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How do Educators Experience Teaching with Digital Personalised Learning

Through the lens of Finnish and Flemish educators

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The use of educational technology has accelerated in primary and secondary education; platforms and tools are utilised on a weekly basis. The effect and impact of these technological implementations have not been met with the same speed. The work of educators is critical in incorporating those technologies, and in that regard, their significance is often under-researched. With a particular interest in primary education, I aim to include the voices of those standing in the classroom and implementing Digital Personalised Learning (DPL) tools such as the ViLLE platform and i-Learns' online portal.

Accordingly, this qualitative research study investigates (primary school) educators' experiences with DPL using the ViLLE tool (Finland) and the i-Learn tool (Flanders/Belgium). This research aims to address the research question of "*How do Educators Experience Teaching with Digital Personalised Learning?*" by conducting semi-structured interviews with educators who have implemented DPL through the method of reflexive thematic analysis (RTA) following Braun and Clarke's principles (2019). This study involves 12 educators (n=12), of which six are from the Belgian group and six from the Finnish one.

With the constructionist epistemology of RTA, I explored the variety of experiences and the meaning given by these educators. The results found that support, autonomy, efficiency, effort and sentiment are important factors to consider when researching DPL efforts in these contexts. The most prevalent finding showcased the stress on educators exercising an active role within the classroom when using the DPL tool, in which description of guiding and facilitating students were prioritised.

This study overall aims to provide several insights with important themes, such as the need for additional support, the role of efficiency and effort, and educators' views on the extent of technology's involvement in education. In addition, the findings provided insight into educators' perceptions of technology's role in education as either an aiding tool or regarded with an overtly technocentric view. It also showcases the need for future research. A discrepancy between the interpretation and the theoretical definition was showcased through participants' emphasis on pupils' autonomy and its importance which illustrated how the aspect of autonomy is significant to DPL from an educator's perspective.

Keywords: Educators, Teachers, Digital Personalised Learning (DPL), Personalised Learning (PL), Autonomy

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1 Introduction

In the aftermath of Covid-19, education underwent rapid development with the increased use of technologies (Dang & Zhang, 2022). The impact of the virus changed the narrative of how education can look with the help of educational technology. While technological changes have often been argued with the narrative of replacing a teacher by media, school practitioners have made this redundant on several occasions (Merikko & Kivimäki, 2022). Teachers are not afraid to use technology in their classrooms to better their students' learning journeys, especially with adaptive learning technologies. This study shows how Finnish and Flemish teachers utilise the importance of their role and their change of responsibilities in these technologies, particularly in DPL tools.

As DPL has gained traction due to its ability to tailor learning experiences to the individual's needs and interests with the help of educational technology, its effect has not been of the same magnitude (Schmid, Pauli, Stebler, Reusser & Petko, 2022). DPL has the potential to revolutionise the way we approach education, but its success hinges on how educators perceive and implement it in their classrooms. This study's goal is to examine those events through the eyes of educators in order to advance our understanding of DPL from their point of view. There is a significant lack of research that studies the effects of DPL, yet Zhang, Basham and Yang argue that the change from a teacher-centred to a student-centred approach entails a consistent and rigorous effort to enhance research in regard to its implementation (2020). Therefore, to acquire a more objective view of the advantages and difficulties, it is essential to look at educators' opinions and experiences with DPL. Often, the benefits are categorised under the pedagogical aspect of inclusive education in which self-directed learning is supported. Personal needs and differences are also considered, encouraging self-motivation and self-regulation (Balakrishnan, 2017, as cited in Li & Wong, 2021). On the other hand, challenges are noted in the aspect of limited technological literacy, issues regarding data privacy, and the cost of development (O'Donnell, Sharp, Wade & O'Donnell, 2013, as cited in Li & Wong, 2021).

The motivation behind researching primary school educators' experience of digital personalised learning is driven by the need to gain insights into their unique perspectives with the i-Learn and VILLE tools and experiences with this approach respective to their Flemish and Finnish contexts. Through this research, I aimed to gain insights into the barriers and challenges educators face to enhance the understanding of their perceptions and implementations of the tools,

with the goal of developing a deeper knowledge that can enhance educators' knowledge and skills in DPL in the context of i-Learn and ViLLE.

Through this Master's programme, I got acquainted with digital transitions in education. This was primarily due to commencing this program during Covid-19. This fast-paced change of learning environment that morphed into a hybrid one opened my curiosity towards online learning environments. Furthermore, my interest in primary education was due to my personal experience of helping a family member in their abrupt change of learning environment. With this, I gained first-hand experience in how children are affected by these changes and how there is a need to further enhance these experiences to encourage a fruitful learning process.

1.1 Contextual framework

Before reading my study on Educators' Experiences Teaching with Digital Personalised Learning (DPL), a section on the contextual framework might help to understand the broad context of this study. The choice of conducting this study within the Flanders region (Belgium) and Finland was due to the aim of including multiple contexts regarding the field of DPL. The range of accessibility I had played a substantial role, meaning that being a student studying in Finland whilst partly living in Belgium opened the opportunity of conducting my research in both contexts. Furthermore, the choice to include both Flemish and Finnish educators in this study was due to the rigorousness of selecting an adequate sample size of participants to substantiate my findings per qualitative research (Hennink, Kaiser & Weber, 2019). As recommended by Braun and Clarke, a minimum of 10 is encouraged for a Master's thesis (2019). In terms of these contexts, the strength of Reflexive Thematic Analysis highlighted both contextual experiences to reveal the challenges and opportunities (Flemish and Finnish) educators may face with DPL. This study comes together to investigate how they have actively experienced the implementation of DPL and to understand the challenges that can be understood and further addressed through sufficient support. This is why, in this study, these two contexts are regarded with rigour. The analysis was carried out per group in order to emphasise the awareness of the different contexts. It is important to note that this is not a comparative study, as I aim to emphasise the outcome respective to the context. This research aims to report the outcome of the interviews in relation to a discussion based on the literature. As this study was carried out in Finland and Belgium, where information and Internet technologies are generally thought to be quite advanced, the present findings may not apply to students in other countries.

The main objective of this research is to develop a conceptual understanding of their experiences with DPL in an explorative manner. This does not entail the dismissal of the influence of the context, as questions such as “(a) Are some themes present in one dataset but not another? (b) If a theme is present in datasets from both groups in an analysis, is the expression of that theme different between groups?” are posed throughout the discussion in order to emphasise the conceptual meanings given per group (Guest, MacQueen & Namey, pp. 162-163).

1.2 Research question

My development towards a research question could be considered simultaneously deductive and inductive. Starting with this study, I had initially set out to answer ‘*How do teachers define their role within DPL?*’ as I found supporting literature entailing the need for further research on their changing roles within student-centred learning (Li & Wong, 2021). However, once commencing Phase 1 of Reflexive Thematic Analysis (Data Familiarisation), I knew that my interviews and their strength did not lie in answering the initial research question. Therefore, I set out to let the data speak for itself and not aim to answer a pre-determined research question. With this, I aimed for the content to emphasise and reflect the data without the overt influence of a conceptual framework whilst acknowledging that having had a previously determined research question influenced this process inevitably, as these cannot be simultaneously exclusive. The field of DPL is quite novel in education. For example, the impact of DPL on educational outcomes has rarely been studied (Schmid, Pauli, Stebler, Reusser & Petko, 2022). Additionally, Schmid, Pauli and Petko emphasised the disconnect between personalised learning and the use of these digital technologies. They state that a dialogue between school practitioners and researchers must occur more often (2022). The aspect of dialogue is also further supported by Van Schoors, Elen, Raes, Vanbecelaere and Depaepe (2023) regarding the need for teachers to be better supported in the future. In prompt, the needs of teachers have been scarcely recognised (Groff, 2017, as cited in Van Schoors, Elen, Raes, Vanbecelaere & Depaepe, 2023). Li and Wong have emphasised future research regarding the realisation of the constraints and challenges of using these technologies. The perspectives of teachers and their roles with the increasing trend of student-centred teaching and the need to further research types of support required to enhance the implementation of DPL are addressed (2021).

The emphasis that I addressed was establishing a dialogue with the educators to seek meaningful answers in future research that could more narrowly address the implementation of DPL.

This study aims to document and analyse educators' professional experiences of DPL within the context of DPL tools. As mentioned above, the field of DPL is novel, and its impact has been underrepresented (Schmid, Pauli, Stebler, Reusser & Petko, 2022). With an emphasis on their professional lived experiences, I believed I would better understand how they interacted and interpreted the tool and the DPL options. This, for me, was a self-explanatory first step towards understanding their perspectives in a broader context that could be utilised more narrowly in later research. With this, the following main research question was established to entail the broadness of meaningful experiences I interpreted from the data.

RQ: How do Educators Experience Teaching with Digital Personalised Learning?

Additional sub-questions included "What aspects of DPL do educators value?", "What are some of the challenges with using DPL?" and "What aspects need to be considered in the future?"

The above-mentioned research question was intended to include an awareness of the educators' real-world experiences. The broadness of the question is additionally connected with the findings of this study as the broadness of that part seeped through in the finalising of a research question. As with this, I aimed to address the various meaningful findings I interpreted from these participants without excluding themes that did not align with each other.

It is important to clarify that the use of the term educator rather than teacher has its purpose in this study. While I initially aimed to solely include teachers in this study, I found that ICT coordinators who were still teaching or had previously taught with these tools were interested in sharing their experiences. Therefore, their participation is further addressed in-depth in *4.1. Procedure and Participants* and entailed a broader use of the term. The choice of term educator was utilised in this study based on it falling under the roles of educators such as "*teaching, curriculum development, advising and mentoring, education leadership and administration, and learner assessment*" (p. 61, Irby & O'Sullivan, 2018). Their role as ICT coordinators is applicable in advising and mentoring, with the responsibility to guide the school and teachers in technological transitions. The role of educational leadership is due to their influence in adopting or discontinuing educational tools. Last but not least, some participants teach ICT to multiple grades.

2 Conceptual framework

When developing the chapter on the conceptual framework, I aimed to include a holistic overview that applies to DPL and simultaneously the social aspects of its implementation. With an in-depth literature study on DPL and its origins, I found the following aspects relevant to understanding the novel field; 1) the History of PL, 2) Personalised Learning, 3) Digital Personalised Learning and 4) Adaptive Learning. Whilst I simultaneously acknowledged the social aspects of DPL, due to it being under-researched in academia, I had to focus on the DPL tools' influence, the impact as well as the constraints of its implementation.

2.1 History of Personalised Learning

Apprenticeship and mentorship are two forms of personalised learning that have been around for centuries. In Europe and the Anglo-American nations, the concept of adjusting instruction to each student's requirements has a long and vast history (Schmid, Pauli & Petko, 2022). Looking back at the origins of Personalised Learning (PL), we see that this comes up in discussion in relation to a variety of educational approaches as well as regarding the different forms, such as design and learning theory (Walkington & Bernacki, 2020).

To take a step back to the 18th century, the French philosopher Jean-Jacques Rousseau has been noted as one of the first educational philosophers to campaign publicly for a system of education that places the pupil at the centre (UNESCO, 2017). Rousseau's premise of naturalism characterises progressive education, which encourages students to pursue their interests and preferences. This is exemplified in his publication of *Emile* in 1762, where the topic of naturalism discusses the development of joy, spontaneity, and curiosity. The character of *Emile* learns via direct, unmediated engagement with his surroundings, taking into account the natural interests and capacities he already possesses. In order to nurture a member of society, the environment actively works to promote this (Dishon, 2017). As with the value of personalised education, it is considered a means of facilitating the learner's natural development. Additionally, Rousseau believed that a child should be in charge of themselves as soon as they develop a will. Dishon emphasises the term "well-regulated freedom" within the context of Rousseau (p. 4, 2017). The sense of freedom is seen as a driver of efficiency for education. This resonates with the PL theory in the sense that once engaged and having autonomy, students will further develop and pursue their interests (Schmid, Pauli & Petko, 2022). Further down the line of history, in the 19th/20th century, John Dewey presented a philosophy of education that can be described as

multifaceted (UNESCO, 2017). Dewey emphasised that a child-centred approach to education should be considered instead of a curriculum-centred approach. According to his writing, educators must consider the disparities among students and recognise that every child has had a unique experience that influences their learning. Dewey thought a child must actively participate in an event to learn; education cannot be something given to or done to them. As a result, Dewey held that education should be based on experience and motivated by student interests (Dewey, 1915, as cited in Shemshack & Spector, 2020). One of the differences between the above philosophers is their view of educators' importance in the pupil's learning journey. Rousseau has been considered limiting towards educators, as freedom is central to a pupil's learning. Within this, the role of an (active) educator is seen as constraining for pupils to explore their environments further. Dewey considers educators as part of support towards their learning journey. They are, in this case, seen as facilitators in the cultivation and development of pupils through their support (Dishon, 2017).

Audrey Matters further explored the historical events of the West within the context of personalised learning in her book *Teaching Machines: The History of Personalised Learning* (2021). She commenced one of her historical accounts with an example of Sidney Pressey's work, which in the 1920s aimed to develop an 'automatic teacher' as exemplified by teaching machines that catered to the individual responses of the pupils in a positive reinforcement manner. Another example of PL occurred three decades later, in the 1950s, with educational psychologist B.F. Skinner 'teaching machines'. These machines let pupils respond to inquiries and get feedback at their own leisure. He thought the classroom had drawbacks since children learn at varying rates, and reinforcement was also delayed because of insufficient individualised attention. As each student typically lacked a personal teacher, Skinner created a notion of programmed learning that would be applied via teaching machines. Furthermore, the learning theory of behaviourism is regarded as an underpinning of PL by Skinner. This theory emphasises that a child is best taught by positive reinforcement with a process of stimuli and rewards with operant conditioning (Matters, 2021). Another learning theory is Bruner's (1966) model of constructivism, often utilised to represent personalised learning (as cited in Bernacki, Greene & Lobczowski, 2021). This theory indicates how learning should maintain that to make the most progress in learning, the active learner and their unique needs must come first (Cornelius-White, 2007, as cited in Schmid, Rauli & Petko, 2022). Last but not least, the aspect of personalised learning environments (PLE) is touched upon with Vygotsky's (1978) zones of proximal de-

velopment (ZPD) that indicate how pupils need challenges above their (personal) existing independence capacity. The emphasis is on the individual learner having learning opportunities that slightly exceed their capacity for independent comprehension. This learning is regarded from a social constructivist perspective that entails acquiring knowledge as a critical social activity. With this, Vygotsky regards PLE as a component of a system designed to enable students to relate their academic achievement to their actual performance in the workplace through work processes. This performance, in return, could further produce novel artefacts to be used among a ZPD (source).

Even with this historical overview, there is still a lack of a shared understanding of personalised learning and how it should be implemented (Schmid, Rauli & Petko, 2022). These historical occurrences all incorporated PL in the manner they deemed fit. Whilst being widely used around the world, the definition of the term is unclear. Due to the concept's complexity and the fact that it encompasses so many different elements, there is a great deal of variability in its definitions and applications (Schmid & Petko, 2019). Currently, there is a clear trend toward student-centred teaching strategies that effectively balance student autonomy and instructor scaffolding (Lazonder & Harmsen, 2016; Reigeluth et al., 2017, as cited in Schmid, Rauli & Petko, 2022). Furthermore, it is challenging to evaluate how personalised learning (PL) affects learners' educational experience and academic success since PL is defined differently in every context in which it is utilised (Bernacki, Lobczowski & Greene, 2021).

2.2 Personalised Learning

While personalisation and personalised learning (PL) have existed for several decades, their popularity has vastly risen. The theoretical alignment of PL lies in the learner-centred paradigm of education to better tailor the learning experience to each learner's specific requirements and experiences (Reigeluth, 2017, as cited in Schmid, Pauli, Stebler, Reusser & Petko, 2022). Li and Wong (2021) further support that PL lies in contrast to the traditional "one-size-fits-all" approach to teaching methods, which has been explored to hinder teachers from recognising and addressing students' specific strengths and needs, resulting in unfavourable consequences, including a greater dropout rate. However, Bernacki, Lobczowski and Greene warn of the overt acceptance of the effects of PL and fall into the trap of the jingle jangle fallacy. As with a broad, imprecise term like 'personalised learning', its use refers to various kinds of personalised instruction, resulting in inadequate labelling of the term and its effects. Therefore, the hopeful

attainment of these effects through adopting inadequate incorporation of personalised learning further results in the failure to achieve the promised advantages (2021). Personalised learning is a student-centred approach attempting to find better methods to handle the diversity of the children at school. Due to its conceptual variety, it has been implemented and interpreted in various ways, thus resulting in a lack of a coherent conceptual framework (Schmid & Petko, 2019). Various researchers have aimed to discuss the conceptualisation of PL, and I have chosen to include certain researchers and their conceptualisation due to their current relevance and extensive research in its conceptualisation.

I recognised the problem of this lack of conceptual overview and emphasised the different research dimensions within the personalised learning approach in schools. They highlight the crucial inclusion of two dimensions in the concept of PL; 1) student-centred teaching methods and 2) student voice and choice. Firstly, for a student to make the best possible learning progress, student-centred teaching methods must put the students' unique requirements at the centre of the lesson. In contrast with traditional teacher-centred instruction, student-centred teaching approaches involve greater levels of student autonomy. These student-centred teaching methods balance instructor guidance and student autonomy (Lazonder & Harmsen, 2016; Reigeluth et al., 2017, as cited in Schmid, Pauli & Petko, 2022). Second, the student has more control over the learning process because of this active participation in the process. They have a voice in the subject matter, the setting for learning, the time and location, and the social structure of learning. Also, the concept of self-directed learning is presented, in which students create their own learning plans with the help of their educators (Schmid & Petko, 2019, as cited in Schmid, Pauli & Petko, 2022). This means that both the assessment of their learning process and the location, time, subject, and social form are co-determined by the students. The effectiveness of personalised learning depends on the close alignment of teacher instruction and pupil activities, despite student-centred teaching methods and students' voices and choices being closely related (Schmid, Pauli & Petko, 2022).

According to Bernacki, Lobcozowski and Greene (2021), PL's definitions vary considerably across fields. As this variety encompasses learner traits to be adapted, the design features integrating them, and for the desired effects of personalisation to be attempted. This shows that personalised learning implementations may be complicated, as they require various design parameters to be evaluated or interacted with. This heterogeneity complicates the methodical research of personalised learning. It necessitates that a learning environment, whether human-driven vs. automated or face-to-face vs. digital, considers the learner and some pairing of their

foreknowledge, culture, aspirations, perceptions, interests, abilities, experience, and motivations with the intent to deliver an educational experience that is sensitive to these traits in ways that should enhance greater interaction and performance during a learning activity. The effort regarding the design process of PL needs to be based on the instructional design paradigm, according to Bernacki, Lobcozowski and Greene (2021). In this scenario, a student enters a learning environment designed to achieve a certain learning purpose, participates in learning, and is assessed on their comprehension or accomplishment of the intended aim. An evaluation of one or more student characteristics serves as the foundation for personalising this learning environment, and it must direct how changes to a principal instructional mode are made in these educational experiences (Bernacki, Lobcozowski & Greene, 2021). Bernacki and Walkington further emphasise the Context Personalisation theory in PL. It differentiates instruction by placing the educational assignment in the setting of the pupil's interests. This approach capitalises on pupils' existing interests in their current circumstances (2018, as cited in Bernacki, Lobcozowski & Greene, 2021) and their problem context expertise (Walkington & Bernacki, 2019, as cited in Bernacki, Lobcozowski & Greene, 2021). Within this theory of PL, a steady approach is provided on what to focus on within PL, such as the pupil's interests. Therefore this also translates to the instructional design processes of how to implement those interests within this educational approach. This additionally showcases the multifaceted view of the actual implementation of this theory, e.g., having to consider various features and design processes in the implementation so that the pupil's interest is adequately portrayed (Bernacki, Lobcozowski & Greene, 2021).

2.3 Digital Personalised Learning (DPL)

The term Digital Personalised Learning (DPL) encountered the same difficulties as PL regarding its conceptualisation. Its vast popularity showed a growth in educational research, resulting in additional definitions and terms aiding an already lacking conceptualisation of (D)PL (Schmid & Petko, 2019). The additional term Digital introduces the aspect of educational technology within PL in various ways, such as defining it with technology and tools, such as learning analytics and algorithms, to automate adaptive learning exercises and resources. Additionally, through the use of technological tools such as these digital ones, teachers can cater to the needs of individual pupils (Schmid & Petko, 2019).

Van Schoors, Elen, Raes and Depaepe emphasise that the notion of DPL occurs in a digital learning environment that adjusts to the unique needs of every learner in order to maximise

individual and/or collaborative learning activities with an emphasis on motivational, metacognitive, cognitive, emotional, and/or efficient outcomes. They additionally addressed the multifaceted view of the operationalisation of DPL, in other words, how it is being practised and in what way it varies as well. There is no clear-cut approach to defining the ‘Digital’ aspect of DPL (2021). Van Schoors, Elen, Raes and Depaepe (2021) systematically reviewed DPL on a conceptual and methodological basis and established a preliminary DPL framework. Their overview of 25 years of research generated a four-set framework in which DPL can be defined according to its characteristics that follow personalisation within DPL. These are the following:

“(1) various learner characteristics are considered, (2) different aspects of a learning environment can be adapted, (3) personalisation can be driven by the teacher, learner or tool itself and (4) teachers might enhance personalisation through the use of learner data visualised by the tool” (Van Schoors, Elen, Raes, Vanbecelaere & Depaepe, 2023, p. 2).

The first point emphasises the learner’s characteristics specifying the metacognitive, cognitive, emotional, and motivational traits. The second pertains to all facets of the learning environment, specifically the content, the (type, amount, and sequence of) learning tasks, the instruction, and the support that the learning environment provides regarding its adaptivity. Third, how personalisation can result from information given by the educator or the student themselves, as well as information gathered by the digital environment. Last but not least, the improvement of personalisation by the educator through making proper use of the information obtained by DPL tools. With the help of this framework, a clearer definition of DPL was established. However, it is still important to note that DPL and this definition are ever-evolving as it is a fast-paced field with tremendous progress towards its theory and technologies used (Van Schoors, Elen, Raes & Depaepe, 2021). This indicates that this definition could be viewed as an in-depth effort to conceptualise DPL with regard to its multicomplexes and various definitions.

Tsai, Perotta and Gašević (2020) have argued that learner empowerment and agency are often falsely presumed to have occurred due to the widespread use of personalised data technologies. Learning agency is defined by the ability to make decisions; thus, the individual has the capacity to make choices (Crick & Goldspink, 2014, as cited in Tsai, Perotta & Gašević, 2020). Their research on personalised learning approaches has shown a variety of interconnected elements leading to tensions that have arisen between increasing a learner's educational ownership and simultaneously limiting their autonomy in the learning analytics process as an active agent.

These elements range from the planning and execution of interventions to the gathering, analysing, and interpretation of data, the transparency of the algorithm development process, and the openness of the data process (Tsai, Perotta & Gašević, 2020). Within DPL, I would also suggest that the aspect of student autonomy and agency be further explicitly explored in a DPL context. As with the conceptualisation of PL, we see that the emphasis on one of the two dimensions lies within the student's voice and choice. Within this learner-centred paradigm, the learner's active ability to have a say in their learning processes is intrinsic to incorporating PL within the learner-centred paradigm (Schmid, Pauli & Petko, 2022). This is further supported by Li and Wong in their focus placed on student choice and ownership in guiding their own education as one of the most distinguishing characteristics of personalised learning (2021). With an emphasis on future research in defining DPL, this should be explored in an 'and' context and not an 'or' regarding the teacher also choosing to individualise their paths in DPL as seen with Van Schoors, Elen, Raes and Depaepe (2021). Most importantly, it is vital to take into account the warning given by Tsai, Perotta and Gašević in terms of the natural assumptions of learning data technologies being inherently empowering to the learner and to consider their future recommendations to avoid the observed tensions (2020).

2.4 Adaptive Learning

When mentioning DPL or PL, we cannot ignore the term adaptivity. Adaptive learning in this context is often used interchangeably with personalised learning (PL). The concepts upon which the adaptive learning system is based have been around for a long time, going all the way back to the days of human tutoring and apprenticeship training. The utilisation of adaptive learning for vast numbers of learners is currently of significant interest, which explains the widespread curiosity regarding big data and learning analytics (Shemshack & Spector, 2020).

Adaptivity entails the capability of a learning system to identify a variety of learner factors and to cater to a learner's particular needs by appropriately modifying the learner's experience to improve learning results. This, more specifically, entails that the application of the adaptations differs by adjusting for the learner's knowledge, emotional conditions, or degree of motivation. The adaptations vary in the degree of challenge or how the material is presented, feedback, or player involvement, as well as in the methods for measuring the learner characteristics that affect how adaptivity is operationalised (Plass and Pawar, 2020, as cited in Debeer, Vandebecelaere, Van Den Noortgate, Reynvoet & Depaepe, 2021).

In that sense, Groff sees adaptive learning as part of the umbrella term of personalised learning (2017, as cited in Li & Wong, 2021). Xie, Chu, Hwang and Wang (2019) additionally use adaptive learning and PL on an interchangeable basis due to their lack of conceptualisation, and whilst these are interchangeable, there is still a difference. The distinction between the two is that they may use various methods to meet several learning demands. By determining the characteristics of specific learners, personalised learning can be accomplished without responding to the ongoing development of a learner's capacity to do tasks. Moreover, adaptive learning can be applied in accordance with a learner's progress without disclosing pertinent personalised information, such as individual traits and preferences, that could further hinder growth or performance. However, once introduced within a technological scope, it mainly seeks to meet the students' various learning demands. Adaptivity in this research signifies a learning system's capacity to recognise a range of learner characteristics and to meet a learner's specific requirements by correctly altering the learner's experience to enhance learning outcomes (Plass and Pawar, 2020, as cited in Debeer, Vandebecaere, Van Den Noortgate, Reynvoet & Depaepe, 2021). An additional emphasis must be placed on the aspect of interactively responding to the learner's actions to enhance their learning process (Aleven, Beal, & Graesser, 2013). As they have been used interchangeably in much existing research, the distinction between "personalised learning" and "adaptive learning" becomes unclear if using technology to enhance learning is only viable. Therefore, in this research, we consider PL and Adaptive Learning to be interchangeable as the technological scope is emphasised within my research.

2.5 Influence, impacts and constraints

As the influence of digital technology has entered different spheres of life such as work, school and private, it is imperative to include a critical view regarding the social shaping of technology. Selwyn (2012) argues that the narrative of technology as "improving" learning and cognitive development tends to be the focus of educational technology authors and researchers, with little to no attention paid to the "wider" aspects of education and society. On the societal level, Watters aligns with Selwyn's narrative as she includes the argument of "the teleology of EdTech" in this conversation (p. 11, 2021). Her critique is regarding the marketing of educational technologies and its overt acceptance justified by the argument that, as a society, we are inevitably going into technological transitions; therefore, it is inescapable to use technology in education for further development (Watters, 2021). On the other side of the coin, the aim of introducing technology in education has to do with the goal of equity. Simon, Kuczera and Pont emphasise

the two-dimensional aspect of equity within education: fairness and inclusion. Starting with fairness, which guarantees that individuals have the opportunity to fulfil their potential despite any personal circumstances that may stand in their way. The second principle is known as inclusion, and it guarantees all students at least a fundamental level of educational proficiency (2007, as cited in Tsai, Perotta & Gašević, 2020). The argument of equity being obtained, for example, by learning analytics in education, has led to the perception that these technologies are utilised to raise equity (Tsai, Perotta & Gašević, 2020). This argument has been further supported by multilateral institutions such as UNESCO, who argue that the technological domain of AI in education will improve and achieve equity and learning outcomes with challenges in mind (2019).

Holstein, McLaren and Alevan (2019) further argue that the involvement of all stakeholders in the design process is pertinent as you need to introduce educators at the beginning of this discussion as they are inevitably the ones implementing it in their classrooms. Therefore an early-stage introduction will aid in aligning all stakeholders' needs and uses of the prototype and tweaking it to cater to educators' real-life needs. Van Schoors, Elen, Raes, Vandebecelaere and Depaepe further emphasise distributed scaffolding in terms of tool and teacher cooperation to enhance the learning process in a variety of ways. This, in practice, entails the educator making a supported decision for the learner based on their experience and interaction with the learner as well as with the tool (2023). The stress lies on teachers as well in regard to responsible DPL tools incorporation. Although technology has shown benefits in education, blind acceptance needs to be avoided as these DPL tools can come with constraints. Inadequate adaptations towards learning goals can result in inappropriate learning goals (Baker, 2016, as cited in Van Schoors, Elen, Raes, Vandebecelaere & Depaepe, 2023). The argument follows educators taking on the role of making responsible critical decisions based on the possible pitfalls that can occur due to these constraints (Baker, 2016, as cited in Van Schoors, Elen, Raes, Vandebecelaere & Depaepe, 2023). O'Donnell, Sharp, Wade, and O'Donnell further addressed this in relation to controversies that can occur with the design of PL actions due to the learners' and educators' insufficient technological literacy (2013, as cited in Li and Wong, 2021).

In terms of how teachers view technology integration in their classroom, it is noted by Gurcan-Namlu that two dimensions were interpreted. The first is a technophilic response, which illustrated strong enthusiasm towards technological incorporation and generally accepted its notion in its entirety. On the other hand, a technophobic response was as well interpreted in which

teachers denounced its interference in its entirety, mentioning several reasons such as inefficiency, being able to teach without it and generally not having the literacy to incorporate it adequately (2002). Whilst throughout this thesis, I argue that the novel field of digital personalised technologies in education has not been studied in-depth, this transcends to the field of emerging technologies (Zhao & Frank, 2003, as cited in Howard, 2013). With this, the teachers can overcome sentiments such as uncertainty and risk if implemented with inadequate support (Howard, 2013).

Whilst the role of the teacher in the DPL environment has not been adequately studied, Prosser and Trigwell brought up the notion of a facilitator concerning PL, in which teachers take on a facilitator role to transfer the change towards independent learning (1999, as cited in Code & Ward, 2002).

3 Methodological Framework

This chapter entails the argumentation of choosing qualitative research to explore the experiences of educators regarding DPL. More specifically, the use of Reflexive Thematic Analysis (RTA) was due to the novel nature of the field in regard to the experiences of educators with DPL and aiming to start a dialogue with them to interpret meaningful themes. Going in-depth on the strengths of RTA, as even with the denouncing nature of academia regarding the method, its strength, particularly in my research, will be emphasised. Additionally, this research aims to address and clarify common assumptions that occur with RTA in order to fully embrace the method.

3.1 Qualitative Research

The phrase "The glass is half full" or "The glass is half empty" is a prime example of the significance of qualitative research. The mathematical equivalent of "The glass is half full" and "The glass is half empty" do not vary. The implications of these two assertions, however, are very different. One can measure it to indicate its quantity, however, the significance still matters. If the prevailing impression shifts from "half full" to "half empty", there will be significant chances for innovation (Stasiulis, Gladstone, Boydell, O'Brien, Pope & Laxer, 2018). The simplest explanation of qualitative research is regarded as analysing data using words as the primary source. Contrarily, quantitative research analyses numbers using statistical methods and uses them as data (Clarke & Braun, 2013).

Often the strength of qualitative research is underacknowledged. O'Shea, Stone, and Delahunty advocate for qualitative research to gain a more thorough knowledge of meaning and needs and to allow participant-informed solutions (2015, as cited in Greenland & Moore, 2022). As Clarke and Braun (2013) describe, qualitative research entails employing qualitative approaches within a qualitative paradigm that differs greatly from a quantitative paradigm. There is more to it than just the facts and the methodology. Its goal is to understand and interpret more detailed meanings. It recognises the facts as having been gathered in a context and may produce knowledge that contributes to the formation of more profound understandings. It is based on the idea that various realities exist, even for the same person, and these realities are inextricably linked to the situations in which they occur. Most importantly, personal involvement and partiality are acknowledged as in qualitative research, the idea of researchers contributing with their subjectivity is accepted, e.g., with their worldviews, frameworks for understanding reality, political

beliefs, and passions, to the research process. This is done by viewing subjectivity as an asset rather than a problem. Within qualitative research methods, the aspect of interpretation is often brought up. Furthermore, whilst qualitative research has often been described as solely descriptive in nature, I would like to emphasise the aspect of interpretation as it is integral within the method that will be used in this research. In order to inquire into, learn about, and develop a knowledge of the participants' DPL experiences and meanings, an interpretative qualitative research design was utilised (Delgado, Evans, Roche, Foster, 2022). Most importantly, the choice for interpretative qualitative research was palpable as my interest was in their lived experiences. Therefore this type of approach was the most appropriate for addressing the issues at hand. The study aims to investigate the participants' experiences, highlighting their voices and opinions on DPL and the use of technology in education.

Furthermore, believing in the strength of qualitative research, I aim to adopt an orientation called qualitative sensibility throughout this research to become an adequate qualitative researcher. This involves the development of a double consciousness in which critical reflection and rejection of face-value acceptance are augmented. This is pertinent in qualitative research as well as in the method that will be used for my study (Clarke & Braun, 2013). As to improve the validity of the data, qualitative sensibility is required. Without taking things at face value, qualitative sensibility asks, "How or why?" and questions where the real interest lies. Hence, it is unnecessary to look for an explanation, and the necessity of understanding is emphasised. This allows us to see the subtleties, complexities, and even the seeming inconsistencies (Clarke & Braun, 2021).

3.2 Thematic Analysis – Reflexive Thematic Analysis

Thematic analysis has often been diminished in its approach as it has been defined poorly, resulting in an underacknowledged analytical method (Braun & Clarke, 2006). I argue that the strength of thematic analysis, if done well, can lead to actively identifying meaningful themes. First, it is important to stress that thematic analysis is not a methodology and should not be considered as such, e.g., meaning having a theoretically informed framework on how to do research. It is a technique for analysing data, thus a method. However, it is still important to note that TA has theoretical underpinnings, which will be discussed in the ontological and epistemological part and thus should not be regarded as completely atheoretical.

Thematic analysis in its whole can be defined as:

“Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail” (p.79, Braun & Clarke, 2006).

The strength of how I aim to analyse the data I generate through interviews lies in the method and its inherent flexibility. Due to its adaptability and capacity to offer deep, interpretive analysis, reflexive thematic analysis (RTA) was chosen out of the three approaches (reflexive TA, coding reliability TA and codebook approaches) (Braun & Clarke, 2006).

The approach of coding reliability TA focuses on maintaining accurate and reliable code through a coding agreement that measures the coding quality furthermore. Deductive, in terms of orientation, would result in early-developed themes. With the analysis part, you would look for further evidence for your (pre-determined) themes rather than using codes as the foundation for themes in reflexive TA. This would further risk the limitation of overlooking meaningful active interaction with other themes. The codebook approach, on the other hand, also has a framework for structured coding that is used to create and document the analyses due to the necessity to enable numerous coders to apply codes in the same manner, which would result in somewhat shallow codes. Last, in line with the qualitative paradigm, the reflexive TA method emphasises the significance of the researcher’s subjectivity as a source of analytical insight, as well as their reflective engagement with data, theory, and interpretation (Braun & Clarke, 2021). The strength of reflexive thematic analysis enables the researcher to see and make sense of common or shared meanings and experiences by focusing on meaning across a data set. The goal of RTA is not to pinpoint particular and peculiar meanings and experiences that can only be discovered in a single data item. Therefore, this approach might help find commonalities in how DPL is discussed and interpreted (Byrne, 2022). Most importantly, this approach completely accepts the principles of qualitative research as well as the subjectivity that each researcher adds to the process. No coding structure is used; instead, coding is open and spontaneous. The ‘result’ of data coding and iterative theme generation should be themes (Braun & Clarke, 2021). This organic and flexible approach is adopted throughout the analytical process, and with this, I, the researcher, understand that the coding process is inevitably active and reflective of my subjectivity (Braun, Clarke, Hayfeld & Terry, 2019).

Inherent to its name, themes are a significant part of TA. The themes in the thematic analysis are considered latent in the content (Vaismoradi & Snelgrove, 2019). With the TA method, themes or patterns are portrayed as the data analysis outcomes (Braun & Clarke, 2006, as cited

in Vaismoradi & Snelgrove, 2019). The theme is the term used to refer to the personal interpretation and culturally specific message of data. Themes may be created from codes that have common points of reference, are highly transferable, and allow thoughts to be unified throughout the research phenomena (Braun, Clarke, Hayfield & Terry, 2019). In other terms, a theme is a link of underlying meanings that allows comparable data elements to be linked together and allows the researcher to address the query "why?" (Erlingsson & Brysiewicz, 2013, as cited in Vaismoradi & Snelgrove, 2019). Themes in the reflexive thematic analysis are similar in nature, however, they are regarded with the utmost precision to avoid falling into the trap of confusing them with topics (Braun & Clarke, 2013, as cited in Braun & Clarke, 2021). The use of a primary concept or idea unites patterns of shared meaning into themes. This implies that themes may bring together information that, at first glance, seems to be rather unlike. Themes have several facets and are best understood as narratives we create about our data. Topics, on the other hand, have no central concept or meaning. These are often the result of summarisation based on the interview questions and then 'falsely' presented as themes. They differ significantly from comprehensions of thematic-meaning patterns where in terms of the topic, the answers by the participants are summarised with no shared meaning, solely a shared topic presented as a theme (Braun & Clarke, 2022b). Additionally, the significance of themes depends less on quantifiable metrics and more on whether it captures something significant in relation to insights from the interviews (Spencer et al., 2003, as cited in Braun & Clarke, 2006). Overall, I wanted to find out educators' general thoughts and experiences regarding the use of the DPL tools in their classes and, second, to delve deeper into the individual experiences of DPL.

As a result, the data were coded using inductive RTA analysis, which does not try to fit the data into an existing coding framework or the researcher's analytic expectations (1990, as cited in Braun & Clarke, 2006). Bryne further emphasises that when using an inductive or "data-driven" approach, the researcher may want to create codes that are simply reflective of the data's content and free of any preconceived theories or conceptual frameworks. To better reflect the participants' intended meaning, data were "open-coded" in this case rather than coded to meet a pre-existing coding frame (2022). Indeed, if themes are established before analysis and coding, they are unlikely to go far beyond topic summaries, as it is hard to imagine thematic patterning, developed from codes, being completely predicted before any considerable analytic effort. To be patterns of shared meaning supported by a central concept, themes must be analytical outputs (Braun & Clarke, 2021). Referring to the term central concept, this encapsulates the essence of a topic. It is a notion or concept that encompasses and sums up the essence of a cohesive and

meaningful data pattern. With this, it is vital to address the choice for inductive RTA in relation to the subject of DPL in this thesis. First and foremost, as mentioned above, inductive RTA is often utilised when one is unaware of nor can find extensive literature on the subject or topic they wish to research. This was evident in my case as the experiences of educators with DPL or the impact of DPL have rarely been researched, according to Schmid, Pauli, Stebler, Reusser and Petko (2022). Additionally, I quote Bernacki:

“The lack of specificity undermines teachers’ and technologies’ delivery of learning opportunities, and students’ experiences during learning.” (p. 18, 2021)

Bernacki related the concept of DPL being underdeveloped and the need for better research of the personalisation efforts in order to obtain the desired effects of DPL (2021). With this, I believe since the research world of DPL and its effect on educators would benefit greatly from an inductive approach as through this, you focus on the voice and choice of the participants’ experience without aiming to focus on the quantity of its use or other already researched aspects (Schmid, Pauli, Stebler, Reusser & Petko, 2022).

Within the RTA method, the term reflexive brings much bearing that should not be lost in research. Reflexivity is a type of thinking in which the researcher, such as I, is involved as a person in the research process. The practice of asking ourselves questions about who we are and what we offer to research is known as reflexivity. This refers to someone who is inquiring, critical, and thoughtful in all areas pertaining to research. In addition, as mentioned above, the researcher’s subjectivity is essential throughout this process. It is harnessed via the instrument known as reflexivity, which supports the researcher’s active participation and assists the study’s quality. Neutrality is denounced as we invariably mould our analysis, as it is a process that requires thinking and interrogation and is influenced by who we are as researchers (Joy, Braun & Clarke, 2023). Reflexive TA cannot be carried out robotically or mechanically (Braun & Clarke, 2019).

3.2.1 Epistemology and Ontology

Although the results and emphasis may vary depending on the paradigm, thematic analysis can be carried out under either the realist/essentialist or constructionist paradigms. Epistemology concerns what you can say about your findings and how you theorise meaning. With an essentialist approach, you may theorise motives, experiences, and meanings in a transparent manner.

This is possible because the essentialists believe in a straightforward, essentially linear link between meaning, experience, and language (Braun & Clarke, 2006). Braun, Clarke, Hayfield and Terry further note that the meanings and systems that are implicit in the construction of these meanings are, for the most part, not questioned, and the interpretative potential of TA is essentially not utilised (2016, as cited in Bryne, 2022). On the other hand, from a constructionist viewpoint, meaning and experience are socially constructed and perpetuated rather than innate to people (Burr, 1995, as cited in Braun & Clarke, 2006). Consequently, TA carried out within a constructionist framework is unable to and does not attempt to concentrate on motive or individual thought processes but rather seeks to explain the sociocultural settings and structural circumstances that permit the individual narratives presented per Braun and Clarke (2006). In this case, a linear link between meaning, experience and language is denounced as constructionists view language's role as inherent in the social creation and reproduction of meaning and experience. Therefore, it adopts a perspective that looks at the link between language and experience from both directions and is not solely linear (Bryne, 2022). Within TA, meaningfulness is a component that has a significant impact on the formation as well as the interpretation of codes and themes. This is, in addition to the repetition of information, noticeably significant. The idea behind the recurrence criterion is that for a theme to be judged significant using this method, it just has to be present in the data more than once. Nonetheless, what is shared does not necessarily constitute a relevant or significant aspect of the analysis (Braun & Clarke, 2012, as cited in Bryne, 2022). Therefore, it is important that I acknowledge that with constructionist epistemology, recurrence is regarded as significant, but nevertheless, meaningfulness is the most important factor that leads to my systematic data coding. Moreover, within RTA and my research's focus on the participants meaning regarding DPL, it was pertinent to regard how knowledge is interpreted from a constructionist perspective. Further noting the constructionist epistemology, an inductive approach is best fitting as I aim to prioritise the data-based meanings given by the participants (Bryne, 2022).

Rather than looking at how knowledge is construed, ontology examines the nature of meanings and realities in light of the presence of objective reality (Kavanagh, Katz, Sandler, Nierenberg, Roger, Boylan & Laws, 1994). When aiming to follow the same line of thought, exploring the ontological positions we can take is essential, starting with realism, which stresses that the truth exists regardless of human interpretation or interaction. Second, relativism entails that reality is relative to the person meaning that human interpretation and knowledge are what define reality. Last but not least, critical realism emphasises that behind the subjective and socially-

located knowledge a researcher may obtain is a knowable and real world (Braun & Clarke, 2022a). In relation to reflexive thematic analysis, it is important to note that I use this as a method and do not regard it as a methodology, therefore, the emphasis lies on the data analysis and the way I understand and interpret the data (Bryne, 2022). Furthermore, when adopting a constructionist epistemology, the regard of relativist ontology is self-evident in order to align with that approach. Relativism, as mentioned above, views reality as subjective and differently experienced by individuals due to external factors. Relativism, in particular, rejects the idea of a singular objective truth, and the goal is to understand people's thoughts and perceptions rather than pinpoint the validity of a claim. Within RTA, more specifically, relativist ontology allows me to interpret different observations and experiences of reality through these participants (Sullivan, 2019).

4 Data collection and analysis

This chapter, following the methods outlined in the previous one, showcases the application of the method of RTA in my research. With the support of a theoretically established foundation of the method, this chapter entails a detailed body of research that was interpreted from the data. In sum, this chapter will emphasise how the data was collected and analysed.

4.1 Investigated tools: i-Learn and ViLLE

Through the cooperation of both the i-Learn and ViLLE tools, I was able to accurately research the experiences of DPL. Both tools utilise personalisation options to enhance the pupils' learning journeys. A brief description of both tools can be found below.

4.1.1 The i-Learn Tool (Flemish-Belgium)

The i-Learn tool, implemented on a Flemish scale, is partnered by imec (research group R&D and digital technologies), KU Leuven (university) and itec (research group educational technology). The educational system in Belgium is, for the majority, the responsibility of the communities. There, the Flemish, French and German-speaking communities are responsible for upholding their autonomous educational system. In this, the i-Learn project was supported by the Flemish government in 2019, and further, in 2021, their digital portal on personalised learning called MyWay was launched to encourage personalised learning. This digital tool aims to ease the transition of digital learning to primary, secondary and special education schools. With design-based research, they emphasise the option of creating personalised learning paths in line with the curriculum to enhance their learning journey catered to their metacognitive abilities. The subjects entail a variety of options presented through the tools such as math, language, science and much more (i-Learn Team, 2022a).

In regards to the workings of the personalised learning paths, it is made possible through the student, teacher and the system. With the option of personalisation by the student, this is guided through the ability to choose their topic for their learning path and also have the option to explore the tools offered to stimulate independent learning. In terms of the teachers, this is more about filtering out certain subjects, themes pertaining to that subject and types of exercises. Through this, they are able to choose the subjects and exercises relevant to their class. The system emphasises the inclusion of adaptivity, in which the system adapts tasks and exercises

based on the pupil's given interests, capabilities and preferences. A deeper level of system adaptivity is also augmented to be in the works (i-Learn Team, 2022b).

The onboarding process entails a variety of measures in order to support educators, such as; a) e-learning, b) training sessions, c) tailored coaching and d) online community. Educators have the opportunity to independently commence the e-learning modules to get acquainted with the tool. Training sessions are also given in an online or physical manner to get familiar with the tool through the help of a coach. The coaching aspect is also further developed, offering a personalised trajectory at no cost if this additional help is requested. Lastly, the aspect of an online community is also offered under the Teacher Design Teams, in which the aspect of inter-colle-gial is encouraged to stimulate communication among the educators (i-Learn, n.d.).

In terms of the technicalities of i-Learn, this project is supported by the Flemish government until the end of the 2023 academic year at no cost. A decision for the coming years has yet to be made.

4.1.2 ViLLE Tool (Finland)

The comprehensive education in Finland, which is relevant to my study, is organised by the municipalities. Nevertheless, schools have the choice to implement an educational tool such as ViLLE. Due to its accessibility of being free, more than half of Finnish schools have utilised it so far for subjects such as mathematics, the Finnish language, programming, etc. (UNESCO, 2021).

ViLLE was started at the University of Turku and the Centre of Learning Analytics. Their establishment started significantly earlier, tracing its origins back to 2006, when it primarily stood out as a visual learning tool. This was further redesigned with reflections and feedback from its initial launch. With those in mind, several principles regarding the design were emphasised, such as a) teacher collaboration, b) pupil collaboration, c) automatic assessment and d) immediate feedback. The working of this collaborative learning tool entails the aspect of collaboration in which the collaborative environment encourages the possibility and opportunity for the teachers to share and discuss their content. This initiative aims to make the ease of sharing resources more readily accessible. Furthermore, this tool emphasises the aspect of active learning by offering various kinds of tasks (Laakso, Kaila & Rajala, 2018).

Regarding the aspect of DPL, the tool features tailored learning routes for students through research-based instruction and assessment tools. Additionally, the AI advanced engine further offers the teachers the option to personalise tasks according to the pupil. In other words, this system is set to recognise the strengths and weaknesses of the students as well as their struggles with a task. This is then communicated to the teacher with the intent of them stepping in to further facilitate their learning journey in a positive manner (UNESCO, 2021).

VILLE works with training sessions to equip the teachers with the knowledge to facilitate the workings of the tool. These training sessions are done on a weekly basis in which the teacher in question can ask questions or request help through a VILLE professional. Furthermore, the collaborative aspects seep through in the training sessions as previously trained teachers have the option to become a trainer and share their knowledge amongst teachers of the same municipality. Instructions are also available to the teachers and public in getting acquainted with the study path courses, and additionally, a teacher's book for the educators to go through at their own pace (University of Turku, n.d.).

4.2 Procedure and Participants

The data collection was carried out from October 2022 to January 2023. Since I was in Belgium and thus constrained by distance with respect to the Finnish participants, twelve interviews were conducted either by video chat (on Zoom/Skype) or in person in the Belgian context. The interview schedule used a funnel strategy, starting broad and general and getting more focused (Milovanovitch, 2019). Most of the questions were left open-ended to let participants dig deeper into the topic, allowing me, as the researcher, to focus on certain topics while delving into the participants' perspectives (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). Participants were then given a chance to express opinions that the interview had not sufficiently covered per their experience. The interview took, on average, between 25 minutes and 1 hour. Trint's AI transcription software was used to create accurate transcripts, which were then adjusted for correctness and anonymity. Specifically, the alteration of names was adopted at an early stage to safeguard privacy when transcribing, as well as deleting references that could jeopardise privacy.

As I was seeking teachers utilising DPL tools, I had the opportunity to utilise i-Learn and VILLE's participants' base to email and recruit educators. Furthermore, due to the necessity of expanding my sample size, I directly contacted teachers on the LinkedIn platform, which was only successful in the Finnish case.

For the purpose of this study, I applied the following inclusion criteria 1) primary school educator, 2) has used a digital tool (either i-Learn or ViLLE) which allows personalised options. The main reason for focusing on primary school teachers is that the overall narrative of educational technology focuses on secondary education, which is also represented in research. As there is a significant discrepancy between the focus of the teacher's experiences, it is imperative to include those experiences that have not been intently researched. My inclusion of criteria 2 was based on the exploration of DPL and its meaning. With this, I found it imperative that they have had or have a working experience of how DPL could be utilised in their schools as I aimed to find out the meaning given to DPL.

The age of interviewees ranged from 36 to 55 years in the Finnish group and 24 to 52 years in the Belgian group. In terms of gender, there was parity in the Finnish group and a female majority in the Belgian one. Furthermore, initially, I intended to only target primary school teachers, however, I had positive responses from the ICT coordinators, who all were once primary school teachers who have used the DPL tools mentioned above or still simultaneously teach in both groups. Therefore, I found it imperative to include those perspectives as well, as I believed they could contribute with their working experience as a teacher and current experience as an ICT coordinator. With this, I established the inclusion of the term educator to include the ones skilled in teaching and simultaneously those who are educational administrators.

Participant	Age	Gender	Role in primary education	Grade
F1	49	F	Teacher	Grade 3
F2	36	M	Teacher	Grade 5/6
F3	52	F	Teacher	Grade 1/2
F4	46	M	ICT coordinator (past teacher)	n/a
F5	55	F	Teacher	Grade 4
F6	36	M	Teacher and principal	Grade 3

Table (F): Finnish group

Participant	Age	Gender	Role in primary education	Grade
B1	24	F	Teacher	Grade 3
B2	52	F	Teacher	Grade 6

B3	46	F	ICT coordinator and current teacher	n/a Taught classes ranging from Grades 1-4
B4	45	F	Teacher	Grade 4
B5	46	M	ICT coordinator (past teacher)	n/a
B6	31	F	Teacher	Grade 6

Table (B): Belgian group

4.3 Interview questions

The following open-ended questions, which are depicted in Appendix 1, were carefully selected from Bishop, Downes, Netcoh, Farber, DeMink-Carthew, Brown, and Mark's (2020) research on teachers' roles in personalised learning environments and adapted to a digital context with the experiences of the educators in mind. An additional question regarding their view on the use of this technology was inquired, putting it as open as possible without preconceived ideas in order to follow Furlong's approach to deciphering the social characteristics of the technology presented (Selwyn & Facer, 2014). I asked follow-up questions adapting to the participant's emphasis on certain content.

Furthermore, in terms of the technical aspects of the interviews, I conducted the interviews with the Finnish participants solely in English and in Flemish with the Belgian participants. These 12 interviews resulted in 98 pages of data collection, of which 50 were the result of the Belgian group and 48 from the Finnish one. I additionally made the conscious decision to translate the meaningful parts of Flemish transcriptions at a later stage to English (Phase 4 RTA) in order to avoid any possible translation errors that could result in a different contextual meaning than intended. This was done on a conscious basis as the strength of expressing your experiences in your dominant language was augmented, as some of the Finnish participants in this study expressed discomfort in fully being able to express their experience in English. The interviews were conducted over four months (Oct 2022- Jan 2023). The longevity of this period was due to the challenges of finding participants and simultaneously fitting the two criteria.

4.4 Data analysis

In terms of the 6 phases of reflexive thematic analysis (RTA) above, I will address how I went about conducting RTA in a concrete manner in my data analysis. It is important to note that this analysis is not linear, which means that I embraced the flexibility of RTA, reflected in my steps of analysis, such as going back to phases on several occasions. This was additionally recommended by Braun and Clarke in terms of not regarding the phases of RTA as a strict sequence of a continuum (2019). Furthermore, I regarded the phases of RTA as flexible guidelines and adapted them to my research. Importantly, Phase 6 ‘Reporting’ will be addressed separately in the ‘Findings’ and ‘Discussion’ sections to avoid repetition. Using NVivo-software, I aimed to showcase how I adhered to these processes whilst acknowledging my actions of flexibility throughout if implemented. NVivo was chosen for its efficiency and transparency, creating an audit trail in which I could continuously reflect and revisit all phases. Through the NVivo-software, I also utilised the option to classify the coding of the two groups in different files. With this, I aimed to respect the contextual differences between both groups. Nevertheless, further along the line, when commencing the coding process of the Belgian group after finishing the Finnish data coding, I encountered similarities in codes. Therefore it led to generating one RTA with respect to the different contexts and possible varieties of meaningful experiences. With this, I emphasised the inductive approach of letting the data speak for itself. With this, I encountered the logical reasoning of having one RTA to emphasise the participants’ lived experiences.

Phases of Reflexive Thematic Analysis (Braun & Clarke, 2020)	Description
Phase 1 - Data familiarisation and writing familiarisation notes	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
Phase 2 - Systematic Data Coding	Coding interesting features of the data systematically across the entire data set, collating data relevant to each code.
Phase 3 - Generating initial themes from coded and collated data	Collating codes into potential themes, gathering all data relevant to every potential theme.

Phase 4 - Developing and reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.
Phase 5 - Refining, defining and naming themes	Ongoing analysis to refine the specifics of every theme and the overall story the analysis tells, generating clear definitions and names for each theme.
Phase 6 - Reporting	Selection of vivid, compelling extract examples, the final analysis of selected extracts, relating back of the analysis to the research question and literature, and producing a scholarly report of the analysis.

Figure 1. Indicating the 6 Phases of RTA (Braun & Clarke, 2006, as cited in Byrne, 2022)

4.4.1 Phase 1 of RTA: Data Familiarisation

Phase 1 is often noted as the familiarisation with the data process, which is common to a wide variety of different methods of qualitative analysis. Familiarisation requires repeatedly reviewing the entire dataset in order to become thoroughly familiar with the data. This is required in order to locate relevant information. Manual transcriptions have been recommended for in-depth immersion (Byrne, 2022). Due to time restrictions, I utilised software (Trint AI) that reduced the burden of transcribing manually. However, I listened to it simultaneously with the recordings to gain a deeper contextual understanding of the data and correct it when needed. It is also important to note that this initial transcription was not a one-and-done phase. Listening and relistening to output correct data was a strenuous and time-consuming process, regardless of the help of the transcribing software. This resulted in an extensive understanding and active listening of the interviews, as with the following interviews, I often made preliminary connections cross-interviews in my head. Due to time constraints, I transcribed all my interviews after each other, which did not create much time between interviews. This also aided in the overall familiarisation of the data and a more holistic understanding of all the interviews as I often made connections between interviews and between the Belgian and Finnish participants. In this part, I initially did not partake in noting my thoughts or perceived shortcomings as a researcher-interviewer. This was done on a later base with NVivo’s qualitative data analysis computer software. Furthermore, aiming to have an audit trail with NVivo and acknowledging my subjectivity as a researcher, I made annotations within NVivo focused on the reflective cycle of

Gibbs in order to initiate reflexivity (1988, as cited in Markkanen, Välimäki, Anttila & Kuuskorpi, 2020). This framework for reflection facilitates critical reflection through experience. Throughout the reflective phase, the model included feelings, ideas, and recommendations for future actions. The first three stages were emphasised in this phase, such as 1) Provide a detailed account of what took place but refrain from drawing any judgments, 2) Explain how you reacted to the event and how it made you feel both during and after it, 3) Do an analysis of the scenario, noting any positive or negative aspects. Within this phase, I emphasised the vocalisation of my own judgements on occasions that required further reflection points (Markkanen, Välimäki, Anttila & Kuuskorpi, 2020). Several examples can be found below that focus on my reflective thoughts and feelings in order to safeguard transparency.

“I feel I missed the moment to delve deeper into this due to the (Internet) connection failing and was then confused in terms of how to proceed. Therefore, I went onto another related question instead of asking the deeper question of why they felt that”

“Unsure if I did not probe enough in this interview due to sensing discomfort with the English language”

“Not sure if it was recommended or pushed upon - they gave the impression that it was not their decision”

“Contradicting herself with the above? - a reference to the variety of difficulty of the tasks given to the pupils”

“This was talked about it in the Finnish group as well when some teachers took it upon themselves to learn it and then helped guide and nurture it their school – cross comparing participants from different contexts”

Figure 2: excerpt RTA diary

4.4.2 Phase 2 of RTA: Data Coding

Within Phase 2, the emphasis lies on code development in which codes are regarded within reflexive TA as a tool or analytical unit in order to develop on a later basis into themes. One way to think of codes is as units that record at least a single observation and show (typically) just one feature. Furthermore, the reflexive TA codes are regarded as a singular identification or insight into the semantics of how participants see things; the emphasis lies here on their perceived observations (Braun & Clarke, 2020). I focused on systematic data coding with the help of inductive coding. A substantial number of codes were identified across the transcripts

as a result. Because of this, there were a total of 45 initial codes produced as a consequence of the initial coding.

Due to the inductive approach, several codes were similar, such as the code, e.g. *support, need for support* and *support in school* and the *new role resulting from it* and the *evolution of the role with the tool in mind*. This came to light with Phase 3; therefore, it is important to acknowledge that this was not a linear process, as I encountered the need for Phase 2B when commencing with the next phase. With the help of NVivo, I could accurately examine the development of the initial coding from Phase 2(A) to Phase 2B. This phase could be detailed as a critical review of the initial coding in order to concede that the allocation of coding in 2B was accurate or if other inductive codes occurred. Within Phase 2B, I examined my initial codes and reduced them from 45 to 34. In order to avoid any more misconceptions over what I meant by a particular code, I took the further step of documenting the code's descriptions within NVivo. A short excerpt can be found below with a few examples of the codes, description and, in italics, the possible connections with the codes.

Name	Description	Files	References
After-effect of all this technology	This after-effect entails the meaning of the participant of the futuristic context of technology in their personal life and work spheres	10	56
Child Autonomy (voice and choice)	References to the child's ability to choose for themselves or having the environment in order to vocalise their desires in how they aim their learning process to look like	5	10
<i>Independence</i>		4	10
Context of the tool	Personal reference of how the teachers/ICT coordinators involved themselves in the use of the tool. This is varied in terms of indicators such as the frequency as well as how they perceive the context of the tool to be best fitting for them	9	16
Context of the school with (d)PL	Similar to the code Context of the tool, however, broader encompasses the school environment with the learning approach of DPL (Digital Personalised Learning)	2	2
Critical stance	Critical standpoint referencing the use of the tool as well as the implementation of everything related to education that affects their classrooms.	4	16

Efficiency in choice	Reflection of old vs new based on what they need to learn	6	8
Effort	What goes behind actually realising the implementation of this tool in the classroom? Reference to the work behind doors (Preparation, explanation, etc.)	6	17
<i>Primary school reference</i>		1	1
Evolution and new features in their role as a teacher	New abilities and skills that stemmed from after or during using the tool	9	22
<i>Evolution of the role when using the tool</i>		9	19

Figure 3: expert from NVivo Phase 2B

The emphasis on this phase is that it is exploratory, meaning that whilst subjectivity is inevitable, I am not trying to overtly think about the research question or a potential research question. This resulted in its use in later phases in determining which of the codes are helpful for generating the themes and putting the others aside. It is important to emphasise that this was not a linear process as I encountered the need for Phase 2B when commencing Phase 3, and this is especially welcomed in the inherent flexibility of reflexive TA (Braun & Clarke, 2020). A complete list of the codes can be found in Appendix 3.

4.4.3 Phase 3 of RTA: Generating Initial Themes

Phase 3 was one of the most challenging phases of the data analysis as I felt that the inherent flexibility of reflexive TA was hard to explore within NVivo. Due to its structure and the feeling of needing to adhere to that hierarchical structure, it was difficult to explore organic ways of clustering codes to have a holistic view of generating themes based on those codes. In brief, Phase 3 emphasises generating initial themes. I carefully aimed to adhere to what classifies as themes and not fall into the trap of summarised topics (Braun & Clarke, 2022b). Here I had to dig deeper into the shared meanings of the educators in order to choose what to classify as a theme. I aimed to find collective meaning that could be interpreted in themes with both groups in mind whilst acknowledging their respective context. The ‘generating initial themes’ part often resulted in new thoughts and led to the conceptual framework, which I noted in my reflexive diary.

Through the use of NVivo, I had an overview of the codes I selected and, from there on, worked on deciphering the shared meanings that I could interpret from these. With this, I would also augment that the themes that resulted from Phase 3 were not based on frequency nor a quantitative number of interpretations. I aimed for this coding process to be as flexible as possible for my subsequent phases to allow more of a concrete view of the themes without the risk of losing a relevant meaning or experience by participant(s) due to choosing it based on the amount of interpretation. However, since themes emphasise shared meaning, this meant that the themes that resulted from it were not individual experiences meaning that others should have experienced that sentiment before settling on its theme generating. This part was particularly challenging to do so in NVivo, as mentioned before, due to the structure of NVivo. Nevertheless, I found a way that worked for me, and I created a mind map in which ten themes resulted from the codes and had a holistic visualisation. I did this through a side-by-side method in which I reviewed my codes and reread the references made within them. Within this, I aimed to find a collective meaning to their interpretations that I could create in my mind map as well as make adequate references pertaining to the different groups. Braun and Clarke (2012) encouraged the creation of a thematic map. This also aligned with additional inductive reasoning and re-immersion in the data. Within the thematic map, I included the option of including certain thoughts to actively analyse directly within the thematic map in this phase and future phases. These thoughts were noted down particular to the theme and in black to distinguish themselves from the themes.

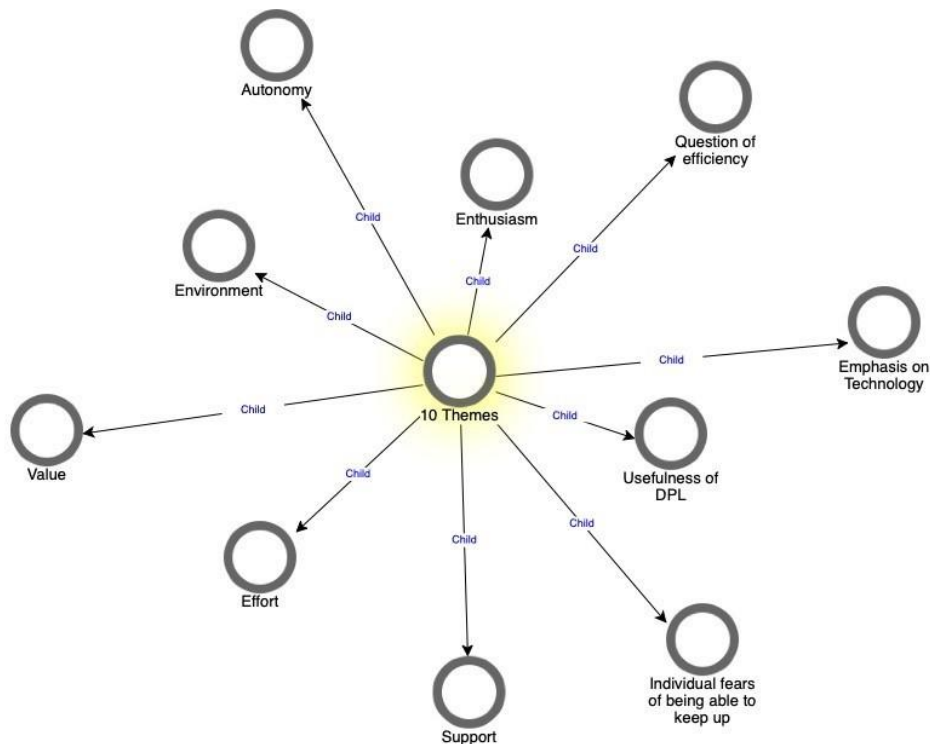


Figure 4. NVivo graph: Phase 3

4.4.4 Phase 4 of RTA: Reviewing Themes

Phase 4 is about developing and reviewing the initial themes that I had set up. With this, I additionally carefully aimed to review my initial themes to avoid falling into the trap of summaries (Braun & Clarke, 2022b). This meant carefully reviewing my work to ensure that my data collection questions were not automatically translated into themes without any deeper meaning and added relevance, as well as not regarding a code as a theme. This was done with the help of Clarke and Braun's guidelines to facilitate qualitative TA (2019). Within this step, I revisited the transcriptions and audio recordings from both groups and re-immersed myself in this initial phase as I felt that it contributed to a re-stage of familiarity that could aid in the reviewal process. With this, I followed the reasoning of Bryne in terms of having two stages of review within this phase. The first stage of this phase is examining the connections between the data items and codes used to inform each main theme and subtheme. It is reasonable to believe that the potential theme or sub-theme makes a rational argument and may add to the overall narrative of the data if the items or codes establish a consistent pattern (2022). This was done manually, as the mind map creation by NVivo did not allow for cross-connections. Therefore, manually I found connections between the theme efficiency and effort, such as active learning of the student and active role (environment). In the second stage of the process, the potential

themes are examined in light of the data set. The relevance of each theme's interpretation of the research question is evaluated based on how effectively it is provided by the theme (Bryne, 2022). This, however, was tweaked as a set research question was not established in this case. Therefore, this stage was used for an additional re-evaluation of the theme's relevance based on the group's context, as it was important to augment and stress the different contexts of the participants. This was done by making a subcode within the theme relating to the relevance of that context if I found a particular meaning that was only relevant to that group, for example. In the case of the Belgian group, for instance, I found that in the support theme, they stressed the need for 'active support' within their schools. This was not the case in the Finnish group, for example. After carefully reviewing the ten initial themes, I viewed that several themes I set up could be considered a medium between a code and a theme. Thus, it is not yet a fully developed theme or is too thin in terms of meaningful data. As a result, five strong themes that emphasised shared meaning within the group and/or across groups stood out.

4.4.5 Phase 5 of RTA: Defining Themes

With Phase 5, I came across a hurdle as NVivo was hard to learn at that time, and some technical errors came along with losing the number of references from the files to have a holistic overview. Therefore, with this experience, I had to start over and begin looking at the references made in Phase 3 to see how they fit with the themes and subthemes I created. With this, I found that referring back to NVivo's mind map from Phase 3 and the manually written connections from Phase 4 would aid in developing a clearer overview of the themes and subthemes. Here, I had to define and name my themes. Within this phase, I aimed for coherence and consistency to withgo any possible misunderstanding or confusion with the themes. On its whole, I believe that this error aided in the additional reviewal of the references in relation to the codes, subthemes and themes. Whilst aiming for a concisely inductive approach, this part had to be done inductively and deductively due to technical errors I encountered. However, I do acknowledge that doing this partly deductively as I had my themes allowed me to analyse my references holistically as I found that few of the references did not align with the theme or a reference fitting in more with another theme than I initially intended for. This resulted in the careful selection of the below five themes and their subthemes.

Main theme	Subtheme	Codes
Support	Lack of active school support	The need for educational ICT coordinators
		Necessity to stimulate teachers
		Improvement of school infrastructure
Autonomy	High regard for students' autonomy	Confidence
		Choice
		Regard of independence
	Frustrated pupils	Feeling of (group) pressure
		Inefficiency
	Collaborative notion	Social development
		Sense of purpose
		Basis for collaboration
	Efficiency - DPL	Valuable and Fair
Active learning		
Easing teacher's tasks		Feedback focus and knowing when to interfere
		Preparation ease and correction automated
		Lessening the personalising efforts
Effort		Active role of the teacher is not diminished with the use of DPL
	Technical added role	
	Setting up the hardware and software	
	Time intensive	Familiarising with the platform/tool
		Individual re-learning and fear of not keeping up
	Sentiment	Aiding tool for the teacher that allows for deeper observation
Quantity and quality of information		
Overt technocentrism in education		Loss of motor skills
		Safety
		Overt emphasis on its use
		Less interaction with peers
		Social skill development

Figure 5. Final themes resulting from Phase 5

5 Results and Findings

In this chapter, I have allocated five subchapters in line with the five themes mentioned above. With this, I intend to discuss the meaningfulness based on my interpretation of these themes as well as the codes that founded the themes.

5.1 Support

This first theme listed above – ‘Support’ - describes the sentiment of needing further support in class and school. This was mainly interpreted from the Belgian participants’ group as the meaning distinguished from the analysis highlighted both the context of the intra-class environment and the intra- and inter-school environment. The emphasis was based on codes such as *the need for educational ICT coordinators*, *necessity to stimulate teachers*, and *improvement of school infrastructure*.

Main theme	Subtheme	Codes
Support	Lack of active school support	The need for educational ICT coordinators
		Necessity to stimulate teachers
		Improvement of school infrastructure

Table 1. Support

The differences regarding the references towards support in the context of the environment could be discerned based on the role of educators. As seen with, for example, the ICT coordinators, they emphasised the holistic need for further inter- and intra-school support to enhance the growth and interaction of DPL tools within their schools. With their responses based on their experiences, they criticised how the Flemish education system, according to them, does not allow for more fruitful interactions with DPL tools and possibly other tools. This adhered to the code of *improvement of school infrastructure*. The adherence to the year plan was an additional point that further constrained teachers in exploring and providing personalised learning experiences to the pupils. This is also showcased by the historical depiction of PL in which the curriculum can have constraining effects on facilitating the implementation of PL (Dishon, 2017). Furthermore, by a certain time, the student needs to have acquired certain knowledge and deviating from that timeframe is, per participant B6, not possible as they refer to the year plan. Their need for support with the increasing trend of student-centred teaching needs to be

further researched in terms of the types of support required to enhance the implementation of DPL is addressed by Li & Wong (2021).

“That is little room for anything else.” (B6) - code *improvement of school infrastructure*

Participant B3 emphasised that the educational system is narrow-minded, referring to it as traditional and highlighting the need for further innovative insights.

“But I find that there are still few aspirations in there and I find that very guided, still very guided and also very well behaved actually” and “important to start thinking about how they want to use ICT coordinators in the organisation” (B3) - code *the need for educational ICT coordinators*

As participants such as B3 and B6 touched upon, the constraints felt in their schools gave the sentiment that they could not encourage their teachers to explore the extent and possibilities of the DPL tools in the manner they would aim for. Belgian teachers often strongly expressed the need for more intra-class support. Most of the discussion can be encompassed with the following quote “We’re kind of left to our own devices. Of like, hey, do try” (B4 – coded *improvement of school infrastructure*). With this in particular, B4 greatly expressed the desire to have further real-time guidance in which the facilitation of acquiring the new knowledge of the tools can be easily adopted in their classrooms. This was brought upon in terms of low confidence in keeping up with novelties at their age. Therefore, having the sentiment of needing further help as their way of processing new knowledge is not at the same pace as their peers. In relation to the discussed literature, the term technological literacy is of relevance which Gurcan-Namlu addresses due to not having high technological literacy. This influences the participants’ view towards its integration (2002). Participant B5, in this case, brought up her age and familiarity with technology, which catered to an easier transition of implementing the DPL tool. With this, B5 and B4 noted that their level of understanding of the technological know-how indicated their further need for support. B4 advocated for further real-time support, and B5 for the system to be understandable enough for her peers with different levels of familiarity and allocated time towards these DPL tools to get acclimated.

5.2 Autonomy

With the theme of Autonomy, I interpreted meaningful subthemes from the participants relating to the main theme that as well justified a separate notion of a discussion. Therefore, the subthemes of *High regard for students' autonomy*, *Frustrated pupils*, and *Collaborative notion* will be separately addressed.

Main theme	Subtheme	Codes
Autonomy	High regard for students' autonomy	Confidence
		Choice
		Regard of independence
	Frustrated pupils	Feeling of (group) pressure
		Inefficiency
	Collaborative notion	Social development
		Sense of purpose
		Basis for collaboration

Table 2. *Autonomy*

5.2.1 High regard for students' autonomy

Certain words were often brought up in relation to autonomy with the DPL tool. Therefore, the codes of *confidence*, *choice* and *regard of independence* were interpreted specifically to this subtheme as these were often utilised in association with an emphasis on the individual and their ownership as well as their voice. This is similar to the conceptual framework of PL, as the literature placed special emphasis on student voice, student choice, and student-centred instructional strategies. (Schmid, Pauli & Petko, 2022). In the Finnish group, I elucidated that the journey of the pupil finding their own knowledge was highly appreciated, as they even noted:

“Nowadays [everyone] is very independent. Hmm. So they, I think they are more satisfied with being more active. They don't need a teacher anymore because they want to” (F6) - code *confidence*

F6 and F4 noted their look on the variation of levels regarding the learner paths in a positive manner as they believed it encourages the active learner within the pupil and also increases interaction due to the level adaptations. There was a perceived notion of increasing the student's

independence and braveness to seek knowledge and try out challenging and new tasks for themselves. Agency regarding the pupil having the choice of codesigning their learning paths was highly regarded in a positive manner. As teachers such as F6 noted that:

“It's important that every student can kind of create their own path. And the personal way to learn and. And, uh, I think the platform it's good because they every, every student can and, go on step by step. And it's... and the speed.” (F6) code *regard of independence*

Per the participants, this entailed a switch in how we view teachers that was implemented in the Finnish schools at an earlier stage. They described their roles with terms such as *guiding* and *facilitating* and therefore found the autonomy and agency aspect of the DPL tool as a natural extension of how they viewed their role to be without the usage of technological tools. The term natural has been brought up by Rousseau in this notion of the importance of naturalism in PL. It encourages students to pursue their interests and preferences (Dishon, 2017). When inquiring about how they experienced students' ownership and voice, it was clear that this was thoroughly welcomed, and its reasoning was based on their view of their role as teachers. Additionally, highlighting the necessity of aiding the pupil in their learning path and aiming for self-realisation in terms of their strengths and weaknesses. Additionally, Rousseau thought that once a child had a will, they should be responsible for themselves (Dishon, 2017).

The Belgian group was of the same sentiment; the code of *regard of independence* was often touched upon and explicitly referenced by B1, B2, B4, and B6.

“...self-regulatory skills in children. And then you did notice that such a learning platform provides additional support for that.” (B1) code - *regard of independence*

“The independent, independent learning is about the same in both cases. Only those learning have traces. Yes. If the exercise fails. Then you have a remedial exercise.” (B4) code - *regard of independence*

They augmented how the pupils in their class went to work independently on their trajectory. With this, the association of confidence was brought up, entailing that this independent work for the pupil was challenging in various ways, and having that experience further instilled self-knowledge of their learning capabilities and self-regulating skills. This was similarly touched upon in the Finnish groups regarding their role and view of autonomy. Overall, the majority of

educators in the focus group valued ownership through the DPL tool, which was also augmented by Schmid, Pauli and Petko as they emphasised the crucial inclusion of two dimensions in the concept of PL; 1) student-centred teaching methods and 2) student's voice and choice (2022). These participants further stated that employing technology in a class and allowing pupils to explore new concepts or solve problems on their own increased their students' engagement and motivation. With their additional encouragement, pupils could further explore their autonomous and explorative selves and in which the active aspect of active learning was re-activated. In essence, the Belgian group stated that the DPL tool provided the pupils with additional opportunities to make their own judgments about how to tackle a problem, pursue their learning path, and make personnel decisions regarding their tasks. Such as B2 with:

“Who can ask for help because they really learn from 'I actually have to go over that curriculum independently and not because the teacher is explaining to me' which gives you more time, but rather than for your students who need extra support.” (B2) code - *regard of independence*

This was of the same relevance to the Finnish group, but no explicit meaning was given to that experience. Entailing that, whilst acknowledged, it was not sure if this was solely done in that DPL tool setting or as well in a non-technological setting as a natural extension of their role and how they viewed students' ownership and voice was touched upon.

5.2.2 Frustrated pupils

Whilst the autonomous aspect has been addressed in a positive light, I found it pertinent to also note the other side of the coin regarding the aspect of ownership and voice. Highlighting that experience under the emotion of frustration has also occurred with some of the participants. Moreover, whilst enthusiasm and eagerness with the DPL tool were often praised, increased frustration levels among pupils with the use of the tool were augmented in a group setting. With this in particular, to the Finnish group, the motivational factor in terms of not wanting to work with the DPL tool resulted in the vocalisation of the students in terms of distaste.

“It's the motivational problems that have been there, and there were more of them when it wasn't working as it is now. So now this one group that I have that isn't so keen on it, it's basically the group doing harm to themselves that they are like, you know, this like this from small flame, those, you know, huge fire with like,

oh, I don't like this. And then the other one, yeah, I don't like this either. And then everyone is like, oh, this is, this is, this is... And it's this collective.” (F5) - code *group pressure*

In the case of F3 and F5, it was interpreted that a common sentiment of frustration occurred in dialogue with the peers, which in return challenged the educator and their facilitation of the DPL tool to the class. F5 found it challenging to further stimulate students to keep going as that particular class vehemently opposed its incorporation. I found this particularly interesting as participant F5 as well augmented that even though the sense of frustration in relation to the DPL tool was ignited by the pupils, it did not result in a change of direction regarding the continuation of the use of the tool in those classes. Therefore, as well as showing the other side of the coin whilst a denounced attitude towards the DPL tool occurred, the autonomous aspect of choice in using the DPL tool was not exercised.

Regarding the Belgian group, a similar situation occurred only when the system failed, and the students were frustrated with the DPL tool, as one stated.

“My students were very excited. Until they discovered that some learning tracks uh yes, did not work or, or uhm that they flew out of the programme in the middle of a learning track” (B4) - code *inefficiency*

This was mainly brought to light by the pupils in that class who were eager to commence their digital learning paths, however, were dismayed by the systems' errors.

5.2.3 Collaborative notion

With more independent and autonomous studying in the classroom, it was particular to note that a collaborative effort was being made amongst students per the educators. The inclusion of this under the theme of autonomy was emphasised as a meaningful subtheme was interpreted in relation to the stimulation of autonomy amongst the pupils. Entailing this dual function of the tool encourages independence and autonomous learning as well as ignites social interaction efforts among pupils.

“They learn that it's someone who needs help to figure out something. Go and help. Because you learn yourself mm hmm. And they have started to do it more and more. But there is lots of work to do that they will do it even more.” (F1) - code *sense of purpose*

The participants showcased great enthusiasm as the fear of loss of socialisation was on their minds. Whilst interaction with their peers differed based on technological and non-technological grounds, their level of interaction adapted to the environment per the educators. The Belgian group noted that whilst the students were working on their individual learner path, this did not mean that the environment did not allow for further interaction with their peers, especially in terms of peer-to-peer support. Regarding the latter, pupils found that they could as easily ask the ones sitting next to them as they could with the teacher and thus were further encouraged by them.

“Yes, the students encourage each other to those learning tracks. Well uh yes, and they also help each other if they get stuck on something then. Then they also help each other.” (B4) code – *basis for collaboration*

This was especially encouraged by certain Finnish educators, as they valued the potential interaction and engagement that could stem from it. F1, for example, continuously stressed to their class the active position a pupil should take when they see their peers requesting help.

“They learn that it's someone who needs help to figure out something. Go and help. Because you learn yourself mm hmm. And they have started to do it more and more. But there is lots of work to do that they will do it even more.” (F1) code- *sense of purpose*

This entailed not only being valuable to the peer requesting help in terms of interaction but additional beneficial that they learn from that experience and know how to transfer knowledge to their peers in an understandable manner.

“Pupils tend to interact more with each other. They discussed the exercise more if they were helping each other more. Mhm. Which is actually what I think it is. Of course, maybe the general idea of pupils using computers in the classroom is that everyone has a device, and then they're just sort of in their own in their own bubble, too. They're just using their devices, and they're not interacting with each other. But actually, I think the opposite is the truth.” (F3). code – *basis for collaboration*

Phan (2020) encountered a similar meaningful experience as F3 in their personalised learning initiatives (PLI) in which they found that PLI could generate meaningful encounters with the technology as well as with their peers. The collaborative touch here does not solely lie between

the peers but also with the teacher. This part was not greatly emphasised in my analysis per the Belgian nor Finnish group. However, one participant noted a collaborative effort with a highly knowledgeable pupil regarding technology, noted in the next theme of efficiency.

5.3 Efficiency (DPL)

The theme of - 'Efficiency'- was interpreted based on the meaningful experiences the participants experienced. They augmented the subthemes *Valuable and Fair*, *Easing teacher's tasks* in correlation to what defines the main theme of efficiency per these participants.

Main theme	Subtheme	Codes
Efficiency - DPL	Valuable and Fair	Fair to those who deviate from the average
		Active learning
	Easing teacher's tasks	Feedback focus and knowing when to interfere
		Preparation' ease and correction automated
		Lessening the personalising efforts

Table 3. Efficiency

5.3.1 Valuable and Fair

According to the educators' observations, the efficient outcomes resulting from the interaction with the DPL tool were most noticeable amongst students who either performed lower or higher than the average. Therefore the code of *Fair to those who deviate from the average* was often interpreted within the participant group. This was also brought up in correlation with the autonomous self-study in which the pupil had their own learning path and had less knowledge of their peers' progress as they were tasked to do independent work. This resulted in active learning and, therefore, the interpretation of the code *Active learning*. With the argument of equity is as well brought in, as this narrative has often been used in the context of technology, focusing on aiming to facilitate equity through their tools (Tsai, Perotta & Gašević, 2020)

“When some students are very, very good at mathematics. Mm-hmm. I allow them to do more in VILLE. So they get like extra practice in VILLE. How do you say it? They get. They have the chance to do more, harder mathematics.” (F1)
code – *active learning*

With the Finnish group, I interpreted the additional challenging aspect of adequately engaging the pupil based on their level that educators encountered, more precisely in not losing the child's attention and resulting in disinterest which I coded as *active learning*. The aspect of this challenge correlated with pupils who were fast performing and finished their learner paths faster. Pupils who deviated from the average on a slower basis, per their educators, found that the DPL tool aided in their sentiment of being on the same level as their peers and, therefore, not having that sense of not fitting in or catching up with their peers. They found that this system encouraged the pupils to further continue on their learning paths without the knowledge of the hurdles of rewards being adapted to their level and not at the level of the class's average. As per Van Schoors, Elen, Raes and Depaepe, in order to maximise individual and/or collaborative learning activities with a focus on motivational, metacognitive, cognitive, emotional, and/or effective outcomes through this digital learning environment, it can adapt to the specific needs of each learner (2021). This is closely related to the position of the pupil in terms of them increasing the child's confidence or their environment not unstimulating their progress based on their level. Their level of comparison is of different levels with the use of the DPL tool, in which they are not too preoccupied with the progress of their peers.

“ADHD. So he's very he has so many difficulties. But I can. I can always say to all the other pupils that this pupil helps me and I can ask us, ask him for help, other pupils and help me. And it's very... I think he loves it.” (F4) code – *fair to those who deviate from the average*

F4 also remarked increased engagement of a particular student who sensed more comfort with technologies. This student had a meaningful experience that was not directly related to the personalised learning paths of the DPL tool. However, of the additional role the student took on in those classes. The educator noticed the pupil's knowledge and interest in helping them get familiar with the tool. The teacher F4 actively aimed to further engage that student in helping them and aimed to request their help in those classes. Per their experience, this child showed high-level knowledge of computers. Therefore they engaged them with helping the teacher set up and understand the tool when needed with the intention to give that positive personal feedback as well as to encourage that pupil further.

“But if there is a people. That is not so good. Yeah. It's very important that I build something. If you get, let's say, that you got a bronze medal if you're done 50% of those exercises. Okay. But for those people, I lower down, but they get the

bronze medal from like 35% of the exercises or 40. So they also get, hey, I got this and then they are more enthusiastic.” (F2) code – *fair to those who deviate from the average*

Therefore, the notion of efficiency within the Finnish group is addressed to those who deviate from the average in terms of encouraging them in their learning paths further with adequate challenges as well as with the sentiment of not keeping up with their peers as their tasks are catered to their level. Therefore, comparing themselves to their peers is less relevant as they are unaware of their learning paths. An additional aspect of efficiency or effectiveness is a more subtle one; it concerns the engagement of peers who lean more towards the use of technology and can take on a social role and responsibility in the classroom of translating the technical know-how the class requires. This collaborative aspect of autonomy and agency is brought up again. Whilst the journey of DPL is often indicated as a personal one, when welcomed, a collaborative, meaningful effort can occur when stimulated by the environment.

“Students who were actually uh weaker. No, they did have the feel like I accomplished this something. I succeeded. OK. And those could then also get away with that quicker quickly.” (B6) code – *fair to those who deviate from the average*

“I think mainly used now for children with a separate learning line. So now my kids, with a learning line either up. Or down, but not for uh, the average learner” (B6) code – *fair to those who deviate from the average*

The Belgian group regarded the effectiveness and fairness of the DPL tool to those who deviated from the average in a helpful manner based on the emphasis of the code *fair to those who deviate from the average*. They were of the same sentiment that this entailed that the experience given to those pupils was based upon their level and not a general one. With this referring to pupils who performed at a lower level and were less influenced by their peers’ accomplishments, this aspect of non-automatic comparisons increased the level of confidence pupils had. It involved the influences of others less in their learning paths. Their influence was not of the highest relevance as it could not be noted in an obvious manner due to their personalised learning paths and focus on their own screens.

5.3.2 Easing teacher's tasks

A couple of the main functions of these DPL tools regarding efficiency was their opportunity to ease teachers' workload. These three functions were interpreted from the educators' interviews which were also interpreted from the codes: 1) Lessening the challenge to personalise, 2) Easing the work of preparing and correcting, 3) Quick feedback to the pupil and teacher. Starting with the function of having less of a challenge to personalise due to the DPL tool, it was interpreted that as an educator, one of the hardest tasks for them is being able to cater to each individual student in a conscious manner. This was also individually interpreted as a code, meaning that the personalisation aspect of it is thoroughly supported by acquired knowledge from the pupil, and even then, the educator is rightfully critical of their personalised task for the pupil. That responsibility is partly divided with the introduction of the DPL tool, as educators noted the following:

“For teachers to personalise learning. It's really hard and time taking, time-consuming, personalised learning without any ICT platforms. If you're just doing it with pen and paper and the school of books and stuff, it's, it's going to be quite, well, quite time-consuming. Mm hmm. And also a teacher keeping track of each individual pupil.” (F3) code - *Lessening the personalising efforts*

This sentiment was particularly noticeable in the Finnish group as they found that they were responsible for enhancing their pupil's learning experience by catering it to their level to engage in active learning. The aspect of time comes with catering to the competencies and interests of the pupil on a manual basis, entailing the time-intensive workload behind the incorporation of personalised tasks that was an addition to their already busy workload. They found that the personalisation aspect of the technological tool was welcomed in retrospect to ease the educator's already intense schedules.

“I would like to give the instruction myself as a teacher, and so the starting point of OK, you start and that difficulty level. So be able to say that you start there, to assess it yourself, but that the platform possibly adjusts from OK. You made that exercise it was it all wrong.” (B5) code - *Lessening the personalising efforts*

In the Belgian group, they noted that the educator still should have the autonomy to decide the level of the starting point of the pupil, and thereafter the system will further guide the pupil

based on the right or wrong answers given to enhance their understanding of the task based on their level. Trust in the tool was highly present in both groups.

In terms of the function of easing the work of preparing and correcting the tasks or classes. The codes of *Preparation ease* and *Correction automated* were grouped together due to the participants' emphasis on both in an interchanging manner. The Finnish group referenced the speed of correction, meaning that the system can indicate immediate wrong answers or right ones that, in return, can help them practice the material further.

“And that gives me a sort of the peace of mind, so to speak. I'm able to know which student is doing fine and which isn't. So that was how I felt using ViLLE as a teacher, as opposed to when we were using textbooks or exercise books.”
(F3) code - *Correction automated*

This ease of tasks was interpreted particularly with the notion of time with the Belgian group. In the sense that whilst it eases the preparation or correction of the tasks distributed in their class, this also means that they have more time to dedicate to their pupils. However, B6 noted that the preparation behind incorporating this DPL tool and its learning path design content is a time-intensive task if the teacher needs to contribute to the learning path design. Whilst they could dedicate their attention and time to their student in those classes, it is still emphasised that it is still overcompensated based on the efforts behind implementing those classes with the DPL tool.

“I just think it only can make teaching stronger in the work the teacher has after hours as in preparation and follow-up. So it can help but not replace the teacher.”
(B5) code - *Preparation' ease*

“But again, you'd have freed up time. But is then also made relative. Time off for students, but then at the expense of your preparation time.” (B6) code – *correction automated*

The question of efficiency in terms of easing the workload of preparing and correcting is addressed. However, it is important to note that this, in relation to the effort behind the implementation, disrupts the notion of efficiency. As the efficient outcome does not overrule the time and effort behind its incorporation in the classroom.

With the third function, I interpreted the term *feedback* as a code to the pupil and teacher to give information directly to the pupil in terms of their performance and where it went wrong or right. Furthermore, with this information, the educators often explained that it could help prevent the student from continuing a subject in a non-understandable manner. The system corrects them where needed and repeats in order to get them acclimated with the subject. Additionally, the educators utilised this moment to gain a deeper active understanding of their pupils at that moment as the system allowed information about the students to be passed to the teacher.

“So instead of correcting for another hour first and then analysing the results yourself and seeing where the mistakes came from? Now I was just presented with it already in a chart of look, there are a lot of kids not making mistakes on that exercise, but maybe those have misinterpreted, and so you can just work on that the next day.” (B5) code - *Feedback focus and knowing when to interfere*

Whilst giving immediate feedback to the pupil was augmented, the relevance of the teacher knowing perhaps where they need to intervene was considered an effective function of the DPL tool. This enabled them to acquire quicker information on the progress of the class. In scenarios of the pupil not understanding the material, reflected in their progress visualised by a chart, a teacher such as B5 utilised that information to repeat or explain the material that needed further addressing.

5.4 Effort

In particular to the theme of ‘Effort’, these subthemes helped define the main theme, such as *Active role of the teacher is not diminished with the use of DPL* and *Time intensive*. These, with my interpretation, correlate but differ based on the emphasis given by the participants. Therefore, acknowledging the subtheme regarding the active role, it is important to address it separately. I interpreted the need to augment their voices regarding recognising their efforts in the classroom, even when using a DPL tool to reveal this to the public.

Main theme	Subtheme	Codes
Effort	Active role of the teacher is not diminished with the use of DPL	Guiding & facilitating roles
		Technical added role
		Setting up the hardware and software

	Time intensive	Familiarising with the platform/tool
		Individual re-learning and fear of not keeping up

Table 4. Effort

5.4.1 Active role of the teacher is not diminished with the use of DPL

Whilst often the narrative of teachers being replaced by technological tools has been passed around, it is denounced by the interpretation of these educators' experiences. They emphasise their active role in the classroom, meaning they go from student to student to ensure they have started, as well as going to the individual students if they require further help or have asked questions.

“I rarely sit down. I go from student to student and from student to student to check how they are doing.” (F5) Code - *Guiding & facilitating roles*

This was exemplified through the codes of *Guiding & facilitating roles*, *technical added role* and *setting up the hardware and software*. With this, as exemplified by F5, the use of the DPL tool does not allow the educator to take ‘a break,’ so to speak. Their view of needing to be available at all times is highlighted, as their active role is multifaceted with its use. They help set up the use of the tool, make sure that everyone has started and is working on the DPL tool, and go around to assist those who need help. These tasks within their role all require active attention and interaction on their part, per the Finnish group. This often occurred with an emphasis on the code regarding the hardware and software in which the facilitating code interrelated to that notion and resulted in taking on an active role. The notion of *facilitating* was as well addressed by Prosser and Trigwell, who found that the facilitator's role is an aspect common with student-centred methods (1999, as cited in Code & Ward, 2002).

With these, the Belgian group's experiences are interpreted on its emphasis on an ‘active role’. They stressed that even if the digital comes into play in the classroom, this does not mean you take a step back as a teacher. According to Dewey, teachers are primarily facilitators in cultivating and developing students through their help, in this case, who view educators as support towards their learning journeys in PL's theoretical foundation (Dishon, 2017). Your role is still active; however, it is diverse in its variety of roles. They described the emergence of a coaching and guiding role using the DPL tool, meaning that with the tool, they are not actively standing

in front of the classroom but rather moving around to facilitate help to those who need it as well. Furthermore, because the innovative field of emerging technologies in education has not been thoroughly investigated (Zhao & Frank, 2003, as cited in Howard, 2013), their active involvement and emphasis are augmented.

Overall, it became apparent that both groups have an active role in the classroom. The idea of teachers or educators taking a step back in the classroom is not justified as the ease of tasks is perhaps adopted with the DPL tool; however, what goes behind the screens is still much needed. Guiding the pupils regarding their understanding of their mistakes, ensuring they are in line with the learning tasks, and checking if they are independently working on the tool. To help the pupils to actively work on those tasks, the DPL tool entails various roles that the educators take on, which do not allow for much passivity.

5.4.2 Time intensive

Another aspect of the behind-the-scenes is the effort of time to familiarise yourself with the tool and its uses. In particular, a couple of references were made in correlation to the teachers' age, explaining that they felt that age came into play in how they could acquire new knowledge in relation to technological tools. With this, I also interpreted the comparison of those who were younger as they could acquire technological know-how faster than their younger peers.

“...the fear maybe is that I can I keep up with my my knowledge and my that I because I'm fine if the pupil is teaching me to me that's really fine with me because they know so much about not as many things, but still I want to know some.” (F2) code - *Individual re-learning and fear of not keeping up*

“...lots of areas in the ICT field yet. I am a beginner. But uhm, the intention is that within a few years, I will be more passionate about it and that I will uh find out more about it. And yes, that scares me a bit.” (B4) code - *Familiarising with the platform/tool*

They noted that it took them a while to get the gist of the tool as well as utilise it in their classes. Some even noted that they have not fully used all the personalisation tools the platforms offer as they have yet to set time aside for learning those new features. The time and effort that goes into familiarising themselves with this tool are stressed as it is quite consuming, and their technological literacy also comes into play. This has been explicitly stated that more emphasis

should be placed on making time for educators to build these professional abilities. Moreover, for the most part, they do not wish to give it priority over their usual responsibilities (Code & Ward, 2002). As we have seen with the conceptual framework, controversies and constraints occur if its use and goal are not carefully understood (2013, as cited in Li and Wong, 2021).

Whilst the effort regarding time and dedication to acquire that specific new knowledge is acknowledged, some participants also question the regard of primary education in its ‘superior’ perceived successor of secondary education. Entailing that the use of tools or learning paths is often created in the sense of being used in multiple classes to secondary education, as compared with primary education, it is not of the same extent as addressed by participant B6:

“Yes, I also think it's different for a teacher in elementary school than in secondary school. I think in secondary you often have. Uhm, you make a learning track and you can use that in four, five, six classes. Maybe? Uh, depending on the size of your things. If you do that in primary it's for 1 class.” (B6)

This was mainly emphasized in terms of the disparity in how often they can reuse a certain learning track as they are focused on their class which continues to be the same for the school year. Therefore, once done with that learning track, they need to introduce a new learning track.

This was especially acknowledged by the Belgian group in regard to the facilities that were presented at their schools. Some teachers mentioned sharing computers and tablets with the whole school, which also meant that the older students got a sense of priority over it, and as such, the equipment was often underutilised by some grades. This, as well as technological literacy, is notable as the teachers have to put in the effort of familiarising themselves with the tool, but the use of it in the classroom is already restricted as the computers or tablets, e.g. are not that easily attainable. According to Baker, in order to prevent insufficient tool adoption, it is essential that individual and environmental efforts coordinate or complement one another (2016, as cited in Van Schoors, Raes, Vandebecelaere & Depaepe, 2023).

5.5 Sentiment

In regards to the participants’ sentiment towards the DPL tool and, in general, the incorporation of technology in school. A two-view “Sentiment” was interpreted as in which it is an aiding tool for deeper observation and, on the other hand, a fear of it encompassing education.

Main theme	Subtheme	Codes
Sentiment	Aiding tool for the teacher that allows for deeper observation	Trust
		Quantity and quality of information
	Overt technocentrism in education	Loss of motor skills
		Less interaction with peers
		Safety
		Overt emphasis on its use
		Social skill development

Table 5. Sentiment

5.5.1 Aiding tool for deeper observation

Regarding the sentiment of the DPL tool being an aiding tool, it was mainly emphasised in its relation to transgress further information regarding the pupil's progress and position in their learning path. With this, the tool allowed for deeper observations that the educator could utilise.

“But I find in the ViLLE it is really nice for the teacher because you get so much information if you are doing it.” (F2) code – *Quantity and quality of information*

“I was I had like the knowledge and the support of I felt safe when I used ViLLE cause I was able to know which pupil needed to get more help from me and which pupils were doing just fine - And that gives me a sort of the.... Peace of mind, so to speak. I'm able to know which student is doing fine and which isn't.” (F3) code - *trust*

“...it's the only time I can observe them because, because when it's normal class, it's surviving.” (F4) code – *Quantity and quality of information*

The deeper observation of the Finnish group related to the quick feedback that could be given to them according to the results of their learning paths. When needed, they could step in to further help the pupil to ensure they understood the material they aimed to acquire. Li and Wong also emphasised the effectiveness of PL learning techniques to target each student's unique abilities and needs instead of pursuing a one-size-fits-all strategy (2021). The term observe or observation was also used by these participants. This was stressed in relation to their other classes in which the option to observe was not made possible, as one even noted that they ‘are surviving’. On the other hand, participant F5 for example, did stress that the tool was not the

main thing in their classes. The others noted the aiding tool aspect and regarded it highly, which it did and could further aid in their classes.

“You should use the digital things when it has an added value here and for yourself and for the children. But it's not the intention that you always use it there.”

(B3) - code – *Quantity and quality of information*

With this in mind, Holstein, McLaren, and Aleven emphasised the importance of appropriately addressing the teacher's demands while also introducing the issue of efficiency to improve the instructors' experience in their classroom (2019). In the Belgian group, participant B3 followed the same line of thought, such as F5 and added the aspect of efficient value, meaning that once it proves to have value, then it should be implemented, however, it should not over-empower the curriculum nor the class environment in its entirety. The following sentiment of the group followed their rationale in terms of how they perceived how education would be involved more in the future. Therefore, the idea of it being part of the future in which it is going in that direction. The educator needs to make sure that they are involved and knowledgeable about those technologies and their use in the school.

5.5.2 Overt techno centrism in education

The novelty of digital tools in education is known nationally and internationally. The idea of technology in education driving further equity has been one of the narratives augmented through multilateral institutions. This view has been regarded with a critique by these participants. They noted that the notion of superiority in relation to technology should not be blindly accepted, as other aspects that pupils need to develop and acquire are sometimes better off without technological interference, as seen by B5.

“But it's getting more and more. Every year there is something new of a digital tool that enters the school.” (B5) code - *Overt emphasis on its use*

With this, the Belgian and Finnish groups shared the same sentiment towards the decline of certain skills. They emphasised two points that need to be carefully reviewed: 1) loss of motor skills and 2) socialisation.

“My fear is that they will lose the ability to write and have handwriting. Yeah, because the connection between your handwriting and your brains and how the brain works, you need it; you cannot be without it.” (F1) code - *Loss of motor skills*

Motor skills refer, for example, to the ability to write in this context, which is regarded as basic skills one needs to execute tasks efficiently. The participants noted a decline in their motor skill development without stating a cause and effect. They have all noted that this stagnation needs to be regarded with utmost caution as this is integral to a child's development. Therefore viewing and writing with pen and paper in certain classes is still much needed, and the need to do everything with a computer or some sort of technological tool needs to be carefully reviewed in relation to not lead to further motor skill stagnation. This was often mentioned in relation to the increasing use of laptops in classrooms. As mentioned before, the constraints of the use of DPL tools need to be carefully examined when aiming to implement it in the class.

“I find that also a social aspect in everything is very, very important because in life or in, in, in your work, whatever you are doing it when you are adult, uh, you need to have that skill. Mhm. The technology. As one part of it. But I think people need to see each other, talk with each other and with each other” (F2) code - *social skills development*

In terms of the socialisation aspect, as seen with F2, here it was interpreted that the Finnish group found it important to consider the socialisation of children and their interaction with each other holistically. This contributes to the overall achievement of a valuable member of society as they regard that most aspects we encounter in adult life require some sort of social interaction. The ability to interact with your peers and as well as having those socio-emotional skills are parts of people that should not be disregarded. These skills and abilities help define us and our ability to connect and interact with others. Selwyn warned about the potential of the social shaping of technology in the sense that it inferences in our interaction and everyday skills (2012).

“...we also have to be careful not to take it to the extreme there because it does remain that personal also very important, especially in primary schools. Uhu. Those personal contacts, that personal transmission, that interaction, those are less in digital. And I think that remains very important.” (B1) code - *social skills development*

“Yes, that social emotional is important though that they can still follow uhm at school and also if they are completely dependent on their computer.” (B2) code - *social skills development*

This socio-emotional development is augmented within the Belgian group with an emphasis on bridging personal contacts with peers. This aspect of socialisation regarding interaction, closeness etc. These are parts of attributes that are part of the curriculum and the goals a teacher should keep in mind. Therefore, using technology in the classroom, these skills must not be forgotten or overpowered. Especially per B1 and B2, the increasing use of technology should not inhibit the development of basic skills or, if stagnating, should regard its incorporation critically.

In the sense of a future context, a common fear of children being deprived is stressed of developing a slower pace of basic motor and socialisation skills amongst both groups. With this, the technocentric role of technology in education per the educators should be regarded with utmost caution and critique. The narrative of the use of technology should be regarded with a look of efficiency and not with an overt acceptance of techno-centrism. Their view of the function of a tool should be, in simple words, regarded as aiding, and it should not be presumed that the tool will aid in the development of all skills, most importantly motor skills, and the old methods should not be blindly put aside. As these do have effects that contribute to the development.

Additionally, several references were made regarding the code and notion of safety.

“...we do have to be careful that it all stays safe. Because yes, by bringing many more devices into the home, more dangers come in there too (B1). code - *safety*

“...the laptop is used to look things up and if they end up on the wrong website... So they have uh, the world wide web which is a bit too big to uh for the kids to find the right source” (B5) code - *safety*

I interpreted that besides the fear of delay in motor and socialisation skill development, this was another factor the participants were hesitant about. The notion of safety regarding the internet cannot be warranted, as participant B5 noted, with the world wide web being so broad. Control for safety regarding the pupils is a challenging effort, both in and out of school environments.

6 Discussion

This chapter will aim to bring the different elements of the findings together to address the relation of the research question with the conceptual framework. The research question for this study is “*How do Educators Experience Teaching with Digital Personalised Learning?*”. Concerning the broadness of the research question, several findings were considered meaningful, and the significance level will be indicated in a descending manner.

One of the most important and noteworthy takeaways in response to my RQ is how teachers see their roles alongside technology in the classroom. The participants’ emphasis on maintaining an active role in the classroom might indicate how they see the scope of their role’s significance in relation to DPL and its use. The stress on the ‘active role’ was augmented through their emphasis on the roles they took on with its implementation. A possible explanation for this emphasis was due to society’s view on the possible increase in passivity when using technologies in the classroom. This might lie in understanding the narrative of teachers’ being replaced by technological tools, which the participants vehemently opposed and denounced in its entirety. Järvelä, Nguyen, and Hadwin as well noted that technologies more particularly in the emergence of Artificial Intelligence does not entail that the replacement of teachers will occur. With this they stress even more on the significance of their capabilities and human skills and therefore technologies should aim to augment them in regard to their educational practices (2023). Gurcan-Namlu also exemplified this on a personal scale through how the teachers’ experience with technology defined a technophobic or technophilic response (2002). Additionally, their active role and emphasis on it are augmented as the novel field of emerging technologies in education has not been studied in-depth (Zhao & Frank, 2003, as cited in Howard, 2013). Moreover, this uncertainty in the field resulted in a perceived risk view toward technology teachers (Howard, 2013). This also translated to their experience of augmenting their active role in the classroom, as I interpreted that these participants viewed society as perhaps unaware of their responsibilities. Having had the experience of DPL, they felt the need to raise awareness of the level of engagement required to implement this technology. It is significant to clarify that this was noted in both groups meaning that this finding was interpreted both on the side of the Finnish and Flemish participants.

This important finding of the aspect of activity can also be found relating to the student-centred approach rather than the one-size fits all one, in which the teachers take a front-of-the-classroom active role. Within the student-centred approach, this notion of activity changes in that it merges

with the student and thus caters to them to facilitate a better learning environment. The key word here is *facilitating*, as Prosser and Trigwell found that within student-centred learning methods, teachers view teaching more in the aspect of facilitating change, such as independent learning (1999, as cited in Code & Ward, 2002). Both groups of participants also commented on the notion of it being time-intensive to acquire and develop the skills to accurately use these tools in the classroom. Code and Ward have explicitly stressed that there needs to be additional focus on making time for educators to develop these professional skills and also to ensure that this is not prioritised over their everyday duties, all while not increasing their workloads (2002). Based on the participants' experiences, this has not been the case, as they did not mention a lighter workload to promote the use of the tool in their classes and schools. With this being said, Holstein, McLaren and Aleven brought up that the effort needs to adequately address the needs of the teacher and as well introduce the aspect of efficiency. With this, they also highlighted an early-stage introduction for teachers to facilitate the above (2019).

In regards to acquiring and gaining those skills, I found a connection with *Support*. This demonstrated that whilst the technological tool can be used to cater to the needs of the teachers, the environments still need to allow for further support in order to facilitate re-learning and keeping up. As mentioned by Baker, the necessity of the effort of both the individual and the environment needs to align or complement each other in order to avoid inadequate adoptions of the tool (2016, as cited in Van Schoors, Raes, Vandebecelaere & Depaepe, 2023). Furthermore, time is needed for educators to fully learn to engage with the tool (Code & Ward, 2002). To sum up, their experience showed that both groups found the need to voice their active role and added responsibilities with this implementation.

Another significant point is regarding autonomy. As the term DPL or digital personalised learning announces, the emphasis lies on the personal, and the significance given by these participants truly lies in the aspect of autonomy and in relation to agency. With this, the significance was highly interpreted on three levels, mainly *high regard for student autonomy, frustrated pupils*, and *medium between the autonomous and collaborative*. The cross-connection between these levels is regarded from how it addressed 'the big picture' of DPL, meaning the pros, cons, and, additionally, the surprising outcomes that stemmed from it. A significant aspect was given to the positive and high regard of students' autonomy, entailing the growing independence of the students as well as their encouragement towards this development. The shift to more student-centred learning was noticeable in the attitudes of the participants, as their given meanings often related to the shift in the educational system in which the search for a balance between

student autonomy and instructor scaffolding is trending (Lazonder & Harmsen, 2016, as cited in Schmid, Rauli & Petko, 2022). In relation to PL, the literature emphasised student voice, student choice, and student-centred instructional strategies. (Schmid, Pauli & Petko, 2022). Per both Finnish and Flemish educators' experiences, it was still interpreted that the significance they put on autonomy and agency was also slightly in contrast to its explicit mention in the literature. In other words, I interpreted that the conceptual framework of Personalised Learning (PL) addressed the voices and actions the student could and should undertake more in-depth to encourage ownership and voice. Nevertheless, within the DPL theoretical framework, it was not given as much attention as research on DPL showcased the aspect of autonomy and agency in an 'or' setting, not entailing it as an exclusive prerequisite of DPL (Van Schoors, Elen, Raes, Vanbecelaere & Depaepe, 2023). By this, I mean that it was not portrayed as an aspect that needed to be achieved in order to implement DPL fully but rather as an option that could be utilised. As portrayed in the theoretical framework of the DPL framework, "(3) personalisation can be driven by the teacher, learner **or** tool itself" (Van Schoors, Elen, Raes, Vanbecelaere & Depaepe, 2023, p. 2). This contrast with both PL and DPL frameworks was insightful as the meaning given by the educators emphasised the positive role of DPL on their pupils due to the aspect of students' ownership and voice, which has yet to be separately addressed in DPL research.

Furthermore, the notion between the collaborative and autonomous was interpreted based on the explanation that the students were encouraged to partake in their own decisions of asking for help from their peers or even helping their peers in their work. Phan (2020) encountered a similarly meaningful experience in their personalised learning initiatives (PLI) in which they found that PLI could generate meaningful encounters with the technology as well as with their peers. The collaborative touch here does not solely lie between the peers but with the teacher. This is since the notion that students with a particular interest in technology were encouraged to explore their potential in helping the teacher and their peers on the topic of technology that they were comfortable with. Prosser and Trigwell further stress this as well, as their research has shown that teachers who adopt a student-centred learning method when integrating technology in their class have shown that with this their aim was for students to gain independence (1999, as cited in Cope & Ward, 2002). This independence is also addressed with discussions amongst pupils to stimulate change in a conceptual manner (Cope & Ward, 2002). This showcased that with their experience on DPL, the notion of "personalised" did not entail a solitary interaction with technology but rather as well with their peers. However, this was particularly

encouraged by the educators in their classes and positively stimulated amongst their peers. In sum, their experience with DPL was augmented by its strength in autonomy and agency as well as its progress toward the initiative in more student-centred learning. With these aspects, the participants found that the experience of DPL and interaction with their pupils contributed to the pupils' independent learning.

Participants expressed a deep understanding of efficiency in several cases with their experiences regarding using the tool in their schools and classes. In particular, I found noteworthy the notion of it being *Valuable and Fair*. In regards to its emphasis on its added value in creating fair experiences, this subtheme was augmented by these participants by mentioning pupils who over or underperform. In this sense, perhaps the freedom that Rousseau emphasised contributed to efficiency in their learning trajectory (Dishon, 2017). Li and Wong also noted the efficiency aspect of PL learning methods to address students' specific strengths and needs rather than exploring the one-size-fits-all approach (2021). Whilst DPL and PL have been emphasised in literature in addressing all students adequately, it was interesting to note that some of the participants found the use of the DPL tool only efficient for pupils who deviate from the class. The aspect of equity brought up by Tsai, Perotta and Gašević has led to the perception that technological implementations entail fairness and inclusion (2020). This was noteworthy as a small section of the participants only implemented the use of the tool among selected students in the group, and this was particularly insightful as they argued this decision as they did not feel the need or 'value' in implementing it for the rest of the class. Regarding its efficiency on the personal aspect of the educators, a three-point function was interpreted in 4.2 - 1) Lessening the challenge to personalise, 2) Easing the work of preparing and correcting and 3) Quick feedback to the pupil and teacher. These functions were interpreted in terms of the value of efficiency it brought to their schools and personal roles as teachers and ICT coordinators. This three-point function was interpreted based on the experiences of the educators and was insightful to note from their perspective.

It is essential to note the experience of the educators in regard to DPL and the future aspects that need to be considered, and the notion of active support in class and school that was touched upon, especially in the Belgian group. The data reflected that the needs of teachers must be considered in terms of requested support, meaning that active guidance and assistance are welcomed when acquiring new skills that need to be used in the class. As mentioned in the conceptual framework, the needs of teachers have been scarcely recognised (Groff, 2017, as cited in Van Schoors, Elen, Raes, Vanbecelaere & Depaepe, 2023). Therefore the meaningful theme

of wanting further support in the classroom in facilitating DPL through the use of digital tools needs to be addressed more in-depth in the future. Additionally, emphasis was put on the constraints given by the educational system that allowed for less exploration for the educator themselves to allow for more in-depth implementation. Often the warning of constraints was augmented through the explanation of these DPL tools, in the sense that one should tread carefully and without overt acceptance as it could result in inappropriate learning goals (Baker, 2016, as cited in Van Schoors, Elen, Raes, Vandebecelaere & Depaepe, 2023). Exploring external constraints when implementing these DPL tools would also be interesting. This research could further target what inhibits or interferes with educators' incorporation process. The notion of 'needing support' heavily lay on the inclusion of full-time ICT coordinators who could assist greatly in the educational aspect rather than the technical aspects of their role. With this, the Belgian ICT coordinators expressed eagerness to contribute further to their fellow teachers while highlighting the constraining nature of the Flemish educational system and its lack of flexibility. With this, and in light of the research question of how educators experience DPL, it is essential to ameliorate the experiences of DPL and showcase the external factors that need to be concisely researched to embrace DPL fully, which this study has shown to be in-class and in-school support in the case of the Belgian group. The Finnish group also showcased some references regarding support; however, no collective meaning was found within that group. This is not to say that no further support was needed. One participant, in particular, noted that further support for the younger grades is required as the tool, according to the participant, was not considered friendly to those who are just learning how to read.

When aiming to address the experiences of the educators in this study, I found it pertinent to include their sentiments towards their experiences as well as their thoughts. With this, I interpreted a two-view sentiment that could be described as 1) an aiding tool that allows for deeper observation and 2) overt techno-centrism in education. The first is mainly in regards to the usefulness of the tool as well as the trust and the quantity and quality that they feel they receive out of it. This aspect of the tool was considered in a positive light because it allowed them to acquire more information faster regarding their pupils to adequately help steer their learning experience. What I found, particularly in line with Watter's warning, was that participants in both groups referred to its acceptance as justified based on going through digital transitions in education (2021). This was essential to note, as this positive regard was in line with perceiving it as a useful tool but simultaneously already accepting it on a pre-existing degree in the argument of its inevitability. The latter point of 'overt techno centrism in education' indicated a

critical awareness in both groups. It was interpreted on the notion of a possible ‘overload’ of technological use in education. I would not necessarily describe this as a technophobic view in which a negative view towards technology is often labelled (Gürçan-Namlu, 2002), but rather supported by their experience of the importance of maintaining motor skills and social interaction. As Selwyn emphasised regarding the social shaping of technology, this also reflected the participants’ views in terms of the possible constraints that technology, in general, might bring (2012).

Furthermore, the notion of safety was augmented in the sense of fearing the safety of pupils as technology and the use of the Internet is not controlled by the teacher. As the world wide web is freely accessible to everyone of all ages, the participants stressed the need for further initiatives to safeguard the pupils’ access to correct information. This is well emphasized on society regard of importance of accessibility (Endicott-Popovsky, 2009).

7 Additional considerations

This chapter aims to discuss this study in its entirety based on the ethical, quality, and reflexive aspects and its limitations. Furthermore, it will address the future directions researchers could take regarding DPL.

7.1 Ethical procedures

This thesis followed the ethical practices outlined by Finnish National Board on Research Integrity TENK. A detailed privacy notice was given to the participants, and during the interview, it was explicitly mentioned that their voluntary participation was highly respected. Moreover, in the case of discomfort towards questions, an emphasis on a safe space was augmented and in which their autonomy to decline or end the interview would be respected. This was touched upon both before and during the interview. The notice and signed privacy form also outlined the purpose of this study, their voluntary participation, respect for privacy and how the data will be collected (annexe 2). To emphasise my position in this study, I had no personal connections with 11 participants. One participant I had a closer connection due to seeking participants through my network.

Furthermore, I found that the strength of vocalising your experience in your dominant language would have perhaps contributed to more in-depth dialogues with the Finnish participants. Unfortunately, not grasping the Finnish language adequately resulted in the interviews being conducted in English. The ethical aspect of having one group express themselves in their mother tongue and the other in their second language might seem counter-intuitive. As I mentioned in my introduction, I found it pertinent to offer the ability to express themselves in their language of choice. With this, I aimed to establish a dialogue with the participants. This entailed carefully selecting my word choice when gauging their comfort level with the language. This ‘situated friendship’ approach I took on allowed me to aim for authenticity by adapting to the level of the interviewee and avoiding overt technical jargon in the interviews (Douglas, 1985, as cited in Welch & Piekkari, 2006). This allowed me to conduct both groups’ interviews to their comfort level and whilst the strength of expressing in your mother tongue is powerful. My adaptation of my level of English and use of technical words allowed me to establish a ‘situated friendship’ in which, irrespective of their language strength, I could conduct a meaningful dialogue with them (Welch & Piekkari, 2006).

7.2 Reflexivity

As mentioned by my method, the term reflexivity brings much bearing in my research, and therefore a section addressing my reflexive efforts was self-evident. Reflexivity pertains to thinking that denounces robotic or mechanical way actions of research (Braun & Clarke, 2019). Instead, acknowledging your non-neutrality is welcomed, and your subjectivity is regarded as essential (Joy, Braun & Clarke, 2023). With this, I aim to acknowledge my own position within this study that could have potentially affected the outcome as well as the process.

As a 24-year-old without teaching experience nor any experience in a school environment as an educator, I found that this has greatly influenced the selection of the interview questions. When reflecting on my choice of questions, I found that I could have been more specific or probed more in certain directions. Furthermore, as mentioned in the limitation section referencing a possible second interview, I found that the choice of questions could have had that sense of direction if I had had work experience, as I would be in a more experienced and grounded position. While I knew this when commencing my research, I aimed to address my shortcomings by mentioning my thoughts in the data analysis to gatekeep transparency and address it adequately in this section and in that on limitations. Furthermore, when looking back at my research with respect to the timeline, I found that the search for participants influenced the speed of this study. That, in return, influenced this whole process by critically reflecting on my writings. With the guidelines of RTA encouraged by Braun and Clarke, I had several points of reflection in which I embraced the flexibility of the method and introduced additional phases (2019). This, I believe, resulted in a strong reflexive thematic analysis of this study. Whilst encountering some mishaps with the NVivo-software, I found that this forced me to reflect on the codes and themes I selected with a new lens. Therefore, I found that whilst I believe that my data analysis aimed to embrace the reflexive and critical notion of RTA, it could have resulted in a more in-depth analysis of my questions from the beginning when conducting the interviews could have had a more specific sense of direction.

7.3 Quality

This section aims to indicate the quality of reflexive thematic analysis (RTA) based on the 'big-tent' criteria by Tracy (2010, as cited in Cilesiz & Greckhamer, 2022). This conceptualisation gives a practical instructional model and offers a universal language of qualitative standards that may be acknowledged as essential by a range of audiences. The following eight points

signify the ‘big-tent’: “(a) *worthy topic*, (b) *rich rigour*, (c) *sincerity*, (d) *credibility*, (e) *resonance*, (f) *significant contribution*, (g) *ethics*, and (h) *meaningful coherence*” (p. 838, Tracy, 2010). By addressing the following criteria, a worthy topic (1.2 Research question), rich rigour (4. Data collection and analysis), sincerity (7.2 Reflexivity and 7.4 Limitations), ethics (7.1 Ethical procedures), significant contribution (6. Discussion) already applies to the chapters addressed in the brackets. Three criteria of the model still need to be augmented separately in order to fulfil the eight criteria. Those aspects are credibility, resonance and meaningful coherence.

Starting with credibility, or as Tracy augments it, ‘qualitative credibility’, this is obtained through partiality, thick description, triangulation, and multivocality (Tracy, 2010). In regard to thick description, this entails providing enough details that allow the reader to see for themselves and encourage their own thought process, as well as augmenting the context in which the findings have occurred (Bochner, 2000 as cited in Tracy, 2010). With this, I found that the nature of Reflexive Thematic Analysis (RTA) by Braun and Clarke showcased an in-depth description of all 5 phases mentioned, which would allow the reader to analyse on their own accord whilst reading my emphasis on the context of the findings through direct quotes. The notion of triangulation is argued in the results of similar findings when different researchers have analysed and conducted their studies. This is denounced by Braun and Clarke as partiality and subjectivity are augmented in RTA and welcomed (2006). A more in-depth explanation can be found in the chapter on Methodological framework (3.) to support the notion of partiality and contest triangulation in qualitative RTA.

Resonance is noted based on transferable findings, evocative representations and aesthetics (Dadds, 2008, as cited in Tracy, 2010). Tracy defines this as how you affect your audience with your study (2010). While it may be hard to argue in support of your own study, I believe that the relevance of the topic and surprising findings are engaging to future readers, especially teachers. For example, the finding of DPL being fair and efficient towards pupils who deviate from the average was a surprising outcome, as well as the potential of a collaborative technology could entail. Furthermore, pointing out the possible direction for future research indicated a level of resonance with centring action and research towards pupils’ autonomy and educators’ adequate support (7.5 Future considerations).

Last, meaningful coherence was demonstrated by drawing on the methodological framework and its appropriateness regarding my study’s date and purpose. By following and addressing

the assumptions of RTA and aiming to avoid its pitfalls, I carefully threaded on the appropriate way of conducting the research (Braun & Clarke, 2019). Understanding the assumptions outlined in regard to the method and analysis and utilising Braun and Clarke's latest article on "*Avoiding common problems and be(com)ing a knowing researcher*", I embraced qualitative sensibility and practised RTA in a justified manner (p.1, 2023).

7.4 Limitations

Regarding the limitations of this study, I found that adequate literature on primary educators' experiences of DPL was hard to acquire, especially those done in the last five years. Whilst I could extend the theoretical framework of DPL regarding its definition and application, I found a lack of it regarding the social aspect of DPL.

Another limitation I found when looking back at the interviews is that an additional interview could have contributed to more narrowly addressing the meaningful findings I interpreted. However, this was not feasible due to the time constraints of this thesis. The notion of saturation indicates abundant data of a sample being retrieved to grasp the phenomenon as it entails adequacy of depth and richness of the data (Hennink, Kaiser & Weber, 2019). In my reflection, this was not achieved as I found that, to a certain extent, the depth in probing the participants was inadequate and, in some cases, resulted in superficial descriptions.

7.5 Future considerations

Overall, this study is significant in giving a glimpse into the notion of DPL tool experiences from the perspective of primary school educators and its implementation respective to its context. With DPL taking significant space in contemporary education and technologies, this research identified two research points in DPL that merit further exploration.

Starting with the implementation of DPL, I found that future research needs to orient more towards students' ownership and voice. The learning theory historically emphasised by Rousseau, Dewey, and Vygotsky focused on the child's ability to choose their own learning path. As stressed by the historical personalised learning theory and contemporary PL theory such as by Schmid, Pauli and Petko, a crucial inclusion of a dimension dedicated to students' voice and choice is warranted (2022). This includes researching how DPL tools enable students to make

decisions and to what extent they feel they have autonomy in their learning paths and the effect of it.

Secondly, I interpreted a generally positive attitude towards DPL tools and their potential in the classroom. However, I did note that educators' journeys of acquiring those additional skills to facilitate the tool in the classroom were often brought up in connotation of 'extra work'. As Code and Ward already emphasised two decades ago, time needs to be made available to correctly develop additional professional skills (2002). This does not entail an additional workload on top of their responsibilities but rather having the space to confidently cultivate those skills. As my study noted, educators are considered facilitators to students in their journey of learning and acquiring skills. However, the need to further investigate the facilitating environment of educators in their journey of learning and developing new skills is worth researching to analyse what types of support are significant and how to facilitate those.

8 Conclusion

This research aimed to interpret educators' experiences with Digital Personalised Learning. These were the main inquiries behind this study:

- **Main RQ:** How do Educators Experience Teaching with Digital Personalised Learning?
 - What do educators value about DPL?
 - What are some of the challenges with the use of DPL?
 - What aspects need to be considered in the future?

Based on a qualitative reflexive thematic analysis of 12 interviews with Finnish (n=6) and Flemish (n=6) educators, it can be concluded that **support, autonomy, efficiency, effort** and **sentiment** are important findings to consider when researching DPL efforts in respect to these contexts. This study revealed both positive aspects and challenges that need to be addressed for effective implementation. Educators value DPL for its ability to provide individualised instruction, promote student engagement, and offer flexibility in learning. They appreciate the potential for tailored content and assessments, allowing students to progress at their own pace. Furthermore, a surprising factor included using the DPL tool as a basis for collaboration, in which educators encouraged students to seek social interaction with their peers when needing or offering help.

The findings indicated that educators are receptive to incorporating DPL tools in their classrooms and schools and dismiss the notion of technological replacement in its entirety. With this, they even augmented the active role they take when facilitating its implementation. The described active role entailed being a facilitator of students' learning journeys, meaning that with this student-centred approach, they encourage the student to learn independently whilst making sure that they are readily available to step in as well to guide them in the right direction, while additionally taking care of the technical practicalities in this process.

However, despite the advantages, educators also face several challenges when utilising DPL. In particular, in the context of primary education, inadequate access to devices hinders the integration of technology into the classroom. Furthermore, educators express concerns about the potential for reduced social interaction, internet safety and a decline in motor skills. Another critical obstacle that must be addressed is educator training and professional development in order to effectively implement DPL, which in particular to the Belgian group, found that further

in-school support is needed. The notion of time was also stressed by both groups, indicating that to familiarise themselves with the workings of the tool, they often had to find time in addition to their daily responsibilities. An equal balance of having additional time to acquire new skills and not over-encompassing on top of their already busy schedule needs to be emphasised.

Furthermore, considering the educators' value of DPL in the aspect of autonomy and agency, there is a further need for research in regard to student ownership. The findings illustrated that the central aspect of DPL's value is defined through its ability to allow pupils to exercise autonomy and have agency over their learning paths. Future research needs to orient more towards, with an attention to detail, teachers' role in facilitating/guiding the DPL tool.

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Appendix 1

Interview questions

Contextual questions such as “*How often are you using the tool in your classroom? Is it used on a continuous basis? How did you choose this tool?*” were asked in order to gain a holistic overview of their experiences.

1. Please describe your role while you worked with students with the tool.
2. How is this current role different from the role you played when not using this tool?
3. Could you tell me more about the development of your role over time and the changes that occurred when implementing this DPL tool?
4. To what extent have you experienced challenges with your role as it relates to the tool? How have you responded to these challenges?
5. Has the role of the educator/teacher been played by students using the tool?
6. How would you like to see your role in the future within DPL?
7. What are your fears and apprehensions regarding the importance of technology in education and especially in classrooms?
8. How would you describe your stance towards personalised learning technologies from an individual perspective?

Appendix 2



Oulu University (English)

Letter of Invitation to Participate in Research

Teachers' Role within Digital Personalized Learning: Interview



September 2022

Dear

As we are entering a world of technological changes, we see that these changes affect our personal and professional lives. Tools are getting more digital, boundaries of time and place as we knew before are being more challenged with technological innovations. These technological changes are vastly seeping through in schools. Therefore my research interest lies on the more social side of this approach, mainly in researching how teachers perceive their role. With this research, I aim to emphasize the voices of educators and to research how teachers define their role within digital personalized learning and their understanding of their role within this technological context.

We invite you to participate in a research study conducted by Salome Yoryoliami, a student in the Education and Globalisation program at The University of Oulu, Finland. The advisor is Dr Andy Nguyen, researcher, Learning & Educational Technology Research Unit. You are eligible to participate in this study if you are a teacher in primary school and are utilising a digital platform that allows personalised learning options to the teacher.

We will ask you to participate in a semi-structured interview that will last around 40 minutes. This interview contains open-ended questions regarding digital personalized learning and how your role has or has not evolved. Your responses will be anonymous and confidential. Your participation in this study is entirely voluntary. If you choose to participate, you may discontinue participation at any time and choose any of the interview questions you do not wish to answer.

If you would like to participate in this research project please use the following [link](https://calendly.com/salomeyoryo/interview-digital-personalised-learning-oulu-university) to arrange a date and time for the interview: <https://calendly.com/salomeyoryo/interview-digital-personalised-learning-oulu-university>. And if you have any questions feel free to contact me at salome.yoryoliami@student.oulu.fi.

Sincerely,

Salome Yoryoliami
Email: salome.yoryoliami@student.oulu.fi
TEL: *****



Oulu University (English)

Letter of Informed Participation in Research



Teachers' Role within Digital Personalized Learning: Interview

Date:

Informed consent for participating in research

This informed consent form provides you, as a research participant, with general information about the research, its purpose and your rights as a participant.

General information

I am enrolled as a student in the Master's Programme in Education and Globalisation, at the Faculty of Education, University of Oulu. As a part of my studies, I am conducting research in educators' experiences with Digital Personalized Learning. The purpose of my research is to analyse and how educators experience teaching with DPL as well as the challenges, value and future considerations. I kindly request your consent for collecting information from you, for the purpose of this research, by means of an interview. All information will be used anonymously, respecting your dignity. No personal details that enable your identification will be included in the analyses and reporting. Systematic care in handling and storing the information will be ensured to avoid any kind of harm to you. After all the information leading to the identification of a person has been removed, the information will be archived electronically, following the guidelines of the Finnish Social Sciences Data Archive.

Voluntary participation

Your participation is completely voluntary. You have the right to withdraw from the research at any time without any consequences. Observe that information collected before your withdrawal may be used. You have the right to get information about the research and may contact me if you have questions. Confirming informed consent I am willing to participate in the research. I allow the use of information given by me for research purposes. I allow the information I have provided to be stored and archived for further research use. Furthermore: Your responses will be anonymous and confidential. Your participation in this study is entirely voluntary. If you choose to participate, you may discontinue participation at any time and choose any of the interview questions you do not wish to answer.

Signature and name (in capital letters):

This research by Salome Yoryoliami is supervised by: Adjunct Professor Andy Nguyen, University of Oulu. More information about research ethics and informed consent: Finnish Board on Research Integrity¹

¹ <http://www.tenk.fi/en/ethical-review-in-human-sciences> Social Sciences Data Archive
<http://www.fsd.uta.fi/aineistonhallinta/en/informing-research-participants.html#partIV-examples-of-informing-research-participants> <http://www.fsd.uta.fi/aineistonhallinta/en/anonymisation-and-identifiers.html>

Appendix 3

Name (Phase 2B)	Description	Files	References
after-effect of all this technology	This after-effect entails the meaning of the participant of the futuristic context of technology on their personal life and work spheres	10	56
Child Autonomy (voice and choice)	References to the child's ability to choose for themselves or having the environment in order to vocalise their desires in how they aim their learning process to look like	5	10
independence		4	10
Context of the Platform	Personal reference of how the teachers/ict coordinators involved themselves in the use of the platform. This is varied in terms of indicators such as the frequency as well as how they perceive the context of the platform to be best fitting for them	9	16
Context of the school with (d)PL	Similar to code Context of the Platform, however broader encompasses the school environment with the learning approach of DPL (Digital Personalised Learning)	2	2
critical stance	Critical standpoint referencing to the use of the platform as well as implementation of everything related to education that affects their classrooms.	4	16
Efficiency in choice	Reflection of old vs new based on what they need to learn	6	8
effort	What goes behind actually realising the implementation of this platform in the classroom. Reference to the work behind doors (Preperation, explanation, etc)	6	17
primary school reference		1	1

Evolverment and new features in their role as a teacher	New abilities and skills that stemmed from after or during using the platform	9	22
Evolverment of the role when using the platform		9	19
limitation	Referencing to certain limitation of the platform as well as problems with the hardware	4	7
hardware reference		1	1
miscomprehension of the P tasks		2	2
motivation	Referencing to the enthusiasm of the children	7	11
Non-Technological tools and technological ones	Comparing and reflecting on non-technological methods or tools and the technological ones. Seeing it in a holistic picture as well as including the position of the student in here	6	11
Reflection on the choice (old vs new) in terms of what they need to l		5	8
perceived worries		11	36
Personal frustration		8	24
feeling of pressure		2	3
positive sentiment		5	14
question of efficiency or Usefulness		7	19

aiding tool		7	19
perceived usefulness		10	25
Perceived usefulness of DPL		12	31
Reason (choice) for using the DPL platform		8	14
Choice of the DPL		6	11
Reference to institutional involvement		3	7
response to challenge		4	5
role description		12	25
self development		6	17
student progression with its use		11	34
seeking others		2	2
support		2	4
need for support		2	8
Support in the school		2	9
Thoughts to the future	How learning should be like and how they want their role to progress etc	7	13
Idea of how learning in general should be like		5	6
value of the teacher		3	5

(regarding technology)			
Use of the Platform		6	7