data and answers *why* rather than *what* (de Vaus 2014, page 101-102).

3.1.2 Quantitative survey

A quantitative survey was used to collect data for this cross-sectional study. A survey allows for systematic data collection and provides a structured overview of the variables and data (de

Vaus 2014, page 51). This was required to generate a clear analysis of the variables to identify relationships between specific factors. To be able to run the data through a statistical analysis program, the data had to be quantifiable, or numerical. Quantifiable data was also desired because a large number of respondents to draw conclusions from the data was desired, as larger sample sizes results in greater data accuracy (de Vaus 2014, page 204-205), and increases the likelihood that the data can be generalized to the population (de Vaus 2014, page 100). Surveys can save time when collecting many units of analysis; therefore, an online survey administered via an open link was chosen as the data collection instrument.

3.2 Population and sample

The population in this study was primary and middle school teachers in Norway who taught students with an IEP online during the school lockdown in March-April 2020. The number of teachers and assistants who worked directly with students during spring 2020 was 90 702 (Utdanningsdirektoratet, 2020). There is reason to believe that the population for this study is smaller. Reason might be that not all teachers had an IEP to consider, some teachers facilitated teaching for students at school, and some might not have been aware of the existence of the IEP, for example assistants or substitutes. Discerning which teachers had to facilitate teaching for students with IEPs would be time consuming. Thus, the sample needed to be drawn from the teachers who themselves identified with the predefined criteria (de Vaus, 2014, pp. 227–228). Subsequently, the respondents needed to select themselves into the sample, which categorized the sampling as *non-probability sampling* (ibid.).

Non-probability sampling should not be used to make generalizations to the population, as it cannot ensure a representative sample, for several reasons (de Vaus, 2014, p. 182). Firstly, having respondents self-selecting themselves into the sample offers little control on whether they actually do fit the pre-set criteria. Secondly, one can assume that those who volunteer to complete the survey might have stronger opinions, experiences and feelings towards the topic, and the sample has a high probability of being biased (McCombes, 2019).

However, the Facebook groups, in which the survey was posted, provided a platform to reach teachers from a wide range of grade levels, subjects, years of experience and education from different schools and locations. The groups have about 130 000 members all together and was the second most used source of support and inspiration during the lockdown (Gilje et al.,

2020, p. 16). Although the sample cannot be said to be representative of the population, the sources of which the sample was intended to be drawn can be said to yield some credibility of the sample.

The sample was gathered through a combination of *convenience-, snowball-, and voluntary response sampling* (McCombes, 2019). *Convenience sampling* is a sample which is the most convenient and accessible to the researcher. This was done by emailing personal invitations to the survey to former colleagues (see appendix A). *Snowball sampling* relies on finding respondents through other respondents, which was done by sending an invitation to the survey to the leadership or one member of the staff in a few schools, asking them to forward the survey to their staff and colleagues (see appendix B). In these schools, I did not know all the staff personally, but had a personal connection in either the leadership team or the staff. Finally, *voluntary response sampling* relies on the respondents' own initiative to respond to the survey. This was done by posting the link to the survey in several groups on Facebook along with an information letter (see appendix C), asking teachers who fit the predefined criteria to complete the survey. These groups target teachers and work as a forum for professional discussions. Two of these groups were created right after the school closed in March 2020, as a response to the need for ideas, resources, and support when the teaching needed to be reorganized. A contact stating the purpose of the survey and research between the group administrator and myself was signed, and can be found in the appendix D.

3.3 Developing the survey

3.3.1 Constructing the survey

To construct the survey, *Nettskjema (Nettskjema, 2021),* which was required and provided by the University of Oslo, was utilized. The structure of the survey is based on the three competence levels of Dale (1999), to directly connect the survey with the literature chapter. Part one contains 12 questions regarding the teaching situation. Part two contains 13 questions regarding the planning time, and part three contains 11 questions regarding the teachers' education, experience, and attitudes. The questions are derived from the possibly influencing factors determined in the literature chapter. The survey was first developed only in Norwegian. Because I wanted to give non-Norwegian speakers the opportunity to partake, such as teachers and former colleagues in international schools in Norway, English translations of the questions were added. Additionally, all questions were equipped with an

explanation to clarify the questions. Since the questionnaire was self-distributed, any questions regarding the meaning of the questions could not be answered immediately by me. To ensure all respondents had the same understanding of the questions and concepts therein, both general, section and question instructions were added, as well as a clarification of concepts within questions (de Vaus, 2014, pp. 193, 219–220).

3.3.2 Survey question

All the questions in the survey were close ended, for several reasons. The factors were already identified though the theoretical framework and literary background; thus, the analysis would consist of calculation of quantitative numeric data, and not categorizing qualitative data (de Vaus, 2014, p. 43). Close-ended questions allow for easy coding of numeric values. Additionally, close-ended questions can minimize misinterpretation, especially if the survey is self-administered (de Vaus, 2014, p. 256). This survey offered two types of close-ended question responses: ratio and ordinal level responses. The ratio level responses asked the respondents to insert a number related to, for example, number of IEPs or years of experience. Some ordinal level responses asked the respondents about, for example, their highest completed degree in pedagogics, rated from *no formal education* up to *Ph.D.* Most of the ordinal level responses were organized though a *4- point Likert scale* with the options of *strongly disagree, disagree, agree* and *strongly agree*. A Likert scale was chosen because they are easy to convert into numerical rating scales, they are highly structured and it requires the respondent to take a personal stance on statements (de Vaus, 2014, p. 262). This was beneficial to capture the teacher's subjective experience and opinions on upholding IEPs. In addition, a Likert scale requires only one response to each item and each item can then be organized into high and low values (de Vaus, 2014, p. 266), which can provide clear analysis between the variables.

The 4-point Likert scale

The mentioned Likert scale contained 4 points, although many Liker scales have 5 points, adding a neutral opinion, such as *not relevant* or *no opinion.* There are some debates about whether or not this option should be included or not, where the argument is connected to how reliable the data will be with or without this option (de Vaus, 2014, p. 272). Including the option gives the respondents the ability to opt out of irrelevant questions, making the data more reliable and accurate, although this has not been proved (ibid.). Although there seems to

be some consensus on including the neutral option (de Vaus, 2014, p. 275), I chose to omit it. As the questions are based on current research and statistics, all the questions in the survey *would* be relevant in the situation of upholding an IEP. Not providing a neutral option would force the respondent to reflect on the situation and, in my opinion, deliver more accurate data.

Order of the questions

The structure of the questions was grouped according to Dale's (1999) competence levels. Because the questions were related to specific situations, clustering the questions related to the same situation seemed to be the clearest and most organized way to structure the survey (de Vaus, 2014, p. 285). However, the question asking about the respondents' success in upholding the IEPs did not clearly fit in any of the categories. It was placed as the first question in the survey, although there is conflicting research on question order bias whether this would yield the most accurate outcome. One study showed that asking difficult questions in the beginning of a survey resulted in a higher self-reported performance and subsequently the opposite for an easy-difficult order (Jackson & Greene, 2017, p. 485). Whether the question can be categorized as easy or hard is debatable, however, anchoring the main question in the beginning of the survey and establishing the relevance of the survey according to the description seemed beneficial (de Vaus, 2014, p. 284).

3.3.3 Pilot-testing

A survey must always be tested before it is administered, also called *pilot-testing (de Vaus, 2014, p. 292)*. This survey went through two parts of pilot-testing, as it was first written only in Norwegian. The English translation was added later, to include English speaking colleagues and connections from international schools in Norway. Firstly, the Norwegian part was checked for grammatical errors, and individual questions and the survey as whole were assessed by questions derived from de Vaus (2014, pp. 295–296). Secondly, the English part was checked by bilingual, native English speakers for grammatical errors, if the wordings and questions meant the same in English and Norwegian. Amendments were made after feedback from the pilot-testing respondents. The pilot questions can be found in appendix E.

3.4 Survey distribution and data collection

3.4.1 Survey distribution

Electronic distribution of the survey was chosen. Although there are debates on the best method for distributing a survey to ensure high response rates (de Vaus, 2014, p. 317), distributing the survey electronically would offer me several advantages. It is time-efficient, low-cost and offers the opportunity to reach relevant teachers across the nation, as the survey was distributed through a link that took the respondents to the survey. Thus, my presence was not required when the survey was being completed. This would also ensure complete anonymity, which might pose an advantage as the topic of self-reported success might be sensitive to some (de Vaus, 2014, pp. 315–317). Moreover, distributing surveys to a homogenous group, such as groups of teachers, often yields a higher response rate than heterogeneous groups. Additionally, the topic of the survey would possibly be personal and relevant, which could lead to higher motivation to complete the survey. Other advantages of online surveys include error checking of wrong answers, feedback for missing answers and enforced question answering requirements (de Vaus, 2014, pp. 315–316), which was all used to ensure categorically correct and full set of answers.

3.4.2 Data collection

The data collection took place over several weeks, and data was collected only though the online survey offered by Nettskjema. Distribution methods was a combination of email invitations with the link and posting the link and an invitation in different groups on Facebook. All the emails were sent out the same day. The Facebook posts were posted in five different groups with 5–7-day intervals. Posting in intervals was chosen for a few reasons. Firstly, many teachers are members of all the groups. Posting it simultaneously in all groups would mean the members would see it only once. Due to the high activity in the groups, the survey would quickly fall too far down in the feed to be seen again. Interval posting would give the survey more visibility and work as a reminder to the members.

When a response in the survey was submitted, the data was collected, organized, saved and stored in *Nettskjema*. An Excel-sheet with all the data could be downloaded from the platform and uploaded in the data analysis program.

3.4.3 Variables

Most of the variables in this study were derived from the 4-point Likert scale with levels "strongly disagree", "disagree", "agree" and "strongly agree". These variables are treated as ordinal level variables, as equal distances between the answer categories cannot be assumed, e.g., the distance between "disagree" and "agree" might not be the same distance as between "agree" and "strongly agree". This is possibly truer for this study, as the neutral option in the scale was removed (Chyung, Roberts, Swanson, & Hankinson, 2017, p. 3). Some variables asked for numbers, such as years of experience. These variables are treated as ratio level variables.

This study had 35 independent variables of both ordinal and ratio level. The dependent variable was ordinal level, called "you were able to uphold students' IEPs during the school lock-down" and was measured through the 4-point Likert-scale. These were divided into two groups for a clearer distinction between the two opposites: "strongly disagree" and "disagree" were merged into "disagree", and "agree" and "strongly agree" were merged into "agree".

3.4.4 Coding

Quantitative survey data needs to be converted into numbers to be analyzed (de Vaus, 2014, pp. 286–287). The aim of the analysis was to find correlations between the answers of the dependent variable with the independent variables. Thus, all questions which provided the same set of answers needed to be coded the same. All Likert scale answers were coded 1-4 and questions about education were coded 1-6. Ratio scale variables were not coded, as the answers already were numerical. *Nettskjema* provided a feature for easy coding, and the complete codebook including the survey questions, answer options, variable name, and codes can be found in the appendix F.

3.4.5 Data Analysis

The data was analyzed in the statistical analysis program *Jamovi 1.6.21 (The jamovi project, 2021).* Descriptive analysis was run on all single variables to gain insight and overview of the variable distribution. To determine whether any correlation exists, ordinal level independent variables were paired with the dependent variable and analyzed using *Spearman's rho* correlation matrix. The H_1 is:

Independent variables which yield a positive correlation with the dependent variable are factors which might have influenced the teachers' ability to uphold the IEPs during the lockdown.

For the independent ratio level variables, the Mann-Whitney U *independent t-test* was used to determine if a relationship to the dependent variable. The H_1 is:

Independent variable which yields a statistical difference of the means of the two groups in the dependent variable is a factor which might have influenced the teachers' ability to uphold the IEPs during the lockdown.

Holm's correction for multiple comparisons

To find whether any of the independent variables could have been a factor impacting the ability to uphold IEP, all independent variables needed to be run against the dependent variable, resulting in 35 analyses. Statistically, 35 analysis with $\alpha = .05$ would yield 1.75 significant *p*-values by chance, i.e., *type 1 errors.* To avoid this, *Holm's correction for multiple comparisons* were calculated and the adjusted *p-values* were used to test for significance against $\alpha = .05$. Adjusted raw *p*-values were calculated

$$p^{\prime} = j \times p_j$$

where $p^{\prime}$ denotes the adjusted value, p denotes the raw *p*-value and j denotes the raw *p-value* ranking (Navarro & Foxcroft, 2018, pp. 343–344). (See appendix G).

3.5 Validity and reliability

This chapter discusses the validity and reliability of the study. A valid study has measured what it set out to measure. A reliable study is one that would yield the same result on repeated occasions (de Vaus, 2014, pp. 139–144).

3.5.1 Validity

Validity of a study refers to whether the instrument used is valid to measure what it set out to measure. To evaluate the validity of this study, a modified framework of Shadish, Cook and Campbell provided by Thor Arnfinn Kleven in *Nordisk Pedagogik (2008)* was used. This framework includes *construct validity, statistical validity, external validity,* and *internal validity.*

Construct validity

Construct validity evaluates how well indicators of a measurement represents the concepts to be measured (Kleven, 2008, p. 224). In other words, whether the theoretical framework directly connected to the questions in the survey. Although this can never be concluded to be fully accurate, the questions in the survey make out the theories of possible factors influencing the ability to uphold an IEP identified in the literature chapter. These theories are directly derived from the theoretical framework of Dale, which relevance is anchored in current literature and research.

Statistical validity

Statistical validity evaluates if the statistical relationship between the variables is substantial enough to draw any conclusions (Kleven, 2008, p. 226). For this reason, effect sizes for all analyses were used as a benchmark to evaluate the strength of the relationship between variables. To retain the H_1 for the ordinal level variables, the analysis needed to yield $\alpha < .05$, and medium correlation coefficient $\rho < .40$ (Akoglu, 2018, p. 92; Navarro & Foxcroft, 2018, p. 288). To retain the H_1 for the ratio level variables, the analysis needed to yield $\alpha < .05$, and medium effect size $r > .30$ (Cohen, 1977, p. 79). Moreover, larger sample sizes yield more representative. This study had a sample size of n=100, taken from a population of 90 700. With a 95% confidence level, a sample size of 100 in a heterogenous group would mean a sampling error of 10% (de Vaus 2014, page 207). 10% sampling error allows for a bigger range of uncertainty about the accuracy of the data. Considering the sample might be a more homogenous group, a sample of 100 might reduce the sampling error to 8-9%. However, as the survey was distributed through an open link, assumptions that all respondents are from the population cannot be made. Moreover, there is no guarantee the respondents filled out the survey genuinely, or that the sample is indeed 100 different respondents, and thus statistical validity would only be valid for this sample alone.

External validity

External validity refers to the extent the results in the study can be transferred to other contexts (Kleven, 2008, p. 229). In other words, if the results can be generalized to the population. Kleven (2008, p. 229) points to three dimensions of external validity: *generalization over persons, situations/contexts,* and *over time.* The nature of this study is

highly *contextual,* and *time based*. It investigates an aspect in which could only emerge in that specific time and context and evaluating the external validity would require a retest in similar context. The nature of retrospective reflection would assume that the results from this study most likely not yield the same results in a retest. Furthermore, the sample was collected through a non-probability method, and offers no guarantee that the sample is representative. Thus, a generalization *over persons, situations/contexts,* and *over time* is not valid. Therefore, this study yields a low external validity, and inferences should only be true for this specific sample.

Internal validity

Internal validity refers to how valid the inferences and interpretations of them are (Kleven, 2008, p. 227). Kleven (2008, p. 227) refers to the list of threats to internal validity found in Shadish et. al (2002, p. 55). Out of the nine threats, only two are relevant in the context of this study: *selection* and *maturation. Selection* refers to respondents whose characteristics might be different. An example of this might be how one tackles changes and challenges. A teacher who tackles challenges poorer than another, might give more responses related to "disagree", and ultimately impact the results of the correlations. On the same line, *maturation* refers to changes over time. Almost a year had passed from the time the lockdown was implemented to when the survey was published. Retrospective memory can be unreliable, and positive experiences and feeling connected to the teaching situation during the lockdown might be heightened or forgotten, and the same for negative feelings. This might yield inaccurate data and thus invalid inferences and interpretation. However, this is hard to measure, and caution regarding the interpretations needs to be considered.

3.2.2 Reliability

Reliability refers to how reliable the measure instrument is, that is, how consistent the instrument is within itself (Navarro & Foxcroft, 2018, p. 459). In other words, could the survey produce the same results if it was distributed again? One way to measure this is through a *test-retest*, having the same sample redo the questionnaire (de Vaus, 2014, p. 113). As the respondents in this sample were anonymous and self-selected, this test for reliability would be impossible. However, all questions were provided with an explanation, as a means to ensure reliability of the answers. Clarification of both English and Norwegian terms were also evaluated though the pilot testing.

A more objective test of reliability is to use an *item-item correlation* (de Vaus, 2014, p. 340). This test checks all the answers from one respondent within the survey, and the test score is based on the consistency of that person's answers. This test is called *Cronbach's alpha*, and acceptable value for reliability is α = > .70 (de Vaus, 2014, p. 340; Taber, 2018, p. 1293). Running all the nominal scales though this test yielded α = .86 and can be considered reliable. The ratio scales were in a separate test, as a different scale was used to answer these. The test yielded α = .50, which means not reliable. However, considering what these questions are asking, a reliable scale is unlikely to obtain, as very different answers might be given on all variables. Thus, none of the ratio level variables are dropped to increase reliability. Descriptive details of the *Cronbach's alpha* test are found in appendix H.

3.3 Ethical considerations

Considering the ethical aspect of this study I will use the five ethical responsibilities outlined in de Vaus (2014, pp. 157–169). These five responsibilities concern the survey participants and include *voluntary participation, informed consent, no harm, anonymity, and privacy*.

As the survey did not collect sensitive data, was completely anonymous and responses could not be traced back to the respondents, approval from NSD was not required. The data was stored in the online *Nettskjema* platform during the project and was deleted August 1st, 2021.

3.3.1 Voluntary participation and informed consent

Even though the survey did not pose any health risks as exists in for example medical research, securing voluntary participation is still important. Reasons be it does ask for personal opinions and experiences, as well as taking up the participants time and is this at a cost for the participants. As the survey was self-administered, participation required choosing to click on the link in the invitation, and voluntary participation can be assumed. However, voluntary participation also involves knowing *what* one participates in. *Informed consent* needs to be insured. The participants need clear information about the goals and aims of the study, how and where and by whom the data will be used and how the outcome of the study can be beneficial to them. As mentioned, the survey links were sent out with an information letter, providing this information (see appendices). It did not include a specific statement the survey was voluntary or ask the participants to explicitly proclaim their informed consent.

However, a clear statement of how and where the data would be used, followed by requiring the participants to click the link to access the survey and submitting a completed survey can assume consent (de Vaus, 2014, p. 161).

3.3.2 No harm, anonymity, and privacy

Although the participants might be participating voluntarily, it is worth mentioning the survey asks about students, colleagues, and school leadership. These people have not volunteered or given consent to be a part of the study, yet nevertheless are a part of it indirectly. The *no harm, anonymity* and *privacy principles* become vital to ensure. The survey asked possible sensitive questions about colleagues and school leadership, as well as respondents' own success rate in a difficult and demanding time. Negative views about colleagues, leadership or their own position could cause harm if the data could be traced back to the individual respondents or their school. For this reason, the survey was completely anonymous and did not ask any questions that in combination could lead to the identification of either the respondent or their school. Because the data collection could not lead to the identification of individuals, and did not collect personal or sensitive data, approval from NSD was not necessary (NSD, 2021). Ensuring anonymity also ensured the respondents *privacy*, as I did not have any information about who partook in the survey.

4 RESULTS

This chapter presents the findings of the data. It is divided in three parts according to Erling Dales's (1999) competence levels K1, K2 and K3. For each part, descriptive statistics of all single variables are presented in a table, followed by inferential statistics measuring the relationship between the variable "I was able to uphold IEPs" with the other variables within the level. Lastly, the summary provides an overview of all variables which yielded significant values to be considered a factor which impacted the ability to uphold IEPs.

Tables for both descriptive statistics and inferential statistics are included in these chapters. Although they are large, they provide a better overview and clearer understanding of all the variables and their distribution and statistical values.

Some variables might to some readers be considered as background information about the sample, such as number of students and IEPs teachers had in their class, found in K1, and level of education and years of experience, found in K3. However, these were not presented as such, due to two reasons. Firstly, I wanted to maintain the structure presented in the literature chapter, and not take variables out of their respective competence level. Secondly, these variables were never intended to operate as background information about the sample, but rather independent factors which might have had an impact on the ability to uphold IEPs. Therefore, all variables are kept within their respective competence level.

4.1 K1 - The teaching situation

4.1.1 Descriptive statistics

Table 1 presents the descriptive statistics of all single variables within K1. It shows the survey question/statement along with their answer options and the counts of how many chose the specific answer option, shown in percent. The mode and median are presented for each variable to show the central tendency. Descriptive graphs corresponding to table 1 can be found in the appendix H. Table 2 presents the number of students and IEPs in the class of the respondents, including the survey questions, mean, median, range, skewness and kurtosis, and the results of the Shapiro-Wilks test of normal distribution.

Table 1: Respondents' answers to the survey questions on ordinal level in K1

Respondents' answers to the survey questions on ordinal level in K1 (*n=100, 0 missing)*				
Survey Questions	Answer	Counts %	Mode	Median
Students and the situation				
You feel you were able to uphold students' IEPs during the school lock-down.	Strongly disagree Disagree Agree Strongly agree	14 34 44 8	Agree	Agree
What grade level was your class?	Grade 1-4 Grade 5-7 Grade 8-10	30 31 39	2	3
Targeted teaching				
Most of the teaching time was used for targeted teaching (i.e., you did not spend time helping students with technology).	Strongly disagree Disagree Agree Strongly agree	7 32 42 19	Agree	Agree
The students have been active participants in the development of their IEP.	Strongly disagree Disagree Agree Strongly agree	17 47 33 3	Disagree	Disagree
Communication				
All students had a stable internet connection during your lessons.	Strongly disagree Disagree Agree Strongly agree	5 19 41 35	Agree	Agree
All students learn to use LKT as a learning resource in their education.	Strongly disagree Disagree Agree Strongly agree	1 13 51 35	Agree	Agree
All students learn to use ICT as a tool in their education.	Strongly disagree Disagree Agree Strongly agree	1 5 51 43	Agree	Agree
The students with IEPs can efficiently use LKT as a learning resource in their education.	Strongly disagree Disagree Agree Strongly agree	6 34 46 14	Agree	Agree
The students with IEPs can efficiently use ICT as a tool in their education.	Strongly disagree Disagree Agree Strongly agree	4 30 53 13	Agree	Agree
All students had good access to appropriate, pedagogical programs/apps/platforms.	Strongly disagree Disagree Agree Strongly agree	4 17 47 32	Agree	Agree

Table 2: Respondents answers to the survey questions on ratio level in K1

Respondents answers to the survey questions on ratio level in K1 *(n=100, 0 missing)*								
Survey Questions	Mean	Median	SD	Min	Max	Skewness	Kurtosis	Shapiro-Wilks W/ *p*
Students and the situation								
How many students were in your class?	21.0	23.0	8.26	1	35	-0.553	-0.170	0.956 *0.002*
How many IEPs did you have to facilitate?	3.09	2.50	2.17	1	14	2.07	6.85	0.804 *< .001*

Students and the situation

Table 1 paints a generally positive picture of the teaching situation during the lockdown, although 48% of the teachers in this study disagree they were able to uphold IEPs during the lockdown. This is good news for the analysis, as the sample appears unbiased towards one side on this matter. The distribution of teachers among the different grade levels also shows a balanced split, with grades 8-10 slightly overrepresented.

Table 2 shows that teachers had 21 students in their class on average. The smallest class contained 1 student, while the biggest class had 35 students. The dispersion of the variable is visualized through the histogram found in figure 1:

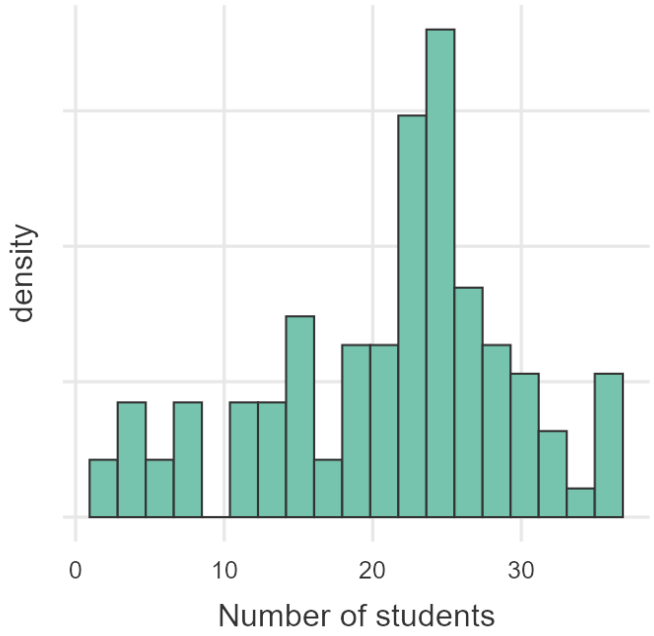

Figure 1: Histogram showing spread and frequency of the number of students in the respondents' classes.

As histogram presented in figure 1 shows, most teachers report a class size of around 22-25 students, which is reflected by the median and the box plot in figure 2. The distribution has a slight right skew but follows a unimodal distribution. Interestingly, classes of more than 30 students do not yield outliers. A reason for this might be a co-teaching situation, where two teachers work together in a larger class. The lack of outliers are also reflected by the box plot in figure 2:

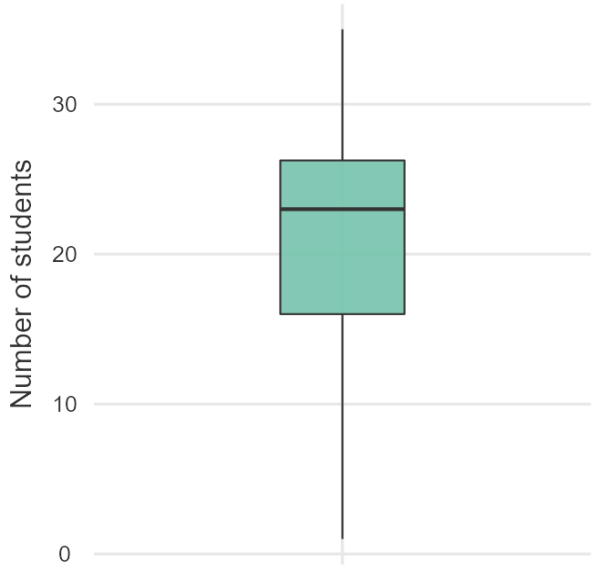

Figure 2: Box plot showing spread of the number of students in the respondents' classes.

Presence of outliers might affect the analysis, but figure 2 shows no outliers in the variable. However, the variable failed the Shapiro-Wilks test of normality. A further investigation on the variable's normality is presented in figure 3.

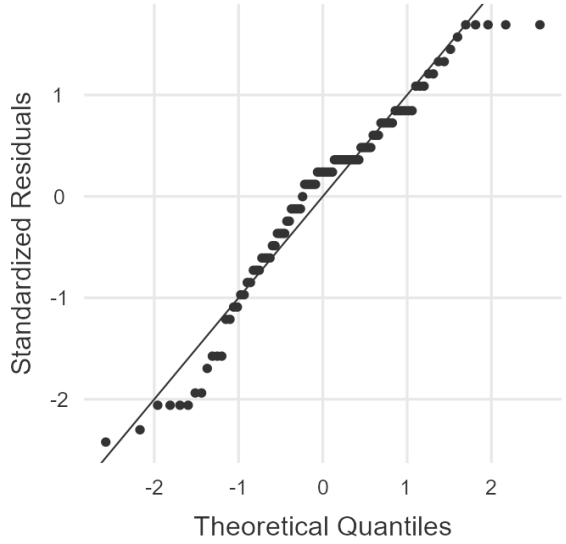

Figure 3: QQ-plot showing the distribution of the number of students in the respondents' classes.

Although the variable failed the Shapiro-Wilks test, the data plots in the figure fall on or close to the line most of the time. However, some deviations are seen at the top and bottom, and normal distribution for this variable is not assumed.

Further in table 2 is the variable about the number of IEPs in the teacher's classroom. Teachers had on average 3.09 IEPs in their class, with 14 being the highest number and 1 being the lowest. Figure 4 depicts the distribution of the data:

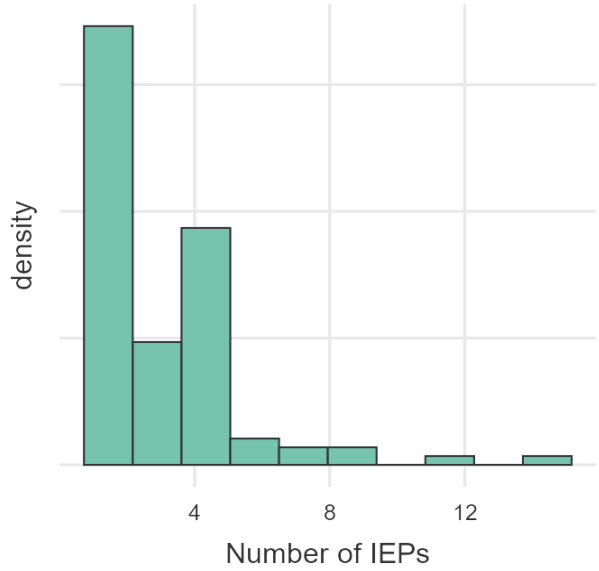

Figure 4: Histogram showing spread and frequency of the number of IEPs in the respondents' classes

Most teachers had between 1-2 IEPs in their class. Numbers between 2-3 IEPs are less common than 4-5 IEPs in the classroom, resulting in a bimodal distribution. The higher numbers are rare, and more than 5 IEPs is not so common in this sample, creating the left skew. To further investigate the distribution, a box plot is presented in figure 5:

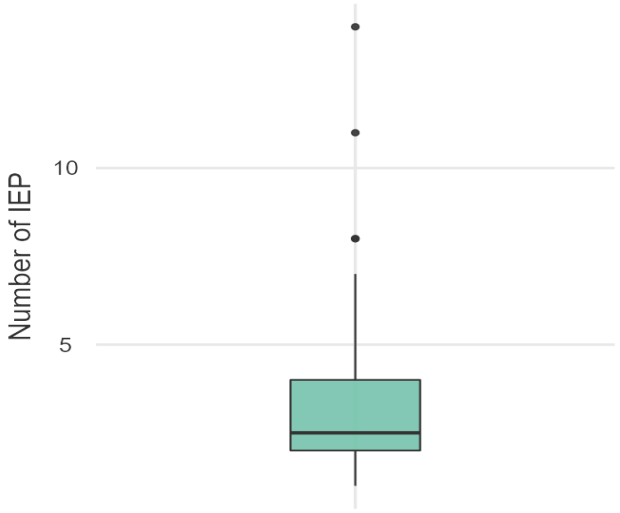

Figure 5: Box plot showing spread of the number of IEPs in the respondents' classes.

The box plot confirms the existence of outliers in the spread, with more than 8 IEPs being classified as such. 50% of the data lies between 2 and 4 IEPs. Because the variable has such

extreme outliers, and failed the Shapiro-Wilks test for normality, figure 6 presents a QQ-plot to further investigate the distribution.

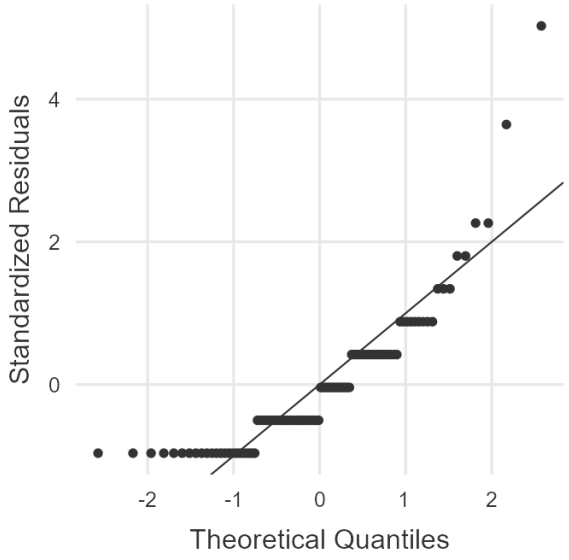

Figure 6: QQ-plot showing the distribution of the number of IEPs in the respondents' classes.

The data plots in figure 6 follow the trend line to a certain extent, but outliers in both ends and only a few plots falling on the line, in combination with the Shapiro-Wilks test, determine that normality for this variable is violated.

Targeted teaching

Majority of teachers agree that teaching time was mostly spent on targeted teaching, although 39% disagree, suggesting these teachers needed to spend time helping students using the technology utilized. The statement about students' participation in the development of their own IEP yielded the highest percentage of disagree within the K1 level, with 64% disagreeing on this statement. This is in line with literature reporting on low levels of student involvement in this.

Communication

With digital literacy being a core element in the Norwegian National curriculum, a high percentage of teachers agree students learn to use ICT and LKT as tools and resources in their education, respectively 86% and 94%, is not surprising. However, fewer teachers agree that students with IEP can efficiently use ICT and LKT in their education, with LKT yielding the highest percentage of disagree among the two. On the statement about students having a

stable internet connection during the lesson, 76% of the teachers agree, leaving approximately ¼ of the reporting disagree.

4.1.2 Inferential statistics

The following tables and figures present the results of the analysis checking for relationship between the dependent variable and the independent variables found within the K1- level. The dependent variable is "You were able to uphold students' IEPs during the school lock-down". Table 3 shows the results of the Spearman's correlation analysis of the ordinal level variables, including the name of the independent variable and the corresponding raw *p*-value, *ρ*-value and Holm's adjusted *p*-value yielded when paired with the dependent variable. Significant correlations are set to $p = < .05$ and $\rho = > .40$ and are marked in bold.

Table 3: Results of the Spearman's correlation analysis of ordinal level variables in K1

Results of the Spearman's correlation analysis of ordinal level variables in K1. All variables paired with variable "*You were able to uphold students' IEPs during the school lock-down*" (n = 100, 0 missing).				
Students and the situation				
What grade level was your class?	Spearman's rho *p*-value	0.03 *0.376*	Holm's p-value	*1.000*
Targeted teaching				
Most of the teaching time was used for targeted teaching (i.e., you did not spend time helping students with technology).	Spearman's rho *p*-value	0.32 ***< .001***	Holm's p-value	***0.020***
The students have been active participants in the development of their IEP.	Spearman's rho *p*-value	-0.10 *0.847*	Holm's p-value	*1.000*
Communication				
All students had a stable internet connection during your lessons.	Spearman's rho *p*-value	0.25 ***0.006***	Holm's p-value	*0.138*
All students learn to use LKT as a learning resource in their education.	Spearman's rho *p*-value	0.25 ***0.006***	Holm's p-value	*0.132*
All students learn to use ICT as a tool in their education.	Spearman's rho *p*-value	0.21 ***0.018***	Holm's p-value	*0.360*
The students with IEPs can efficiently use LKT as a learning resource in their education.	Spearman's rho *p*-value	**0.46** ***< .001***	Holm's p-value	***< .001***
The students with IEPs can efficiently use ICT as a tool in their education.	Spearman's rho *p*-value	**0.43** ***< .001***	Holm's p-value	***< . 001***
All students had good access to appropriate, pedagogical programs/apps/platforms.	Spearman's rho *p*-value	0.32 ***< .001***	Holm's p-value	***0.020***

Significant correlations marked in bold.

Table 4 shows the results of the Mann-U Whitney independent *t*-test of the ratio level variables, including the name of the independent variable, mean, median, SD and SE for the two answer categories, the corresponding raw *p*-value, Holm's adjusted *p*-value, and the effect size. Significant correlations are set to $p = < .05$ and $r = > .30$ and are marked in bold.

Table 4: Results of the independent t-test of the ratio level variables in K1.

Results of the independent *t*-test of the ratio level variables in K1. Both variables paired with variable "*You were able to uphold students' IEPs during the school lock-down*" (n = 100, 0 missing)									
Variable	Uphold IEP	Mean	Median	SD	SE	Statistic	*p*	*Holm's p*	Effect size *r*
Students and the situation									
How many students were in your class?	Disagree	23.2	23.0	7.40	1.07	942	**0.034**	0.512	0.25
	Agree	19.0	22.0	8.56	1.19				
How many IEPs did you have to facilitate for?	Disagree	3.48	3.00	2.30	0.332	944	**0.032**	0.512	0.24
	Agree	2.73	2.00	2.00	0.278				

Significant correlations marked in bold.

As seen in table 3 and 4, two independent variables yielded significant values when analyzed for a relationship with the independent variable in the K1-level: *Students with IEPs can efficiently use LKT as a learning resource in their education* and *students with IEPs can efficiently use ICT as a tool in their education.* Both independent variables fall under the category communication and are related to students' digital literacy. The strongest correlation is found in the variable concerning the students with IEPs being able to use LKT as a resource and is presented in figure 7 below.

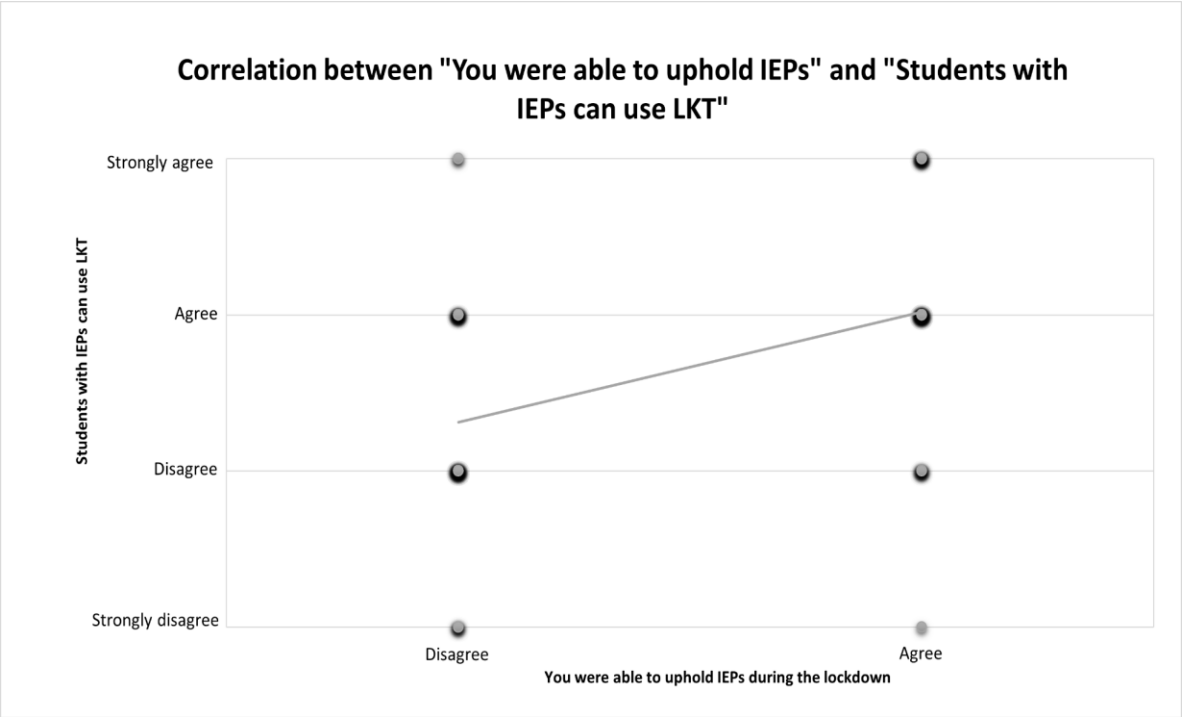

Figure 7: Scatter plot showing the correlation between "Uphold IEPs" and "Students with IEPs can use LKT"

The trend line in figure 7 shows a positive correlation between the two groups agree and disagree in *You were able to uphold students' IEPs during the school lock-down* and the

variable *students with IEPs can efficiently use LKT as a learning resource in their education*, meaning that those teachers who disagree they were able to uphold the IEPs also disagree that students with IEPs can efficiently use LKT as a learning resource in their education.

The correlation between *Students with IEPs can efficiently use ICT as a tool in their education* and *you were able to uphold students' IEPs during the school lock-down* is presented in figure 8 below.

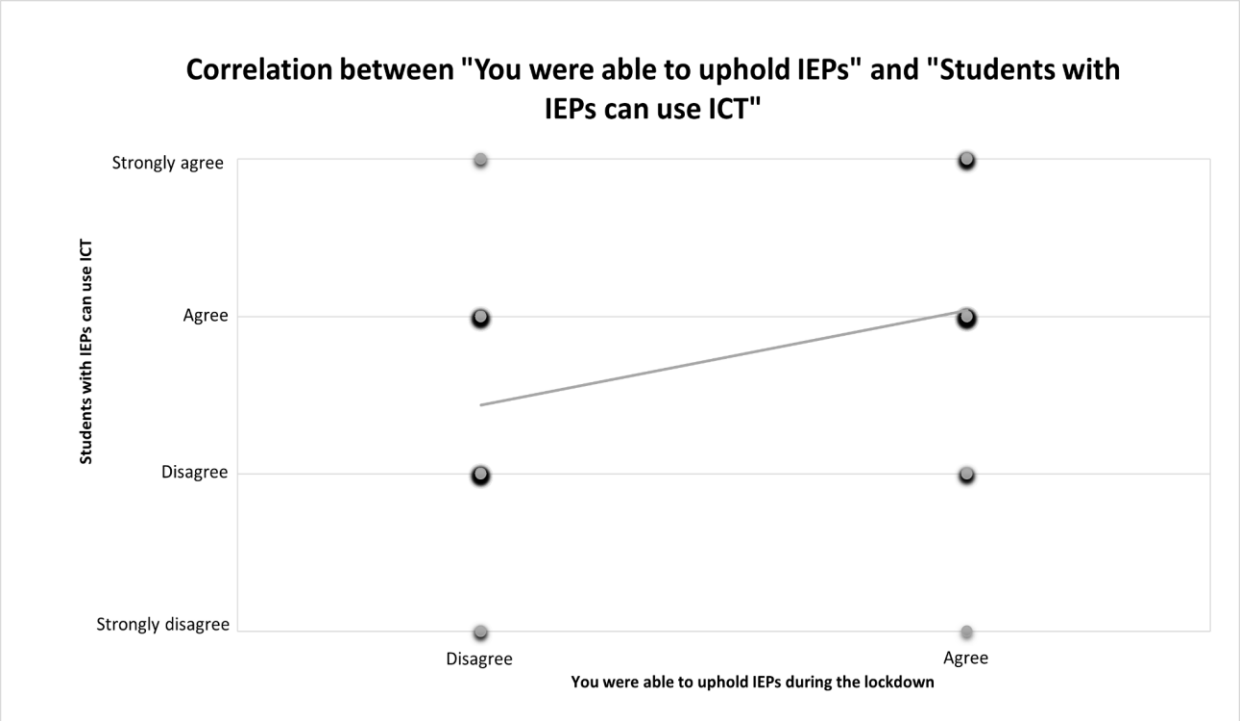

Figure 8: Scatter plot showing the correlation between "Uphold IEPs" and "Students with IEPs can use ICT"

Similar to figure 7, the trend line in figure 8 shows a positive correlation between the two groups agree and disagree in *You were able to uphold students' IEPs during the school lock-down* and the variable *Students with IEPs can efficiently use ICT as a tool in their education.* This means that those teachers who disagree they were able to uphold the IEPs also disagree that students with IEPs can efficiently use ICT as a learning resource in their education.

Although table 4 shows the analysis did not yield the values needed to be considered significant, a difference in the mean between agree and disagree can be observed for both *number of students* and *number of IEPs*, which might be worthy consideration regardless.

4.2 K2 - Constructing the teaching program

4.2.1 Descriptive statistics

The descriptive statistics of K1 has been divided into two tables, 5 and 6, as presenting it within one page posed a challenge. Table 5 presents factors connected to resources. Table 6 presents factors connected to communication and time. It shows the survey question/statement along with their answer options and the counts of how many chose the specific answer option, shown in percent. The mode and median are presented for each variable to show the central tendency. Descriptive graphs corresponding to table 5 and 6 can be found in the appendix I.

Table 5: Respondents' answers to the survey questions on ordinal level in K2

Respondents' answers to the survey questions on ordinal level in K2 (*n=100, 0 missing)*				
Survey Questions	Levels	Counts %	Median	Mode
Resources				
You had good access to material resources	Strongly disagree Disagree Agree Strongly agree	11 25 47 17	Agree	Agree
You had good access to human resources	Strongly disagree Disagree Agree Strongly agree	16 32 37 15	Disagree	Agree
You had good access to appropriate, pedagogical programs/apps/platforms	Strongly disagree Disagree Agree Strongly agree	6 20 53 21	Agree	Agree

Resources

The majority of the teachers report on having sufficient access to human, material and digital resources, although access to human resources yields a slightly lower percentage of *disagree,* where 48% of the respondent disagree they had access to human resources. This variable has the highest percentage of *strongly disagree,* while access to apps etc. has the highest percentage of *strongly agree.*

Table 6: Respondents' answers to the survey questions on ordinal level in K2

Respondents' answers to the survey questions on ordinal level in K2 (*n=100, 0 missing)*				
Survey Questions	Levels	Counts %	Median	Mode
Communication				
It was easy to communicate with the students outside of teaching hours	Strongly disagree Disagree Agree Strongly agree	13 33 40 14	Agree	Agree
You received good support from other teachers when you needed it	Strongly disagree Disagree Agree Strongly agree	3 16 51 30	Agree	Agree
You received good support from special needs teachers when you needed it.	Strongly disagree Disagree Agree Strongly agree	30 21 33 16	Disagree	Agree
You received good support from the leadership when you needed it	Strongly disagree Disagree Agree Strongly agree	13 26 43 18	Agree	Agree
You were closely followed up by the leadership	Strongly disagree Disagree Agree Strongly agree	25 37 27 11	Disagree	Disagree
You had good communication with most of the parents	Strongly disagree Disagree Agree Strongly agree	4 18 52 26	Agree	Agree
You had good communication with PPT/BUP and/or other special needs educational institutions	Strongly disagree Disagree Agree Strongly agree	44 35 16 5	Disagree	Strongly disagree
Time				
You had enough time to adapt your teaching to online teaching to successfully meet the learning outcomes for the unit/period	Strongly disagree Disagree Agree Strongly agree	30 41 15 14	Disagree	Disagree
You had enough time to successfully adapt your teaching for students with IEPs in a way that met the learning goals in the IEP	Strongly disagree Disagree Agree Strongly agree	30 44 16 10	Disagree	Disagree
You had enough planning time and collaboration time with other teachers	Strongly disagree Disagree Agree Strongly agree	15 45 26 14	Disagree	Disagree

Collaboration

Teachers agree on receiving good support from other teachers during the lockdown, and this variable has the highest percentage in the category *agree,* with 81%. Fewer teachers agreed they received good support from special needs teachers. This might be connected to teachers reporting on not receiving support from special needs teachers. The survey contained two statements regarding collaboration with the leadership. One regarding *support* from the leadership, and one regarding *the follow-up* from the leadership. Interestingly, these two variables yielded very different outcomes. 61% of the teachers *agreed they received good*

support from the leadership during the lockdown, but 62% *disagreed they were closely followed* up by the leadership in the same period. A reason for this discrepancy might be the definition of the two terms might be different from respondent to respondents, despite the guiding sentences within the survey. However, it is possible the leadership provided support when asked for it, but not checking in on the teachers on their own accord. Communication with parents seemed easier than communication with the student outside of the teaching hours. Although this can be linked back to students' digital literacy, it is reasonable to keep in mind that teachers might not have needed to have contact with the students outside of the teaching. Lastly, the statement regarding communication with external institutions yielded the highest percentage of *disagree*-responses with 79%. This might indicate poor collaboration, although it might also reflect that the teachers did not need to collaborate with these institutions during the period.

Time

All variables regarding having enough time show a majority of *disagree.* Highest percentage of the category *disagree* is found in the statement regarding adapting the teaching to the students with IEPs. Enough time to plan and collaborate has the highest percentage of *agree* out the three, suggesting time to adapt the teaching was most pressed. This could be connected to literature showing that plans for digital teaching were not ready, and that teachers did not have much experience in planning for online teaching.

4.2.2 Inferential statistics

The following tables and figures present the results of the analysis checking for relationship between the dependent variable and the independent variables found within the K1-2level. The dependent variable is “You were able to uphold students’ IEPs during the school lock-down”. Table 7 shows the results of the Spearman's correlation analysis of the ordinal level variables, including the name of the independent variable and the corresponding raw *p*-value, ρ-value and Holm’s adjusted *p*-value yielded when paired with the dependent variable. Significant correlations are set to $p = < .05$ and $\rho = > .40$ and are marked in bold.

Table 7: Results of the Spearman's correlation analysis of ordinal level variables in K2

Results of the Spearman's correlation analysis of ordinal level variables in K2. All variables paired with variable "*You were able to uphold students' IEPs during the school lock-down*" (*n* = 100, 0 missing). *Significant correlations marked in bold.*				
Resources				
You had good access to material resources	Spearman's rho *p*-value	0.39 **< *.001***	Holm's *p*	**0.001**
You had good access to human resources	Spearman's rho *p*-value	**0.40** **< *.001***	Holm's *p*	**0.001**
You had good access to appropriate, pedagogical programs/apps/platforms	Spearman's rho *p*-value	0.22 ***0.013***	Holm's *p*	0.273
Collaboration				
It was easy to communicate with the students outside of teaching hours	Spearman's rho *p*-value	0.37 **< *.001***	Holm's *p*	**0.005**
You received good support from other teachers when you needed it	Spearman's rho *p*-value	0.08 *0.220*	Holm's *p*	1.000
You received good support from a special needs teacher when you needed it	Spearman's rho *p*-value	0.27 ***0.003***	Holm's *p*	0.072
You received good support from the leadership when you needed it	Spearman's rho *p*-value	0.31 **< *.001***	Holm's *p*	0.065
You were closely followed up by the leadership	Spearman's rho *p*-value	0.05 *0.308*	Holm's *p*	1.000
You had good communication with most of the parents	Spearman's rho *p*-value	0.34 **< *.001***	Holm's *p*	0.044
You had good communication with PPT/BUP and/or other special needs educational institutions	Spearman's rho *p*-value	0.18 ***0.035***	Holm's *p*	0.512
Time				
You had enough time to adapt your teaching to online teaching to successfully meet the learning outcomes for the unit/period	Spearman's rho *p*-value	0.35 **< *.001***	Holm's *p*	**0.005**
You had enough time to successfully adapt your teaching for students with IEPs in a way that met the learning goals in the IEP	Spearman's rho *p*-value	**0.45** **< *.001***	Holm's *p*	**< .001**
You had enough planning time and collaboration time with other teachers	Spearman's rho *p*-value	0.17 ***0.044***	Holm's *p*	0.528

Although several analyses yield a significant p-value, only two variables also yielded a significant ρ-value when paired to check for correlation: *access to human resources* and *enough time to successfully adapt your teaching for students with IEPs.* Figure 9 visualizes the correlation between *uphold IEPs* and *access to human resources,* and figure 10 visualizes the correlation between *uphold IEPs* and *time to adapt for IEPs*

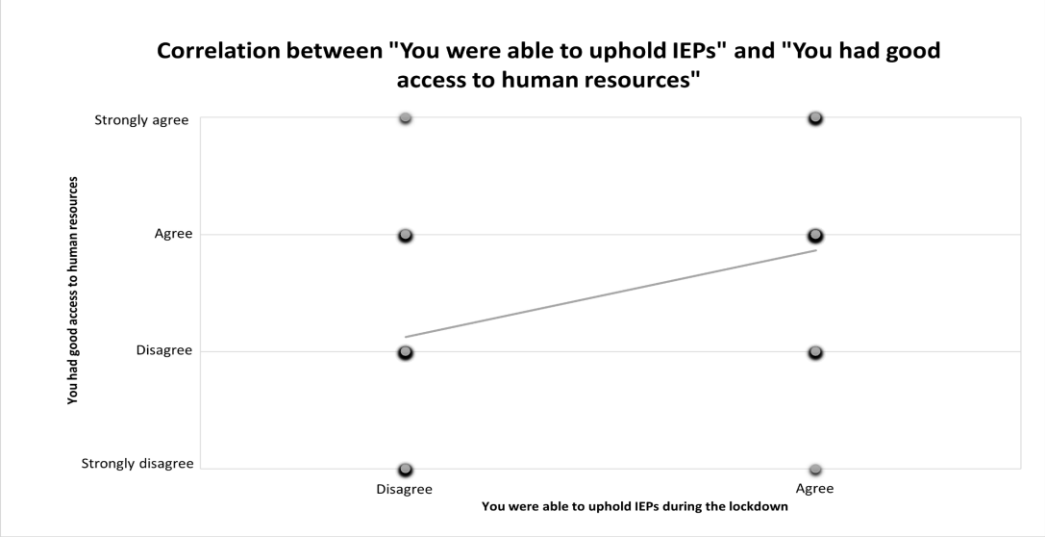

Figure 9: Scatter plot showing the correlation between "Uphold IEPs" and "Access to human resources"

The trend line in figure 9 shows a positive correlation between the two groups *agree* and *disagree* in *uphold students' IEPs* and the variable *access to human resources*, meaning that teachers who disagree they were able to uphold the IEPs also disagree they had good access to human resources.

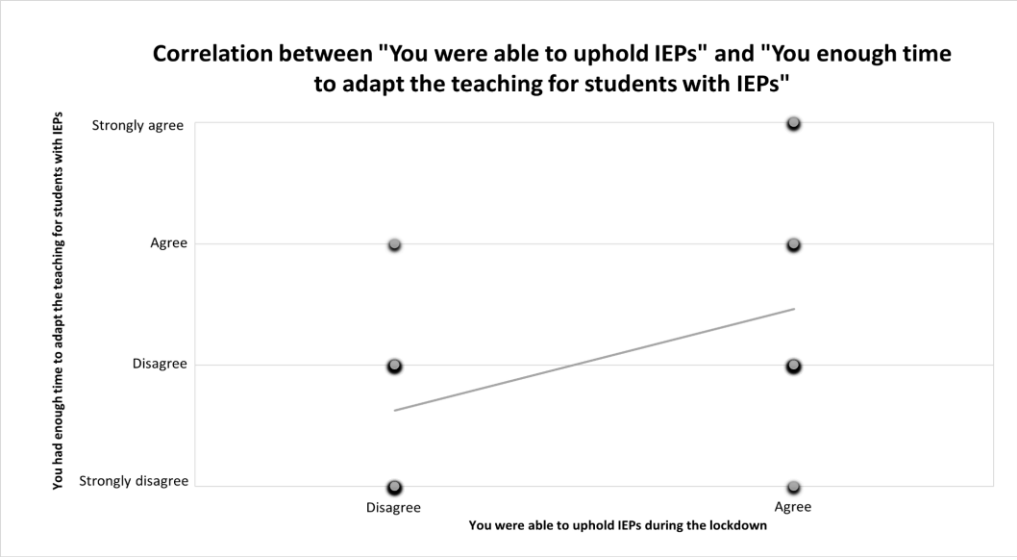

Figure 10: Scatter plot showing the correlation between "Uphold IEPs" and "Access to human resources"

The trend line in figure 10 shows a positive correlation between the two groups agree and disagree in *uphold students' IEPs* and the variable *enough time to adapt for IEPs*, meaning that teachers who disagree they were able to uphold the IEPs also disagree they had enough time to adapt their teaching for students with IEPs.

4.3 K3 - Communication in and construction of didactical theory

4.3.1 Descriptive statistics

Table 8 presents the descriptive statistics of all single variables within K3. It shows the survey question/statement along with their answer options and the counts of how many chose the specific answer option, shown in percent. The mode and median are presented for each variable to show the central tendency. Descriptive graphs corresponding to table 8 can be found in the appendix J.

Table 8: Respondents' answers to the survey questions on ordinal level in K3

Respondents' answers to the survey questions on ordinal level in K3 ***(n=100, 0 missing)***				
Survey Questions	Answers	Counts%	Median	Mode
Education				
What is your highest completed pedagogical education?	No formal education One semester Year course/PPU Bachelor Master Ph.d	1 2 15 52 30 0	Bachelor	Bachelor
What is your highest completed subject-specific education?	No formal education One semester Year course/PPU Bachelor Master Ph.d	2 2 22 51 23 0	Bachelor	Bachelor
What is your highest completed special needs education?	No formal education One semester Year course/PPU Bachelor Master Ph.d	55 13 17 8 7 0	No formal education	No formal education
The school gives you opportunities for professional development/courses/further education relevant to the subject you teach.	Strongly disagree Disagree Agree Strongly agree	17 31 34 18	Agree	Agree
Reflection				
I have high self-efficacy as a teacher in general	Strongly disagree Disagree Agree Strongly agree	1 3 59 37	Agree	Agree
I have high self-efficacy in the subject chosen for this survey	Strongly disagree Disagree Agree Strongly agree	1 3 53 43	Agree	Agree
You use reflection systematically as a tool to improve your curricula and your teaching	Strongly disagree Disagree Agree Strongly agree	2 7 51 40	Agree	Agree
Common frame of reference				
You believe that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.	Strongly disagree Disagree Agree Strongly agree	3 18 48 31	Agree	Agree
The school leadership believes that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.	Strongly disagree Disagree Agree Strongly agree	3 21 48 28	Agree	Agree

Education

Table 8 shows the majority of teachers in the study have education in pedagogics. Most hold a bachelor's degree in both pedagogy and in the specific subject they teach, although a year course or PPU is more common for the specific subjects. Masters and bachelor's degrees in special needs education makes out only 7% and 8% of the respondents, where the majority has no formal education, and some have a year or less. The statement regarding the school offering in-service education shows close to a 50/50 split between the agree and disagree categories, suggesting different practices in different schools.

Common frame of reference and reflection

The two statements related to a common frame of reference in terms of special needs education yields similar results of the distribution between the categories disagree and agree. This might suggest the schools represented by this sample have a common frame of reference regarding special needs education. Moreover, the majority of teachers report on using reflection systematic as a tool to improve their curricula and teaching. This suggests schools set aside time for this work and might also be a reason for the seemingly common frame of reference.

Experience

Table 9 presents the respondents years of experience, both as a teacher in general and as a subject teacher, including the survey questions, mean, median, range, skewness and kurtosis, and the results of the Shapiro-Wilks test of normal distribution.

Table 9: Respondents' answers to the survey questions on ratio level variables within K3

Respondents' answers to the survey questions on ratio level variables within K3 ***(n=100, 0 missing)***								
Survey Questions	Mean	Median	SD	Min	Max	Skewness	Kurtosis	Shapiro-Wilks W/ *p*
Years of experience								
How many years have you worked as a teacher?	11.2	10.0	7.80	1	39	0.959	0.730	0.919 *< .001*
How many years have you worked as a subject teacher?	10.3	9.00	7.34	1	30	0.910	0.120	0.911 *< .001*

Table 9 shows the teachers in this sample have worked as teachers 11.2 years on average. The length of experience varies from one year to 39 years. The distribution of the data is

presented in figure 11.

Figure 11: Histogram showing spread and frequency of years of experience

As seen in figure 11, the histogram has a left skew, as majority of teachers have between 0-20 years of experience. It follows a unimodal distribution, as the number of teachers drops as the years of experience increase. The wide spread of the data is due to outliers in the data set, and Only a few respondents seem to be in their first year of service, while the highest frequency is found for 3-6 years of experience. This is further visualized with the box plot in figure 12.

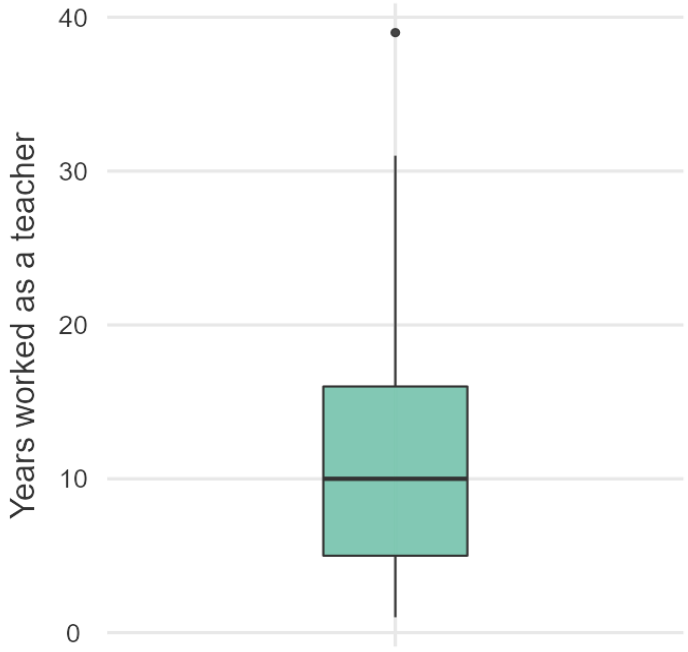

Figure 12: Boxplot showing spread of years of experience

The box plot in figure 12 confirms the outlier at the top of the spread and confirms that 50% of the teachers have 5-16 years of experience. Table 9 also shows the variable failed the Shapiro-Wilks test for normality, and a QQ-plot is presented to further investigate the distribution of the variable.

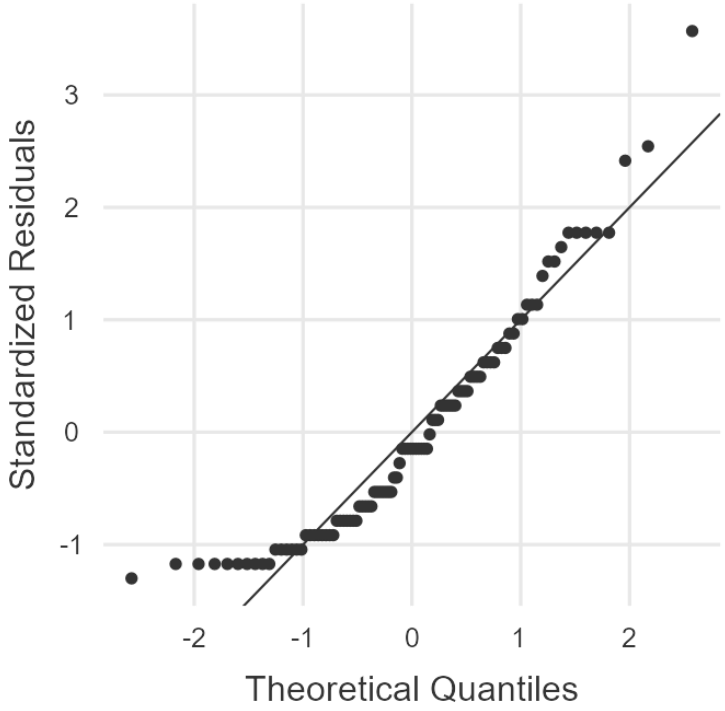

Figure 13: QQ-plot showing the distribution of the data

The data plots in the figure 13 QQ-plot fall on or close to the line most of the time. However, some deviations are seen at the top and bottom, and normal distribution for this variable is not assumed.

Table 9 also shows the teachers in this sample have worked as subject teachers 10.3 years on average, meaning the teachers have less experience working as subject teachers versus teachers in general. The length of experience varies from one year to 30 years. The distribution of the data is presented in figure 14.

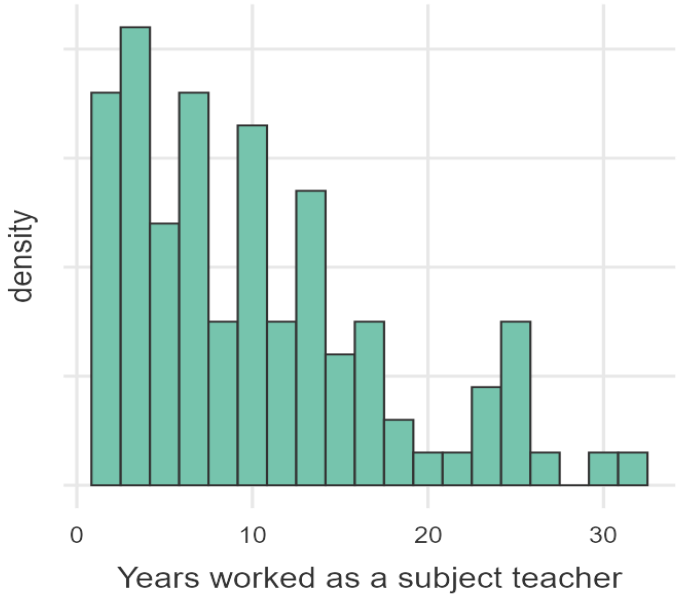

Figure 14: Histogram showing the distribution of the data

The histogram in figure 14 shows less teachers have more years of experience, resulting in the right skew. Most of the respondents have between 2-3 years of experience. A spike in density can be seen between 24-26 years of experience, and approximately the same number of teachers have around 20 years of experience and 30 years of experience as subject teacher. To further investigate the distribution, figure 15 presents a box plot.

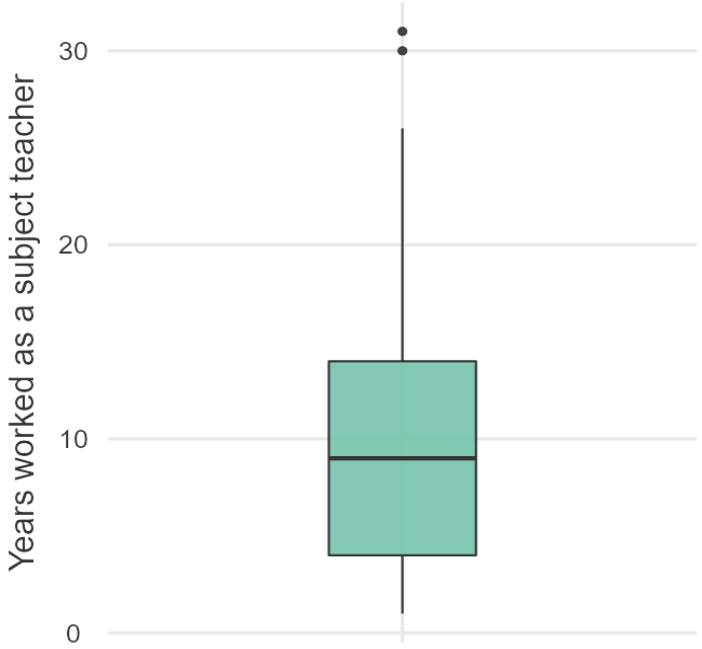

Figure 15: Box plot showing the distribution of the data.

The box plot reveals the teachers with around 30 years of experience are categorized as outliers within the dataset. 50% of the teachers have between 4 and 14 years of experience. As the data has outliers and the Shapiro-Wilks test of normality failed, figure 16 presents the QQ-plot of the variable.

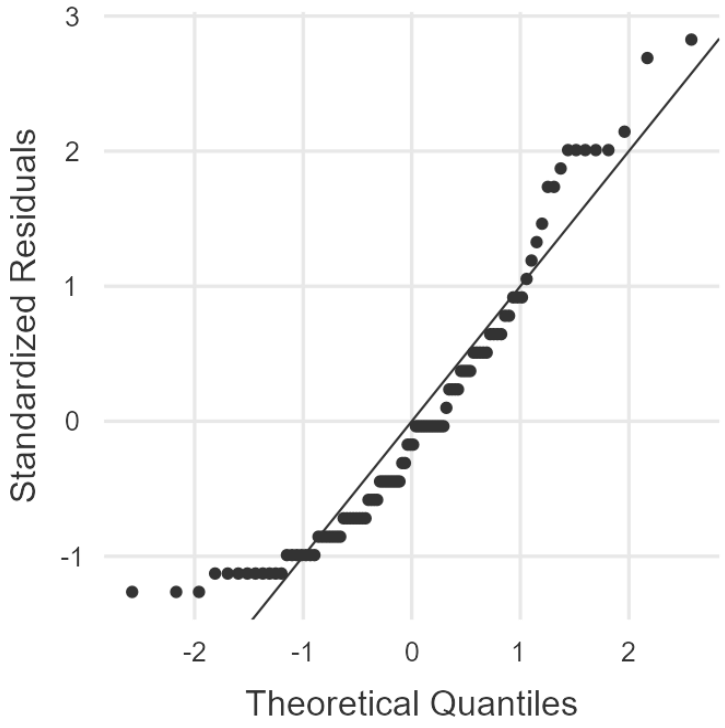

Figure 16: QQ-plot showing the distribution of the data

The QQ-plot reveals outliers in both ends of the graph. Although most of the data points fall on or close to the line, they deviate from the line at the top. In combination with the Shapiro-Wilks test, normal distribution of this variable should not be assumed.

4.3.2 Inferential statistic

This chapter presents the findings of the analysis between the dependent variable and the independent variables found within the K3- level. The results of Spearman's correlation matrix are presented in table 10, and the results of the Mann-U Whitney independent *t*-test are presented in table 11.

Table 10: Results of the Spearman's correlation analysis of ordinal level variables in K3.

Results of the Spearman's correlation analysis of ordinal level variables in K3. All variables paired with variable "*You were able to uphold students' IEPs during the school lock-down*" (*n* = 100, 0 missing).				
Education				
What is your highest completed pedagogical education?	Spearman's rho *p*-value	0.16 *0.052*	Holm's *p*	0.572
What is your highest completed subject-specific education?	Spearman's rho *p*-value	0.11 *0.138*	Holm's *p*	1.000
What is your highest completed special needs education?	Spearman's rho *p*-value	-0.01 *0.545*	Holm's *p*	1.000
The school gives you opportunities for professional development/courses/further education relevant to the subject you teach.	Spearman's rho *p*-value	0.050 *0.314*	Holm's *p*	1.000
Reflection				
I have high self-efficacy as a teacher in general	Spearman's rho *p*-value	0.20 ***0.024***	Holm's *p*	0.432
I have high self-efficacy in the subject I chose for this survey	Spearman's rho *p*-value	0.18 ***0.039***	Holm's *p*	0.512
You use reflection systematically as a tool to improve your curricula and your teaching	Spearman's rho *p*-value	0.19 ***0.030***	Holm's *p*	0.510
Common frame of reference				
You believe that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.	Spearman's rho *p*-value	-0.03 *0.631*	Holm's *p*	1.000
The school leadership believes that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.	Spearman's rho *p*-value	-0.03 *0.629*	Holm's *p*	1.000

Significant correlations marked in bold.

The correlation matrix in table 10 reveals no variables yielding significant values, neither for the Spearman's correlation or the adjusted *p*-value. Significant raw *p*-values are observed within reflection. However, these significant values might be due to chance as described earlier, and the adjusted *p*-value needs to be taken into consideration. The same trends can be seen in table 11.

Table 11: Results of the independent t-test of the ratio level variables in K3

Results of the independent *t*-test of the ratio level variables in K3. Both variables paired with variable "*You were able to uphold students' IEPs during the school lock-down*" (*n* = 100, 0 missing). Significant correlations marked in bold.									
Variable	**Uphold IEP**	Mean	Median	SD	SE	Statistic	*p*	*Holm's p*	Effect size
Experience									
How many years have you worked as a teacher?	Disagree	9.85	8.50	7.27	1.05	1007	0.096	0.960	0.19
	Agree	12.3	10.0	8.16	1.13				
How many years have you worked as a subject teacher?	Disagree	8.71	7.00	7.05	1.02	912	**0.020**	0.380	0.27
	Agree	11.7	10.0	7.36	1.02				

Although the mean between the two groups *agree* and *disagree* within the variable UpholdIEP are different in both the dependent variables, the difference is not big enough to be considered statistically significant. A significant raw *p-value* is observed in the table. However, these significant values might be due to chance as described earlier, and the adjusted *p*-value needs to be taken into consideration.

4.5 Summary

This chapter has presented the descriptive and inferential analysis of the data collected through the online survey. All variables K1, K2 and K3 were presented as single variables. All single variables were paired and analyzed for a statistical relationship with the dependent variable “I was able to uphold IEPs during the lockdown”. 4 variables yielded both significant *p*-values and *ρ*-values, two in K1 and two in K3. No pairs of variables yielded significant values in K2. These variables are presented below, and were, for the context of this sample and study, factors impacting the teacher’s ability to uphold students' IEPs during the school lockdown in spring 2020.

On K1-level

- Students with IEPs can efficiently use LKT as a learning resource in their education.
- The students with IEPs can efficiently use ICT as a tool in their education.

On K2-level

- You had good access to human resources.
- You had enough time to successfully adapt your teaching for students with IEPs in a way that met the learning goals in the IEP.

5 DISCUSSION

The research question of this study was *How do primary and middle school teachers rate their own success in upholding IEPs during the school lock-down in Norway from March 12th-medio April 2020?* The results of this study show that 48% of the teachers in this sample disagree they were able to uphold student's IEPs. The research objectives of this study were to identify specific factors which could be linked to higher and lower self-reported success, i.e., which factors were ranked "agree" or "strongly agree" by those who also reported "agree" or "strongly agree" on the ability to uphold the IEPs. Additionally, which factors were ranked "disagree" or "strongly disagree" by those who also reported "disagree" or "strongly disagree" on the ability to uphold the IEPs. The result showed four factors with this *positive correlation*. Two were found in K1: the ability of students with IEP to efficiently use LKT as a learning resource in their education, and the ability of students with IEP to efficiently use ICT as a learning resource in their education. Two were found in K2: the teacher's access to human resources and having enough time to adapt the teaching for students with IEPs in a way that met with the learning goals in the IEP.

An interpretation of the results is presented first. A discussion of implications of the results follows before limitations and further recommendations are discussed.

5.1 Interpretation

The results indicate the challenges of upholding IEPs during the lockdown are connected to the actual teaching situation (K1), and the development of their teaching plans (K2). The following parts present a discussion of the interpretation of the results in all three competence levels.

K1 - The teaching situation

Digital literacy

The factors in K1 are both related to the students' digital literacy; their ability to use ICT and LKT efficiently. This is not surprising, as recent research establishing students lack digital literacy (Nordahl et al., 2018; Spurkland & Blikstad-Balas, 2016). On the other hand, 86% of the teachers agree all students learn to use LKT as a tool in their education, and 94% agree all students learn to use LKT as a resource in their education (table 1). This indicates most

students represented in this sample learn digital literacy in school. However, learning to use them and being able to understand and critically evaluate information from digital resources, as stated in the national curriculum (Utdanningsdirektoratet, 2017) are not the same. The result from this study identifies a gap between learning and using ICT and LKT for students with IEPs, as 60% agrees students with IEPs can efficiently use LKT, and 66% agree students with IEP can use ICT. This gap is possibly the reason why students who received help from parents performed better during the lockdown, as identified by Fjørtoft (2020). Why this gap exists is not clear from either studies. On one hand, it might suggest students with IEPs need more support in learning how and when to use the digital tools. On the other hand, students with IEP might have struggled if the teachers introduced new or unfamiliar digital tools during the lockdown. Students who were familiar with the digital tools and digital teaching methods prior to the lockdown were able to better navigate the tools and teaching during the lockdown (Fjørtoft, 2020). Consistency in choices and utilization of digital tools for students with IEP might reduce the gap between learning and using digital skills. However, it is important to keep in mind that the questions regarding *learning* ICT and LKT were not specified to students with IEP, but all students, while questions about *using* ICT and LKT were. It is also important to keep in mind that IEPs are as individual as the student. Students with heavy or complex learning needs might not have been able to utilize digital tools efficiently regardless, and this nuance was not included in this study.

K2 - Construction the teaching program

Within K2, the factors are related to resources and time. This is not surprising, as teachers reported on a higher workload than normal (Federici & Vika, 2020, p. 38; Fjørtoft, 2020, p. 43).

Human resources

The fact that the number of human resources available influenced the teachers' ability to uphold IEPs suggests a confirmation of reallocations of staff during the lockdown. It might also suggest that the teacher lost the organizational support on facilitating learning for students with IEPs such as co-teaching or one-on-one teaching, and thus resulting in not being able to uphold the IEP. Interestingly, 51% of the teachers *disagree* they received support from a special needs teacher when they needed it, but 81% *agree* they received good support from other teachers when they needed it (table 7). A few reasons might explain the

result: 1) More special needs teachers were reallocated than other teachers, 2) the lack of specialized help from the special needs teacher might have increased the disagree rate, and 3) teaches lacked help within the teaching situation but received help and support outside of the teaching situation. However, the results tell us that teachers need more help and support from people in order to be able to uphold IEPs in an online teaching situation.

Time

The change from physical to online teaching was done almost overnight, and it was anticipated that factors related to time would be influencing factors. However, the only aspect which yielded values to be considered significant, was the factor of having enough time to successfully adapt the teaching for students with IEPs in a way that met the learning goals in the IEP. Although it is not surprising that factors directly related to the IEP influence the ability to uphold it, the results do suggest teachers needed more time to prepare or the shift from physical to online teaching. This is in line with the other factors related to time, as the majority of the teachers disagree they had enough time to adapt, plan and collaborate. However, it might also confirm recent research stating that IEPs are not really used as guides for the planning and teaching (NOU 2016:17, n.d.). Not having enough time can mean "not prioritized", signaling that the IEP is not an important document in the planning process. The survey did not ask how the IEP is being used, and clear insight into this topic cannot be provided. A possible reason for not having enough time can also be connected to the number of resources available. Finding appropriate resources can be time consuming, and there is a possibility the adaption for students with IEPs might have been done only partially. Looking at the counts of answers in table 6, 30% *strongly disagree* they were able to adapt the teaching for students with IEP, and 44% *disagree.* Although these numbers do not reveal the true difference between these two answer options, it might be linked to incompletely or partially being able to adapt. It might also be related to the findings about the digital literacy of students with IEP. Teachers might not have had enough time to help the students navigate the digital landscape as good as other students, or enough time to find appropriate tools. However, the results suggest teachers need more planning time in order to adapt their teaching for students with IEPs, possibly more support from special needs teachers in order to know how to do it, selecting resources and possibly more support in the classroom to increase the number of digital tools available for the students. Moreover, the vast majority of teachers disagree they had good collaboration with external institutions (table 6). Although this insight

is outside of the scope of this study, better support from external institutions might have made the adaption for students with IEP easier and smoother, and thus less time consuming.

K3 - Communication in and construction of didactical theory

No factors in K3 yielded significant results, and for this sample, aspects related to K3 did not influence the ability to uphold IEPs during the lockdown. However, this is still an interesting result in the study. The K3 level can be seen as the foundation of the three levels, as it focuses on education, reflection, and a common frame of reference; all aspects which are more abstract than factors in K1 and K2. This result suggests that the level of education, experience, reflection, and schools common frame of reference did not impact the ability to uphold IEPs during the lockdown, depicting a situation where the teachers and the schools themselves did not pose an obstacle in this matter. This is positive news, as these less tangible factors can be hard to measure and evaluate, and time consuming to change.

An interesting observation is that years of experience did not have an impact on the ability to uphold the IEPs for this sample. Both national and international studies (Antonsen, Maxwell, Bjørndal, & Jakhelln, 2020; Nilsen, 2020; Nordahl et al., 2018; Pit-ten Cate et al., 2018) showed newly graduated teachers struggled adapting and catering for students with special needs, suggesting experience within the field is significant. However, the results of this study suggests that experience did not, or to a lesser degree, prove as an advantage. A possible reason why experience was not significant for the sample in this study, might be that the online teaching situation was a new situation for all teachers, regardless of their years of experience. This suggests two considerations to be made: Either the pre-service education provided sufficient preparation for a digital teaching situation, or the in-service education did not provide enough preparation for a digital learning situation. It would be unfair to expect teachers, universities, and schools to completely prepare for a fully digital learning situation, as the change happened over night. However, knowledge, understanding and implementation of digital tools and skills are possibly lacking in one way or another, as the number of years did not make a difference.

The results show the challenges are situated within the practical levels of the teaching, suggesting the preparation and focus to better support teachers to uphold IEPs in a fully digital teaching situation needs to be connected to practical aspects of the teaching.

5.2 Closing reflections

The articles and documentation which led me into this topic all raised concerns about whether students with special needs received the teaching and education they had the right for during the lockdown (Ertesvåg, 2020; Federici & Vika, 2020; Helsedirektoratet, 2020). According to the sample in this study, there is hold in this concern, as 48% of the sample disagree they were able to uphold IEPs during the lockdown. However, as discussed above, there might be several confounding factors behind this result, for example the IEP was not used as a foundation for the teaching. Another factor to consider is that teaching is highly personal work, and teachers might set unrealistic standards for their work, and thus, from their point of view, feeling as if they did not manage to uphold the IEPs. To gain deeper knowledge into this matter, and get a more balanced view of this, studies where the students' perspectives are included is needed. Lastly, it seems important to highlight that, although 48% disagree they managed to uphold IEPs, 52% agree they managed. Considering all the challenges, restraints and changes these teachers experienced during the period, a majority of the sample is left with positive reflections of the situation regarding IEPs. It suggests that the Norwegian school system, school leaders and teachers are on the right path to ensuring all students receive meaningful teaching, also in an online teaching situation. The results from this highlight some possible pain points to further increase the *agree*-percentage in a similar situation in the future, and the implications of these findings are discussed in the next section.

5.3 Implications

In many ways, the results of this study aligns with existing studies done on the teaching situation during the Covid-19 school lockdown in spring 2020, showing lack of digital literacy, high workload, and lack of time (Federici & Vika, 2020; Fjørtoft, 2020; Gilje et al., 2020). Although existing reports say differentiating, special needs education and upholding IEPs were challenging, none of them looks at *why* this was challenging. The results presented in this study have identified four factors which made this work challenging and are valuable factors to consider when schools and teachers are planning for fully digital teaching.

Teachers need to make sure students with IEPs not only learn how to use digital tools, but also learn when to use them and how they can work as tools and resources in their education. These tools should be used on a regular basis in order for the students to be familiarized with

them. Moreover, teachers need to be mindful of utilizing new and unfamiliar digital tools when the students do not have access to support.

School leaders need to be mindful of allocating enough people to assist teachers in their teaching if their class has students with IEPs, and especially special needs teachers. They also need to ensure enough planning time for teachers who have students with IEPs, in order to find best possible solutions for each individual student in order to utilize the best resources and methods. Support in implementing appropriate digital tools for different learning needs might be beneficial, and school leadership could increase collaboration with external institutions in order to support the teachers in this. Moreover, an investigation into how the IEPs are actually being used in the school might also be beneficial. If IEPs are indeed mere administrative documents, focus on training teachers in how to use IEPs as a guiding document to ensure meaningful teaching might be in order.

Policy makers and politicians might want to consider allocating more resources for human resources in school when it is fully digital. Assistants or other teachers might be hired as help for teachers in order to alleviate the workload and open up time for planning and collaboration.

5.4 Limitations

As with every research, this study is also not free from limitations. Firstly, the results from this study cannot be generalized to the population. A sample of 100 respondents only make out a small part of the entire population. Because the sample was self-selected, chances the sample is representative of the population can also not be guaranteed. The sample might not be 100 different respondents, and all respondents might not fit the inclusion criteria of teaching a class in primary or middle school, with at least one student with an IEP during the lockdown in spring 2020. Moreover, because the sample was self-selected and unsupervised, assumptions that all respondents had the same understanding of the questions, or that respondents answered truthfully cannot be guaranteed.

Secondly, the reliability of the survey is difficult to determine. Although Cronbach's alpha yielded a strong correlation in the reliability test (α = .86), checking for reliability though retesting in an identical environment would pose almost impossible. First of all, the survey

was assessing a situation which was highly contextual. Secondly, if we were to distribute the survey again, the time between the lockdown and the completion of the survey would be longer than in this study.

Thirdly, the content of the questionnaire has some shortcomings. In K1, the survey did not investigate how often students would keep their microphones and videos off. This would be valuable in order to see whether or not this has an impact on upholding IEPs. In K2, the survey did not investigate and compare levels of collaboration and support *before* the lockdown and *during* the lockdown. This would have been especially valuable to get a clearer view of the question about collaboration with external institutions. Questions about how the IEPs are being used in a day-to-day context would be beneficial. Lastly, the K3 level should have included a specific question related to in-service education related to special needs education, to see if this would have had an impact on upholding IEPs during the lockdown.

Fourth, this survey is not trying to answer *why or how* these factors impacted the ability to uphold IEPs, but rather give an overview of *what* impacted the ability. This study offers limited details, as the *independent variables* were only paired with *one dependent variable*. It does not look at correlations between more *independent variables.* Different variables within the dataset might have had an impact on each other. Moreover, the survey does not provide insight into class dynamics or culture. It would provide an interesting insight into the different classrooms and unarguably important aspect of upholding IEPs, but this was outside of the scope of the survey.

5.5 Recommendations

This survey provides an overview of the teaching situation and does not delve into details of the situation. Special needs education during Covid-19 is still in its early beginnings, and more research is needed to fully understand the situation and how teachers can be better equipped to cater for all needs in an online teaching situation. *Larger studies*, specifically investigating the state of special needs and the usage of IEPs in school and in online teaching situations, need to be conducted. This would provide deeper insight into the topic, and more reliable and generalizable results. *More specified studies* are needed to look directly into specific factors and how they relate to the rest of the situation, their impact and how it can be improved. An example would be looking at *access to human resources* for teachers who

facilitates teaching for students with IEPs in an online teaching situation. Moreover, research looking at how several factors impact the teacher's ability to facilitate teaching for students with IEPS and trying to provide a more detailed presentation of *why and how* these factors have an impact. *Qualitative studies* on challenges teachers, special needs teachers, and school leadership tackles during online schooling and possible solutions are needed. Moreover, qualitative studies looking into how less tangible factors impact the online teaching situation is needed. Examples of such factors can be culture and dynamics, both in the class and within the school as a community, for both students and staff. An important contribution for understanding the state of online special needs education, are qualitative studies taking the perspective of students with special needs and their parents. Lastly, *systematic reviews* should provide a toolbox of best practices and tools for online special needs education. These studies would benefit from being focused on specific learning needs and provide a list of digital tools beneficial for students with these specific learning needs.

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Appendix A. Personal invitation to colleagues.

Hi friends!
I hope you are all doing well! I miss you all!

Some of you may know that I am writing my master thesis this semester in special needs education. I am doing research on how well teachers felt they were able to uphold IEP's during the school lock-down in March-April 2020. I would love to hear your opinion through this survey: https://nettskjema.no/a/179084

The survey takes about 10 minutes, and it is completely anonymous. It cannot be traced back to you or [school name], as I am sharing it everywhere I can (so feel free to forward it to anyone you know who taught in the spring 2020 in Norway!).

The goal is to publish an article showing what teachers need in order to be better equipped to facilitate teaching for students with extra needs.

Let me know if you have any questions, or if you wanna grab a virtual coffee. I really do miss you all.

Lots of corona-friendly hugs.
Liv :)

Appendix B. Email forwarded through personal connections.

Kjære ansatte på [skolenavn],

Mitt navn er Liv Jorunn Sætra, og jeg er masterstudent i spesialpedagogikk ved Universitetet i Oslo. Jeg skriver masteroppgave dette semesteret.

I masteroppgaven forsker jeg på læreres opplevelse av å ivareta IOP'er under skolestengingen i mars-april 2020. Hvordan opplevde de det? Hadde de alt for å klare det bra? Var det vanskelig å gjennomføre? Jeg vil veldig gjerne høre deres meninger, og lurte på om du kan videresende denne mailen til lærerne på skolen?

Hensikten er å kunne se hva vi lærere trenger for å klare å ivareta IOP'er når all undervisning plutselig må gjøres online. Dette blir samlet til en artikkel som skal sendes inn til publisering i tidsskrifter og aviser. Målet er å vise hva vi lærere trenger for å stå bedre utrustet til å ivareta de med ekstra behov i en hjemmeskolesituasjon. Jeg håper dere vil være med å bidra.

Jeg har lagt ved en link til spørreundersøkelsen (tar ca 10 minutter). Den er helt anonym, og kan ikke spores tilbake til hverken lærere eller skolen de jobber på. Informasjonen fra denne undersøkelsen blir brukt i mitt masterprosjekt.

Bare ta kontakt om dere lurer på noe!

Link til spørreundersøkelsen: https://nettskjema.no/a/179084

Hilsen Liv Jorunn Sætra

Appendix C. Invitation to the survey, posted on Facebook.

Hei alle sammen!

Jeg er masterstudent i spesialpedagogikk og forsker på grunnskolelæreres opplevelse av å ivareta IOP'er under skolestengingen i mars-april 2020. Hvordan opplevde dere det? *Hadde dere alt for å klare det bra? Var det vanskelig å gjennomføre?* Jeg vil veldig gjerne høre deres mening!

Hensikten er å kartlegge faktorer som påvirket mestringsfølelsen av å ivareta IOP'er både positiv og negativt når all undervisning plutselig måtte gjøres online. Dette blir samlet til en artikkel som skal sendes inn til publisering i tidsskrifter og aviser. Målet er å vise hva vi lærere trenger for å stå bedre utrustet til å ivareta de med ekstra behov i en hjemmeskolesituasjon. Jeg håper dere vil være med å bidra!

Linken under tar deg til en spørreundersøkelse (ca 10 minutter). Den er helt anonym, og kan ikke spores tilbake til hverken deg eller skolen din. Informasjonen fra denne undersøkelsen blir brukt i mitt masterprosjekt. Jeg studerer ved Universitetet i Oslo. Bare spør om dere lurer på noe:)

På forhånd tusen takk!

https://nettskjema.no/a/179084

Appendix D. Contract of purpose.

Samtykkeerklæring
mellom
Liv Jorunn Sætra
og
«Pålogga»

Svar kort og konsist på spørsmålene. Pålogga vil vurdere erklæringen og gi en tilbakemelding innen to dager.

Tittel på forskningsprosjektet:
Grunnskolelæreres selvrapporterte mestring av ivaretakelse av IOPer under koronastengte skoler våren 2020 i Norge: en kvantitativ undersøkelse om faktorer som påvirker selvrapportert mestring.

Bakgrunn og formål med prosjektet?
Bakgrunn: Mange rapporter viser til at elever med spesialpedagogiske behov (IOP) ikke har fått den opplæringen de har krav på (Federici & Vika, 2020; Helsedirektoratet, 2020; Nilssen, H., Trommald, M., Greve-Isdahl, M., Carlsen, E. M., 2020). Rapportene fra Federici & Vika og Nilsen et.al (2020; 2020) har kartlagt for eksempel skolenes ressursfordelinger, IKT-kunnskap, digital infrastruktur og dekning av teknologisk hardware (ibid.). Likevel mangler vi kunnskap om hvilke faktorer rundt lærerne som førte til et redusert opplæringstilbud for elever med IOP.
Hensikten med dette prosjektet er dermed å finne hvilke faktorer som knyttes til lavere selvrapportert mestring hos grunnskolelærere, og hvilke faktorer som kan knyttes til høyere selvrapporter mestring.
Målet er å kunne avdekke konkrete faktorer og foreslå konkrete tiltak knyttet lærerne, slik at de står bedre rustet til å ivareta IOP-er når undervisning må gjøres digitalt.

Hva innebærer deltakelse i studien?
Deltakelse innebærer å svare på en anonym spørreundersøkelse. Den tar ca 10 minutter.

Hva skjer med innhentede opplysninger?
Innhentede opplysninger blir analysert og brukt i min masteroppgave knyttet til Masters of Special Needs Education fra Universitetet i Oslo. Opplysningene blir lagret i Universitetet i Oslos spørreskjemasystem "Nettskjema" frem til 1. August 2021, og deretter slettet.

Hvilke grupper ønsker dere poste i?
- Koronadugnad for digitale lærere
- Koronadugnad for digitale lærere 1-7

- Koronadugnad for digitale lærere 8-10

Når ønsker dere poste innlegg? Ved ønske om gjentatt posting må det fremkomme her.
Så snart som mulig. Jeg ønsker å starte å poste i Koronadugnad for digitale lærere, og deretter de to andre med 3 dagers mellomrom.

Deltakernes rettigheter
Så lenge en kan identifiers i datamaterialet, har en rett til:

- innsyn i hvilke personopplysninger som er registrert om en
- å få rettet personopplysninger om en,
- få slettet personopplysninger om en,
- få utlevert en kopi av ens personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av ens personopplysninger.

Spørreundersøkelsen er 100% anonym, samler ikke inn sensitiv data, og svar kan ikke linkes tilbake til verken læreren eller skolen de jobber på. Om noen skulle ønske å trekke tilbake svarene, kan svarene slettes hvis de har dato og tidspunkt for innsendelse av spørreundersøkelsen.

Samtykke
Jeg samtykker at Pålogga har hverken juridisk eller økonomisk ansvar eller forpliktelse ved prosjektets utførelse eller spørreundersøkelsene.
All ansvar, samt deltakernes personopplysninger og rettigheter ligger hos **Liv Jorunn Sætra og Universitetet i Oslo.**
Publiserte resultater deles med Pålogga ved forespørsel.

Rælingen, 19.02.2021 Liv Jorunn Sætra

(Signert av prosjektansvarlig, dato og sted)

Federici, R. A., & Vika, K. S. (2020). *Spørsmål til Skole-Norge : Analyser og resultater fra Utdanningsdirektoratets spørreundersøkelse til skoleledere, skoleeiere og lærere under korona-utbruddet 2020*. Nordisk institutt for studier av innovasjon, forskning og utdanning NIFU.

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Appendix E. Questions for pilot testing

Questions for pilot testing, Norwegian

1. Er instruksjonene innledningsvis og underveis tydelige og enkle å forstå?
2. Er spørmålene lette å forstå?
3. Kan noen av spørsmålene forstås på flere måter, eller er de tydelige?
4. Med svaralternativene "Helt enig/enig etc..": er de lette å velge, eller burde det være flere nyanser, f.eks "litt enig/uenig"?
5. Hvor lang tid brukte du på å gjennomføre undersøkelsen?
6. Noe du mener burde være med som faktor for å klare å tilrettelegge/ivareta IOP'ene?
7. Grammatikkfeil/skrivefeil?

Questions for pilot testing, bilingual

1. Are the questions and instructions in English and Norwegian understood in the same way?
2. Have I used the correct terms in English (safeguard, facilitate etc)
3. Do you find the survey easy to read and answer with both languages in one? Or is it messy and exhausting to read?
4. Grammatical or spelling errors?

Appendix F. Code book.

GradeLevel
Hvilket trinn var klassen din i da du underviste dem online i mars-april 2020?
What grade level was your class when you taught them fully online in March-April 2020?

1 Småskolen (1.-4. trinn)/Lower primary (grade 1-4)
2 Mellomtrinnet (5.-7. trinn)/Upper primary (grade 5-7)
3 Ungdomsskolen (8.-10.trinn)/Middle years (grade 8-10)

SafeguardIEP
Du føler at du mestret å ivareta elevenes IOP-er under skolestengingen i mars-april 2020.
You feel you were able to uphold students' IEPs during the school lock-down in March-April 2020.

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

NumberStudents
Hvor mange elever hadde du i klassen?
How many students were in your class?

NumberIEP
Hvor mange IOP-er måtte du tilrettelegge for?
How many IEP's did you have to facilitate?

DevelopIEP
Elevene har vært aktive deltakere i utviklingen av sin egen IOP.
The students have been active participants in the development of their IEP.

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

StudInternett
Alle elevene hadde en stabil internettilkobling under dine timer
All students had a stable internet connection during your lessons

StudLKT
Alle elevene lærer å bruke LKT som en læringsressurs i sin utdannelse
All students learn to use LKT as a learning resource in their education

StudICT
Alle elevene lærer å bruke IKT som et verktøy i sin utdannelse
All students learn to use ICT as a tool in their education

iepLKT
Elevene med IOPer klarer å bruke LKT hensiktsmessig som en læringsressurs i sin utdannelse
The students with IEPs can efficiently use LKT as a learning resource in their education

iepICT
Elevene med IOPer klarer å bruke IKT hensiktsmessig som et verktøy i sin utdannelse
The students with IEPs can efficiently use ICT as a tool in their education

StudAppAccess
Alle elevene hadde god tilgang på hensiktsmessige, pedagogiske programmer/apper/platforme
All students had good access to appropriate, pedagogical programs/apps/platforms

TeachTime
Mesteparten av undervisningstiden ble brukt til målrettet undervisning (dvs, du brukte ikke tid på å hjelpe elevene med teknologien
Most of the teaching time was used for targeted teaching (i.e. you did not spend time helping students with technology)

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly Agree

MaterialResources
Du hadde god tilgang på materielle ressurser
You had good access to material resources

HumanResources
Du hadde god tilgang på menneskelige ressurser
You had good access to human resources

AccessApps
Du hadde god tilgang på hensiktsmessige, pedagogiske programmer/apper/platformer
You had good access to appropriate, pedagogical programs/apps/platforms

StudentCommunication
Det var lett å kommunisere med elevene utenfor undervisningstiden
It was easy to communicate with the students outside of teaching hours

TimeAdaptOnline
Du hadde nok tid til å adaptere undervisningen din til online undervisning som samsvarte med læringsmålene for perioden
You had enough time to adapt your teaching to online teaching to successfully meet the learning outcomes for the unit/period

TimeAdaptIEP
Du hadde nok tid til å tilrettelegge undervisningen for elevene med IOP-er som samsvarte med læringsmålene i IOP-en
You had enough time to successfully adapt your teaching for students with IEPs in a way that met the learning goals in the IEP

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig /Agree
4 Helt enig / Strongly disagree

TeacherSupport
Du fikk god støtte av andre lærere når du trengte
You received good support from other teachers when you needed it

SpecialEdSupport
Du fikk god støtte av en spesialpedagog når du trengte det
You received good support from a special needs teachers when you needed it

LeadershipSupport
Du fikk godt støtte av ledelsen når du trengte det
You received good support from the leadership when you needed it

CollabTime
Du hadde nok planleggings- og samarbeidstid sammen med andre lærere
You had enough planning time and collaboration time with other teachers

FollowupLeadership
Du ble tett fulgt opp av ledelsen
You were closely followed up by the leadership

1 Helt uenig / Strongly diagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

ParentCommunication
Du hadde god kommunikasjon med de fleste foreldre
You had good communication with most of the parents

PPTCommunication
Du hadde god kommunikasjon med PPT/BUP og/eller andre spesialpedagogiske institusjoner
You had good communication with PPT/BUP and/or other special needs educational institutions

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

HighestPed
Hva er din høyeste gjennomførte pedagogikkutdannelse?
What is your highest completed pedagogical education?

HighestSubject <p>Hva er din høyeste gjennomførte fagspesifikke utdannelse?
What is your highest completed subject-specific education?

HighestSpePed
Hva er din høyeste gjennomførte spesialpedagogiske utdannelse?
What is your highest completed special needs education?

1 Ingen formell utdannelse/No formal education
2 Et semester (30 studiepoeng)/One semester (30 study points)
3 Årsenhet/PPU/Year course/PPU
4 Bachelor
5 Master
6 Doktorgrad/Ph.D.

YearsTeacher
Hvor lenge har du jobbet som lærer?
How many years have you worked as a teacher?

YearsSubjectTeacher
Hvor lenge har du jobbet som faglærer?
How many years have you worked as a subject teacher?

OfferCourses
Skolen gir deg muligheter til kurs/etterutdanning relevant for faget du underviser i.
The school gives you opportunities for professional development/courses/further education relevant to the subject you teach.

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

EfficacyGeneral

I lærerrollen generelt
As a teacher in general

EfficacySubject
I faget du valgte for denne undersøkelsen
In the subject you chose for this survey

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

ReflectionTeaching
Du bruker refleksjon systematisk som et verktøy for å forbedre undervisningsplanene dine og undervisningen din
You use reflection systematically as a tool to improve your curricula and your teaching

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

InclusionByTeacher
Du mener at alle elever, uavhengig av ferdigheter og evner, skal inkluderes i alle aktiviteter resten av klassen gjør.
You believe that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

InclusionBySchool
Skolens ledelse mener at alle elever, uavhengig av ferdigheter og evner, skal inkluderes i alle aktiviteter resten av klassen gjør.
The school leadership believes that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.

1 Helt uenig / Strongly disagree
2 Uenig / Disagree
3 Enig / Agree
4 Helt enig / Strongly agree

Appendix G. Holm's correction for multiple analysis.

Alpha level	Rank	Raw *p-value*	Varible	Holm's *p*	Outcome
0.05	35	0.00000240	TimeadaptIEP	0.000084	SIG
0.05	34	0.00000270	IEP use LKT	0.000092	SIG
0.05	33	0.00001900	IEP use ICT	0.000627	SIG
0.05	32	0.00003477	Human resources	0.001113	SIG
0.05	31	0.00004409	Material resources	0.001367	SIG
0.05	30	0.00015194	Student Access to Apps	0.004558	SIG
0.05	29	0.00017772	Time to adapt online	0.005154	SIG
0.05	28	0.00071000	Student Access to Apps	0.019880	SIG
0.05	27	0.00074000	Teaching was targeted	0.019980	SIG
0.05	26	0.00169147	Parent Comminication	0.043978	SIG
0.05	25	0.00260327	LeadershipSupport	0.065082	NON SIG
0.05	24	0.00300000	SNE teacher support	0.072000	NON SIG
0.05	23	0.00600000	Internet	0.138000	NON SIG
0.05	22	0.00600000	Student can use LKT	0.132000	NON SIG
0.05	21	0.01300000	Teacher access to apps	0.273000	NON SIG
0.05	20	0.01800000	Students can use ICT	0.360000	NON SIG
0.05	19	0.02000000	Years as subject teacher	0.380000	NON SIG
0.05	18	0.02400000	General self-efficacy	0.432000	NON SIG
0.05	17	0.03000000	Reflection	0.510000	NON SIG
0.05	16	0.03200000	Number of IEP	0.512000	NON SIG
0.05	15	0.03400000	Number of Students	0.512000	NON SIG
0.05	14	0.03500000	PPT communication	0.512000	NON SIG
0.05	13	0.03900000	Subject self-efficacy	0.512000	NON SIG
0.05	12	0.04400000	Collaboration time	0.528000	NON SIG
0.05	11	0.05200000	Ped education	0.572000	NON SIG
0.05	10	0.09600000	Years as teacher	0.960000	NON SIG
0.05	9	0.13800000	Subject education	1.242000	NON SIG
0.05	8	0.22000000	Support from teachers	1.760000	NON SIG
0.05	7	0.30800000	Follow-up leadership	2.156000	NON SIG
0.05	6	0.31400000	School offer courses	1.884000	NON SIG
0.05	5	0.37600000	Grade level	1.880000	NON SIG
0.05	4	0.54500000	SNE education	2.180000	NON SIG
0.05	3	0.62900000	School's belief	1.887000	NON SIG
0.05	2	0.63100000	Personal belief	1.262000	NON SIG
0.05	1	0.84700000	Students developed IEP	1.262000	NON SIG

**Adjusted p-values above 1.0 are denoted as 1.000 in analysis tables.*

Appendix H. Descriptive table of Cronbach's alpha test for reliability.

Ordinal level variables

Scale Reliability Statistics

	Cronbach's α
scale	0.860

[6]

Item Reliability Statistics

	if item dropped
	Cronbach's α
GradeLevel	0.862
SafeguardIEP	0.853
DevelopIEP	0.862
StudInternett	0.857
StudLKT	0.855
StudICT	0.855
iepLKT	0.854
iepICT	0.855
StudAppAccess	0.856
TeachTime	0.852
MaterialResources	0.852
HumanResources	0.851
AccessApps	0.854
StudentCommunication	0.851
TimeAdaptOnline	0.848
TimeAdaptIEP	0.848
TeacherSupport	0.857
SpecialEdSupport	0.856
LeadershipSupport	0.848
CollabTime	0.855
FollowupLeadership	0.853
ParentCommunication	0.856
PPTCommunication	0.853
HighestPed [a]	0.864
HighestSubject	0.861
HighestSpePed [a]	0.866
OfferCourses	0.857
EfficacyGeneral	0.859
EfficacySubject	0.857
ReflectionTeaching	0.859
InclusionByTeacher	0.863
InclusionBySchool	0.862

[a] reverse scaled item

Ratio level variables

Scale Reliability Statistics

	Cronbach's α
scale	0.497

[6]

Item Reliability Statistics

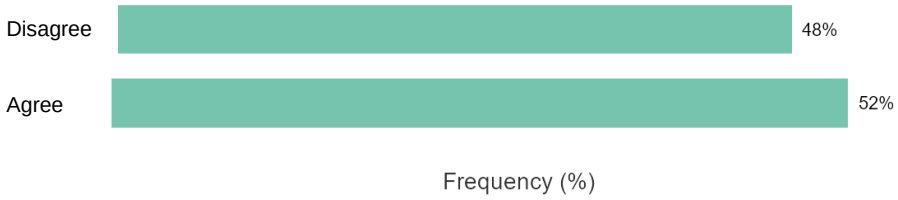
	if item dropped
	Cronbach's α
Number of IEP [a]	0.5492
YearsTeacher	0.0402
YearsSubjectTeacher	0.0743
Number of students [a]	0.7085

[a] reverse scaled item

Appendix I. Descriptives plots K1.

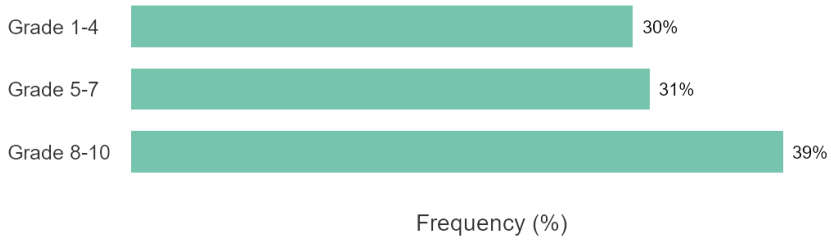
SafeguardIEP_groups

You feel you were able to uphold student IEPs during the school lock-down.



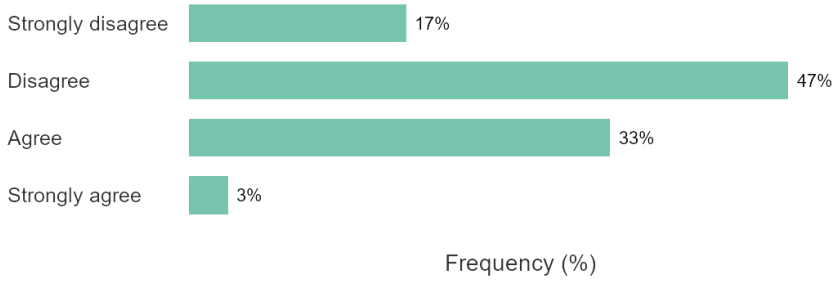
GradeLevel

What grade level was your class?



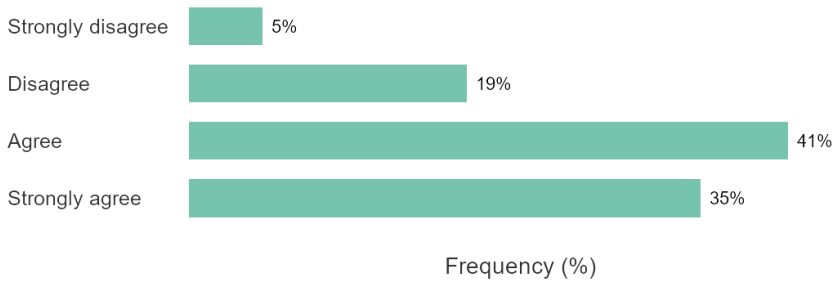
DevelopIEP

Students have been active participants in the development of their IEP.



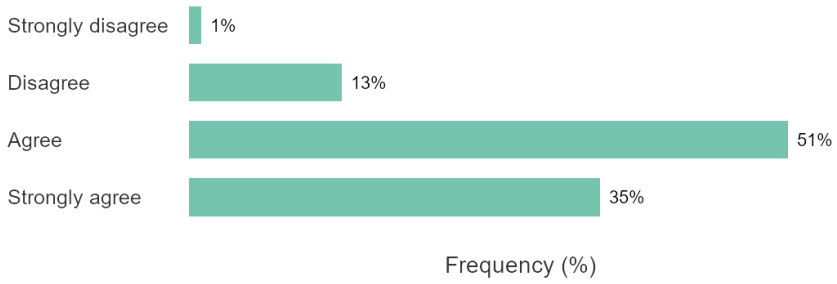
StudInternett

All students had a stable internet connection during your lessons.



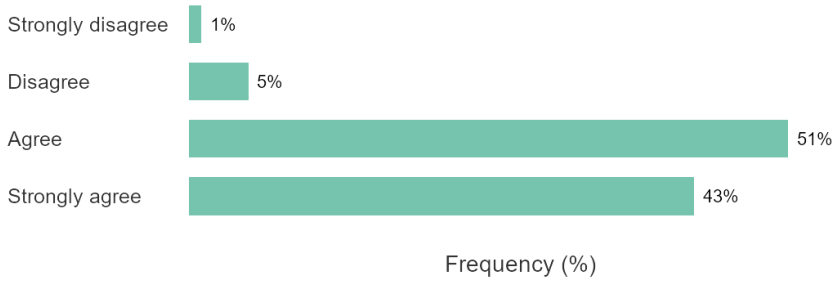
StudLKT

All students learn to use LKT as a learning resource in their education.



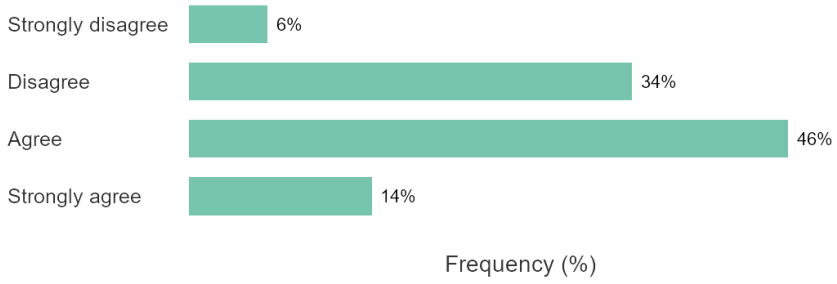
StudICT

All students learn to use ICT as a tool in their education.



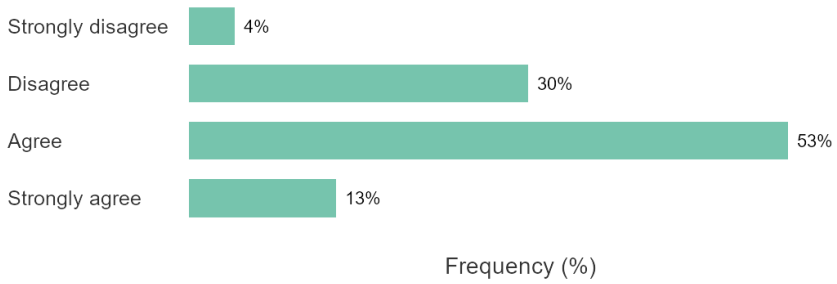
iepLKT

The students with IEPs can efficiently use LKT as a learning resource in their education.



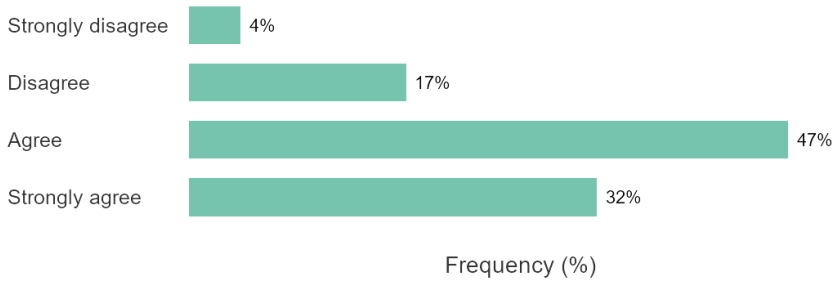
iepICT

The students with IEPs can efficiently use ICT as a tool in their education.



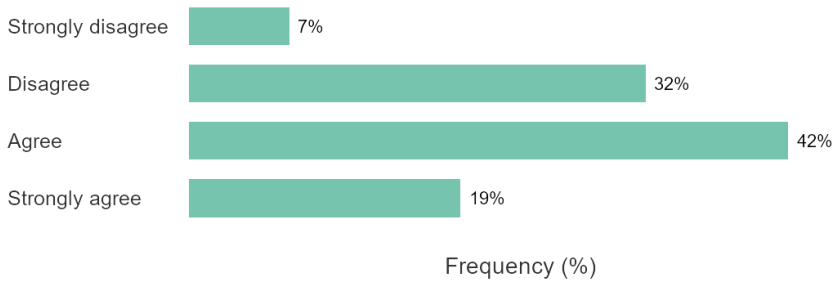
StudAppAccess

All students had good access to appropriate, pedagogical programs/apps/platforms.



TeachTime

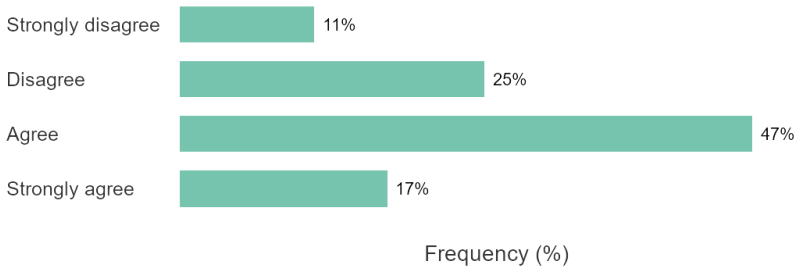
Most of the teaching time was used for targeted teaching



Appendix J. Descriptives plots K2.

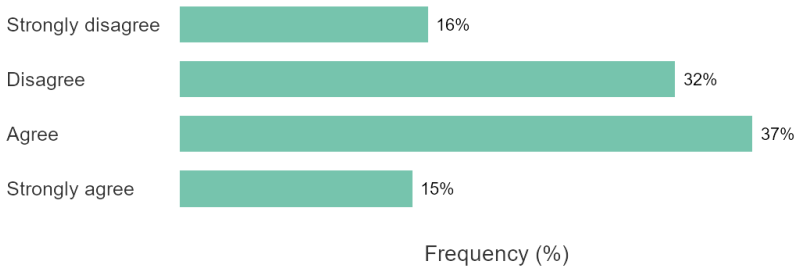
MaterialResources

You had good access to material resources.



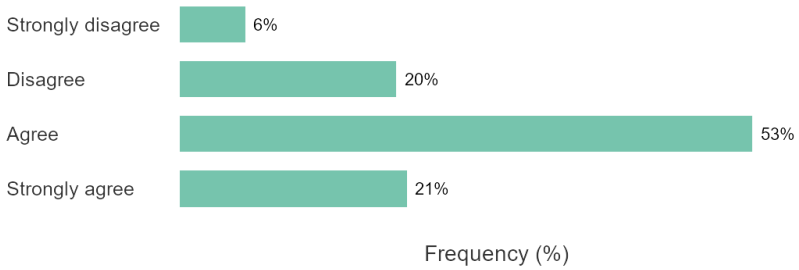
HumanResources

You had good access to human resources.



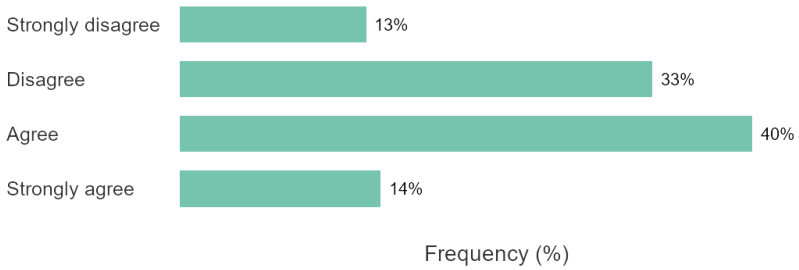
AccessApps

You had good access to appropriate, pedagogical programs/apps/platforms



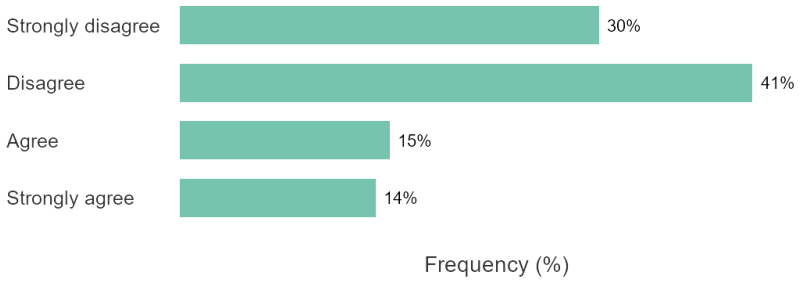
StudentCommunication

It was easy to communicate with the students outside of teaching hours



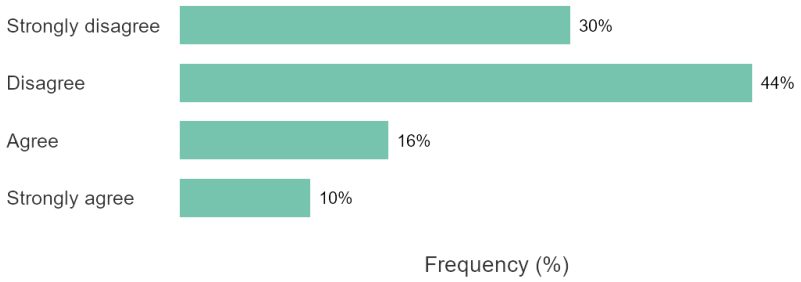
TimeAdaptOnline

You had enough time to adapt your teaching to online teaching to successfully meet the learning outcomes for the unit/period



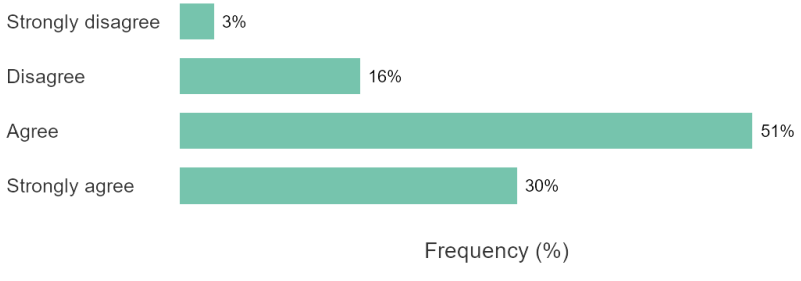
TimeAdaptIEP

You had enough time to successfully adapt your teaching for students with IEPs in a way that met the learning goals in the IEP



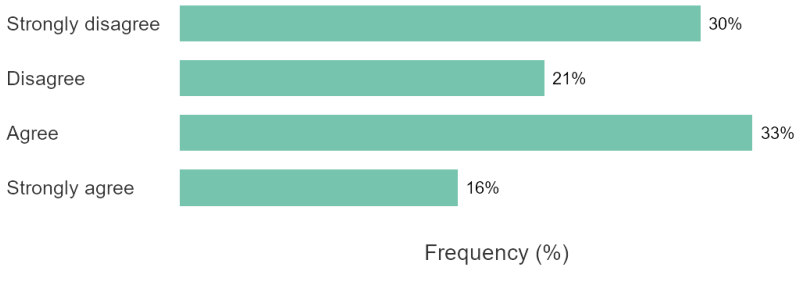
TeacherSupport

You received good support from other teachers when you needed it



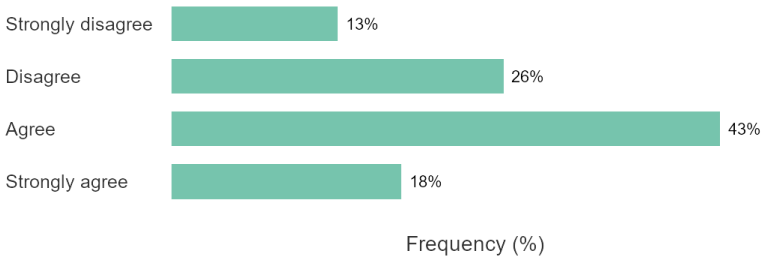
SpecialEdSupport

You received good support from a special needs teachers when you needed it



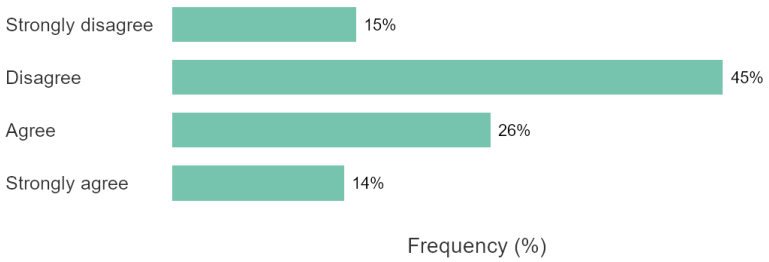
LeadershipSupport

You received good support from the leadership when you needed it



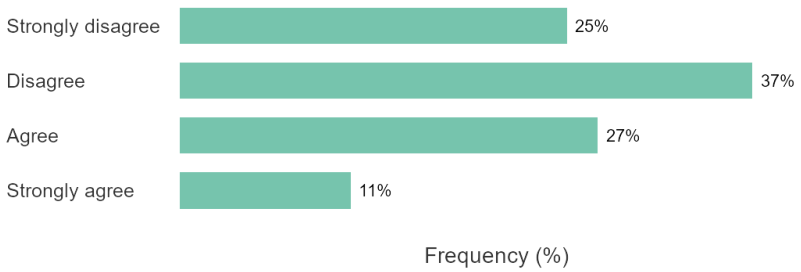
CollabTime

You had enough planning time and collaboration time with other teachers



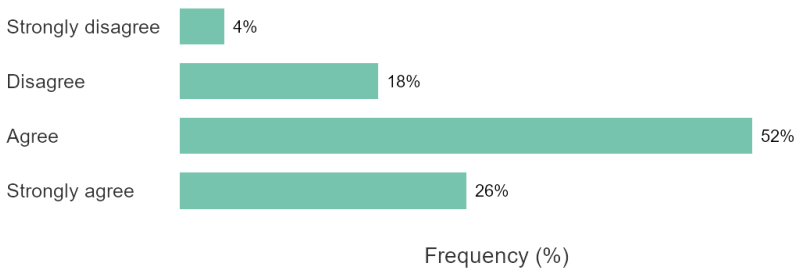
FollowupLeadership

You were closely followed up by the leadership



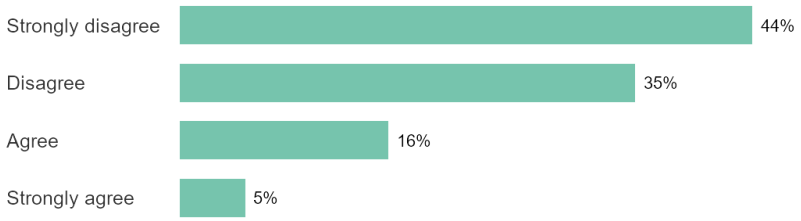
ParentCommunication

You had good communication with most of the parents



PPTCommunication

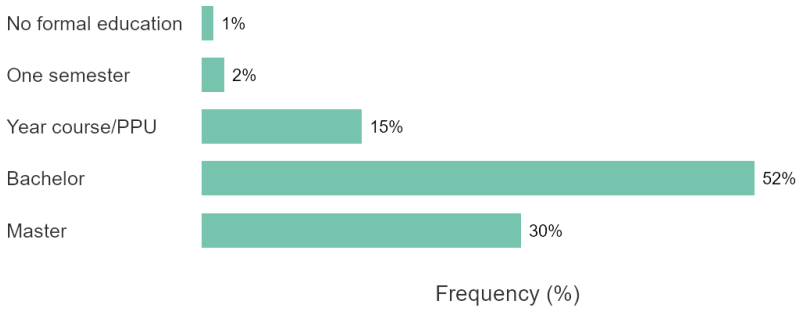
You had good communication with PPT/BUP and/or other special needs educational institutions



Appendix K. Descriptives plots K3.

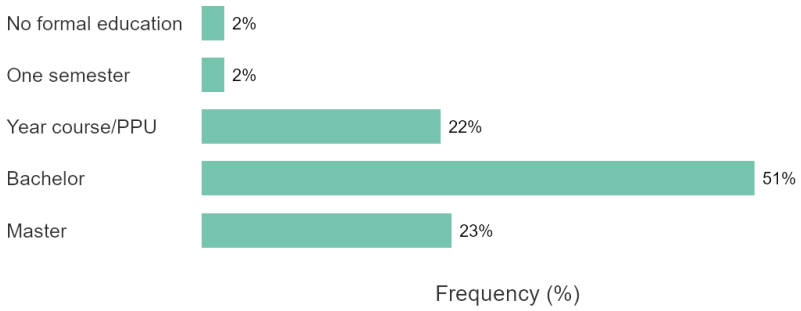
HighestPed

What is your highest completed pedagogical education?



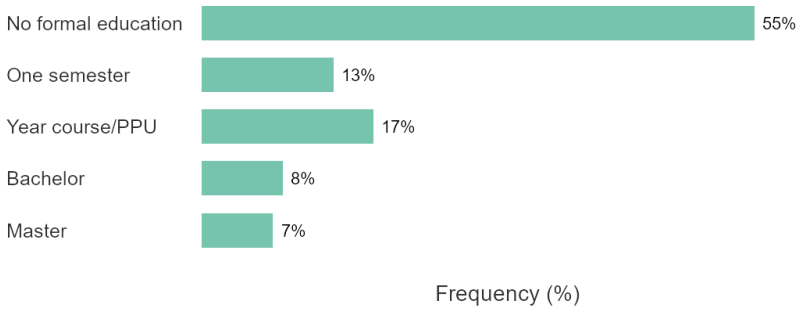
HighestSubject

What is your highest completed subject-specific education?



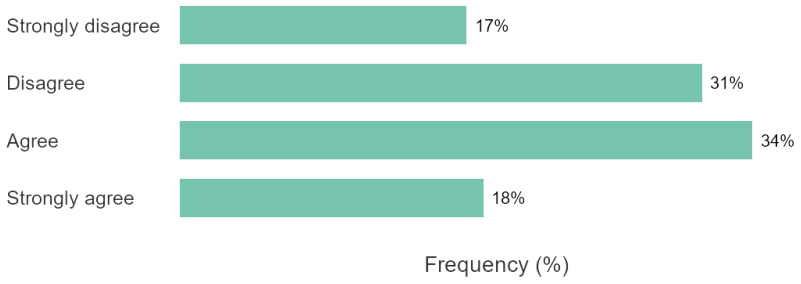
HighestSpePed

What is your highest completed special needs education?



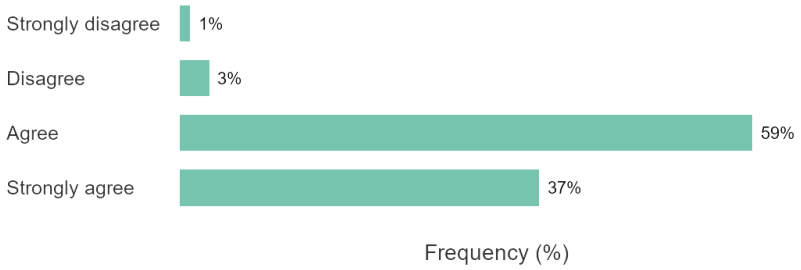
OfferCourses

The school gives you opportunities for professional development/courses/further education relevant to the subject you teach.



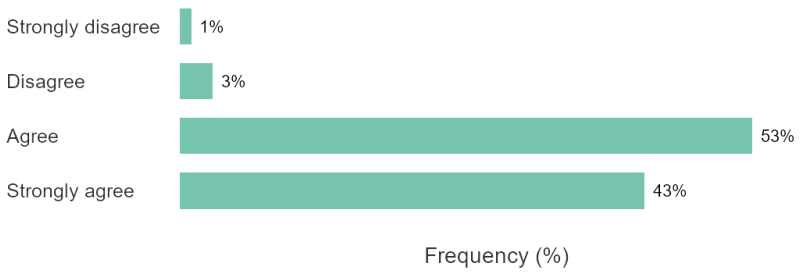
EfficacyGeneral

I have high self-efficacy as a teacher in general



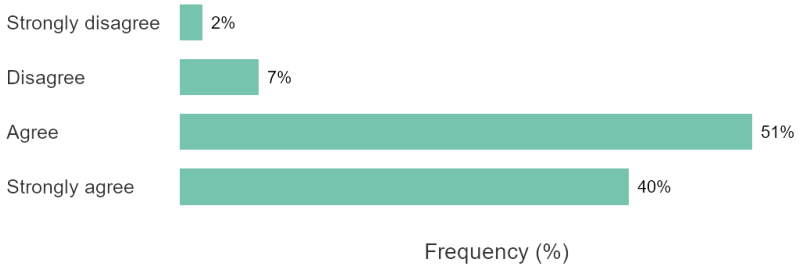
EfficacySubject

I have high self-efficacy in the subject you chose for this survey



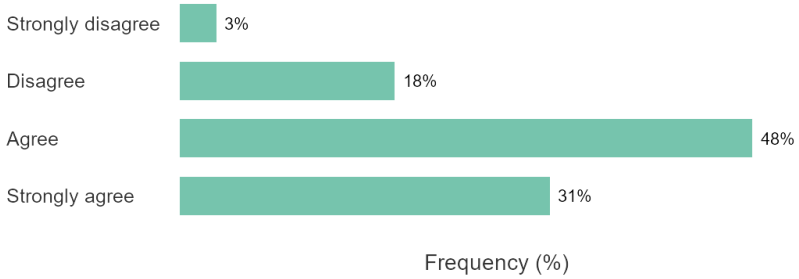
ReflectionTeaching

You use reflection systematically as a tool to improve your curricula and your teaching



InclusionByTeacher

You believe that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.



InclusionBySchool

The school leadership believes that all students, regardless of skills and abilities, should be included in all activities the rest of the class does.