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NOTE-TAKING HABITS OF ONLINE LEARNERS:

A POSTPHENOMENOLOGICAL STUDY

BY

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Approval of Thesis

The undersigned certify that they have read the thesis entitled

THE NOTE-TAKING HABITS OF ONLINE LEARNERS: A POST-PHENOMENOLOGICAL STUDY

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Abstract

Academic literature discusses various aspects of note-taking and a variety of tools for taking notes and their benefits and challenges. What is the meaning of note-taking and its related technologies for graduate students in an online university? This qualitative study explores the lived experiences with note-taking for online students and the intertwined human-technology connections using a postphenomenological design. Data collection includes interviews, reflective activities, and artifacts. Data analysis includes thematic analysis, variational analysis, and visual research methodology. The study revealed that note-taking is not only about recording and storing information but also individual preferences of online learners. Such preferences affect the choice of note-taking strategies and technologies for taking notes. Online learners take both digital and pen and paper notes. Also, online learners strive to be successful in their graduate studies and balance life and school activities finding in their busy schedules the place and time to study which may be less than perfect.

Keywords: note-taking, online learning, postphenomenology, technology

Preface

This thesis is an original work by Elena Chudaeva. The research project, of which the thesis is a part, received research ethics approval from Athabasca University Research Ethics Board, project title “Note-taking habits of online learners: A postphenomenological approach”, Ethics file No 24944, October 20, 2022 – April 30, 2024. At the time of defense, no part of this thesis had been previously published. No content generated by Artificial Intelligence technologies has been used in this study.

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Note: all images in the study were created by E. Chudaeva (2023)

Glossary of Terms

To provide context for the terminology used throughout this study, the following definitions were used with the study and its objectives.

- 1) *Analytic memos* are notes a qualitative researcher takes while developing more abstract ideas, themes, or hypotheses from an examination of details in the data (Neuman, 2011).
- 2) *Andragogy* is the art and science of adult learning, according to Malcolm Knowles (Kearsley, 2010).
- 3) *Bracketing or epoche* is the first step in phenomenological data analysis in which the researcher sets aside all preconceived experiences (Creswell & Poth, 2018, p. 314).
- 4) *Clusters of meaning* is the third step in phenomenological data analysis, in which the researcher clusters the statements into themes (Creswell & Poth, 2018).
- 5) *Content analysis* is a systematic examination of text and visuals, media and/or material culture to analyze their prominent manifest and latent meaning (Saldana, 2011, p. 10).
- 6) *Distance education* is a method of education in which students can study in their own time, at their own place of their choice, and without face-to-face contact with a teacher (Bates, 2008).
- 7) *Distance learning* is a method of study where teachers and students do not meet in a classroom but use the Internet, email, mail, etc., to have classes (Merriam-Webster, n.d.).
- 8) *Essence* is the goal of the phenomenological study, a brief description that typifies the experiences of all of the participants in a study (Creswell & Poth, 2018).
- 9) *Imaginative variation*, is a method of analyzing phenomenological interview data, a form of phenomenon reduction in relation to the removal of variant parts (by imaginatively

varying the phenomenon structural components to uncover invariant parts) and phenomenon clarification (Bevan, 2014).

- 10) *In vivo coding* is the type of coding in qualitative research that is based on the actual language used by participants (Saldana, 2011, p. 99).
- 11) *Introspection* is a means of learning about one's own currently ongoing, or perhaps very recently past, mental states or processes (Schwitzgebel, 2019).
- 12) *Invariant phenomenological structures*, in phenomenological interviews, are irreducible structures of experience that are essential and intersubjectively accessible in contrast to purely individual experiences of participants (Hoffding & Martiny, 2016).
- 13) *Latent meaning* (in content analysis) is one that is suggestive, connotative, and subtextual (Saldana, 2011, p. 10).
- 14) *Lifeworld*, in postphenomenology, is a place where we live, work, and play, a place where perceptions begin (Irwin, 2016).
- 15) *Lived experiences* is a term used to emphasize the importance of individual experiences of people as conscious human beings (Creswell & Poth, 2018, p. 314).
- 16) *Manifest meaning* (in context analysis) is one that is surface and apparent (Saldana, 2011, p. 10).
- 17) *Metacognition* refers to the deliberate conscious control of cognitive activity (Schunk, 2020).
- 18) *Modes of appearance*, in phenomenology, "means that a thing experienced, such as a person, car, idea, emotion, or memory, is experienced in many ways from different perspectives, by one person or by many people" (Bevan, 2014, p. 137).

- 19) *Multistability* is related to the idea that technology has multiple purposes, can fit into multiple contexts, can be meaningful in different ways to different people, and can evolve differently within different cultures (Rosenberger, 2020).
- 20) *Natural attitude* is a way in which each of us is involved in the lifeworld (Husserl, 1970).
- 21) *Note-taking* is the practice of recording information captured from another source.
- 22) *Online learning* is a form of distance education where the primary delivery mechanism is via the Internet and where a course or program is intentionally designed in advance to be delivered fully online (Bates, 2008).
- 23) *Phenomenon* is the central concept being examined by the phenomenologist. It is the concept being experienced by subjects in a study (Creswell & Poth, 2018, p. 315).
- 24) *Phenomenology* is commonly understood in either of two ways: as a disciplinary field in philosophy, or as a movement in the history of philosophy (Smith, 2018).
- 25) *Phenomenological study* describes the common meaning for several individuals of their lived experiences of a concept or a phenomenon (Creswell & Poth, 2018).
- 26) *Photo Elicitation Interview* (PEI) involves “using photographs to invoke comments, memory, and discussion in the course of a semi-structured interview” (Banks, 2001, p. 87).
- 27) *Poetic inquiry* is an emergent movement within qualitative research; in this approach the qualitative data is transformed through poetic structures (Saldana, 2011, p. 13).
- 28) *Posthumanism* is a perspective that the age of humanism has come to an end. It is premised on the idea that humanism's twin assumptions that humans are both knowable and reasonable are false. It rejects the idea that humans can be known, largely because

the dividing line between human and non-human or animal is difficult to delineate in the first place and highly permeable too (Buchanan, 2018).

- 29) *Postphenomenology* combines philosophical analysis with empirical investigation of technology to reveal the relationships between human beings and technological artifacts, focusing on the various ways in which technologies help to shape relations between human beings and the world (Rosenberger & Verbeek, 2015).
- 30) *Qualitative reliability* indicates that the researcher's approach is consistent (Creswell & Creswell, 2018).
- 31) *Qualitative validity* means that the researcher checks for the accuracy of the findings by employing multiple validity strategies (ex., triangulation of data, member checking, use of thick description, clarifying possible biases, and presenting discrepant information) (Creswell and Creswell, 2018).
- 32) *Reflexivity* is the aspect of qualitative research that requires the researchers to reflect on how their role in the study and their background may shape the study (Creswell & Creswell, 2018).
- 33) *Self-efficacy* refers to an individual's belief in their capacity to execute behaviours necessary to produce specific performance and to exert control over one's own motivation, behaviour, and social interactions (Bandura, 1977, 1986, 1997).
- 34) *Self-observation* is an overarching term for any process in which the self is taken as the object of attention and/or reflection (Falkenström, 2012).
- 35) *Structural description* addresses how the phenomenon was experienced (Creswell & Poth, 2018, p. 315).

- 36) *Technology in education* is a thing or a tool used to support teaching and learning such as a learning management system or a printed book (Bates, 2019).
- 37) *Textural description* addresses what was experienced (Creswell & Poth, 2018, p. 315).
- 38) *Thick description* is qualitative data in which a researcher attempts to capture all details of a social setting in an extremely detailed description and convey an intimate feeling for the setting and the inner lives of the people in it (Neuman, 2011).
- 39) *Transparency*, in postphenomenology, refers to the degree to which a technology is in the background of the user's awareness when used (Rosenberger & Verbeek, 2015).
- 40) *Variational analysis*, in postphenomenology, is "the creative brainstorming of possible stabilities (or variations) for a given technology" (Rosenberger, 2014, p. 377).
- 41) *Variational cross-examination*, in postphenomenology, involves critical contrast of the various stabilities of a multistable technology to explore how particular stability has become dominant (Rosenberger, 2014, p. 24).
- 42) *Visual Research Methods* (VMR) are "methods which use visual materials of some kind as part of the process of generating evidence in order to explore research questions" (Rose, 2014, p. 25).
- 43) *Voyant Tools* is a web-based reading and analysis environment for digital text (<https://voyant-tools.org/>).
- 44) *Worldviews* are general philosophical orientations about the world and the nature of research that a researcher brings to a study (Creswell & Creswell, 2018).

Chapter I – INTRODUCTION

Technology has been assisting education and learning from the use of stones to carve figures on rocks to the use of personal electronic devices by students today. In the 1980s personal computers started to be available for the mass market and in the 1990s the World Wide Web became available to everyone. The expanded use of technology and the Internet in higher education has sparked numerous debates about what technology tools, learning designs, and practices support teaching and learning best. One of the questions that have been in exploration for several years, and still does not have a definite answer, is “Is the pen mightier than the keyboard?”. The paper “The pen is mightier than the keyboard: Advantages of longhand over laptop note taking” by Mueller and Oppenheimer (2014) answered yes to this question. However, there are contradictory findings. Thus, in 2022, there is still no definite answer to the question “What is mightier? The pen or the keyboard?” In general, there are three categories of findings:

- longhand note-taking is more effective than a keyboard (Allen et al., 2020; Mfaume et al., 2018; Mueller & Oppenheimer, 2014);
- taking notes on a computer is beneficial for learning (Grahame, 2016; Gilanlioglu & Ertay, 2021; Reimer et al., 2009);
- the effectiveness of the note-taking techniques and technologies depends on various factors (Aragón-Mendizábal et al., 2016; Gorospe & Abad, 2023; Huang et al., 2021; Luo et al., 2018; Voyer et al., 2022).

However, the exploration of note-taking for learning started much earlier than the use of computers in the classroom. Crawford's work on the effects of note-taking in the classroom is considered pioneering research (Crawford, 1925). Since then, many studies have been exploring different aspects of note-taking in different educational settings. Also, in the 1950s, Walter Pauk, a professor at Cornell University, developed a system for taking, organizing, and reviewing notes "Cornell Note Taking" (Pauk & Owens, 2010) which is still being taught today as a study skill. In 1992, King explored various strategies to review notes from lectures to improve retention and comprehension. Today many post-secondary education institutions provide support to learners with tips for both digital and analog note-taking strategies (University of Saskatchewan Library, 2023; University of Washington, 2023; University of Waterloo, n.d.; University of York, 2023). This was the case decades ago, too: "The availability of these resources testifies to the intuitive belief that learning will be facilitated if the student manipulates incoming information by way of the notetaking process" (Carrier and Titus, 1979, p. 299).

Why is note-taking still of interest to researchers and educational practitioners? An answer may be that note-taking is a very popular and effective learning strategy. Also, note-taking is directly related to how people learn (Barnett et al., 1981; Kiewra et al., 1989; Kobayashi, 2005). Hence, it is critical to explore factors that impact note-taking, and, as a result, learning. Students' notes reflect the progress of their education (Nakayama et al., 2014). Research evidence indicates that note-taking positively impacts students' learning and test performance (Boch & Piolat, 2005; Kiewra, 1989; Kiewra et al., 1991; Peverly et al., 2003). With the rapid development of technology, there are many available tools to take notes. However, the impact of technologies on the note-taking habits of students has not been fully understood.

Additionally, with the development of distance education, the most popular option for adult learners, there is a need not only to explore ways to support personalized, lifelong, and life-wide learning but also to understand the role technology plays in online learning and how it affects choices online learners make about their study and their life. Since adult learners do not study in isolation from the world, it is important to understand the context of adult learning and factors affecting it such as globalization, the information society, technology, and changing demographics (Merriam & Bierema, 2014).

Moreover, education plays an important role in reducing injustice and transforming the future. UNESCO report *Reimagining our Futures Together* proposes a new social contract for education – one that aims to rebuild our relationships with each other, with the planet, and with technology (UNESCO, 2021a). Since technology is part of our world, it will be valuable to explore how “being-in-the-world” with technology makes a difference in how we live (Irwin, 2016). To continue this line of thought, it will be valuable to explore how technology affects our behaviour as a learner and the choices we make about the ways we study.

In Chapter II: Literature Review, I will be exploring the functions, benefits, and various strategies of note-taking, and technologies that are used by learners to take notes with a focus on distance education and online learning. Studies on the impact of study habits on post-secondary student educational outcomes tend to approach the idea of note-taking depending on the note-taking strategy, types of technology tools used for taking notes, and individual preferences.

The first set of studies explores various note-taking strategies and their impact on students learning (e.g., (Nayar & Koul, 2020). The second set of studies mostly explores the note-taking behaviour during lectures or online courses in in-person programs (e.g., Fanguy et al., 2021) and examines the use of various tools such as laptops, mobile devices, note-taking

capabilities of online platforms and textbooks, and pen and paper (e.g., Veletsianos, 2020). The third set of studies investigates how individual differences (e.g., age, gender, learning preferences, and motivation) affect note-taking behaviour and choices students make about their learning (e.g., Chen, 2021).

Due to the fast and emergency development of online education, before the COVID-19 pandemic and especially during the pandemic, the experiences of students taking online courses or programs were of interest to researchers (Concannon et al., 2005; Norton & Hathaway, 2008; Pelikan et al., 2021; Salmani et al., 2022; Schreiber, 2022; Shafiei Sarvestani et al., 2019). However, only a relatively small number of studies explored note-taking and its related technologies in distance education programs and looked into what note-taking means to learners (e.g., Shafiei Sarvestani et al. (2019) used a qualitative approach and Nakayama et al. (2017) used a quantitative approach to explore these topics). Even a smaller number of articles used a phenomenological approach to investigating postsecondary learners' experiences with paper-based and paperless note-taking (e.g., Bravo Palacios & Simons, 2021 and Marin & Sturm, 2020).

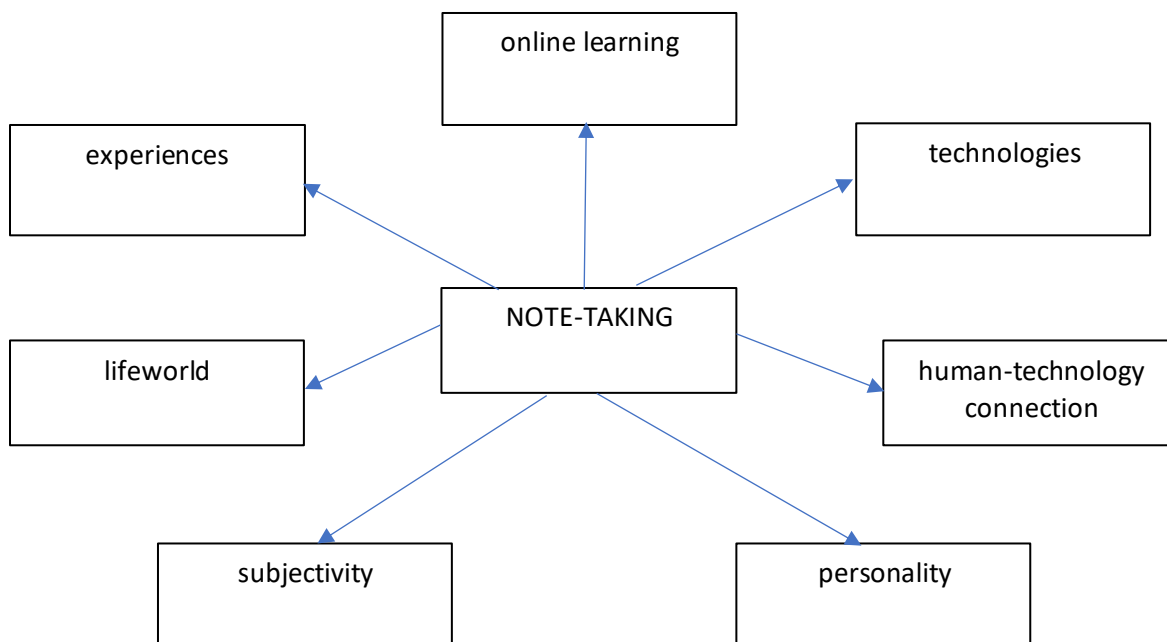
There is a large body of educational literature that discusses the shift toward digital practices and explores instrumental aspects of technology such as comparing the effectiveness of old and new tools and approaches. However, maybe the meaning of education itself and the meaning of being educated have been transformed by living with digital tools (Vlieghe et al., 2019). It is worth exploring traditional and digital note-taking and technologies for taking notes in online settings to support learners, education practitioners, and researchers. Exploring what note-taking and its related technologies mean for online students might shed light on some of the aspects of this shift to digital-first education. To start theorizing about a new era in education, it

is important to understand the current situation first, and phenomenology and postphenomenology can help us do this task.

Describing the essence of note-taking and exploring the interrelationship between human and technology will support understanding of the lifeworlds of online students. Gaining an understanding of the lived experiences of online learners with note-taking will inform choices students make about their learning and inform inclusive teaching practices and course designs in online programs. This study attempts to contribute to the knowledge base on students' experiences with online learning and the philosophy of technology-enabled learning by exploring the experiences of online graduate students with note-taking and describing choices they make with technology tools for taking notes. This study uses a postphenomenological approach to explore the experiences of online learners in-depth and describes students' experiences with note-taking and the technology they use to take notes (Figure 1).

Figure 1

Note-Taking in this Study: Related Terms



Statement of the Problem

Online learning requires numerous skills and literacies. Learning strategies research has uncovered a variety of dimensions that make a difference in academic performance (Bernt & Bugbee, 1990). From the beginning of distance education, one of the recommendations for distance education providers was to include training on effective study techniques including note-taking (Small, 1986). Filcher and Miller (2000) identified a potentially useful theoretical framework to classify learning strategies that were useful in a distance education environment based on a taxonomy that encompassed the cognitive, metacognitive, and resource management aspects of learning proposed by McKeachie et al. (1986). The cognitive component of this taxonomy focuses on the methods by which students actively process information and structure this information into memory (Filcher & Miller, 2000). Filcher and Miller explored cognitive strategies, metacognitive strategies, and resource management strategies for distance education students to see which one affected their academic achievements the most. The cognitive strategy included rehearsal, elaboration, and organization. Note-taking was identified as part of elaboration and organization strategies. Filcher and Miller mentioned that note-taking as a cognitive strategy was the only tactic to distinguish between achievement levels in the distance education context in studies by Miller (1997a, 1997b). Miller (1997b) discovered that most of the students in distance education courses delivered by videotape utilized an elaborative strategy (building connections between new and previously learned material) by taking notes while watching the video, and an organization strategy (building connections within new information) by outlining class notes. Miller (1997a) also found that students who took notes were more likely to perform well in the courses.

However, the same study by Filcher and Miller (2000), mentioned that Bernt and Bugbee (1990) found no significant differences between low passing and high passing students who reported very frequently or almost always organizing/condensing notes and summarizing with charts, diagrams, and outlines. Distance education students reported taking notes to help with information processing and only 20% of participating students reported note-taking as a frequently used learning strategy (Bernt & Bugbee, 1990). Researchers concluded that the unique concerns of adult learners create a learning context in which cognitive strategies (information processing and elaborative processing) were still significant, but less important than self-monitoring and motivational strategies (Bernt & Bugbee, 1990).

The various note-taking techniques have been examined in academic literature. The evidence is almost uniformly consistent in indicating that taking notes supports learning and is closely related to academic achievements. Usually, students who take notes in any form perform better than students who do not take notes. For example, graphic organizers are an effective way to support better academic performance compared to not taking notes at all in online lectures (Watkins et al., 2015) and scaffold the note-taking process (Crooks et al., 2007). Making cognitive and metacognitive tools such as matrix note-taking with self-monitoring prompts available to students during their knowledge construction is an effective instructional strategy to support learning from online text and performance in a Web-based environment (Kauffman et al., 2011).

In online learning, technology is a mediator between a learner and the learning material. Online students usually use a variety of note-taking tools. Some students take notes on paper, some students digitally, using word processing software or taking photos, and some learners take both paper and digital notes, combining formats in a variety of ways to meet their individual

needs (Veletsianos, 2020). Additionally, e-books and their affordances of making digital notes while reading or creating them are useful applications for online students and instructors (Casselden & Pears, 2020; Shiratuddin et al., 2003). Studies discovered that effective note-taking strategies that consider individual differences may improve academic performance (Nakayama et al., 2014) and collaborative note-taking is a valid way to support students in online programs (Veletsianos, 2020).

Studies on the role of note-taking in post-secondary education in face-to-face settings and digital note-taking continue to emerge (Fanguy et al., 2021; Hang et al., 2021; Morehead et al., 2019; Orndorff III, 2015). For example, Fanguy et al. (2021) found that students who took and shared collaborative digital notes performed better on measures of retention (online quizzes), and students who took individual notes performed better in academic writing (written assignments). Whether the findings of these studies on note-taking in traditional settings are relevant to adult online education environments, however, remains an open question. Classrooms and note-taking technologies have evolved: students can take notes on electronic devices (laptops and smartphones), and many classes have an online component or are entirely online. More research is needed on note-taking in online education (Watkins et al., 2015). This study attempts to contribute to the knowledge base by exploring the experiences of online graduate students in an online university with note-taking and the tools they use to take notes.

Purpose of the Study

The purpose of this postphenomenological study is to understand the human-technology relationship between technology and the practice of note-taking as experienced by online graduate students at a Canadian online university.

Research Question

The central question that guides this study will be:

What is the meaning of note-taking and related technologies for graduate students in a program at a Canadian online university?

To address this question more specifically, the following sub-questions, phenomenon-oriented and context-oriented, were developed. Sub-questions allow us to explore what participants experienced and how participants experienced the phenomenon in terms of the conditions, situations, or context. These two types of questions are in alignment with a phenomenological approach to inquiry (Creswell & Poth, 2018).

Phenomenon-oriented subquestions:

- *What role do note-taking and note-taking technologies play in studying?*
- *What is difficult or easy when taking notes?*
- *What factors affect the learner's choice of tools for note-taking?*
- *To what extent are students aware of or intentional about their own note-taking habits?*

Context-oriented subquestions:

- *What are the learning situations in which students employ note-taking?*
- *What processes are involved in note-taking?*

Study Contributions

The study of note-taking habits of online students is important for several reasons. First, this research will help develop an understanding of how online learners manage information in their learning process and how note-taking supports this. Traditional note-taking (with pen and

paper) may still play an important role in online learning. However, new challenges that online students have in terms of managing various technology, information management tasks, and demands of self-regulated learning have become increasingly complex due to the post-pandemic impact and new technology developments.

Second, a developmental and holistic perspective on learning recognizes that learning intersects with other developmental processes in a student's life and that students bring not only knowledge and abilities into the classroom but also their social and emotional experiences (Ambrose et al., 2010). Considering the greater diversity of students today than, for example, 50 years ago (Bates, 2019), understanding the experiences of adult learners can serve as input to the decisions about teaching and learning strategies that promote learning. For discovering what is the essence of note-taking (and how learning occurs through note-taking) the meanings and perspectives of individuals are important. Understanding lived experiences provides additional insights into the nature of note-taking for online learning and exposes the multifaceted nature of adult learning. The findings of the study will directly benefit higher education practitioners, adult education researchers, and adult learners.

Third, the use of a postphenomenological lens will help advance our understanding of the intertwined human-technology relations. Online education depends on technology. Being an online student means continuously living with and experiencing "technological entanglement". This term was used by Irwin (2016, p. 7) in describing the human-technology connections and how technology can change us. According to Irwin (2016), "Technology users interpret the world through their technologies" (p. 5). By examining the note-taking habits of online students, using a qualitative approach, we can better understand the choices learners make when it comes to choosing note-taking techniques and technology (analog or digital) for their learning. With

this understanding, educators and instructional designers can develop learning strategies and guidance to better support distance learners. Also, the results of this study will be useful to online students themselves because the findings will help learners make informed decisions about ways to use technology tools for learning, explore the factors that affect the choice of technology for note-taking, and how the choices affect their actions in the world.

Since online learning and distance learning is here to stay, the importance of understanding the habits of successful online/distance learning experiences is very important for all educators and students. This study will help us understand not only the role of traditional and digital note-taking in online and distance learning environments, but also how students perceive and use note-taking for distance learning.

Summary

The process of learning involves cognition, feeling, experience, and context. Individuals vary greatly concerning their ability, capacity, and interest in learning. Note-taking is a well-known and widely used practice to support learning. Academic literature discusses a variety of ways students take notes: pen and paper, digital notes, and a combination of both. The choice of the note-taking strategy depends on individual preferences, study context, and learning goals and tasks.

This study seeks to explore the lived experiences of online students with note-taking to describe the meaning of note-taking and related technologies for online learners and their choices of technology tools, keeping in mind that the human-technology relation is intertwined. The study employs a postphenomenological perspective by acknowledging that technology is a mediator between humans and the world.

All in all, research on students' learning is important because it helps inform the online learning practices of students and educators alike. This study will help provide recommendations for teachers and students to use the potential of note-taking more effectively.

Chapter II – LITERATURE REVIEW

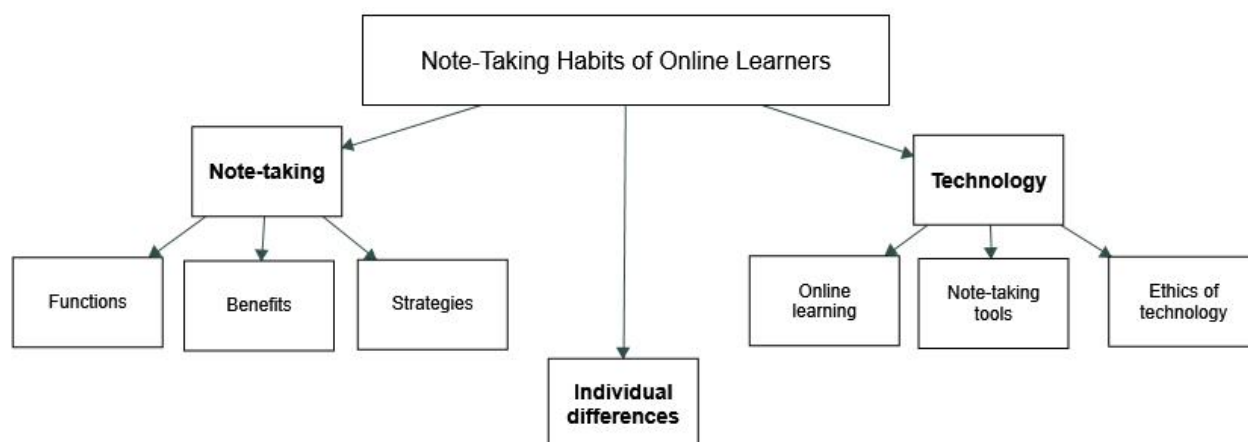
Introduction

A literature review was conducted to explore note-taking and related concepts in post-secondary educational settings with an emphasis on online and distance education contexts. The search query consisted of two components, one focusing on note-taking and the other on distance education. Key terms searched were note-taking, taking notes, distance education, online education, online learning, and note-taking strategies and phenomenology and postphenomenology. These words and combinations of words provided the basis for this review of the literature and the foundation for this study. Furthermore, other cited references found at the end of the research articles were examined for potential usefulness. The databases searched were Athabasca University Library, ProQuest, and Google Scholar.

The purpose of this literature review is to provide insights into what educational research reveals about note-taking practice and note-taking in distance and online education (Figure 2). This literature review allows us to position this study in the field of educational research.

Figure 2

Literature Map



The literature review integrates previous scholarly work and is comprised of the following topics:

- Note-taking: Functions, Benefits, Strategies, and Individual Differences
- Learning at a Distance and Technology.

Note-Taking: Functions, Benefits, Strategies, and Individual Differences

This section of the literature review will provide a definition of note-taking that will be used in this study, an overview of the benefits that come with taking notes for learning, and a discussion of different strategies learners use to take notes. Also, we will have a look at what prior research discovered about individual differences among learners related to the practice of taking notes for learning.

Definition and Functions of Note-Taking

In research literature, note-taking is generally defined as the practice of writing down or otherwise recording main ideas and important points of information (Lam, 2021; Zhang, 2012). In addition, Ozcakmak (2019) introduces the idea of time to the notion of note-taking, pointing out that note-taking as a skill has two components: the moment the notes are taken and the use of these notes later. According to Piolat et al. (2005), note-taking is a complex activity that requires one to understand and choose information and necessitates written production processes.

Some researchers emphasize the cognitive aspect of note-taking and its relation to information management. Note-taking allows learners to actively process information, interact with learning material, pay attention, and process important content deeply. As a result of the literature review the following functions of note-taking have been identified:

- to support encoding and external storage of information (Crooks et al, 2007; Fisher & Harris, 1973; Kiewra, 1989);

- to store main ideas and summarize lectures to review later (Hadwin et al. 1999; Kirby et al., 1999);
- to record information and /or to aid reflection (Boch & Piolat, 2005);
- to keep a record (external storage) and to facilitate learning material they are currently studying (Nakayama et al., 2014; Shier, 2020).

Another aspect of note-taking that received attention over the years is what learners do with the notes after they take them. For example, in an experiment by Kiewra et al. (1991), researchers explored three note-taking functions:

- encoding (take notes and no review),
- encoding plus storage (take notes and review notes), and
- external storage (reviewing someone's notes)

relative to three note-taking techniques:

- conventional (just noting their ideas and material),
- linear (outline and space to write are provided), and
- matrix (two-dimensional table).

Kiewra et al. (1991) found that for undergraduate students the external storage function of note-taking was least effective, and encoding plus storage was more effective. In terms of note-taking techniques, matrix notes were the most effective for taking notes (Kiewra et al., 1991).

Benefits of Note-Taking

Note-taking provides several benefits in addition to recording information:

- Note-taking keeps learners active and involves the body in the process of learning, engages the mind and focuses attention, and helps organize and manage information (McCallum et al., 2015).

- Note-taking increases student attention during lessons and improves comprehension skills (Kiewra, 1991; Ozcakmak, 2019).
- Taking notes helps students recall important information (Bahrami & Nosratzadeh, 2017; Lam, 2021; Nakayama et al., 2017a).
- Another beneficial effect of note-taking is known as the encoding effect, which refers to the deeper processing of information because of taking notes (Jansen et al., 2017; Wang et al., 2017). However, the type and use of notes may affect the retention of knowledge (Hadwin et al., 1999; Huang et al., 2021; King, 1992).
- Taking notes and reviewing notes later increases academic performance (Gary, 2021; Kobayashi, 2006).
- Visual note-taking not only helps recall information but also improves thinking and helps develop creative expression (Quirion Hutton, 2017).
- Most importantly, research has found that note-taking is closely related to academic achievements: students who take better notes have higher GPAs (Bui et al., 2013; Gary, 2021; Kiewra et al., 1987; Ozcakmak, 2019; Salame & Tompson, 2020).
- Taking notes also supports working memory and multitasking during online searches for information and the evaluation of information found (Wu, 2020).
- Collaborative note-taking increases students' understanding of the material even though taking notes with peers may be a more confusing process than taking individual notes (e.g., Costley & Funguy, 2021).

Although students reported that note-taking is an important learning strategy, Morehead et al. (2019) found that fewer students in online courses took notes compared to face-to-face

classes. Hence, to maximize learning performance in a fully online learning environment, the development of better note-taking behaviour is important (Nakayama et al., 2014).

Note-Taking Strategies

Students who take notes use different techniques. There are a variety of types of notes to choose from. Some researchers even talk about the art of note-taking (Jackson, 2011). Often students require support in learning effective note-taking strategies. A meta-analytic review found that more students are willing to take notes with guided notes (provided by a teacher) because they perceive it as requiring less effort than taking their own notes (Konrad et al., 2009).

Note-taking is usually completed through either a longhand format or a digital format. However, a combination of these approaches is possible, too. At the university level, note-taking allows students to gather information from lectures, books, or any other sources that they will later have to memorize or use to successfully complete their program of study. Note-taking as an information storage method in its most simple and effective form may be just “copy-regurgitate” strategies (Boch & Piolat, 2005, p. 102). More complex “reformulation-interpretation” strategies are less frequently used by students because they require more effort from learners (Boch, 1999; van Meter et al., 1994).

Academic literature discusses the following types of notes:

- guided notes with an outline of the main points of a lecture with spaces for students to fill in content (Schreiber, 2022);
- conventional, linear, and matrix for storage and organization of information (Benton, 1997; Kauffman et al., 2011; Kiewra et al., 1991);
- graphic organizers for text comprehension improvement (Katayama & Robinson, 2000; Robinson et al., 2006);

- visual note-taking with images and sketches allowing for more clear ideas and acknowledgment of others' perspectives (Pillars, 2015; Quirion Hutton, 2017; Zucker, 2019);
- doodling as an effective and engaging learning strategy (Nayar & Koul, 2020);
- voice notes for more elaborate and comprehensive notes (Khan et al, 2020);
- photo-taking of lectures (Wong & Lim, 2021).

Whatever strategy a student chooses for taking notes, this should not be the only action. Re-reading notes, highlighting main ideas, and summarizing notes support the learning process (Boch & Piolat, 2005; Boyle, 2007; Chen, 2021). Recently, NSTS (Note-taking System and Teaching Strategy), which combines learning styles concepts (students take notes in the way they prefer) and peer learning concepts (notes are shared and discussed with peers) to achieve student interaction and promote their thinking skills, has been explored (Huang et al., 2021). Huang et al. found that NSTS not only encouraged students to take notes to support their learning but also positively impacted student motivation to learn and improved student exam performance.

Note-Taking and Individual Differences

As was previously discussed there are a variety of note-taking strategies available to students and instructors to support the learning and retention of material. However, what strategy learners choose depends on their personality, learning preferences, cognitive abilities, and study context.

Despite many benefits of note-taking, some researchers point out that in some learning contexts note-taking may be less advantageous and depends on the way lectures are presented, how notes are taken, and individual differences in cognitive abilities:

- Cognitive variables such as control processes, learning strategies, and prior knowledge may affect note-taking (Kiewra, 1988) or may not affect the quality of notes (Northern et al., 2022).
- Being cognitively different may result in students adopting different note-taking strategies and getting different efficiency (Bui and Myerson, 2014; Jansen et al., 2017).
- Listening without taking notes may be more effective if a narrative text is used (Ozcakmak, 2019).
- Note-taking is a miscellaneous and complex process that leads students to take unfruitful or incomplete notes (Zuckerman, 2016).
- The individual differences in cognitive ability and working memory may affect the usefulness and effectiveness of note-taking (Jansen et al, 2017; Kirby et al., 1999; William & Eggert, 2002).
- For students with lower cognitive abilities note-taking led to worse academic performance (Jensen et al, 2017).
- Learners with better working memory had more effective note-taking skills (William & Eggert, 2002); however, Bui and Myerson (2014) point out that there are inconsistencies in the reported results among studies on the relationship between working memory and lecture note-taking.
- In some learning situations students with higher working memory benefited more from listening to the lecture than listening and taking notes (Hadwin et al., 1999).
- The effect of computerized note-taking differs depending on the levels of the learner prior knowledge: the greater prior knowledge less distractive the process of note-taking is (Wang et al., 2017).

Furthermore, learners' personality, gender, and education experiences affect note-taking:

- Females valued note-taking more than males and students with more educational experience created more effective and better notes (William & Eggert, 2002).
- Females are more likely to employ various note-taking strategies (e.g., organization, elaboration, and comprehension-monitoring) than males (Chen, 2021).
- Females record more information in notes and have a higher quality of notes (Reddington et al., 2015).
- Personality of learners (such as learning efficacy) and their information literacy affect the ways students approach notes (e.g., using a coloured pen or a highlighter, writing additional information, and reviewing notes) and learning experiences in online courses (Nakayama et al., 2014).

Additionally, learners' beliefs and learning management skills affect note-taking behaviour:

- Learners' beliefs affect how they approach learning and are inconsistent with what impacts their learning (Northern, 2016). Northern found that most students believed that reading material before a lecture helped their notetaking, even though no significant difference was found in quality and the number of notes taken between students who read before a lecture and those who did not read before the lecture.
- The differences in self-motivation and goal-setting skills, secondary study strategies, affected the academic success of distance education students more than the difference in primary study strategies (information processing and elaboration; note-taking was part of information processing strategies) (Bernt & Bugbee, 1990).

Learning at a Distance and Technology

Online students depend on technology to access their education. Learners use various tools for learning and note-taking to support their learning. Some online learners use pen and paper and some use laptops and apps for taking notes. This section provides an overview of online learning and tools for note-taking.

Note-Taking and Technology

The literature investigating experiences with technology includes three main areas of educational technology research (Cilesiz, 2011):

- Students' experiences with online education
- Teachers' experiences as they integrate technology in their teaching
- Users' psychological experiences with computer applications.

Note-taking is closely related to all these areas. Adaptive technology for note-taking (open source and proprietary) is available today for any educational setting. These technologies are compatible with Windows and Mac, as well as mobile devices such as smartphones, tablets, and iPads. These technologies include but are not limited to, Livescribe Smartpen (Livescribe, 2022), AudioNote 2 (Luminant Software, 2019), Citation Machine (2022), and Notability (Ginger Labs, 2022). Such tools allow for the integration of handwriting, typing, audio, video, and pictures as well as annotating documents and creating citations. Multiple resources are available for teachers and students that explain various options for note-taking for learning. For example, Portland State University (2023) created a page discussing various note-taking technology tools, their features, and resources to explore each of the technology tools further. Holland's article in Edutopia (2014) explains the benefits and tools for digital note-taking and

educates faculty about providing students with digital options to remove barriers to learning and support the development of expert learners.

A large amount of research has been conducted on the facilitation of the note-taking process for learning. Students use various technology tools:

- Medical students reported that note-taking was the most frequently and consistently reported use of iPads during study years (Pyorala et al., 2019).
- Students may use several devices or applications for taking notes. OneNote, Google Docs, and MS Word are the most common tools (Gombas, 2020).
- Many students intuitively use mobile phones for note-taking, taking photo notes, or recording lectures during class time (Mfaume et al., 2018; van Wyk & van Ryneveld, 2018).
- Mobile devices are often used for informal note-taking, not related to school (Dai et al., 2009).
- Collaborative note-taking applications like GroupNotes (available on Google Play or the Apple app store) and Metapholio (2018) on smartphones may be a good pedagogical strategy for engagement and peer motivation aspects of note-taking (Petko et al., 2019; Reilly & Shen, 2011).
- Stylus, a digital pen, provides similar benefits as longhand note-taking but also provides benefits of digital technology by producing digital files that can be further organized and used (Shell et al., 2021).

It is important to consider that emerging mobile technologies and apps have innovative note-taking and reflection capabilities that may support learning (Al Zaidi et al., 2014; Petko et al., 2019). However, studies showed that people react to note-taking electronic devices

differently: some people often need to work around hardware and software limitations (Dai et al., 2009; Kim et al., 2009), and other experience mind-wandering effects and less concentration while studying (Wong & Lim, 2021). This may explain why some studies found that more students use paper notebooks versus digital notebooks (Ruan et al., 2015).

Nevertheless, the question of what is better for note-taking, a pen and paper or a computer, is still far from definite. Technology may complicate note-taking because keyboard and mouse activate different areas of the brain as well as technology tools may provide additional distractions (Flanigan & Titsworth, 2020). Despite this fact, Schoen (2012) and Bui et al. (2013) found that computer note-taking is more beneficial for the retention of material than longhand note-taking in a lecture context. At the same time, some studies noted that writing things down by hand (as opposed to typing) seems to improve retention (Mueller & Oppenheimer, 2014), exam scores and course grades (Allen et al., 2020; Mfaume et al., 2018).

Mueller and Oppenheimer (2014) discovered that note-taking by hand was more effective than computer note-taking in storing both factual and conceptual information. Also, an apparent advantage of longhand note-taking reported in some studies can be explained at least partially by distractions from note-taking by other applications that are present only with digital devices (Voyer et al., 2022).

However, a replication study of Muller and Oppenheimer's 2014 study failed to generate the same findings (Morehead et al., 2019a). Sometimes taking digital notes may be beneficial for learning. On one hand, typing notes has a couple of advantages:

- The handwriting speed is much less than the typing speed. So, more information could be recorded by typing, which may be beneficial as external storage (Kim et al., 2009).

- Students recognize that as compared to hand-written notes, digital notes offer some advantages such as they are easily searchable, editable, shareable, and more malleable (Grahame, 2016; Reimer et al., 2009).

On the other hand, these advantages are not automatically transferred to the quality of the information collected (Aragón-Mendizábal et al., 2016). Although taking notes with cell phones, a common practice among students, allows them to capture more information, this technique requires less attention and as a result, may have less impact on learning, and less remembering of information compared to handwritten notes (Mfaume et al., 2018; Wong & Lim, 2021), but maybe still better compared to traditional note-taking for some students (Gilanlioglu & Ertay, 2021).

All in all, the optimal note-taking medium depends on the nature of the learning activity and whether notes are reviewed (Luo et al., 2018; Williams & Eggert, 2022) and handwritten or digital notes may be equally effective in terms of performance (Voyer et al., 2022).

Learning at a Distance

Since this study's purpose is to explore the habits and experiences of online students, it is natural to explore what distance learning is, especially because learning at a distance has unique challenges. Distance education students are usually older, have family and job commitments, have limited interactions with other students due to different geographical locations, and rely on technology to provide information for learning (Filcher & Miller, 2000; Zamecnic et al., 2022). Even though predicting the future of technology in education is difficult (Schunk, 2020), Canadian post-secondary institutions are planning to have more online and hybrid course offerings for students in the 2021-2022 academic year (Johnson, 2021).

Many post-secondary courses or at least parts of courses are delivered via mobile devices with test results that are not significantly different from traditional or blended courses results in addition to meeting the individual needs of students (Feng et al., 2018; Giani & Martin, 2021; Talan, 2020; Tuncay, 2016). Even though many post-secondary institutions have had successes with new technology, some challenges have been discovered. For example, Fichten et al. (2022) discovered that during the pandemic emergency remote learning most students used mobile technology to do schoolwork (70% of all participants), however, even though most used technologies such as Google Docs, Zoom, and MS Word worked well, students with disabilities had more problematic experiences. Also, Reisdorf et al. (2020) found that a lack of technology negatively affects student achievement.

Defining distance education may not be as easy as it seems. Distance education may be characterized as a continuum ranging from mixed in-person and distance teaching and learning on one end to complete distance teaching and learning on the other end. Not surprisingly, an analysis of findings from the 2021 National Survey for Online and Digital Learning by the Canadian Digital Learning Research Association (CDLRA) reveals that there is a need for a standard, pan-Canadian understanding of digital learning and all its forms (online, hybrid, distance, remote, and in-person) as Canadian institutions define these types of digital learning differently (Johnson, 2021). Johnson defines digital learning as “an overarching term that captures all kinds of technology-supported learning” (p. 2).

The definition of *distance learning* used in this study comes from the Modes of Learning Spectrum developed by CDLRA (Johnson, 2021). The Modes of Learning Spectrum framework first makes the distinction between *distance learning* and *in-person learning*. With the

acknowledgment that some institutions have distinct definitions for *remote learning*, this framework considers the terms *distance learning* and *remote learning* to be interchangeable.

According to Johnson (2021), *distance learning* is defined as all learning that takes place at a distance. *Online learning* (where the learning experience is delivered via the Internet either synchronously or asynchronously) is the predominant mode of distance learning; however, distance learning also includes *offline distance learning* (where the learning experience is fully remote but does not use Internet technology, such as a course being delivered in print format via mail).

For this study, the terms *distance learning* and *distance education* will be used interchangeably. It is important to mention the interactive capabilities of distance education that allow two-way feedback and discussions to become part of the learning experience.

Distance learning requires a large amount of self-regulation potentially putting students at risk of missing out on wider learning opportunities and being overwhelmed by the requirements to acquire and understand academic content with reduced or minimal support from their teachers (Pelikan et al, 2021). Research on the impacts of the pandemic on distance learning (in many cases emergency remote learning) found that the lack of physical presence and the lesser extent of informal discourse and spontaneous interaction with classmates, friends, and teachers increase the risk of developing negative emotions and feelings of loneliness (Berger et al., 2021). The impact of the pandemic on the study habits of post-secondary students is also of interest to education researchers and practitioners. Aristeidou and Cross (2021) found that the pandemic had a significant negative impact on the study habits of distance education students (but less than on students who took in-person classes before the Covid-19 pandemic): students accessed study activities less, reviewed study material less often, as well as participated less frequently in

course-related social activities. Even though distance learners can study and learn at any time and place they want, they are responsible for planning, managing, and assessing their learning processes (Moore & Kearsley, 2012). Hence, changes in life circumstances also affect online learners and the way they approach their studying. Self-regulated learning involves multiple cognitive and metacognitive constructs. One study found that note-taking as a cognitive strategy and self-monitoring as a metacognitive process play a significant and critical role in students' self-regulated learning which has its biggest impact on more complex learning activities (Kauffman et al., 2016).

Note-Taking in Distance Education

Cakiroglu (2014) found that there are significant relationships between the students' learning styles, study habits, and performances in online learning. The area of interest related to this study is note-taking in online education. However, only a few studies have been exploring it. In this section, I will present prior research related to note-taking in a broader context of distance education and online education. In 1993 there were mixed feelings about technology and distance learning: many distance education students felt that note-taking was more difficult for the remote site (Smith & McNelis, 1993). A couple of decades later, Bui et al. (2013) suggested that individuals with poor working memory (an ability traditionally thought to be important for note-taking) can still take effective notes if they use a note-taking strategy (transcribing using a computer). Preferences of students in terms of the type of learning materials also affect note-taking strategies. Watkins and co-authors (2015) found that preferences for visual or audio or text study materials among online students in graduate-level programs affected their choice of taking notes or not during the online study. Nakayama et al. (2016) studied student learning in a

blended course and concluded that note-taking activities and learners' self-reflection on their learning were connected; note-taking activities supported self-assessment of learning.

There is a consensus among scholars that self-regulation, motivation, and learners' diversity, as well as their learning environments, play critical roles in online learning. Also, online learning requires numerous skills and literacies. From the beginning of distance education, one of the recommendations for distance education providers was to include training on effective study techniques including note-taking (Small, 1986). Like in in-person learning, note-taking activity in online and distance education courses is closely related to academic achievements. Many studies found that note-taking in its various forms supports learning in online environments:

- Online students perform better when taking notes (Filcher & Miller, 2000; Miller, 1997b).
- Graphic organizers as a tool to support learning from online lectures (video and audio) were a very effective way to support better academic performance compared to not taking notes at all (Watkins et al., 2015).
- Providing notes (graphic organizers) to students taking online courses may be an effective way to scaffold the note-taking process (Crooks et al., 2007).
- Distance education students usually take notes on paper or digitally, using word processing software or taking photos. Some students take both paper and digital notes, combining formats in a variety of ways to meet their individual needs (Veletsianos, 2020).
- Studies discovered that effective note-taking strategies that consider individual differences may improve academic performance (Nakayama et al., 2014).

- The matrix method is superior to other methods for taking notes from online text whether the note-taking tool is a pen and pencil or a computer (Kauffman et al., 2011). The study (Kauffman et al., 2011) provided evidence that making cognitive and metacognitive tools such as matrix note-taking with self-monitoring prompts available to students during their knowledge construction is an effective instructional strategy to support learning and performance in a Web-based environment.
- E-books and their affordances of highlighting text and taking digital notes while reading a book were found to be useful tools for online students and instructors as well (Casselden & Pears, 2020; Shiratuddin et al., 2003).
- Online learners use collaborative note-taking to facilitate their learning (Veletsianos, 2020).

It is worth noting that note-taking with online tools was one of the strategies students used for in-person university courses, too (Fanguy et al., 2021; Orndorff III, 2015). That is why understanding what role these tools play in students' learning will help develop inclusive and accessible learning environments.

Summary

Through the purposeful investigation and synthesis of the literature, the importance of note-taking for learning and the need to explore the experiences of online students with note-taking and tools for note-taking is identified. Despite the vast number of studies on note-taking and educational technology to support learning, there is still not enough research on what note-taking and its related tools mean for online students based on their personal stories. As demonstrated through the literature review, there is strong evidence that highlights the importance of personal characteristics and unique life circumstances of learners that affect the

choices students make in terms of the ways they approach studying. Understanding the lived experiences of online students with note-taking and related technologies will contribute to the body of knowledge about creating effective learning environments to support the needs of all learners.

Chapter III – METHODOLOGY

Introduction

Qualitative research is “a situated activity that locates the observer in the world” (Denzin & Lincoln, 1994, p. 43). Qualitative research consists of a set of interpretive, material practices that make the world visible and transform the world (Denzin & Lincoln, 1994). Qualitative researchers study things in their natural settings and collect field notes, interviews, conversations, photographs, recordings, and memos with interpretations of the collected information and new questions to the self.

This section discusses philosophical worldviews and interpretive frameworks that are relevant to this exploratory study. Postphenomenological case study design will be discussed as well. Methods of inquiry include phenomenological interviews, analysis of reflections of online learners, investigation of the phenomenon in samples of participants’ notes, and reflective analysis of multiple possible uses of technology for note-taking used by the study participants. Data analysis techniques include methods related to phenomenology (describing the essence of the phenomenon under study) (Cresswell & Cresswell, 2018), postphenomenology (exploring applications of technology and habits of users in addition to the relationships between human and technology and the world) (Irwin, 2016; Rosenberger, 2014; Rosenberger & Verbeek, 2015), and Visual Research Methodology (content analysis of images) (Rose, 2007). Finally, validation and evaluation strategies, ethical considerations, as well as researcher's background will be explained in this chapter.

Philosophical Worldviews

Worldviews are general philosophical orientations about the world and the nature of research that a researcher brings to a study (Creswell & Creswell, 2018). Philosophical

assumptions influence how we formulate a problem of qualitative research and search for information to answer research questions. According to Denzin and Lincoln (2011), the second phase of the qualitative research process is about stating philosophical assumptions.

Ontology

Ontology discusses the nature of reality. Qualitative researchers embrace the idea of multiple realities. A phenomenological exploration begins with the idea of existence, ontology. Irwin (2016) discusses interrelated ontology when exploring the “technological texture” of our life, mediating the role of technology in our perceptions and environment, and human-technology connection (p. 15). The same phenomenon may be experienced and seen differently by study participants.

By doing this study, I discovered that the reality of being an online learner and a note-taker is quite different for all participants because it reflects their preferences and individuality as well as the circumstances of their lifeworld and everyday activities. I was surprised by the extent of such influence on the learning processes of online students which vary in many dimensions. I realized that through the studying of note-taking habits and related technologies, I learned a lot about each participant as a human being and about their lives in school and outside school. I experienced multiple realities of taking notes in online learning and eight different technology-mediated lifeworlds. They might look similar at first sight, but when explored deeper, they are all unique.

Epistemology

From a philosophical perspective, learning can be discussed under epistemology – the study of the origin, nature, limits, and methods of knowledge. Two positions on the origin of knowledge and its relationship to the environment, that are recognizable in current learning

theories, are rationalism and empiricism (Schunk, 2020). Rationalism discussed by Plato, Descartes, and Kant refers to the idea that knowledge derives from reason without recourse to the senses: knowledge arises through the mind. Empiricism, which was discussed by Aristotle and Locke, refers to the idea that experience is the only source of knowledge. Since phenomenology and postphenomenology are concerned with describing human experiences, and humans experience world through perceptions then the epistemological views pertaining to this study will be close to empiricism.

By exploring experiences with note-taking of online adult learners, I found that the sources of knowledge about note-taking habits and various technologies learners use for online learning came from participants' reflections (shared during interviews and in writing about their experiences with taking notes) and actions (shared through their images of notes). Also, I think the limits of knowledge about note-taking habits also come from the reflections of participants and their actions. I learned as much as they were willing to share with me in a way, they chose to share with me. My interpretations are also a source of knowledge and limits at the same time.

Axiology

Every qualitative researcher brings value to the study. As practical implications for any qualitative inquiry, Creswell and Poth (2018) suggest including one's own interpretations with those of participants. My background and bracketing will be discussed in the sections to follow. After conducting the study, I realized that my values and assumptions had an impact on how I interpreted and read the data and what questions for clarification I asked. So, the technology-mediated world of note-taking described by this research is visible through my personal lens and my story is not a universal one.

Postphenomenology

The ‘post’ in ‘postphenomenology’ indicates that it moved beyond classical phenomenology. Postphenomenology is one of the theories to try to explore the issue of technological agency (Rosenberger, 2014). We live in a world where it is impossible to exist without technology, from primitive tools to advanced science, and online students cannot attend their university courses without the use of technology. So, I explore not only the note-taking habits of students but also the role technology plays in note-taking and how technology impacts human-technology relations.

Interpretive frameworks operate on a more practical level than philosophical assumptions. They may be the beliefs that a researcher brings to the process of research or theories that guide the practice of research (Creswell & Poth, 2018). Considering these theoretical frameworks also allows me as a researcher to engage in reflexive practice and help uncover what I think about note-taking and related technologies.

Considering the context of this study, the following frameworks may guide the process of research:

- philosophy of technology
- pragmatism
- ethics of technology.

Background

Postphenomenology, as an area of research, has been gaining interest recently (Arzroomchilar, 2022; de Boer, 2021; Rosenberger, 2020). Postphenomenology offers a distinct understanding of the ways that people experience technology usage. “Technology is a texture, a feeling or surface that is knit into how we live and what we do” (Irwin, 2016, p. 4). In the

approach of postphenomenology, phenomenology becomes complemented by pragmatism (Ritter, 2021).

Phenomenology emerged from the fields of philosophy, psychology, and education (Creswell & Poth, 2018). Phenomenology has a strong philosophical component and draws heavily on the writings of the German mathematician Edmund Husserl and those who expanded his views, such as Heidegger, Sartre, and Merleau-Ponty (Creswell & Poth, 2018). As a qualitative research approach, phenomenology was first conceptualized and theorized by Husserl (1931) to understand the context of the ‘lived experiences’ of people (research participants) and the meaning of their experiences.

Ihde developed a postphenomenological position that builds on Heidegger’s philosophy of technology. Ihde (1993) wrote, “Technologies must be understood *phenomenologically*, i.e., as belonging in different ways to our experience and use of technologies, as a human-technology relation, rather than abstractly conceiving of them as mere objects” (p. 34). For example, a phenomenological approach to affordances of technology may provide a critical and empirically based approach to educational technology, which counterbalances the currently reigning technoptimism (“technologies will save our educational system”) without lapsing into technological instrumentalism (“technologies will be what we make of them”) (Aagaard, 2018).

The postphenomenological perspective points to perception, but it is a particular structured perception, which fixes its object in privileged cultural ways (Hasse, 2008). The phenomenological idea of intentionality is part of postphenomenology: careful description and examination of intentionality show how a conscious subject cannot be simply presupposed as a starting point but is discovered from within the movements of experience (Zweir et al., 2016). In postphenomenology, technologies cannot be reduced to quality-bearing objects that are

perceived by a subject, they are “woven into the movements of experience in ways that exceed the scope of objectivist accounts” (Zwier et al., 2016, p. 315). Ihde (2006) claims that technology is not just a particular object of study but is itself a way in which experience is mediated. We experience things technologically; technology modifies both what and how we experience the world.

To understand postphenomenology as a method to explore human-technology connections, several ideas will be helpful to discuss. These ideas are transparency of technology, multistability, non-neutrality, and embodiment.

- Transparency is described by the degree to which technology exists in the background and is not apparent to a user of that technology tool. The level of transparency depends on several factors, including “the user’s individual level of familiarity, accustomedness, expectation, and bodily habituation with regard to the device” (Rosenberger, 2004, p. 376).
- Another central idea of postphenomenology is that technologies always remain “multistable,” i.e., subject to different uses and meanings (Rosenberger, 2017). Even the simplest technology has no singular, stable essence, but can be taken up for different purposes or ‘stabilities’ in different contexts (Aagaard, 2018).
- When thinking about human-technology connection using a postphenomenological approach, the term “lifeworld” is frequently used. A lifeworld is a place where we live, work, and play, a place where perceptions begin (Irwin, 2016). One way to understand how technology affects us is to study the personal subjective experiences of users, keeping in mind that technologies are not a neutral part of our lifeworld, but are embedded, and textured within it (Irwin, 2016).

- Rosenberger and Verbeek (2015) proposed that postphenomenology is an interrelated ontology, which proposes that human-technology relation is not just interrelational but also co-constitutive. Moreover, this co-constitutive relation is mediated by technology. The human-world relationship is typically a human-technology-world relationship. Ihde defines the originally mediated nature of existence as embodiment (Ihde, 2002). Artifacts such as glasses or hearing aids are perceived as part of our embodiment in contrast with trees and tables that are part of our environment (Brey, 2000).

Postphenomenology is related to another post approach, posthumanism. This new kind of humanities responds to the redefinition of humanity's place in the world by both the technological and the biological continuum in which the “human” is one life form of many (Wolfe, 2009). The posthuman subject is constantly “becoming through the myriad of constituting relations in their life” (Lewis, 2021, p. 15). It may not be possible to understand all the interrelations that constitute us, but the more we become aware of how we relate with the world through transformed aspects of ourselves, the greater chance we will have to claim back some of our agencies (Lewis, 2021).

Philosophy of Technology

The field of philosophy of technology and science tries to understand technological agency. The philosophical investigation of technology is relatively recent. Ernst Kapp (1877) was the first to use “philosophy of technology” in the title of his book “Grundlinien einer Philosophie der Technik”. Marx (1964) advocated the importance of new technologies in promoting the development of society. Heidegger (1977) discussed scientific technology and issues of power and dominance of contemporary technology. Heidegger discusses technology from a perspective that emphasizes relations between humans and technology (An & Oliver,

2021). For example, Heidegger talks about ready-to-hand entities; entities that when we use them are transparent to awareness (Dreyfus, 1991). One of the key features of ready-to-hand (one that results in a unique form of “observation distortion”) is that in our everyday dealings, we interact with ready-to-hand entities not by thinking about them but by using them (Ward, 2020). Indeed, if all goes well, the equipment we use “disappears” into the work at hand, and our concern with equipment is subordinated to the project itself (Heidegger, 2008, p. 98). However, when we experience a tool-breakdown (e.g., a pencil breaks), then we notice what is not happening and how the note-taking process is going wrong (a ready-to-hand tool is failing). We experience an entity as ready-to-hand only if it is experienced as part of a network of ready-to-hand relations: usable by someone, for something, and with other entities (Ward, 2020).

Closely related to postphenomenology is the Actor-Network Theory, a sociological theory that includes artifacts in addition to humans when studying collective actions (Rosenberger, 2014). The Actor-Network theory considers technology as a participant in the chain of people and objects that work together on a problem. This theory investigates the social roles of various technologies encountered every day. A series of articles by Latour (1992, 1994, 1995, 1999) developed the Actor-Network analysis of technology with the central notion of mediation, the way humans and nonhumans work together through networks to perform tasks (Latour, 1994).

As a specific example of mediation, Latour (1992) discusses delegation, when human duties may be delegated to nonhumans. For example, the duty of a police officer to prevent speeding may be delegated to speed bumps. In this example, either an actor, a police officer, or a speed bump, will have the same effect on a driver, supporting the notion that technologies are some aspects of the world upon which a user perceives or acts. This understanding of mediation

in the Actor-Network theory is different from the understanding of mediation in postphenomenology. Postphenomenology focuses on mediation in terms of technology “coming between a user and the world, transforming each participant and their relationship to one another in the process” (Rosenberger, 2014, p. 375). Verbeek (2005) explains that mediation is non-neutral but is context dependent.

The philosophy of technology brings together logical, metaphysical, epistemological, ethical, and political philosophical questions to think about when making and using artifacts (*Philosophy of Technology* / *Encyclopedia.com*, n.d.). Ethical implications of technologies depending on our views on technology (as just instruments to do various jobs or as mediators of human experiences and practices) will be discussed in the Ethics of Technology section.

Pragmatism

Postphenomenology is grounded in pragmatism in the way postphenomenological case studies explore the use of a specific technology by people, various perspectives and uses of technology, and the emphasis on the interplay between the tools and outcomes of using them.

From an ontological point of view, pragmatism sees reality as what is useful (Creswell & Poth, 2018). Pragmatists agree that all knowledge in this world is socially constructed but some of these constructions match individuals’ experiences more than others (Kaushik & Walsh, 2019).

An individual who holds an interpretive framework based on pragmatism focuses on the outcomes of the research - the actions, situations, and consequences of inquiry (Creswell & Poth, 2018). Patton (2005) explains that pragmatism is premised on the idea that research focuses on “practical understandings” of concrete, real-world issues (p. 153). Classical pragmatism is concerned with knowledge and forms of knowing that have practical consequences (Patton,

2005). Later, pragmatists also emphasize the importance of acting on problems in the real world. For example, Creswell and Poth (2018) summarize that a researcher who employs this worldview “will use multiple sources of data, will focus on practical implications of the research, and will emphasize the importance of researching that best addresses the research problem” (p. 27).

Research in educational technology has typically focused on pragmatic questions and on understanding the features of new technologies (An & Oliver, 2021). Technology in education is a thing or a tool used to support teaching and learning such as a learning management system or a printed book (Bates, 2019).

Considering the context of the study, the following three principles of pragmatism developed by Kelly and Cordeiro (2020) may be useful:

- an emphasis on actionable knowledge
- recognition of the interconnectedness between experience, knowing, and acting, and
- a view of inquiry as an experiential process.

Onwuegbuzie and Leech (2005) point out that pragmatic inquiry recognizes that individuals within social settings can experience action and change differently, and this encourages them to be flexible in their investigative techniques.

Ethics of Technology

Technology ethics is the application of ethical thinking to the practical concerns of technology (Green, 2021). The scope and the agenda for the ethics of technology depend on how technology is conceptualized: as a neutral tool, as a worldview, or as a historical necessity (Franssen et al., 2018).

According to Franssen et al. (2018), conceptualizations of technology over time have included the following:

- as a political phenomenon
- as a social activity
- as a cultural phenomenon
- as a professional activity
- as a cognitive activity.

The development of the Internet and the subsequent extensions of computers into all aspects of our everyday lives prompted questions about how this information technology will change human existence (Introna, 2017). This encyclopedia entry suggests that depending on the approach to technology, artifact/tool approach, social constructivism, or, phenomenological, the approach to ethical implications of technology will change:

- In the artifact/tool approach, technology is a tool that we use to do certain things. So, the task of ethics is to analyze the impact of technology on practices and to correct the injustices of rights caused by using these tools (Stanford Encyclopedia of Philosophy, 2017).
- In the social constructivism approach, technology and society co-construct each other from the start. Hence, the task of ethics will be to investigate the values of built-in design and the use of technology (Stanford Encyclopedia of Philosophy, 2017).
- In the postphenomenological approach, technology and society co-constitute each other from the start. The task of ethics will be to reveal the conditions of

possibility that make a particular technology show up as meaningful and to question our *being-with* technology (Stanford Encyclopedia of Philosophy, 2017).

Some themes in the ethics of technology that are discussed in the literature are:

- neutrality versus moral agency (whether the technology is value-laden);
- responsibility (for the creation of technology and the impact it can have on earth and humanity, e.g., engineering ethics);
- design (its social consequences, e.g., computer ethics);
- technological risks (what is safe enough?)

(e.g., Floridi, 2013; Franssen et al., 2018; Friedman & Kahn, Jr, 2007; Moss & Metcalf, 2020; Schuurman, 2010).

Technologies that are ubiquitous, interconnected, and allow easy access to the Internet have become deeply integrated with everyday life and education. As a result, we increasingly depend on cyberspace for social, economic, and political interactions. At the same time, the online environment has increasingly been subjected to sophisticated and targeted threats; our ever-increasing reliance on cyberspace is creating new and significant vulnerabilities (Office of the Privacy Commissioner of Canada, 2014).

Since online students use technologies on an everyday bases and for all the tasks related to their education and learning, the following risk factors are relevant to them to the same degree as to all users of modern technology:

- More valuable electronic data is being stored and processed on a massive scale, much of it in the cloud.
- Powerful and portable computing devices such as smartphones, tablets, and laptops are increasingly integrated into every aspect of our lives.

- Information is shared, combined, and linked with other information with greater frequency.
- Third-party relationships (e.g., outsourcing to a cloud provider) are the norm.

In education, the protection of student privacy is a key societal value. Big data and Learning Analytics have the potential to gain insights to improve education experiences through large-scale empirical analysis of data related to student information and interactions with educational technology, but this also presents ethical concerns about the use of big data, privacy, and data protection (Reidenberg & Schaub, 2018). Privacy is a basic human need, but Big Data is global and permanent. Data ownership and Learning Analytics algorithm fairness are other issues related to education. Raw data belongs to learners, but processed data does not belong to the learner (Tzimas & Demetriadis, 2021). Learning Algorithms use Machine Learning, and oftentimes learners have no information about these algorithms.

Artificial Intelligence (AI) such as image recognition enables faces to unlock mobile phones, and for financial fraudulent activity to be detected by banks, have become part of our life. Educational tools enabled by AI have recently attracted attention for their potential to improve education quality and enhance traditional teaching and learning methods (Congressional Research Service, 2018; UNESCO, 2021). Students, especially distance education students, often use their own devices. Students use various apps, AI-enabled tools, and social networking sites, and their personal information and data are likely accessible to education technology companies, webpages, and other organizations. The following are primary concerns that teachers and students should be familiar with (Kerr, n.d.):

- information privacy
- anonymity

- surveillance
- autonomy
- non-discrimination
- ownership of information.

Students often work collaboratively on course assignments and some educators suggest using collaborative note-taking to record classes (Patson, 2021). For distance education students this means potentially using several technologies at the same time including apps for note-taking. Usually, learners either are not aware of or ignore the potential risks of using those tools. Spread Privacy (2020) identified some commonly encountered risks in note-taking apps including saving private information to an unencrypted note-taking app. In addition to apps, many students use Google Drive, a hard drive in a cloud, to store, share, and collaborate on documents. In this case, it is important to understand the privacy and security of the information kept there and what AI-powered services such tools use (e.g., spam filtering, and virus detection).

Given our growing technological power and its potential to address some of the biggest challenges in education and innovate teaching and learning strategies, we need to put more and more attention to ethics if we want to live in a better future (Green, 2021; UNESCO, n.d.).

Conclusion

Mediation is an element of the postphenomenological approach in the philosophy of technology (Verbeek, n.d.) Postphenomenology is inspired by a phenomenological focus on lived experiences and takes its starting point in empirical and philosophical analyses of actual technologies (philosophy ‘from’ technology rather than philosophy of technology) (Verbeek, n.d.). The postphenomenological approach combines an empirical orientation with philosophical analysis and “aims to integrate science and technology in its analysis of the relations between

human beings and their world” (Rosenberger & Verbeek, 2015, p. 11). Postphenomenological studies explore technology in terms of the relationship between human and technological artifacts, focusing on the various ways in which technologies shape human-world relationships and mediate experiences.

Study Design

Research studies that explore learning employ various types of paradigms (models): correlational, experimental, qualitative, laboratory, and field (Schunk, 2020). This inquiry will employ a qualitative research paradigm (Lincoln & Guba, 1985).

Scholars agree that qualitative research can be distinguished from quantitative methodology by the following unique characteristics that are inherent in the design (Creswell & Creswell, 2018):

- qualitative researchers collect data in a natural setting;
- qualitative researchers collect data themselves and interpret it; they are a key instrument in the research process;
- typically, the qualitative researcher gathers multiple forms of data;
- qualitative researchers use inductive and deductive analysis;
- qualitative researchers keep a focus on learning the meaning that participants hold on an issue;
- the research process is emergent, the process may change after the data collection begins;
- reflexivity is part of qualitative research how the background of the researcher may shape the direction of a study);
- qualitative researchers try to develop a holistic account of the problem under study.

Postphenomenology Case

My study design is based on a postphenomenological approach with more emphasis on phenomenology than on pragmatism. Some researchers think that focusing on the philosophical aspects of phenomenology and less on pragmatic aspects supports and strengthens postphenomenology (Ritter, 2021). The phenomenological aspect of the postphenomenology case study approach will allow for the research to occur within a real-life context and provide means to deeply understand participants' lived experiences and the multiple perspectives that define the phenomena under study. However, according to Rosenberger and Verbeek (2015), the focus on mediation and mutual constitution “sharply demarcates the postphenomenological approach from classical phenomenology” and “...access to the things themselves becomes an impossibility...” (p. 12). Technologies facilitate certain perceptions and actions while inhibiting and foreclosing others (Rosenberger, 2014). Exploring the mediating roles of technologies in human-world relations on a micro-scale “takes us back “to the things themselves”: material technological artifacts that deserve explicit philosophical attention” (Rosenberger & Verbeek, 2015, p. 12).

Pragmatism and ethical aspects of postphenomenological cases investigate specific technologies and allow exploring these tools in all their multistability and potential uses, the mediation aspect of these tools between a human and the world, and how these tools affect choices people make.

In postphenomenology, a case is a well-developed and established method to explore and write about the human-technology connection (Irwin, 2016). In a postphenomenological case study the focus is on one type of technology (in this case, note-taking technology). A postphenomenological case study design should not be confused with the case study approach to qualitative inquiry.

The purpose of using the case study as a qualitative research design is to get in-depth details as much as possible about an event, person, or process (Njie & Asimiran, 2014) and describe a phenomenon of some sort occurring in a bounded context (Miles & Huberman 1994). The case study approach to qualitative inquiry is traditionally used when there is a need to explore a phenomenon or an event in natural settings (Creswell & Creswell, 2018). The steps of a case study involve defining a case, selecting cases, collecting, and analyzing data, and interpreting the results (Creswell & Creswell, 2018).

Both approaches are similar in the way that they discuss a case with specific clearly defined boundaries and use several data collection methods, but data analysis steps are different. As Rosenberger and Verbeek (2015) explain “postphenomenological studies typically make a conceptual analysis of the implications of technologies for one or more specific dimensions of human-world relations - which can be epistemological, political, aesthetic, ethical, metaphysical, et cetera” (p. 31). The way to analyze data is through variational analysis of multiple possible uses of a particular technology tool (Rosenberger, 2014).

To illustrate the postphenomenological case study approach, let’s consider these examples:

- Verbeek (2011) explored obstetric ultrasound and how it extends not only to health practitioners’ capabilities but also how it allows for new relations between future parents and the fetus.
- Pavel et al. (2020) used a postphenomenological case to understand learning with technologies for resilience in the presence of innovative multistable technologies such as artificial intelligence. The study (Pavel et al., 2020) showed that learners

struggled to adopt new technologies, as well as to recognize and consider multiple potentialities and implications for multiple stakeholders in the learning network.

- Vindenes and Wasson (2021) used a postphenomenological case to understand user experiences of immersive virtual reality. The authors discuss immersive aspects of virtual reality, related embodied experiences of users, and how virtual reality mediates human-world connections.
- Morrison (2020) discussed the use of postphenomenology as a method that allows us to combine dimensions of technology with phenomenological reflection on our lived experience of engagement with technical objects and our moral perception and agency. This position was illustrated by a postphenomenological examination of a disaster case study approach (e.g., the NASA space shuttle explosion in 1986) and how this examination should inform engineering ethics.

Technology plays a crucial role in distance and online education, and we all live in a digitally mediated world. In addition, the relation between humans and technology is complex and intertwined (Irwin, 2016). A postphenomenological case study design will be used to investigate graduate students' experiences with note-taking and related technologies as well as to explore the lived experiences of human-technology connection.

Participants

The sampling design is based on a non-random purposive or a "criterion" sample (Creswell & Poth, 2018, p. 150). The suggested number of participants for the phenomenological study is between 5 and 25 (Creswell & Poth, 2018, Table 7.1, p. 15). I recruited nine graduate students at an online university in Canada, but eight graduate students participated in all the steps of the data generation process.

The criteria for participants in this study are:

- inclusion criteria:
graduate students enrolled in online post-secondary education programs who take notes of their coursework;
- exclusion criteria:
students enrolled in Undergraduate programs, taking face-to-face or blended courses, and individuals who do not take notes of their coursework.

To find eligible participants, the information letter with the description and purpose of the study and consent form were sent to current students by the department administration using the institution's email database. Participation was voluntary, with the right to refuse participation or withdraw from the study. The information letter and the consent form are in Appendix A.

Data Collection Procedures

The intent of qualitative research is not to generalize the information but to “elucidate the particular, the specific” (Creswell & Poth, 2018, p. 158). Qualitative methods are used to gather perceptions of both the process and outcomes (Saldana, 2011).

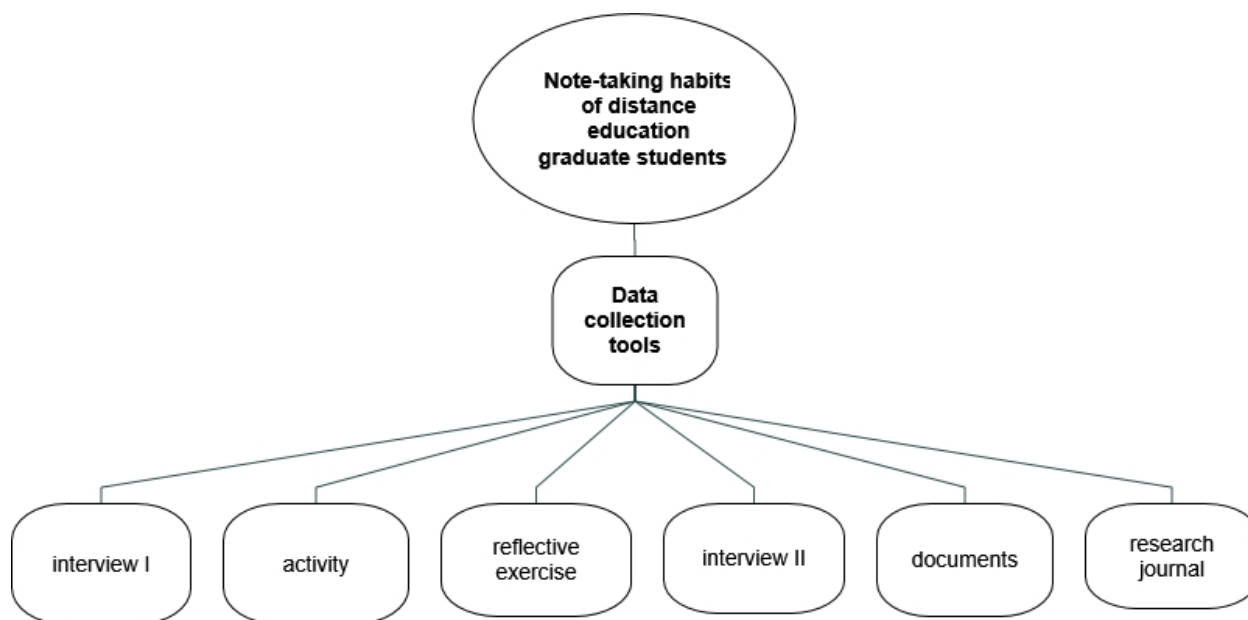
According to Saldana (2011, p. 24) to study “the social world is to study humans and their products – complex endeavors to be certain”. To learn about note-taking and related technology tools, the individual views and subjective experiences of participants were collected. Several data collection methods were used in this study (Figure 3).

Considering the phenomenological lens, open-ended questions in semi-structured interviews allowed participants to construct the meaning of a situation in which they use note-taking and related technologies. A reflective exercise and the recording of the experiences of participants when doing it were used. Self-reporting techniques ask people to report or discuss

their perceptions, beliefs, and thought processes (Fetsco & McClure, 2005). Also, getting as close as possible to the participants being studied allows one to understand the context of what participants are saying (Creswell & Poth, 2018). For this purpose, I kept a research journal and analyzed samples of participants' notes using analytic memoing.

Figure 3

Data Generation



Using different methods of data generation will allow me to reveal different aspects of the phenomenon under study:

- phenomenological interview # 1 at the beginning of the study to provide access to participants' initial views and preconceptions (via MS Teams; maximum time is 1 hour; for questions and procedures see Appendix B and Appendix C);

- summaries of the interview I created by me. These summaries were sent to participants a couple of days after the first interview. Participants either confirmed that Elena's understanding was correct or sent their corrections;
- activity to try and experience various types of note-taking (pen and paper and digital) over a study period of 2 days: taking notes with pen and paper, and on a digital device (1 hour x 2 = 2 hours; for instructions see Appendix E);
- self-reports in written, audio, or video format to reflect on their experiences during note-taking activity (handout with prompts for reflection was provided (Appendix E); maximum time is 1 hour);
- samples of notes (images of notes on paper and digital notes taken during the reflective exercise) to access participants' stories through visuals;
- image elicitation and clarification interview # 2 to discuss reflective exercise responses, clarify participants' experiences with taking notes with pen and paper and with an electronic device, and talk about their images of notes (via MS Teams; maximum time is 1 hour; for sample interview protocol See Appendix D);
- my analytic memos;
- my pen and paper notes made during the interviews;
- a research journal with my observations and reflections kept by the researcher during the study to help introduce reflexivity in the study design and reduce biases. The entries will be made throughout all the steps of the study.

On average, each participant spent about 5 hours participating in data collection activities. Both interviews were conducted via MS Teams and were video and audio recorded with the permission of participants. After the interview, I summarized the main points of the

interview in a one-page summary that was then sent to participants. Participants had the opportunity to comment on my understanding and/or confirm that the main ideas were captured correctly. The reflective exercise responses and images of notes were sent to me by email. I went through reflective exercise responses and images and wrote down my observations and questions for clarification to be asked during interview II.

No videos were shared. One participant shared their answers to the reflective exercise as voice recordings, and the rest sent MS Word files of their responses. Images of notes were shared as PDF, JPG, or JPEG files, or as a link to a shared document in Google Docs or iCloud.

During the photo elicitation part of interview II (Glaw et al., 2017; Hodgetts et al., 2007), participants collaborated with the researcher in the exploration and explanation of their note-taking strategies. Students were asked to clarify and discuss with the researcher the features of their notes. They explained how they had taken notes and how they had organized them, what a particular way of taking notes means to them, and how they use it for learning.

Verification of Interview Questions

Interview questions were tested by asking university students who graduated from their master's program. This verification helped make sure that the wording of the questions conveyed the desired meaning and was at an appropriate reading level for respondents. This test also allowed exploring the use of oneself as a research instrument in a qualitative study. Based on this test, an amendment was submitted to REB consisting of one additional question for interview I about ethical concerns that learners may or may not have about their note-taking habits. This decision was made because usually students did not talk about ethics unless asked.

Considering the phenomenological lens, open-ended questions in semi-structured interviews allowed participants to construct the meaning of a situation in which they use note-

taking and related technologies and to generate in-depth and detailed descriptions of human lived experiences. Phenomenologically informed qualitative interviews can provide a rich source of knowledge (Hoffding et al., 2022). The focus of the phenomenological interview is not only to understand the experience of the interviewee but more importantly to understand the invariant phenomenological structures of this experience (Hoffding & Martiny, 2016).

Bevan (2014) provide some practical suggestion about conducting phenomenological interviews which I adapted to interviews conducted in this study:

- Phenomenological interviewing should be kept practical. This is also important for maintaining methodological consistency and increased trustworthiness. Therefore, a phenomenological researcher is free to structure his or her interview in a way that enables a thorough investigation.
- Contextualizing questioning (natural attitude and lifeworld) enables a person to reconstruct and describe his or her experience as a form of narrative that will be full of significant information; in apprehending the phenomenon (modes of appearing, natural attitude), the researcher begins to explore that particular experience in detail with more descriptive questions; clarifying the phenomenon (imaginative variation and meaning) involves the imaginative variation.

Reflective Exercise and Introspection

One benefit of using introspection, a deeper form of personal reflection, as a data collection tool is that self-reporting allows the researcher to collect data that cannot be observed directly due to ethical considerations, privacy issues, and the nature of distance education programs. Introspection may foster self-insight (Hixon & Swann, 1993). Introspection is a means of learning about one's own currently ongoing, or perhaps very recently past, mental states or

processes, and it is a valid phenomenological method (Cerbone, 2012; Hixon & Swann, 1993; Schwitzgebel, 2019).

Reflective exercises, one of the data generation tools, support thinking about the self and allow participants to reflect on various ways to take notes. Such exercise as a data collection method will allow for the exploration of participants' experiences as well as the use of tools for note-taking and what role they play in note-taking, the Heidegger's ready-to-hand (Wheeler, 2011). To reduce the burden of this task, participants were asked to work on their current course material while taking notes.

Documents and Image Elicitation Interview

Another form of data generation in this study is the collection of images. The images of notes help capture the outcomes of the process of taking notes and explore many features of notes and tools used to take notes without the need for many words. Analysis of images of notes reveals the manifest meaning of note-taking and related technologies (e.g., pen and paper notes vs digital notes). Also, it is an opportunity to reveal the unspoken during the interviews, latent meaning (e.g., the frequency of using drawings and colour preferences of learners).

The image elicitation interview happened after the first interview and after submitting the responses to reflective exercises and images of notes by participants. The second interview, an image elicitation interview, allowed participants to look at their notes again and helped capture the participants' perceptions of their notes. Visual research methods (VRM) were used to analyze documents and images. Rose (2014) defined visual research methods as "methods which use visual materials of some kind as part of the process of generating evidence in order to explore research questions" (p. 25). This method of data collection was chosen because it has the following strengths:

1. VRM is effective in generating evidence that other methods (e.g., interviews or surveys) cannot (Rose, 2014).
2. visual materials can ‘reveal what is hidden in the inner mechanisms of the ordinary and the taken for granted’ (Knowles & Sweetman, 2004).
3. VRM “are argued to be inherently collaborative” (Rose, 2014, p.29). Taking images of the notes was designed to engage participants with the study.

Visual methods enhance the richness of data by discovering additional layers of meaning, adding validity and depth, and creating knowledge. They add to traditional methods by capturing more detail and a different kind of data than verbal and written methods.

Participants submitted their responses to the questions in the reflective exercise which I consider as documents in this study. The format of these responses was digital (MS Word files, PDFs, shared files in Google Drive, or audio clips). These documents provided some insights into note-taking practices and tools.

According to Saldana (2011), documents, if carefully studied and interpreted, may reveal more than they contain at first glance, revealing latent meaning. Participants cannot be observed directly. So, the documents collected from participants (e.g., images of notes taken during reflective exercise sent to me by email or shared via a link to a Google Docs) present data to which participants have given attention. These documents demonstrate the language and words of the participants. Images, text documents, shared links, and voice recordings (no videos) have provided an additional opportunity for participants to directly share their reality and for me to have ideas of the tools they use to take notes and the technologies they are familiar with.

All in all, the chosen data collection tools allowed me to have control over the line of questioning and the sequence of data collection procedures as well as the modification based on

the previously collected data. However, the chosen data collection tools have some limitations such as not all people are equally articulate and perceptive, the reflection may be challenging for some participants, and digital artifacts may be difficult to interpret. To help me interpret images, part of the second interview was conducted as a photo elicitation interview that will allow each participant to tell me more about each of the images submitted for the study.

Data Analysis Overview

This section briefly discusses the way I analyzed data during the study. To analyze text data, I used thematic analysis to create themes in data as well as a postphenomenological variational analysis technique. My interpretations and experiences with note-taking will be shared throughout the analysis, too. The postphenomenological approach to the inquiry will be used to explore the relationship between learners and note-taking tools.

Thematic Analysis

Phenomenological and thematic analysis research uses the analysis of significant statements, creates meaning units, and describes the essence of a given phenomenon (Brown & Clarke, 2006; Creswell & Poth, 2018). I start analyzing data by doing thematic analysis because Braun & Clarke (2006) suggest that it is the first qualitative method that should be learned as “...it provides core skills that will be useful for conducting many other kinds of analysis” (p.78).

The data analysis follows the phenomenological design and thematic analysis by identifying patterns or themes within qualitative data:

- becoming familiar with data, managing and organizing data: organizing data files, deciding on a file naming system, deciding on a place to store data, and deciding on the technology to be used for data analysis;

- memoing emergent ideas and search for themes: during this stage, notes about data and initial codes were recorded in the research journal;
- describing and classifying codes into themes. This step aims to “...identify the ‘essence’ of what each theme is about.” (Braun & Clarke, 2006, p.92);
- describing my personal experiences as a researcher through epoche. Epoche or bracketing is a step in which an investigator sets aside their experiences as much as possible (Creswell & Poth, 2018).
- developing interpretations.

Postphenomenology

The methods to analyze data in postphenomenology include variational analysis and variational cross-examination. Technology is a multistable phenomenon. Ihde (2006) explains variational multistability and points out that technology can have indefiniteness in the range of state patterns, considering the diversity of cultural contexts. Ihde thinks that we can learn something from reflecting on variations within a form of technology.

Variational analysis, as Ihde (2006) calls it, is a key methodology in postphenomenology (Rosenberger, 2014). The variational analysis is “the creative brainstorming of possible stabilities (or variations) for a given technology” (p. 377). Postphenomenology empirically analyzes the various ways technology shapes intentionality, subjectivity, and objectivity (Ritter, 2021).

Variational analysis may be considered as the first step of postphenomenological analysis of human-technology relation with the purpose of establishing the technology’s multistability through the identification of concrete alternative stabilities (Rosenberger, 2014). Rosenberger states that he expanded the notion of multistability (technology can be used for multiple purposes

through different contexts) with the method of “variational cross-examination” (p. 24).

Variational cross-examination may be considered as an additional method to variational analysis.

Rosenberger further explains that this principle involves critical contrast of the various stabilities of a multistable technology to explore how particular stability has become dominant.

Furthermore, Rosenberger (2014, p. 370) asks questions regarding the problem of a technological agency such as

- *What makes possible these specific assorted uses for a particular device?*
- *What social factors are involved?*
- *What material factors make some options possible for usage and not others?*

According to Rosenberger (2014), the variational analysis includes both the user’s intentions and habitual inclinations toward technology, and the ways that the same technology has been materially customized by others for their purposes.

Interview and Reflective Exercise Analysis

Step 1: Initial coding and emergent themes

Two interviews were recorded and transcribed. The transcripts were analyzed to generate classifications that represented the information gathered. Essential themes emerged at this point from initial codes.

Step 2: Applying postphenomenology analysis techniques

In this stage of data analysis postphenomenology technique of “removing technology” is applied (Rosenberger, 2014). I looked through transcripts of interview 1, interview 2, and reflective exercise answers to fill out the table with my observations and interpretations for each participant. Then, based on the information in the table, a summary of these observations and interpretations was created for each participant.

Attention was paid to

- habits
- relationships
- ways of doing
- social factors involved.

Also, in this stage, I re-read the transcripts and added analytic notes about

- participant's perceptions or actions in relation to themselves (identity as a learner and as a user of technology);
- towards the technology (including any breakdowns of failures of technology, creative uses of technology beyond its original intent – postphenomenological multistability);
- perceptions or actions in relation to their lifeworld (e.g., how they perceive or interact with their immediate environment; how they see their actions in relation to other contexts regarding notetaking such as views on academic success or instructor interactions; and
- beyond note-taking (e.g., on their mental health, ethics, and lifestyle).

Such a summary was created for each participant and an overview of all participants was written to summarize their characteristics.

Step 3: Identifying common themes related to technologies

I identified common themes related to the use and experiences with technologies across participants and supported them with some anecdotes (quotes) from participants. Van Manen (1997, p. 116) says: “An anecdote can be understood as a methodological device in human science to make comprehensible some notion that easily eludes us”.

Step 4: Analysis of study environment

For the description of the environment in which note-taking takes place, I used poetic inquiry. I chose this method because it is a form of an anecdote. I used the words of the participants. As Van Manen (1989) pointed out "... in everyday life the anecdote is probably the most common device by which people talk about their experiences" (p. 232). According to Saldana (2011), poetic inquiry can take various forms. I extracted from interview I Question 2 transcripts the key verbatim words and phrases that seemed to capture the essence of the text. First, I went through the first interview transcripts and used a bold font for the phrases that stood out for me. Then, the bolded words were extracted, examined, and arranged into a poetic structure (sometimes referred as to "found poetry" (Saldana, 2011, p. 14)) to render the essentialized account of the participants' perceptions. "To anecdote is to reflect, to think" (Van Manen, 1989, p. 232). The process of intertwining anecdotes in the writing of this paper allowed me to reflect on data, findings, and process of the study as well as on the way to present information and the writing process in human study research.

Step 5: Using Voyant Tools

To analyze some text responses quantitatively (for interview I and reflective exercises) and to visualize data I used Voyant Tools (2023):

- Cirrus - to create a word cloud that visualizes the frequency of words in documents.
- Mandala - to visualize relationships between terms and documents.

Image Analysis

Participants generously shared with me the images of their notes. I based my analysis of images of notes on visual methodology (Rose, 2007).

To classify images into two groups, I used the following working definitions:

- pen & paper notes - when an artifact is a paper with some text or images written with a pen or a pencil
- digital notes – when an artifact is created by using an electronic device (digital images of notes on paper are excluded).

Decision Background. “Visual imagery is never innocent: it is always constructed through various practices, technologies and knowledge” (Rose, 2007, p. 26).

Even though the images used in my study are much simpler than photographs or paintings, I decided to base my image analysis on the methods that are often used in visual methodology. As a guide to visual methodology, I used the book by Rose (2007) and did an additional search in the Athabasca University library for the relevant academic paper.

Another reason for why I decided to use the visual methodology in this study is that one of the approaches to interpreting visuals is anthropological. Such an approach places images in the world, they are not just images, but they are connected to the world of people. Rose (2007) discussed that material objects (e.g., images or other artifacts) have agency meaning that they co-constitution of people and objects. This notion in a sense reminded me about a notion of non-neutrality in postphenomenology: technology is a mediator between the human and the world.

Rose (2007) argues that the importance of images has been increasing for contemporary Western societies and for doing social research. In relation to research methodology, Rose discusses three sites at which the meanings of an image are made:

- The site of production – technologies used in the making of an image;
- The site of the image - the image itself;
- The site of audiencing – the viewers of an image.

Each of these sites has three modalities.

- Technological – what technology was used to create an image;
- Compositional – specific material qualities of an image or a material object;
- Social – the range of economic, political, social relations, institutions, and practices that surround an image and through which it is seen and used.

The various combinations of sites and modalities form the basis for the visual methodology and should be chosen to best answer the research question of a study.

I will be using the following sites:

- The site of production
- The site of the image

The site of production will be used to answer the questions:

- How was an image made?
- Why?
- For whom?

The site of production is chosen because it is closely related to technologies used when producing images, study notes in my case, and understanding the technology used. Another active element in the site of production is the author of an image and what the author or maker intended to show.

The site of the image will be used to answer the questions (Rose, 2007, p.19):

- What visual effects were used?
- What is the meaning of the visual elements used?
- What is the composition of an image?

The site of the image was chosen to analyze the properties of the images themselves through the content analysis explained further.

The social modality of this site in my case will be the researcher's lens as a viewer of participants' images. The social identity of those who watch images affects image interpretations (Rose, 2007).

Rose (2007) recommends looking at the following features when analyzing images (compositional analysis):

- Content
- Colour
- Spatial organization
- Light (which is not applicable in my case)
- Expressive content (affective characteristics).

Compositional interpretation (implicit analysis) pays attention to the production of images, especially their technologies, but is mostly concerned with the image itself (Rose, 2007).

About Content Analysis. Even though this is a qualitative study, I decided to use some quantitative data. According to Saldana (2011), numbers can add insights, texture, and context to qualitative data. Content analysis was originally developed to analyze written and spoken texts (Stemler, 2001). Stemler (2015) pointed out that content analysis may be a promising technique and methodology with visually based data. Rose (2007) argues that though content analysis is a very explicit method of analyzing images (involving quantitative elements), it is compatible with qualitative research and allows us to add another dimension to it.

I followed four steps of content analysis suggested by Rose (2007):

Step 1: Finding images

In my case, I asked participants to take notes on paper and digitally while studying in their courses and share some images with me.

The sampling method in my case was census: I used all the images that were sent by participants in my analysis.

Step 2: Devising categories for codes

I looked through all the images and came up with initial code categories. Then I coded a sample set of images to test my codes.

According to Rose (2007), “the codes used must depend on a theorized connection between the image and the broader cultural context in which its meaning is made” (p. 64). She suggested starting with research questions. To develop the code, I used research questions, my observations, and analytic notes about interview I, and postphenomenological concepts.

Also, Rose (2007) explains that coding categories must be:

- Exhaustive – every aspect of the images must be covered by one category;
- Exclusive – categories must not overlap;
- Enlightening - categories must produce an interesting and coherent analysis of images.

Step 3: Coding the images

First, I tried and made my coding process replicable. I did this by selecting three images and showing them to family members and asking them to code using the codes I developed. I also coded the same images using the same codes. Then we compared our coding results and discussed them. This way the codes were refined. Then the codes were shared with my supervisor with the sample images. This adds to the intercoder reliability. It also increases the chances for the coding process to be replicable. Replicable means that any other viewer of images should code the same images using the same codes as I used.

After this process, the coding process itself began. I did my best to apply the set of coding categories carefully and systematically to all the images in my collection. I carefully examined each image and applied codes to it.

I recorded the coding process in an Excel spreadsheet (Figure 4). Image ID was the rows and code categories were the column names.

Figure 4

A Screenshot of Content Analysis in Excel

Image ID	type	Notes are short	Notes are long	Notes are part	Notes for topic	Notes are words	Handwritten notes	Headings	Hyperlink	bullet form	numbered list	Date is present	Highlighting	Bold font	Default font	Preferred font	Additional colour used for notes	Images (copy&paste)	References to source material
01d	digital	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
02d	digital	1			1	1		1	1	1			1	1	1			1	
03d	digital				1	1							1		1				
04d	digital					1													
05d	digital	1		1		1		1	1	1				1	1				1
06d	digital	1				1	1										1		1
07d	digital			1		1	1						1	1	1	1			1
08d	digital			1		1	1		1				1	1					1
09d	digital	1				1	1		1				1	1	1	1			1
10d	digital	1				1	1	1	1	1	1	1	1	1	1	1			1
11d	digital			1		1	1		1		1		1		1				1
12d	digital	same image as 11d but in details																	
13d	digital	1				1	1		1	1	1	1	1	1	1	1	1	1	1
14d	digital					1	1		1	1	1	1	1	1	1	1	1	1	1
17	total digital	6	5	1	11	13	1	6	5	7	2	7	5	6	10	2	3	2	6
18	01p	paper	1			1	1	1	1	1	1								1
19	02p	paper	1			1	1	1	1	1		1							1
20	03p	paper	1			1	1	1	1	1									1
21	04p	paper	1			1	1	1	1	1									1
22	05p	paper	1			1	1	1	1	1									1

Step 4: Analyzing Results

As a result of the coding process, each image had several codes attached to it. Then I counted codes for each image to get frequency counts. In addition, I counted the frequencies of various codes for both pen and paper and digital notes and displayed these frequencies on one graph for easy comparison.

According to Rose (2007), “numbers do not translate easily into significance” (p. 72). For this reason, image analysis was one of the data analysis methods for this study which adds

another layer of understanding of note-taking habits of online students. Another limitation of image content analysis is that this method deals with the site of the image itself and not so much with the site of production and the site of audiencing. To overcome this limitation, a second interview was conducted during which participants had an opportunity to clarify my questions about the images and to confirm that my understanding/view of images was correct. In addition, I used my initial observations (qualitative approach) on the images of notes to create a holistic approach to image analysis.

A Note on Referencing Images

After interview II, the images were collected into two collections: images of notes on paper and digital images. Images were anonymized and references using the same master list as was used for anonymizing interview transcripts and either the word “paper” or “digital” and a number (in case more than one image was sent by the same participant). This decision was made after reading Rose’s book and her suggestions about the importance of referencing one’s images.

Validation and Evaluation Strategies

Many perspectives exist regarding the importance of validation in qualitative research, the definition of it, terms to describe it, and procedures for establishing it (Creswell & Poth, 2018). Lincoln and Guba (1985) use the following terms to establish the “trustworthiness” of a qualitative study:

- credibility (internal validity) establishes whether the research findings represent plausible information drawn from the participants’ original data and is a correct interpretation of the participants’ original views;
- transferability (external validity) is the degree to which the results of qualitative research can be transferred to other contexts or settings with other respondents;

- dependability (reliability) is the stability of findings over time;
- confirmability (objectivity) is the degree to which the findings of the research study could be confirmed by other researchers;
- reflexivity is the process of critical self-reflection about oneself as a researcher (own biases, preferences, preconceptions), and the research relationship (relationship to the respondent, and how the relationship affects the participant's answers to questions).

Terms such as internal and external validity, reliability, and objectivity are used by researchers conducting quantitative studies (Neuman, 2011).

It is important to take steps throughout a study to check for the accuracy and credibility of the findings (Creswell & Creswell, 2018). Validity has a different meaning in qualitative research than in quantitative research. Qualitative validity means that the researcher checks for the accuracy of the findings by employing multiple validity strategies (ex., triangulation of data, member checking, use of thick description, clarifying possible biases, and presenting discrepant information) (Creswell & Creswell, 2018). Qualitative reliability indicates that the researcher's approach is consistent (Creswell & Creswell, 2018).

To explain their data, researchers try to make logical connections between the data and other knowledge possessed by the researcher, including theoretical knowledge. Researchers want these explanations to be valid. Validity refers to the quality or the correctness of an explanation or a decision. Researchers try to increase the likelihood that their explanations are valid by considering alternative explanations for their data. By eliminating alternative explanations, researchers can have more confidence in the conclusions they draw from their research (Fetsco & McClure, 2005).

Creswell and Poth (2018) discuss ethical validation (considering moral assumptions and ethical implications) and substantive validation (understanding one's topic derived from other sources and documenting this process). Additionally, the self-reflection of the researcher contributes to the validation of the work (Creswell & Poth, 2018).

As a qualitative researcher, I used the following validation strategies suggested by Creswell and Poth (2018):

- Researcher's Lens:
 - corroborating evidence through triangulation of multiple data sources (i.e., interviews, documents, participants' reflections, and the researcher's reflective journal entries) (to address credibility and confirmability);
 - clarifying researcher bias and engaging in reflexivity (to address confirmability).
- Participant's Lens:
 - corroborating with participants (to address credibility) (through member-checking via emails after the first interview and during the second interview).
- Reader's or Reviewer's Lens:
 - having a peer review of the debriefing of the data and research process with another graduate student (via an oral presentation and open discussion in a graduate student meet-up group).

To enhance reliability, I followed the advice of Creswell and Poth (2018) and kept detailed notes of the process of the study, created a codebook, manually coded data, and used computer programs, to assist in recording (MS Teams and MS OneDrive) and analyzing the data (Voyant Tools). Creating a thick description of data, meticulous records of all interviews, and documenting the process of analysis in detail help to ensure the reliability and transferability of

the study (Brikci & Green, 2007). Since this study is exploratory, as a researcher, I recognize that the discoveries from data analysis may require different frameworks and that the chosen frameworks should not bring predetermined views on the data collected and future results. To facilitate this process, I kept a research journal (a collection of separate pages with my thoughts) to describe my feelings and thoughts about conducting research in this area of study.

In addition, conducting member checking after interview I and using visual methods resulted in increased trustworthiness of the findings by eliciting participants' reflections and descriptions of their images.

Ethical Considerations

To ensure the study conforms to established ethical guidelines approval was obtained from the Research Ethics Board of the institution before conducting the study. All data collection instruments and procedures (see Appendices B, C, D, and E) were reviewed by the institution's Research Ethics Board.

I have also completed the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans CORE training.

Participants were provided with a truthful representation of the nature and purpose of the study (no deception) and the process of providing data (Creswell & Creswell, 2018). All the participants were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (https://ethics.gc.ca/eng/policy-politique_tcps2-eptc2_2022.html). Although there were no anticipated risks for participating in this study, a few considerations were kept in mind. To protect the participants, the following steps were followed during the data collection stage and the research analysis stage:

- given that this study explores lived experiences, the interviews were scheduled to accommodate participants' preferences;
- masking participants' names by assigning aliases as soon as data was collected;
- embedded in the research timeline opportunities for sharing procedures and results.

Researcher Bias

Since this qualitative study relies on the experiences, perceptions, and judgment of the researcher and the data collected will be unique and subjective to each participant, it is harder to avoid biases than in quantitative research. Biases do exist and affect all steps in a research process due to the researcher being an instrument and part of the study as well.

Some biases identified in this study include:

- design bias: the chosen methods of a study may affect the results. The sample size, if increased, may change the findings.
- sampling bias: all participants for this study will be from the same online master's program. There is a possibility that they share many characteristics.
- procedural biases: the time given for an interview may affect the way participants respond.
- interview bias: the researcher may unintentionally influence the responses of participants.
- response bias: it is possible that participants did not reflect on their experiences of note-taking but gave responses that they thought were correct.

To minimize the influence of these biases on the research process the following activities will be planned and followed during the study:

- The invitation to participate in the study was distributed to all students in the master's program to increase the representation of the sample.

- The duration for the interview was chosen considering that students have multiple commitments, but still enough time was given to explore the topic of interest.
- During the interviews, the researcher followed the developed interview protocol. Open-ended questions were asked.
- Multiple forms of data collection were used to better represent participants' voices.

Bracketing

One of the defining features of the phenomenological approach to qualitative inquiry is that a researcher brackets themselves out of the study (Creswell & Poth, 2018). This process of stating implicitly what a researcher brings to the study is called bracketing or epoché (Creswell & Poth, 2018).

The Husserlian epoché (bracketing) is a means of becoming aware of conscious processes that usually go unnoticed and setting aside what we already know about a given phenomenon (Husserl, 1970). Therefore, if a researcher practices epoché, it is not that they genuinely create the aspects of consciousness they become aware of, but rather they shift their attention toward them (Gutland, 2018). It is worth acknowledging that total abstention is impossible (Bevan, 2014). By undertaking the epoché (or bracketing) there is a change in attitude toward the phenomenon under investigation, which is situated in reality but does not attempt to exclude this reality (Zahavi, 2003).

Researcher Background

In qualitative research, the conceptualization of the research begins with the researchers considering what they bring to inquiry (Creswell & Poth, 2018; Denzin & Lincoln, 2011). Denzin and Lincoln (2011, p. 12) discuss the process of research consisting of five phases, the first one being about positioning the researcher in a study.

Being an educator and a life-long learner, I have been involved in various teaching and learning activities. I have taught in K-12 settings and higher education institutions as well. Also, I have experienced different educational approaches and received degrees and certificates from two countries, Russia, and Canada. These experiences allowed me to compare various education approaches and the learners' role in educational processes. Additionally, I went back to school a couple of times, in a face-to-face mode as well as a distance learning mode. Being an online learner allowed me to explore the role of technology in studying in online courses. As a student and as a teacher, I take notes to support my learning and store information. I have always been taking notes. Even though I am currently taking online courses, I still use pen and paper to take notes. I became interested in note-taking because even though technology shapes all aspects of our lives, on many occasions we still use analog tools to take notes. I used various note-taking strategies for different purposes. For example, I took paper notes during the interviews even though I knew that digital transcripts would be available after the interview. Such notes allowed me to capture my first impressions, surprises, or salient information during the interview. I also took digital notes during the study. Such notes were mostly to store useful information for later (e.g., my observations or prior research annotated bibliography). This is the lens through which I may investigate note-taking and related technologies and how they allow us to make decisions and mediate our relationships with the world. I try to be aware of my experiences with note-taking and keep an open mind for participants' experiences that may be different from mine and capture them throughout the process of doing this study.

Throughout my education, I took courses on pedagogical aspects of teaching mathematics and science, approaches to adult learning, instructional design, and educational technology. Also, through professional development opportunities, I have deepened my understanding of Universal

Design for Learning and EDI (Equity, Diversity, and Inclusion) practices. As an education practitioner, I have been involved in the Scholarship of Teaching and Learning (SoTL) and designing and teaching blended and online courses. I undertook inquiries into ways of building a Community of Inquiry in face-to-face and blended college courses and integrating virtual science labs and social media into general education courses to support students' learning. These experiences allowed me to explore various technologies and their various uses by various people in various situations. As part of my study and work, I collected and analyzed qualitative data by using thematic analysis to identify patterns or themes within qualitative data, collected and analyzed quantitative survey data, and used visualizations and programming for exploratory data analysis. I have always been interested in the ways we connect as humans through technology to the world around us. Reading the case studies from the books by Irwin (2016) and Andreallo (2022) allowed me to get familiar with the postphenomenological approach, explore many ways to analyze human-technology connection, and become familiar with the ways to write about these connections. One of the preconceptions that I as a researcher may bring into the study is that online students are self-determined or self-directed learners, know how they learn best, and are motivated to learn. In addition, I have been using technology in a certain way, which may be different from the ways other people use it, or different from the intended way of using it. This may shape the interpretations I made during the study. Reflexivity and my positionality as a researcher are essential aspects of the research process influencing my interpretation and understanding. Also, as a researcher, I have been one of the tools of qualitative data collection. One of the reflexive practices I used during the data collection and analysis phases is keeping a reflective journal to capture insights and observations and my perspectives on the data and research process. Another reflexive practice I used during the whole research process is

visualizing research activities and insights as visual maps to display the invisible (Parmentier-Cajaiba & Cajaiba-Santana, 2020).

Study Limitations

The author should report their research assumptions to improve the quality of their findings and the interpretation of the evidence presented (Theofanidis & Fountouki, 2018).

According to Mauch and Park (2003), a limitation is a “factor that may or will affect the study but is not under the control of the researcher” (p. 114).

The following factors may be considered as the limitations of this study:

- participants are self-selected; all participants are female;
- participants may drop from the study, leaving insufficient participants to provide enough data; one participant did only interview I and no other data gathering activities, and their data was not used in the analysis.

The study was conducted at a Canadian online university that has a very diverse student population. The data was collected only from graduate students who have certain characteristics that are not representative of the university population.

In addition, the following were excluded from this study:

- experiences of international students;
- experiences of undergraduate students;
- experiences of students in face-to-face or blended courses;
- experiences of students related to other than note-taking studying techniques.

Chapter IV - FINDINGS OF THE STUDY

In this chapter, I will present what I discovered in the data. I would like to start by acknowledging that for all participants such a reflection on their approaches to note-taking and related technologies was new (all participants told me this during the interviews). As a result of participation in this study, the majority of participants confirmed their preferences in terms of note-taking strategies and tools, however, one participant discovered that digital note-taking was not as bad as she thought before and would use it more often going forward in her studying. All participants were thankful for the opportunity to think deeper and reflect on their study and note-taking habits.

Participant 3 shares:

Well, it was an interesting experience because note-taking isn't something I've really thought about much. It's just something that you sort of mindlessly do as a component of study, but it has been interesting to take a step back and think about that experientially.

Overview of the Analysis

In this chapter, I will present and discuss:

- the participants of the study by providing an overview of the participant pool, sharing created participant profiles, and summarizing technologies that participants mentioned during the interviews;
- participants' definition of note-taking;
- created study environment illustration – the development of technologies allows for liberating learners and creating a positive perception of their lifestyle;
- developed themes in data:

- being a human note-taker – note-taking is not only about recording or storing information, emotions and senses are greatly involved in the practice of note-taking;
- being a user of technology – technology is a big part of the life of an online learner, and it affects all aspects of school-related activities as well as relationships with their lifeworld;
- being an online learner – the identity of an online learner affects the way students choose and use technology and note-taking strategies.
- emerged ideas on ethics of note-taking technology and academic integrity – ethical aspects of using technology that learners consider or do not consider while experiencing online learning;
- results of artifacts analysis and images of notes shared by participants – discovered note-taking practices of the participants shared through the visuals of their notes.

A Note on References to Prior Research in This Section

When presenting the findings of the study below, I also include references to prior research to help position my results within the findings of other people as well as support the interpretation of emerging themes. Even though my main methodology is not Reflexive Thematic Analysis, I like the idea of Braun and Clarke (2012; 2013) to support the interpretation by including the wider social context by referencing prior research to contextualize the study and facilitate meaning creation.

Postphenomenology Case Description

I would like to start by describing the postphenomenology case in this study. This study explored note-taking technologies and their uses for taking notes in the context of graduate online education at a Canadian University. I investigated not only the variety of technologies

that online learners use to take notes, but also how the choice of technology affects note-taking practices, how technologies used for online learning and other technologies that learners have access to affect the lifeworld of participants and the decisions they make about approaching note-taking activities. This case study revealed that even though online learners may use the same technologies to access the same online resources and take notes on the same study materials, the way learners use the technologies may be quite different (e.g., only typing on a laptop or using speech-to-text capabilities as well or using MS Word or OneNote for taking notes or use cloud storage or store files locally on a personal electronic device). The same technology may have various uses. All the choices learners make depend on their individual preferences, the technologies that students have access to, the time and place where learners study and take notes, health-related and learning-related needs as well as their intentions when taking notes and interactions with the lifeworld.

Participant Profiles

This section will help set up the stage for understanding the collected data and analysis and illustrate my interpretations and propositions. I will start by providing an overview of all participants and their experiences with technology and their definition of note-taking. Then I will introduce each participant individually by sharing the story of their being an online learner as I see it.

A Note about the Participant Pool

Self-selection bias is a well-documented research phenomenon. All participants in my study were females. So, I do not claim that my sample is representative of the entire population of Canadian online graduate students. All participants gave their consent to participate in this study and to use images of their notes in the thesis. All participants completed all steps of the data collection process and sent their images to me. Participants did not receive any form of

monetary compensation. All of them mentioned that this experience helped them reflect on their note-taking strategies and their approach to online learning as well. Reflective exercise requirements (to take pen and paper and digital notes) pushed some participants to step out of their comfort way of taking notes, which eventually was beneficial to them in a way that they either realized the benefits of their usual ways of taking notes and why they like it, or it showed them new possibilities in taking notes for learning. Also, all of them mentioned that participation in this research provided them with valuable insights and experience in doing qualitative research and master thesis which many of them plan to do.

When writing this section, I followed the general principles (American Psychological Association, 2018) to ensure that my language is free of bias (as much as possible) and acknowledges the contributions of people who participated in my work and their kind and generous contributions of time and energy to do all tasks required as well as being genuinely interested in the study and my success.

Overview of Participant Group

This section summarizes the general characteristics of my participant pool. All participants are graduate students at an online Canadian university. Participants are in their second half or close to the end of the program. All participants attended virtual interviews from their homes at a convenient time and place via MS Teams. All participants are females. Seven out of eight participants are from Canada. One participant is an international student. Participants' age ranges from 30 to 69. All of them have a job and many of them have families and young children. They have from three to eight years of online learning experience including graduate study courses and individual work-related online courses. Participants have from three to 13 years of post-secondary education experience. Many learners have been taking one course

per semester in their graduate online studies due to family and work commitments and might have had some breaks in between courses or programs of study.

Participants have as little as two years in an online program and as many as eight years taking courses online (Table 1).

Table 1

Online Learning Experience of Participants

Number of years	Number of participants
0 to 3	4
3 to 5	3
5 +	1

All participants report a good understanding of the requirements of an online learning environment, its challenges, and the technology tools and skills needed to participate in online learning successfully and meaningfully. Several of them mentioned that they are still in the process of figuring out how online learning works. All participants have a personal electronic device (or several devices) to access online resources and do assignments. Some participants use cloud storage and cloud-based tools for schoolwork, some participants store files in folders on their personal electronic devices, and some participants store paper notes and paper-based course materials in binders. All participants reported using a laptop, a desktop, or an iPad to do school-related activities. None of them used smartphones to do schoolwork on a regular basis, but they might occasionally use a phone to read a paper or to check notifications from school accounts.

All in all, participants are familiar with many technologies for online learning and note-taking (digital and analog). Some technologies are not necessarily used directly to take notes but

Technology tool	P1	P2	P3	P4	P5	P6	P7	P8
MS Excel							v	
MS Office 365		v	v				v	
MS OneNote					v		v	
MS OneDrive								v
Google Drive	v		v					
Google Docs	v	v	v		v	v		
Google Sheets					v			
Google Slides			v					
Google Calendar	v							
Google search		v					v	
Defaults note app on a laptop (Mac)	v							
Apple pen				v				
iPad				v				
iBooks				v				
iCloud storage	v							
Laptop (Mac)	v	v					v	v
Desktop computer (Mac)								
PC			v		v	v		

Technology tool	P1	P2	P3	P4	P5	P6	P7	P8
Smartphone (to access readings and discussion forums)		v		v				v
chatGPT					v			
Charging cables	v	v	v	v	v	v	v	v
printer					v	v		
Multiple computer screens			v					v
Printer					v	v		
LMS (course content, discussion forums, dropbox)	v	v	v	v	v	v	v	v
Digital PDFs (to read and make notes)	v	v	v	v	v	v	v	v
Computer mouse	v	v	v	v	v	v	v	v
Keyboard	v	v	v	v	v	v	v	v
Notion	v							
Notability				v				
Zotero						v		
Voice recording	v							
Text-to-speech	v						v	
Speech-to-text							v	
e-Text		v	v		v		v	
Paper textbook						v		

Technology tool	P1	P2	P3	P4	P5	P6	P7	P8
Videoconferencing tools	v	v	v	v	v	v	v	v
Assistive technology (a recording pen; transcripts of videos; captioning)					v		v	

Access to the Internet was mentioned a few times during the study as a factor impacting learners' decisions about approaches to online learning. For example, one participant decided to start an online program only when she received access to the Internet and Wi-Fi at home (an international student). Another participant mentioned that she did not use cloud-based tools and kept all her school-related work on the laptop because she lives in a rural area with an unreliable Internet connection. And by saving files locally she can have access to them anytime.

Participants' Definition of Note-taking

I would also like to use participants' own words to show their combined understanding of note-taking. This will provide a starting point in my description of what the meaning of note-taking and related technologies is for the study participants. I used visuals created by Voyant Tools, a web-based reading and analysis environment for digital texts (<https://voyant-tools.org/>). One of the questions that participants answered was: "What is note-taking?". I extracted the responses of each participant and combined them in one text that was used by Voyant. Figure 5 was created by using a cirrus tool, a word cloud that visualizes the top-frequency words of a corpus or document (<https://voyant-tools.org/docs/#!/guide/cirrus>).

Figure 5

Participants' Definition of Note-taking Created by Voyant



Such words as ‘way’, ‘note’, ‘taking’, ‘notes’, ‘usually’, and ‘material’ were removed from the analysis. These words were very often used words that are related to the way the question was asked and not relate to the definition of note-taking which was the goal of such visualization.

Also, it is clear from the image that note-taking as a learning activity is closely related to learning processes: summarizing, retention, recall, synthesize, trigger, process, etc. We also see that such words as ‘digital’, ‘computer’, ‘screen’ and ‘pen’ appear often, providing a hint into the nature of notes and possible tools used. Words ‘underlining’ and ‘highlighting’ reveal some note-taking strategies used by participants. Figure 5 shows that sources and references are closely connected to note-taking as reflected in participants’ responses.

The statements below represent some suggested answers to the question of ‘what are good notes?’. These answers come from interviews with participants:

Good notes are organized. (Participant 1)

Good notes are messy. (Participant 7)

Good notes are neat. (Participant 4)

Good notes are summaries of the main ideas of reading. (Participant 2)

Good notes are as short as possible. (Participant 6)

Good notes are very detailed. (Participant 8)

Good notes are the learner's interpretations. (Participant 5)

Good notes are the exact words of an author or a professor. (Participant 3)

Even though these suggestions do not reveal lived experiences with taking notes, even one image (Figure 5) and this summary of responses reveal that note-taking is a complex activity for online learners which we will discuss further in more detail.

Individual Participant Profiles

Now let's introduce the participants and their lived world without whom this study would not be possible. I am grateful for the time and effort spent by all the participants on supporting this study, their willingness to share their practices, and their thoughtfulness in their responses.

Participant 1. She is between 30 and 39 years old with 10 years in post-secondary education and four years in online learning. She has been a graduate student in an online program for a few semesters, but she is still figuring out how online learning works in terms of digital literacy skills and approaches to studying online. She is glad that this online program did not have tests and exams. She enjoys the learning process itself and writing papers. However, she would prefer to have more frequent opportunities for live interactions with fellow students and professors via MS Teams.

She has a Mac laptop to do school-related activities and reports to be a proficient user of this device and its affordances such as the Notes app that she used for taking course notes. She tried other programs for note-taking such as Notion and Scrivener but found them more complicated than the note app on her Mac and decided to stick with a more convenient tool. She also uses a feature of Mac that allows her to have a split screen and have an article and notes in front of her on the same screen. In addition, she always has paper, pens, and mechanical pencils close by for taking notes while reading. She uses Google Calendar to organize school-related activities, especially to note assignments' due dates. She also uses iCloud paid services to back up her information.

She prefers to study in her home office. She is sometimes interrupted by family members and children which distracts her from her study activities and her time is limited.

Participant 2. She is between 30 and 39 years old with 10 years in postsecondary education and three plus years in online learning. She had a face-to-face experience in her bachelor years in which most of the activities were paper based. She decided to do a master's degree online when high-speed Internet and reliable Wi-Fi became available in her area. This shift to online education forced her to learn how to use technology to access university resources and use a laptop to access course materials and work in MS Word professionally to take notes and do assignments. However, she expresses the desire for more guidance from the program on how to approach online learning and tips and tricks for note-taking to support learning. She feels that online students should know everything in advance or learn online learning secrets during the study by themselves.

She has family and young children, so she intentionally makes decisions about her schedule during the day to accommodate multiple responsibilities and still does coursework well.

She enjoys learning. Sometimes she uses her phone to read course materials when she is waiting for her children or to have a free moment outside her home. Otherwise, she prefers to study at home when the children are at school and the distractions are limited.

Participant 3. She is between 30 and 39 years old with 13 years in postsecondary education and eight years in online learning. She is an experienced online learner with a good understanding of how to approach a certain task to work on it most effectively and to achieve the best results. For example, she enjoys listening to an information source while walking outside and having a different experience than in her office to be able to reflect on the ideas she listens to. She does her schoolwork while her household is still asleep early in the morning or when she has a moment without distractions on the weekends. She enjoys learning and can study for hours until some external factor interrupts her.

She is also proficient in using cloud-based tools for learning such as Google Suits (e.g., Google Docs and Google Slides). She switched to cloud storage (about five to seven years ago) after the experience of almost losing her information after her computer broke. She describes that she could use many features of Google Docs to make her study process and notes comprehensive and functional so she can use them in a meaningful way to achieve her learning goals. She has good experience in using Google Docs for collaborative projects and finds it a good way to engage asynchronously with other learners.

Participant 4. She is between 40 and 49 years old with five plus years in postsecondary education and four plus years in online learning. She switched completely to the digital way of approaching this online program. She reasons that since everything in an online program is online and in digital format, why bother with pen and paper anymore. She found that such an approach works for her well and receives the grades she expects. The devices that she uses for

schoolwork are the iPad and Apple pencil. To make sure that she has everything that is needed to do schoolwork well, she bought a new iPad with more memory and a new Apple pencil with a longer time of work without charging. She loves this way of approaching school, though she mentioned that there was a learning curve to learn all the nuances of such a device. She uses iBooks to organize her course materials. Though she does all school-related activities on her iPad and its available apps, sometimes she uses Notability to convert a course material to PDF format and then to save it in an iBooks dedicated folder. MS Word is used only to create an assignment to be submitted to the Learning Management System drop box.

This online program does not have tests or exams, so she approaches learning differently. All her activities are about learning and understanding ideas and connecting ideas to her work or research interests. As a result of this, she is taking more diligent notes now because these notes are for learning and application of learned concepts and not for memorizing facts for exams.

She has a family and a full-time job, so her time is limited. She studies when everyone is in bed and it is quiet, so she can fully enjoy learning.

Participant 5. She is between 40 and 49 years old with six years in postsecondary education and three plus years in online learning. She is still in the process of figuring out what online learning is because doing a degree program online is a new experience for her. She has been figuring out such aspects of online learning as information management and ways to approach online learning including a transition from a paper-based approach to a digital approach using a PC for various course-related activities. This has been an important transformation because she describes herself as a kinesthetic learner and enjoys engaging her hand while learning (e.g., taking notes with pen and paper). Such types of activities help her to interpret and relate to what she studies. Now she mostly takes digital notes and uses paper only

when there is a very challenging concept to learn. Also, she might brainstorm on paper with a physical pen which helps her to actively process information and supports retention. She points out that she still uses paper notes a lot for various aspects of life and work-related activities, for example, task lists or shopping lists.

For her schoolwork she uses cloud-based tools like Google Docs and Google Drive. She tried other tools (e.g., MS OneNote) and some assistive technology tools (e.g., a recording pen, Livescribe Smartpen, <https://www.livescribe.com/en-us/solutions/learningdisabilities/>). She learned that such tools required some time to learn how to use them effectively and decided to stick with what she knew and what served her needs. She uses Google products including Google Sheets for creating tables to keep references in one place and other metadata related to the sources. She is very comfortable with all features of Google Docs such as headings, tables, and others to make good use of it and support the organization of notes for learning. She is interested in language and how language works. That is why she was very excited to try Artificial Intelligence tools to support writing and generating ideas. She uses ChatGPT (<https://chat.openai.com/auth/login>) from time to time because she is interested in this technology's abilities and uses it as additional support when working on the course material. Such an approach to chatGPT allows her to use it meaningfully as a source of new perspectives and not as a source of all information to be used in assignments as it is. This helps her to expand the possibilities and familiarize herself with the content to understand the material better.

Due to family obligations and commitments, she has her study space in the living room and needs to deal with distractions often. Sometimes, she does her schoolwork in a local diner or a library.

Participant 6. She is between 60 and 69 years old with seven years in postsecondary education and five plus years in online learning. She has always preferred dealing with paper books and not digital and taking notes with pen, paper, and highlighter. She gets tired from working long on an electronic device and does not like to use such a device to take notes. This may be because too much screen time tires her eyes. Even if a course has digital e-text, she buys a paper textbook even if it is a previous edition, so she can take notes in the book while reading or write notes on sticky notes and place them on the pages. Then the book goes into her library and notes become a part of the book content. If she needs to read an article, she prints it out and then makes margin notes. So, a printer and cartridge are a necessity for her and are a big part of her online learning. When she started this online program, she tried to use digital techniques for note-taking such as highlighting in a PDF file but found that having notes on paper as part of her library works best in terms of ease of finding necessary material. By trying digital note-taking a few times, she figured out that having a paper in front of her and the ability to physically write on paper was a must for her successful learning and retention of ideas. She is very particular about the pen and the highlighter she uses: a soft gliding gel black pen and a yellow highlighter are always the tools for her.

She loves writing, writing with a pen. However, she never draws, and her notes may be just one or two words on a margin. Even though she prefers to take notes on paper while studying and uses a paper calendar for planning, she takes digital notes on the material that is relevant for upcoming assignments and that might be used in an assignment. Sometimes she uses a ‘copy & paste’ strategy to insert part of the textbook (e.g., a very important long table) into digital notes to increase productivity and save time. She would use MS Word for taking notes and writing assignment drafts, but eventually saves files in Google Drive and works in Google

Docs. She keeps all her coursework (course materials and assignments) in dedicated folders on her computer as well.

Even though she usually studies at the bar table in the living room (far from the busiest places in her house, kitchen, and dining area), she takes her time to organize the table to look like a desktop and to have everything ready (a computer, printed articles, pens, paper, highlighter, printed course outline, calendar) to dive into the learning. This way of organizing her study space allows her to minimize disruptions, but still to be aware of family activities in the house. She always needs a cup of tea or water to accompany her during the study process; sometimes meditative music at a very low volume may be on, too.

Participant 7. She is between 60 and 69 years old with three plus years in postsecondary education and three years in online learning. In her early years of post-secondary education, she worked with paper books and longhand notes on paper. But when she started this online program, she “evolved with technology”. She started using a laptop for all school-related work, no paper anymore.

By the nature of her job, she deals with various educational technologies, so she has experience in learning new tools as well as applying them to practical learning strategies. She believes that a new tool can be learned only by using it. She is not afraid to learn new tools and try them. Based on how this process goes, she decides whether to switch to a new learning strategy and a new technology tool. The switch happens if she discovers that a new strategy and tool suits her learning needs better. To illustrate, she has recently switched to MS OneNote and found this tool superior for organizing material and taking notes compared to other tools she used before. Previously she made notes in a digital PDF and used MS Word. To do school-related work she uses a MacBook Pro 2012 and is aware of how to use its affordances, such as

assistive technologies and keyboard shortcuts, to her advantage. She sometimes voice-records her notes or uses text-to-speech function (screen reader) to read articles for her. Such an approach allows her to still be able to learn something after a long workday when she is tired, and her hands may ache after working on a computer the whole day.

Her primary area of study is a bed or a couch, so writing with pen and paper does not work, but digital note-taking and reading course materials from screen works perfectly, in addition to providing some rest to the body.

Participant 8. She is between 30 and 39 years old with six plus years in postsecondary education and two plus years in online learning. She started taking notes in a very traditional way that she learned in high school: with pencil and loose leaf of lined paper, and notes to be kept in a binder. She approaches her learning in this master's program differently from her bachelor education. Now learning is about understanding and constructing meaning and seeing how the topic and the course fit into the whole program and not just memorization of facts. She found a master's program full of new terminology and started developing note-taking as a practice from the very beginning of the program to support her learning.

She is comfortable with both digital note-taking and pen and paper note-taking but believes that digital note-taking is not as effective as longhand note-taking for her. However due to the online nature of the program, she has developed a practice of creating notes and assignments in MS Word and then saving them in MS OneDrive. She prefers working on a desktop version of documents but saves it to the cloud to be able to access them across devices. For schoolwork she uses a desktop computer, and a laptop is usually used for personal activities. She may use her phone occasionally to check the notifications in the course forums. She has not been actively searching for and trying new technologies to support learning and note-taking. She

tried a couple tools that her friends suggested but decided to use what she knew and worked for her.

To make her study place an ideal space for her learning, she uses two big computer screens (to see materials better), so digital notes, readings, and courses on the Learning Management System can be opened and used with ease if required. In addition, paper notes, blank paper, and pencils are on the desk to support her learning needs. She prefers to use a computer mouse and usually pushes her keyboard aside when doing coursework. Paper notes taken during reading course materials then go to the binder and serve as the proof of that the learning has happened. Keeping notes in a binder allows her to find them easily and review if necessary. She has one pretty binder that she uses for a current course to store notes in. She likes the notes and binder to look good, which makes the learning process even more enjoyable. Then when the course is finished those notes go to a larger, not so pretty binder where notes from other courses are kept. The pretty binder is ready to be used to keep notes from a new course. She discovered that listening to jazz music supports her concentration and study mood, though she had never listened to this type of music before.

Due to family and work commitments, she studies on the weekends mostly. Sometimes, in the evenings, if she feels like studying but is tired, she might go to the living room, sit on a couch, and take digital notes while reading course materials. This way of learning she found less efficient than in her office at the desk but is “better than nothing”.

Summary

I described the general characteristics of the participants of the study as well as provided the individual participant profiles. All participants have some experience with online learning though some are more experienced than others. All participants are familiar with a variety of technologies though some have more experience than others. For all participants, note-taking is

about learning though notes may be taken digitally or with pen and paper. Participants are also quite different in the environment in which learning takes place. The next section reveals the spaces where participants are engaged in online learning.

Study Environment

This section presents the results of environmental factors analysis. I will present the findings related to how participants balance life and school, how life affects study routines, and the need to adapt and adjust study habits in an online program.

Participant 1

I do have preferences for when to study. I have to, because I have kids.

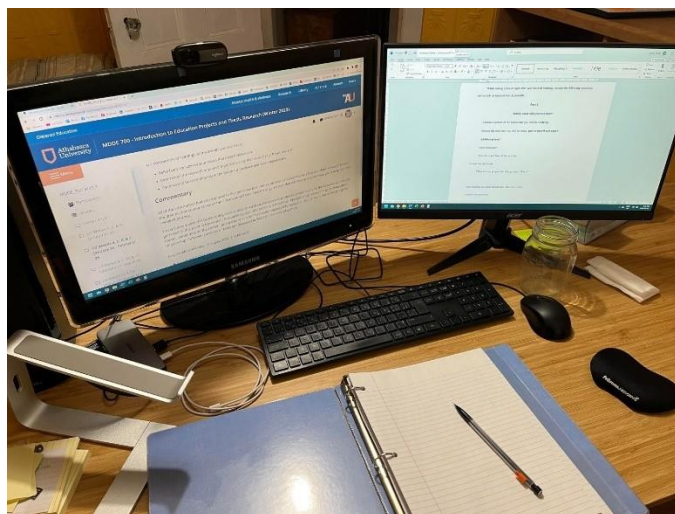
To analyze data related to the environments in which participants study, I used a poetic inquiry approach (Faulkner, 2019; Saldana, 2011). Poetic inquiry takes notes of what words and phrases seem to stand out from the data corpus as rich material for interpretation. Poetic inquiry allows participants to speak in this research. However, the poetry that I present here using only the participants own words was created by me to show my interpretation of the environment the world participants live and study in relation to note-taking practices and online learning. Poetic inquiry allows me to showcase participants' experiences of being and becoming online learners.

According to Saldana (2011), poetic inquiry can take various forms. I extracted from interview transcripts the key verbatim words and phrases that seemed to capture the essence of the text. First, I went through the interview transcripts and used a bold font for the phrases that stood out for me. Then, the bolded words were extracted, examined, and arranged into a poetic structure (sometimes referred to as "found poetry" (Saldana, 2011, p. 14)) to render the essentialized account of the participants' perceptions.

We may wonder what the study environment looks like for an online learner. A possible answer is in Figure 6.

Figure 6

Study Place of One of the Participants



However, based on the study results, this is only one example of a possible learning environment in which online learning happens. It may seem that such an environment would be a dream for many learners. However, online learners sometimes do not want to learn in such an office-like space. Many participants work with digital devices all day long and would like to change the environment while working on school-related tasks. Or maybe they just do not have a dedicated place in their house to do schoolwork.

Research literature (e.g., Aschenberger et al, 2023; Matharani et al., 2021; Yeung & Yau, 2022) explored the lives of learners during the COVID-19 lockdown and found that there are a lot of challenges for students when attending school from home. Students and their schoolwork are impacted by community expectations (including their families and work colleagues), time and location of their learning activities (including time of online classes and home shared

spaces), and access to technology (sometimes shared technologies) to name a few (Matharani et al., 2021; Yeung & Yau, 2022). I think that the realities that learners around the world experience during emergency remote learning are the normal learning situations for online learners. Online learners need to deal with the challenges regularly to make sure that they are successful in all areas of life. The realities of online earners involve real-world physical spaces (time and place to do schoolwork, technology to use, work and family responsibilities to balance), cultural and individual practices (positioning of online learning in everyday lives), and the agency online learners must negotiate with their surroundings and school requirements (Matharani et al., 2021; Pandit et al., 2022).

To illustrate the environmental factors that influence note-taking habits and related technologies as well as choices learners make about the way they approach their online program, let's allow participants to speak for themselves:

My time is limited so I need to make the most valuable use of it. (Participant 1)

Yes, there are always distractions! That's life working at home with kids. I just do what I can. (Participant 1)

My favorite time to start to study is 10 at night. I just seem to do better work when it's quiet and dark. (Participant 6)

I'm a mother of two children, an 11-year-old, and a 7-year-old. Once they go to school, from 7:00 until 9:00 o'clock in the morning, I study. (Participant 2)

I wake up before the rest of my household, creep downstairs to my little workspace, and if I'm lucky, I'll get a few hours of uninterrupted study time. (Participant 3)

When I started in the graduate program, it was primarily weekends. Now it's primarily evenings and weekends, slow slogging. (Participant 7)

I work full time, and I have a family and a house and mortgage and all those things, so it limits my time. (Participant 4)

For me personally, my hands are very sore after a day of serious work. (Participant 7)

I'm on the couch in the living room and doing digital notes. (Participant 8)

I also study on my couch, which is less efficient and effective, due to the small screen and distractions, but when I cannot motivate myself to go to my office, it gets the job done and is therefore more effective than nothing! (Participant 8)

I usually do my learning activities on my bed and at the dining table. I don't have an extra room that I can use for my studies. (Participant 2)

I usually do coursework on my bed. Not the best place, but it is what is available and allocated. (Participant 7)

I have a separate study area where I can still be part of the family and study in peace. (Participant 6)

My bed is my favorite place. I'm doing it on my iPad, I can have the light off so I'm not disturbing my husband. (Participant 4)

I always need either a cup of tea or some water. (Participant 6)

I have the notes opened. Occasionally I will have music playing on one screen in the background and then my primary screen that has my notes on it. (Participant 2)

If I don't have time to do the readings, I don't do all the readings. (Participant 1)

Too much time on the computer for me really tires me out. (Participant 6)

If I'm taking notes about my own ideas, then I may voice record or use text to speech
(Participant 1)

I use my mouse to scroll and my loose-leaf papers in front of me with my pencil and eraser if I need to adjust, and I take notes that way. (Participant 8)

When I'm learning something new, I'm either sitting at my workstation at home or I'm walking in the bush with my headphones on, listening to a podcast or audiobook.
(Participant 3)

My decision is at the moment. (Participant 5)

I don't want any distractions when I'm writing my notes. (Participant 2)

Participants' relationship with space and time is intentional and multi-layered. This reminded me of Merleau-Ponty's ideas of kinesthetic awareness or 'body schema' (the body's relationship with the space; the body lives or inhabits space and not just is in space) (Merleau-Ponty, 2012).

As we can see from the words of participants, several topics are developing:

- The time of the day of reading and taking notes: Participants study at night or early morning during the week and/or during weekends. "*My favorite time to start to study is 10 at night, so I usually go 1:50 AM or so. I'm a middle of the night studier.*" (Participant 1). These times of the day may not be their personal preferences but the choice they made to make sure that they can manage multiple tasks of busy adult life. Participant 4 explains

“That's not necessarily due to my preference, but it's due to just making school, full-time work, and the family life work.”

- The place for reading and taking notes: Some participants prefer to study in an office-like environment, but many prefer spaces that were not originally designed for studying such as beds and couches. Such places became their places for taking notes and working on the course material. This happened not necessarily because they prefer these places but because of negotiations with family and work responsibilities. If participants could choose, they would prefer a quiet place with no distractions and interruptions so that they could study for a period to do a certain task in full and make logical breaks between tasks, not to stop in the middle of a task.
- Personal preferences/health/mood: Participants bring their individual preferences in the ways they take notes. Music in the background, a cup of coffee or water, a cozy blanket, all these items, and accommodations of health-related issues (pain in the hands or just being tired after a full workday) play an important role in how participants create the atmosphere that surrounds their note-taking practices. Sometimes, note-taking strategies depend on the mood and on what is available close by in the room for taking notes.
- Decision-making process: Participants have clear goals in mind when they start reading course materials and taking notes. They also meticulously plan their study time to make sure that they read what is the most important and valuable for doing assignments successfully. The choice of tools for taking notes and the strategies they employ also depend on the goal of note-taking.

One salient aspect of the poem for me is that what is not in the poem is the complaints about the hardship of being an adult online learner, complaints about the need to always plan and

manage their own and their family's expectations, complaints about all occasions when technology did not work, or they struggle. This shows that all participants (adult learners and graduate students) are very self-determined and enthusiastic learners and are very resilient and resourceful individuals. They do their best in the circumstances that they live in.

Prior research on online learning experiences also discovered that online learning self-efficacy is multidimensional (Shen et al., 2013; Tsai et al., 2020). She and colleagues (2013) consider such dimensions as self-efficacy to complete an online course, self-efficacy to interact with classmates and instructors, and self-efficacy to handle tools in LMS. Just to note here, one participant expressed the desire for more live interactions with an instructor and other learners.

Self-efficacy in using technologies is a big part of online learning and note-taking. If we look closer, we will see that all these themes have various technologies in the background and often such technologies may be transparent, and invisible to users. Study findings related to the role technology plays in mediating note-taking habits and learning habits will be discussed in the section “Themes in Data”.

All participants are adults, and they have busy lives. They have full-time jobs, they have children, they have other commitments in life mortgage, family issues, and life just happens which adds more to their plates. All of them are self-responsible, self-directed, and self-determined learners. The words above are their own words, how they describe the environment and conditions of how they study.

The quotes above demonstrate that many learners do school related work at night or on weekends or whenever time permits. Usually, they are tired, and some of them experience physical pain after a long workday. Technology can reduce pressure and stress related to doing schoolwork. They find places and time to study the courses where they feel comfortable and able

to keep learning and making the best of sometimes not-ideal situations. Some of the participants read while in bed or on a couch with coffee or quiet music in the background. Some of the participants enjoy an office-like environment for learning with a desk and a desktop computer. Whatever place and time they choose to study, technology is invisible; invisible to the direct awareness and senses, agent that makes this happen. Technology allows flexibility and mobility and such a level of confidence and comfort to make sure that even with everything happening around them, participants will do their best to learn the material. Technology allows for personalized approaches to learning. These technologies operate in the background of every action of online students. In postphenomenology, technologies may be transparent though tools “are not neutral ‘intermediaries’ between human and world, but mediators; they actively mediate this relation” (Verbeek, 2005, p.114). They affect participants’ decisions about the ways of acting in the world, and the ways they choose to study and take notes.

If we look at the notion of technology in general, then a bed and a table or a couch can be a technology for learning in this case. A bed is a place to sleep, but if you are an online learner, it is also a place to work on your courses. The same goes for a couch. A kitchen table is used to have dinner with your family, and after dinner when everyone is asleep it may become a work desk, a place to study and put a laptop and a notebook on. These examples show us how technology mediates user relationships with the world providing spatial freedom. It seems that online learners’ lifestyle is one of a technology-enabled nomadic lifestyle with seemingly blurred boundaries between schoolwork and life commitments.

The way participants learn reminds me of an idea of digital nomads discussed in current academic literature in relation to nomadic learners and workers (Kara, 2023; Nurhas et al., 2022; Reichenberger, 2018). The idea of digital nomads is not new. It was discussed in the book by

Makimoto and Manners in 1997 and was related to the influence of technology on the work-travel-life balance of workers and liberating workers. With the development of various technologies and online learning, we can think about technological possibilities for liberating learners. Digital nomadic online learners aim to create a holistic lifestyle and regard work and study and life as equally enjoyable and have positive perceptions of this lifestyle.

Themes in Data

In this section, I will discuss the main themes that were constructed through data analysis (Table 3). I decided to name the themes this way to reflect postphenomenology idea of human-technology-world relations (Verbeek, 2015). Themes one is about human note-taker, themes two is about the mediating role of technology in note-taking process, and theme three is about positioning note-taking and related technologies in the world of online learning.

Table 3

Theme and Subthemes Discovered in Data with Selected Codes

Theme: Being a Human	Theme: Being a User of	Theme: Being an Online
Note-taker	Technology	Learner
Subtheme: Note-taking is an	Subtheme: Note-taking	Subtheme: Need for
'intimate' practice	strategies and related	organization and self-
Selected codes:	technologies should	determination
<ul style="list-style-type: none"> • Notes to indicate confusion or surprise 	<ul style="list-style-type: none"> serve a desired purpose 	Selected codes: <ul style="list-style-type: none"> • Get organized before taking notes
<ul style="list-style-type: none"> • Mechanical pencil 	Selected codes:	<ul style="list-style-type: none"> • Goal-oriented practice
<ul style="list-style-type: none"> • Doodling, drawing 		

Theme: Being a Human	Theme: Being a User of	Theme: Being an Online
Note-taker	Technology	Learner
<ul style="list-style-type: none"> • Notes of own ideas • Notes of professor's words • For individual use 	<ul style="list-style-type: none"> • Easy to search digital notes • Google docs • Google Calendar • Google Drive • Note-taking as a learning process (helps to learn the material) • Note-taking as a skill (can be developed, needs to be developed) 	<ul style="list-style-type: none"> • Need for backup (files) • Note-taking system of symbols • Working toward an assignment
<p>Subtheme: Aesthetics and use of colours in notes</p>	<p>Subtheme: Note-taking technologies should be comfortable and pleasant to use</p>	<p>Subtheme: Constant evolution as an online learner</p>
<p>Selected codes:</p> <ul style="list-style-type: none"> • Colour coding • Highlighting • Notes are messy. • Pretty notes 	<p>Selected codes:</p> <ul style="list-style-type: none"> • Intuitive decision • Convenient tools 	<p>Selected codes:</p> <ul style="list-style-type: none"> • Figuring out what online learning is • No paper anymore

Theme: Being a Human	Theme: Being a User of	Theme: Being an Online
Note-taker	Technology	Learner
<ul style="list-style-type: none"> • Use colours (no system) • Yellow highlighter 	<ul style="list-style-type: none"> • Easy and attractive • Engaging hands, kinesthetic • I am super happy to be taking notes on technology and not on index cards. (in vivo code) 	<ul style="list-style-type: none"> • Place to study (room, drinks, other aspects of environment) • it was a natural evolution (in vivo code) • Studying routing that fits life (kids, work, schedules, health, home routine, furniture, mood, quiet place)
<p>Subtheme: Mood, health-related needs, and note-taking strategies</p>	<p>Subtheme: Experiences with technologies: Tool Breakdown and</p>	
<p>Selected codes:</p> <ul style="list-style-type: none"> • Printing an article if important (or a book chapter) 	<p>Multistability of Tools</p> <p>Selected codes:</p> <ul style="list-style-type: none"> • Tried new tools (technology tools) 	

Theme: Being a Human	Theme: Being a User of	Theme: Being an Online
Note-taker	Technology	Learner
<ul style="list-style-type: none"> • Read aloud • Screen capture as notes • The screen is split to show notes and reading at the same time • Microphone (to dictate notes) • Being tired 	<ul style="list-style-type: none"> • Switch to using Google tools (docs, drive, etc.; away from the desktop version of Word, etc.) • Switched to digital note-taking (from paper or another tool) • Mechanical pencil • iCloud • Apple pencil • Google Sheets • Printer • Gel pen 	

Main discovered themes are:

- Being a Human Note-taker
- Being a User of Technology
- Being an Online Learner.

Why these three themes? The idea of a human note-taker appeals to me because I discovered that note-taking is very much about a person and not only about information as I thought before. For online learners taking notes is all about technology, but not always about electronics. Being a user of technology is about the use of a variety of tools available to participants for learning and situations in which these tools are used. The theme of being an online learner just shines through all aspects of this study because the study is about the experiences of online learners. Online learning was mentioned in relation to any aspect of note-taking and related technologies, and choices participants make about schoolwork.

But before talking about these themes in detail, I would like to introduce the findings that were shared among all participants.

Summary of General Ideas Common among All Participants

I would like to start by acknowledging that all participants are still figuring out what it means to be an online learner even though they consider themselves to be good students. Also, I observed that learning in this online program for participants not only consists of either working on the course materials (readings or videos) or working on the assignments (discussions or papers) but also of making constant decisions about what technology to use for a task at hand and where to attend to school-related activities. In terms of note-taking practices, most of the time participants take notes either on learning materials (mostly course readings) or make notes for upcoming assignments. Their notes vary in format: they can be words, symbols, pictures, tables, personal feelings, and even communication with generative AI tools.

According to the findings, note-taking is very important and mostly used practice for learning among study participants though they might occasionally just read an article without taking notes when they are tired, or they think that the material is not relevant to them.

Participants report that note-taking allows them to better comprehend the material, think deeper

about assignments, and relate course material to other areas of their graduate program. Often, participants make notes on an assignment in parallel to reading course materials and making notes that support understanding of what they read.

Another observation is that initially many participants used pen and paper approach to note-taking in this online graduate program, then with the development of understanding of what it means to be an online learner and what technologies are involved in learning (e.g., eBooks, LMS, digital articles, online discussions, online video conferencing tools, etc.) as well as the personal access to electronic devices (such as a laptop, reliable Wi-Fi, Apple pencil and iPad, cloud tools), and assistive technology features (such as text-to-speech or speech-to-text) many of them shifted to taking digital notes and to read course material from the screen. Some participants go completely digital.

Also, the fact that their graduate online program does not have tests and exams and has only written assignments affected their choice of tools and strategies for taking study notes. Many participants mentioned that now they take notes for learning and see note-taking as part of a personal learning process not necessary as a learning product for professor evaluation.

The other observation I made is about reading preferences: from screen or from paper source. Many participants mentioned that the program has mostly digital readings, so many participants would read from a screen. However, some participants mentioned screen fatigue and their preferences for reading from a printed text even if they need to pay again to buy a paper textbook in addition to the e-text provided with the course. It seems that preferences on where to read (on screen or paper) affect the choice of tools for note-taking tools, too. Those who like to read from a screen, take mostly digital notes. Those who like to read from paper tend to take paper notes for learning but still take digital notes when working on an assignment.

All participants experienced the evolution of their note-taking practices and approaches to online learning to some extent. Even though they might still prefer taking notes on paper, there is a necessity to take digital notes because all assignments will be submitted as files in a Dropbox in LMS. Also, the fact that all course-related activities are online and all the material for online courses is presented in digital format forced some participants to try, learn, and start working with new to them digital note-taking tools, change their habits related to taking notes, and adapt to new learning platforms and systems.

Another common theme for all participants is the need to balance various life demands on their time and energy. All participants emphasized that their study routine should fit other responsibilities such as full-time job, family, and health-related issues. Participants often mention that the affordances of the technologies such as mobility of a laptop, or speech-to-text option support not only their diverse needs but the needs that might vary on a day-to-day basis. All participants reported the need to learn the features of their preferred technologies to make learning comfortable and efficient as well as to be very organized in all that they do.

Also, participants mentioned that they do require quiet places where they can concentrate on learning and do the best work in the shortest period possible. Usually, participants try and find a place that will allow them to work for a period undisturbed to finish a task that they have planned for this study session. Some participants have dedicated space (e.g., a home office) but many participants use other areas in the house as their learning spaces (kitchen, bedroom, or a corner in a dining room) as other household activities permit. If a learner studies on a couch with a cup of tea in their hand, it may seem to an observer that this person is relaxed and just enjoying the process. However, the minds of online learners are busy, they keep making sense of the material and applying the new concepts to their assignments or future theses topics, but they do

enjoy the process. Many of them simultaneously make notes on the ideas and articles that may be useful in the future. Some participants have a separate place for keeping track of references and resources they encounter in their learning journey as well as conferences or names of researchers to be explored later.

Participants recognize that note-taking is not only about taking notes but also about making sure that they can easily find the material they took notes on as well as cite properly the sources of information and quotes. In relation to ethical note-taking practices and use of related technologies, all participants pay special attention to academic integrity and avoid plagiarism, especially in the notes for an assignment. However, sometimes participants do not do proper citations in the notes for learning because notes are for individual use only. Also, participants often use a 'copy & paste' strategy to copy some passages or images from a source into one's digital notes or writing a quote without proper citation and reference is of little concern to many participants. Again, participants validate such a practice by the fact that they do not share their study notes and such practices save time. Notes are used to support their learning in a very personalized and individualized way.

In all these varieties of activities, the choices participants make about the ways to do schoolwork and behave in the world depend on the technologies at hand and their knowledge of how to operate technology, and the best strategies for learning to meet the needs during a particular study session.

Let's explore the constructed themes now in more detail.

Theme 1 – Being a Human Note-taker

The finding that note-taking is not only about learning itself but is very much about personal practice was a little bit of an unexpected discovery for me. The extent to which note-taking in online learning is about personality and personal preferences was unexpected. I felt

privileged to glimpse into participants' personal lives and personalities by discussing seemingly impersonal topics such as note-taking strategies.

To explore and illustrate note-taking as a personalized and personal learning activity, I present findings as a set of the following subthemes:

- Note-taking is an 'intimate' practice
- Aesthetics and use of colours in notes
- Mood, health-related needs, and note-taking strategies.

Note-taking as an 'intimate' practice. It is well known that people take notes to store information and help recall (shopping lists or notes taken while reading an article). In relation to schoolwork, learners take notes to support their learning. But it is less known and less obvious that learners may treat their school note-taking activities as journaling or as a therapeutic activity. These uses of note-taking are not usually discussed in relation to note-taking in school-related settings; these affordances of note-taking practices may be difficult to even notice.

An analysis of the participants' discussions and materials reveals that online learners treat their notes as a personal creation. They want to be creative with their notes and not only treat them as the storage of useful information. An online learner has an opportunity to do whatever they like with their notes (because notes are for personal use only) and enjoy the process and product of note-taking. Note-taking is an experience, part of the learning experience. Some participants also see their notes as a token of their hard work on the course.

Note-taking as a process gives learners agency in the way they take notes and can instill their personality in the process of making notes. Additionally, note-taking can be used as a therapy tool especially for those who like kinesthetic activities and keeping hands busy while

learning. Interactive elements in notes such as drawings, may be a source of positive emotions and “a quick anchor to reinforce memory” (Participant 5).

Participant 5

So, I ensured that I had my hands involved, had something to do physically. I really like something kinesthetic. I find that I think and clarify my thoughts if I'm writing and interpreting while I'm reading.

Participant 5

For my reading particularly, I even bought myself stickers, Minecraft stickers, and Star Wars stickers, things that were very dramatic and playful. So that I could have a selection and very quickly dress up and put some images in my notes without needing to draw a lot.

Note-taking is not only about the process but also about the product, the result of note-taking activity. Note-taking as a product gives learners confidence that they learned the material (like self-assessment activity) and makes them feel good about learning when they see the physical result of their hard work.

Participant 6

If I just read what was required, I didn't take notes and then went to try to write a paper, it would be very, very difficult for me, I wouldn't be able to concentrate. So, taking notes is necessary for me. It gives me a good grounding and foundation and a lot more confidence when I write the paper.

Participant 8

I think it's very useful. I think it feels very productive. It feels in a lot of ways more active learning than simply reading. I like seeing products. You've done your readings, but when you're taking paper notes, you have something to put in your binder.

While the main purpose of notes may be for learning, connecting ideas with lived experiences and research activities, and tracking the progress in a course there are other uses for notes that analysis generated. For example, some learners may use note-taking as a journaling activity. Participants sometimes add their personal thoughts and feelings into notes because they feel it is safe to do so (no one is supposed to see their notes).

Participant 4

I'll journal it to myself. I'm just going to put it in my note, because I'll journal it out and that will help. If not, the stuff is just bothering me. If I write it out, OK, you wrote it, you got to say your piece, you didn't get to say it to your professor or the person you wanted to tell it to.

Participant 5

In my reflective journal, those notes may have more personal kinds of things in them, so then the harm would be to me if other people found them at or potential harm, not harm, but risk that people without respect or empathy or understanding could further share those notes if notes weren't secure.

They might write in the notes they take their reactions to a certain idea in the readings that they do not feel safe to share with a professor or peers. Such comments allow them to express their thoughts in a safe environment and make connections with personal experiences or other school ideas. In this situation, learners use their notes as a tool for critical thinking and reinforcement of their learning.

Participant 7

Sometimes I write about how I'm feeling. You'll see me argue with a statement that somebody's made: 'Well, I think that's stupid', or 'I think that's great' or 'Aha, that's brilliant'. This makes sense to me. Sometimes I do put in how I'm feeling and thinking and with the expectation that no one else is going to read that.

Participant 5

If something surprises me, I might write a little response just to indicate that. So, I monitor my confusion, monitor my surprise, and take notes so that I'm able to revisit those parts.

In addition, note-taking as a reflective and personal practice is a common theme among all participants. Note-taking requires one to think of what to take notes of and how.

Participant 1

I find that I question myself a lot when I'm taking notes like 'Why did I write that down?'

Another quote from Participant 1

Taking notes is part of learning, it's part of processing, and part of understanding what you're reading, so it's not the same for two people necessarily. You must play around and figure out how your brain processes information and how things make sense to you.

Interestingly, some note-taking strategies may not necessarily support participants' learning, but if they are familiar and enjoyable, learners keep using them.

Participant 5

I still use highlighters. Even though they've never really been useful to me. I still like them.

All in all, the ways in which online learners take and make notes depends a lot on the personality of a learner. Participants feel that their study notes are a safe place to share personal feelings and thoughts and not only course related information.

Aesthetics and use of colours in notes. This section again presents findings to support the idea of note-taking as a personal and artistic endeavor. I use the word “aesthetics” to explore such features of notes and their neatness and use of colours as well as the role technology plays in this. Analysis shows that participants use colours differently in their notes as well as have different levels of tolerance toward messiness in their notes. Personality and technology both play a role in these decisions. Affordances of technologies (digital and analog) allow one to have a most enjoyable experience and have esthetic pleasure in learning and taking notes if a learner would like to.

Participant 8

I also think there's a bit of merit to having pretty things for me anyway, and that's why I like to have my pretty binder that I put my notes in afterward.

All participants have preferences about the colors they use in their notes. Many mention that they like their notes to be not boring. Sometimes the choice of a tool for note-taking depends on the features of technology that allows for a creative approach to note-taking. One participant chose MS OneNote because it has beautiful colours. So, they can use the colour that they prefer when taking notes and enjoy how notes look. This allows learners to be artists on a small personal level.

Often, we think about the affordances of technology related to digital tools only. However, the study discovered that participants who prefer to take analog notes have strong preferences for pens and pencils they use. Participants talk about physical sensations that the

tools they use provide. For example, while taking notes with pen and paper, participants like to use a smoothly gliding pen, black or blue, or a sharp pencil, a mechanical one usually with no need to sharpen it. This may be explained that learners like to be comfortable with the tools they use while learning and reduce distraction, such as a constant need to sharpen a pencil and remove shavings.

Participant 6

I use a black pen and it has to be soft gel. It's this beautiful Sharpie. It's a soft gel pen and it's black.

Even though participants may have preferences for digital notes, they still have some preferences for writing tools they use occasionally to write down something.

Participant 7

The tool was handy. That was it. No preference, whatever is around. However, I don't usually take notes in pencil. On paper, I choose pen to write notes with because pen is easier on the hands to write notes with. It's cleaner.

Participant 7 again:

If I'm marking in a textbook, a physical paper textbook, then it will be in pencil and I'll find a pencil to do that so that if I want to erase it, I can.

Another aspect related to aesthetics is that participants who take notes on paper like to use a nice binder to keep notes in, at least for the current course. After the course, if finished notes can go to an ordinary binder for storage. Technology tools for digital note-taking make it much easier to work with notes and make them neat and pretty.

Participant 4

With the iPad, if my note isn't perfect, if I run out of space when I'm writing, or if it gets messy, it's perfect. You can move it to a different space on the paper or resize it. By just pinching your fingers to move it to another section or duplicate it. So, it makes it much easier, and then my notes always look pretty.

Participant 7

I've intuitively started to make pink things that are important because pink is close to red. You can't read through red [highlighter], but you can read through pink.

Colours play an important role in learners' notes. It may be a preference for the colour of a pen or a font, but also for colour of a highlighter. Highlighting is a common practice for both digital and pen and paper notes. Sometimes learners are very consistent in their choices of colour because of their personal preferences.

Participant 6

My favorite highlighter is yellow. It's always yellow. It's my personal preference. I did buy a pack of all different colors, but it is always yellow that I use. I need the yellow one.

Interestingly, many students prefer yellow highlighters and the yellow colour can enhance learning (Plass et al., 2014; Porter-O'Donnel, 2004). Also, colours may be used to help differentiate sources of information, for example, red for one's own thought and black for the thoughts of one's professor.

Participant 3

I've started doing something else in my notes. I would be concerned as I went to do my assignments that some of my notes I'd remember as my thought, but it was a quote from a reading or from my professor, so I started putting my thoughts, my interpretations, or

reactions and color code them in red. So that I know right away anything in red is my idea. Anything black text or default text is either the professor's or an author's ideas.

Participant 4

What I do is color coordinate. In the Apple Pen, you can pick any color in the rainbow you could imagine, and it has so many different options. Blue happens to be my favorite color, but sometimes it's because that's my favorite color right now and that's the color I want to see. It makes me happy. Usually, I color coordinate and I don't always have it the same way.

Sometimes colours are used without any system, just to differentiate one thought from another. Prior research found such practices still supportive of knowledge acquisition (Keller & Grimm, 2005; Roy Choudhury & Bhansali, 2022).

Participant 7

I just alternate colors. If the last one was pink, this one would be yellow. The next one might be green. OneNote has some nice colors.

By looking at and interpreting the images of participants' notes (full analysis will be shared later), I developed a notion that digital notes are often neat. I can attribute this fact to the affordances of digital tools. Technology tools for digital note-taking make it much easier to work with notes and make them neat, pretty, and easy to read later than unriddling someone's handwriting. My observation is that many people (me included) when writing tend to rush and not write calligraphically. Participants usually prefer neat notes which was one of the reasons for switching to digital note-taking as reported by some participants. My interpretation is that neat notes are much easier to understand and faster to use later when such a need occurs.

Participant 4

With the iPad, if my note isn't perfect. If I run out of space when I'm writing or it gets messy, it's perfect. You can move it to a different space on the paper or resize it by just pinching your fingers to move it to another section or duplicate it. So, it makes it much easier, and my notes always look pretty.

All in all, I learned that online learners make their decisions about which tool to use for note-taking in part on what that tool has to offer in terms of colour choices, pleasant physical sensation, and the opportunity to make notes look neat if they like so.

Mood, health, and note-taking strategies. The study results suggest that mood and health issues also affect decisions about tools and strategies learners employ for taking notes. Prior research shows that digital and analog note-taking require different muscles in the hands to work (Vongjaturapat & Chotikakamthorn, 2022) as well as the surface type (paper or a tablet screen) and type of a pen affects the way the hands work (Gerth et al., 2016; Gerth & Festman, 2023; Potle et al., 2023). Typing the text is less tiring for hands than writing with a pen (Vongjaturapat & Chotikakamthorn, 2022). As we saw, study activities often happen at night and after a workday.

All participants choose technologies for taking notes that accommodate their health-related needs (e.g., reduce pain in their hands or reduce screen fatigue). For example, two participants in this study reported having CTS. The search in Google Scholar revealed that Carpal Tunnel Syndrome (CTS) had been studied extensively. The search on August 1, 2023, with the search terms “(typing and handwriting) and (adults) and carpal tunnel” resulted in 3,880 articles since 2019. CTS affects about 100 people per 100,000 in a year (Squissato & Brown, 2014). Also, CTS affects women more often than men (Simmons & Bisch, 2006).

Participants' choices may be quite different. Various technologies available to learners support their needs as required. Some learners choose to take analog notes to have a break from digital tools. Whereas other participants use digital technologies to support their needs.

Participant 1

Too much time on the computer really tires me out.

Participant 6

It [digital note-taking] seems to be far more tiring and meaningless. It is time-consuming and adds to the confusion as my desktop fills up with folders and documents.

Participant 7

I'm not doing pen and paper, so sometimes I will type. My hands are very sore after a day of serious work. Taking notes by hand always requires the effort of sitting properly and using my hands, whereas, with my device, I can choose to lie in bed, and have some easier tools available to me.

If one is so tired and one's hands are very achy or has CTS then technology is here to support. Speech-to-text and text-to-speech are not only useful for people with special needs but are great friends of online tired learners. Such technology affordances are of great support for online learners. It allows learners to listen to the articles that a being read by a computer voice and think about it, then pause at any time either to just think or to take notes. Speech-to-text writes words for you and saves it for you. And then it is up to the learner to do whatever is necessary with that text. One participant says that typos do not bother her because this is the notetaking, process of learning, that matters, not the results, or notes.

Participant 7

It would be nice if I had some strategies. I think my strategies are dependent on how I feel that day. So, if I am feeling particularly tired, I'll turn the mic on. Then I'll just read.

The study shows that studying and note-taking as a practice requires time and energy to do it. This is not new. Participants report that one important task they have is to manage time and energy to take notes effectively and efficiently. Also, the approach to learning and taking notes may change from day to day to accommodate various demands on a learner.

Participant 5 about study routine:

It's quite organic as it fits with my schedule, mental health, emotional health, and physical health. I fit it [note-taking] in where and when I'm able according to my energy levels and capacity to concentrate.

All in all, online learners are humans, and they may get tired or have health-related issues. However, all of them are very determined to keep learning and make decisions about the tools to use so that they can support their learning needs, which may vary from one day to another.

Theme 2 – Being a User of Technology

This study uses postphenomenology as a methodology. So, I chose this theme as it shows how technology mediates human-world relationships by exploring note-taking habits and related technologies.

To explore and illustrate note-taking approaches and their related technologies, I present findings as a set of the following subthemes:

- Note-taking strategies and related technologies should serve a desired purpose;
- Note-taking technologies should be comfortable and pleasant to use;
- Experiences with technologies: Tool Breakdown and Multistability of Tools.

Note-taking strategies and related technologies should serve a desired purpose. I asked participants to teach me how to take notes as part of the first interview. Their most often response was “*If I wanted to teach you [how to take notes], I would find out what your purpose is.*” (Participant 5).

Since all participants are adult learners and have busy lives, they always need to choose what to spend their time on and set priorities. Participants believe that grades are a measure of success in higher education and want to do well in their courses. This belief affects the decisions they make about the way to approach their learning.

Participant 5

Typically, in my program, I'm working on large papers and assignments. My goal is on my assignment.

Participants do take notes that can be or will be part of their assignments. Such notes can be incorporated into their learning notes or can be a separate set of notes. The format of notes is very personalized, and the way notes are organized is suitable for a particular person. Some take notes for assignments while reading and some take notes for learning while reading. Often both these processes happen at the same time. All notes can be digital, or a learner can take notes for learning with pen and paper and take digital notes for an assignment at the same time. In any combination of notes, a separate process is to keep track of references.

Participant 6

I guess my note-taking involves the paper, the pen, the highlighter, and having a Word document open so that I can copy and paste into if there's anything important.

Participant 6 continues

I use a pen always and I use a yellow highlighter. I will highlight it on paper or textbook. Then I'll make notes in the margins. Then if I'm writing a paper and using the resources, I will also have a Word document up on my screen and I will make a note of references. I will always start my reference section first.

Usually, participants use several technologies at the same time while doing schoolwork. Having multiple screens allows a learner to have an article, assignment notes, and paper notes in front of the learner at the same time. All this may be overwhelming, but that is the reality for some learners. One may use several technologies at the same time and take the benefit of such a situation. Participants share that learning often happens in chunks. One always knows that if for whatever reason, they need to stop learning, they can come back to it later, and it will be there. Notes support the way of working that way by providing a place to come back to the most recent ideas and keep working on their learning journey. So, for all participants, accessibility of notes is a priority. Interestingly, for this reason, some participants use cloud-based tools and for the same reason, some participants do not use digital notes and cloud-based tools.

While thinking about new ideas or connecting them to previous knowledge, learners may use a different tool than if they were working on an assignment's notes. The technologies of choice do not serve the need to create an artifact to be used in the assignment (e.g., typed text), but just to materialize their ideas or talk them out loud:

Participant 1

If I'm taking notes about my own ideas, then I may voice record or use text-to-speech.

Learners realize that the way they approach and think about digital notes differs from paper notes. Writing on paper is permanent and hard to manipulate, whereas digital notes can be easily modified.

Participant 7

One of the reasons I prefer to take notes digitally is that I'm writing as I'm reading.

Then, for example, I realized that I was starting to itemize in sentence form, though it would be better to itemize in bullet form. Well, in pen, you got to scratch it out. I suppose if I was using a pencil, I could take an eraser, but eraser has never erased completely and cleanly. So, in a digital format, I could clean that up and make it nice and orderly.

Also, participants may use both strategies to serve different goals in taking notes: paper notes for just-in-time comprehension or planning support (not necessarily to be used later) and digital notes for storing ideas (to be used later).

Participant 1

If I'm writing an assignment, I do sometimes actually print things off. If I have an assignment that has complex instructions, then I like to print it because it's easier. I can scratch off the stuff that I've done or make notes on paper. So, I use paper quite a lot.

All participants have some strategies to support note organization and navigation. Such strategies include using colour to convey meaning, crossing out the items on a list that were done, and noting the page till the reading was done. These strategies allow learners to plan their work most efficiently. These are the strategies for making specific parts of notes more salient than others. However, some participants do not have a solid note-taking system and may vary their note-taking strategies from note to note.

Participant 7

I think my [note-taking] strategies are dependent on how I feel that day.

All participants use note-taking primarily to support their learning. Such a practice should support goals and not inhibit the learning process. For example, digital note-taking strategies

(e.g., typing notes, using ‘copy & paste’ techniques for images, tables, or text passages from course readings, and taking screenshots) allow learners to increase the speed of taking notes and this way supporting the process of recording information if the learning goal is to record as much as possible.

Participant 7

I type faster than I write. So, handwriting slows me down – thus my train of thought is held back by my not being able to write fast enough to keep up.

Participant 6

The other cool thing about distance learning as compared to my undergrad experience, which was in person, is we're online. Sometimes the professor would pull up a great slide or something that just laid things out very nicely. So, I just do a quick screen capture and dump that screen capture into my document [with notes] with a little bit of explanation, before or after it.

In other cases, paper notes work better. When the course materials and notes are stored in binders, it is easy to retrieve them, no need to use a computer or Internet to access them. Such low-tech solutions for learning are still valuable in the current digital age and work well for some online learners.

Participant 6

I need the physical paper and pen in front of me. I seem to retrieve articles and notes much quicker from my binders. I also read much quicker on paper than on a computer screen.

It seems that some participants use digital technology to support their learning out of necessity: you cannot be an online learner without technology and life has changed. Pens, pencils, and paper are simple tools that some learners still love and miss.

Participant 8

In a perfect world, I would love to have ALL handwritten notes for ALL the material in ALL of my courses. I just don't have the energy and motivation to apply myself that long and deeply, while trying to manage a household, take care of myself, do freelance work and work full-time.

However, one factor named by participant against notes on paper is that they may be a nuance in a household:

Participant 2

There's too much paper at home [if you take all notes on paper].

All in all, the findings suggest that all participants recognize the importance of technologies to serve their needs and support note-taking and learning as effectively as possible. The purpose of taking notes was reported by participants as the first factor to consider before taking notes; the purpose will affect the choice of tools and strategies learners use.

Note-taking technologies should be comfortable and pleasant. The study reveals that not only does the goal of taking notes affect the choice of tools, but also the learner's comfort level with a tool.

Participant 8 recommends:

I would say use the tools that you are most comfortable with and that you find enjoyable to you use.

Participant 1 shares:

I keep it simple and use just the notes app on my computer.

As was discussed in the section on the study environment of participants, online learners may use technologies to make their learning process more comfortable and more enjoyable. Feeling comfortable while doing schoolwork is important for many participants. Some participants bring with them into the places they read learning materials and take notes such items as a cup of coffee or water, a pretty binder, or a blanket. To me, it seems like they want to “dress up” their hard work, so it looks attractive, enjoyable, and motivating. Online learners have such an opportunity and freedom to set the stage for their learning as they like.

Participant 5

I had to make it [process of taking notes] easy and attractive.

Another aspect that I would like to mention is that all participants report that they are not afraid to try new technologies, though some new tools may have a steeper learning curve than others. The result of this can be that some participants return to what they have already been using and some participants switch to new tools.

Participant 5 tried and returned to familiar tools:

I've tried some other tools. I tried Microsoft OneNote. I've even tried a recording pen because I had access through work to try some of the assistive technology. I didn't try it in depth; it took some adapting and learning.

Participant 6 tried and switch to a new tool:

When I first started using Google Docs, I didn't love it. It was unfamiliar compared to Word and I felt a bit frustrated. I was probably a pretty expert level user of Word when it comes to APA formatting.

The study shows that online learners are in constant search for strategies and tools that support their learning. Such practice takes time, effort, and reflection on how they study best.

Participant 6

When I first started online studying, I tried doing the highlighter and the different techniques right on a digital document. It didn't work for me. I need the paper in front of me to physically make notes with my pen and highlighter. It might have to do with the screen tiring my eyes and not being able to physically write with a pen.

Participant 7

I find it takes some effort to take notes. Using OneNote has made it better, as I can leverage the dictation tool, also insert images, text, and video easily if I do not want to type.

Participant 6

There are so many tools available and no one tool is the perfect tool for every context. So, I've just found the ways I guess that without even really thinking too critically about them [tools], just what tends to work best for me.

To conclude this section, online learners are familiar with various tools, try new tools as they go, and always make decisions about what tools to use. Often, the comfort level with a tool makes a difference in their future decision to use the tool or not for learning. In addition, tools that are familiar to users and are pleasant to use support their motivation and note-taking practices.

Experiences with Technologies: Tool Breakdown and Multistability of Tools. In this section I will discuss technologies participants use for taking notes, their affordances and drawbacks identified by learners, and such aspects that are in alignment with

postphenomenology as tool breakdown, transparency of tools, non-neutrality of tools, and multistability of tools (Heidegger, 2008; Irwin, 2016; Rosenberger, 2004; Rosenberger, 2017).

Technologies are faithful partners of online learners that are always there for you. As mentioned before, online learners usually use several technologies at the same time. Some of them go unnoticed while they work. However, we experience technologies differently when they break down or behave unexpectedly. Such tool breakdown incidents may force a user to think of other tools to use or at least make such a tool “visible” to the user. To illustrate this idea let’s consider the decisions participants make about using cloud-based tools. For example, the choices learners make about the ways to store their files, locally or in the cloud, depending on previous experiences with various technologies.

Participant 6

My computer died on me suddenly. I had some decent file backup, management practice, but I could have lost a lot. I liked the cloud hosting strategy just because it alleviated that concern about saving or worrying about backups.

Other examples of a tool breakdown that participants mentioned that brought tools into their awareness and led to a certain decision about studying strategies include:

- A pencil that broke in the middle of writing down a thought distracts from the learning process and upsets a learner. The decision is to use a mechanical pencil, no need to sharpen it.
- An Apple pencil that lost its last bit of charge and stopped working in the middle of taking notes on a reading distracts and annoys a learner. The decision is to buy a better-quality Apple pencil.

- A pen that does not glide smoothly on paper annoys the learner and causes unpleasant feelings. The decision is to buy gel pens only.
- There is no stable access to the Internet and Wi-Fi. The decision is to start an online program when reliable Wi-Fi became available at her place; for another participant, to save files on her laptop locally (and not on the cloud) to have the opportunity to keep working on her courses even without the Internet.
- There is no ink in a printer when there is a need to print. The decision is to keep an eye on the printer and buy a new cartridge in advance.

These examples illustrate that participants try and keep their note-taking process uninterrupted as much as possible and try and do whatever is needed in advance to make sure that they can concentrate on taking notes and not tools. Also, it is clear to me that some learners are very much dependent on the tools they use for taking notes (e.g., gel pen) and the need to use another tool may result in unpleasant feelings.

Such a tool breakdown events impact note-taking and study processes and many participants are aware of their needs to support the best learning experience in taking notes. However, in many cases note-taking technologies and their affordances are transparent to users. Another example can be the possibility to have a computer screen split into parts that come as a given option in a certain digital personal device that users just use and take for granted.

Participant 1

On my screen, the notes are on 1/3 of the left-hand side of the screen, and then the PDF [of a reading] is on the right. I don't have to switch back and forth. They're both in front of me. I take notes as needed.

Another example illustrates that some tools are better suited for a certain situation than others; the tool is not neutral, it affects the decision-making process and a learner's actions. Participants make choices based on their experiences. They try various technologies for note-taking and identify their best use: "*I find it is difficult to type on a smartphone, I use keyboard always.*" (Participant 1). Participant 1 also shared that she may use her smartphone to read course materials when she is, for example, waiting for her kids in a car and has a moment to check schoolwork. This example illustrates the idea of technology that blends seamlessly into everyday objects and activities. It seems to me that for all participants their online learning also disappears into everyday activities and objects to some extent.

These examples also illustrate the idea that electronic devices differ in their degree of embodiment. According to Merleau-Ponty (2012), there is no separation between the actions of the human body and the technologies that they use, it is about the unity of behavior in the world of human and technology to which the body becomes adapted and a certain way of using a tool become a habit. For Participant 1 her smartphone requires more attention from her when taking notes for school than when making a call. The same tool, a smartphone, is less transparent and less embodied in activity than a laptop, for example. This preference is true for other participants, too, because none of the participants shared that they would prefer to take notes on a smartphone. A computer screen, for example, has a background human-technology relation, the screen is not experienced itself but is the context of the learner's actions.

In other cases, learners use the affordances of technologies to meet their health-related needs. This is another example of how technology mediates human-world relationships.

Participant 7

I'm rubbing my hand right now because it hurts so bad from the day of work. So, as soon as I learned that I could read out loud and something would capture and transcribe it, I felt amazing. So, I do quite a bit of that.

Technologies that participants use for note-taking and doing online school are multistable meaning that the same tool can be used for several purposes:

- With an iPad one can lie on a bed and read an article, take digital notes at the same time with the same device and Apple pencil, search the Internet if necessary for additional support or information. One does not even need a lamp to work, you can do this in the dark because the screen is bright. So, such a way of studying is not disturbing for people around even during the night, while a person beside a learner may sleep and the online learner is learning.
- With a laptop, one can study anywhere, on a couch, or kitchen table or move quickly to a different place and continue learning in a place with conditions more conducive to learning. One participant shared that sometimes she works from a café, which can be easily done when doing schoolwork on a laptop.
- With MS OneNote one can take notes, have a very wide range of colours, and use OneNote as an organization or scheduling tool that supports the planning of schoolwork. In addition, it is easy to create digital book-like document/repositories of information that may contain as many or as little folders and pages as a learner requires.

Participant 7

I'll write [in digital notes in OneNote] that "page 44, go to 61" or something like that.

That tells me how much further I must read. So, I can measure my time and know whether I'm going to finish it that night.

Another example is that some participants use MS Excel or Google Sheets as database tools for collecting references or information on various topics that are of interest to learners (e.g., conferences and ideas related to their research area).

Overall, often many technologies work together to provide an online learner with everything they need to take-notes and learn. In many cases such technologies are transparent to users. Tool breakdowns that participants experienced in their journey through online education inform their choices of tools and practices that illustrates that technologies that participants use for taking notes are not neutral, they mediate participants relationships with the world and their actions.

Theme 3 – Being an Online Learner

The purpose of this study is to explore the experiences of online learners with note-taking and related technologies. It was visible to me in all the steps of the steps of the study that being an online learner affects every aspect of a learner's life and approaches to learning including note-taking habits and choice of technologies.

To explore and illustrate connections between note-taking and online learning, I present findings as a set of the following subthemes:

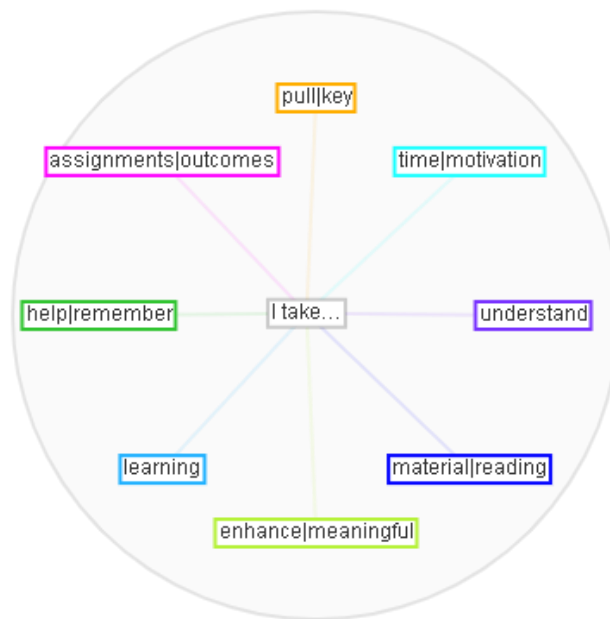
- Need for organization and self-determination
- Constant evolution as an online learner.

Again, I would like to start with the image created by Voyant Tools. Combined responses of all participants to the question "Why take notes while studying online courses?" were used.

This time I chose the visual called mandala (key words auto-detect <https://voyant-tools.org/docs/#!/guide/mandala>). Mandala is a conceptual visualization that shows the relationships between terms and documents. In my case, there is only one document. Each term (or magnet) pulls terms toward it based on the term's relative frequency in the corpus. Figure 7 shows relationships between the magnet 'I take...' and other terms in the document that I submitted to Voyant Tools; 'I take...' means 'I take notes'.

Figure 7

Mandala by Voyant: Why Take Notes while Studying Online Course?



We can see that the tool identified several main ideas related to the purpose of note-taking in online learning that participants share. The purpose of note-taking is:

- To learn key concepts;
- To motivate learning, but taking notes takes time;
- To understand concepts;
- To take notes while reading course materials;

- To enhance learning;
- To help to retain information;
- To get ready for assignments.

To me, this again confirms my understanding that for participants note-taking is not only about storing information that then needs to be memorized, but it is about meaningful learning, making connections, motivating to keep learning, and, of course, working toward good grades.

Need for Organization and Self-Determination. In this section, I will present findings that show that all participants expressed the need for organization of course material, study routine, self-determination, and self-motivation to keep learning. Note-taking supports these needs.

Participant 5

I feel more of a need for organization of data online. So, my note-taking is more just information organization and data organization. A tool, so that I can quickly access and return to the original.

All participants explain that they try and find the most effective and efficient approaches to learning and note-taking due to their busy schedules. All participants expressed the pressing need to be organized in the ways they approach online learning, in the ways they plan and divide study tasks, in the way they organize study materials, notes, and assignments, and in the way they take notes.

Participant 1

I have to be organized or else it won't get done.

Another common idea shared by all participants is that being an online learner means constantly evolving as a learner and reflecting on what works and what does not work. This applies to the ways of organizing notes and technologies used for taking and storing notes.

Participant 7

I wish I were better at it [note-taking] and I honestly wish I were more organized.

All participants recognize the importance of developing a system of organizing course-related materials (readings and assignments). Participants report that the organization of their notes that works for them is a crucial aspect of their learning experiences. Technologies help them create such personalized experiences.

Participant 1

For a long time, I wanted to take all my notes on paper or print out the research and highlight it and take notes. I do like doing that and I do that with books still, but I just found that when I write a paper, it would be hard to get it [notes] organized. Plus, you have a lot of papers. So, I switched to my notes app because you can search it easily. It's all there and it's organized.

Learners utilize features of technologies they use for taking notes to support information organization and retrieval.

Participant 5

In Google Docs I like headings and table of contents. I can adapt the headings to APA 7. I can create a table of contents that links to places in the document, so the document gets very long. I can link and have headings at the beginning.

Note-taking can also support self-determination, attention focus, and study management skills.

Participant 6

The experience of taking notes for me is a forced discipline, almost like a self-imposed discipline. You can't take notes on something if you're not listening to it.

All in all, participants emphasize the need to be organized in every aspect of online learning including note-taking practices and storing notes. Some participants think that in online learning the need for organization is even higher than in in-person education. Note-taking as a practice helps them to stay organized and motivated to keep moving forward in their graduate studies.

Constant Evolution as an Online Learner. In this section, I will share the findings that reveal that approaches to learning are affected by the online program design participants take such as absence of tests/exams, all material being in a digital format, and all study related activities being online. Participants share that even if they have been online learners for some time they still evolve as learners and adapt to changes in their learning environment and in their lifeworld.

With the adaptation to changing reality, learners' choices of technology tools and note-taking practices change in response. Some participants shared that because of a program design (everything is done online, and all assignments are research-based written papers and no tests), they changed their note-taking practices to some extent. Some participants have switched to digital-only note-taking (and are very happy with this decision), some switched to mostly taking digital notes with a little bit of paper notes (e.g., taking paper notes while brainstorming), and some switched to taking digital notes in addition to taking paper notes, for example taking digital notes that will be part of an assignment (they are not too happy about taking digital notes but understand that this is part of being an online learner).

Participant 5

Initially I started with a very paper-based approach. I seldom use paper anymore for my online learning. However, I continue to use paper notes for other purposes in my life and work.

Participant 4

I made much more diligent notes because I must memorize information and try to pull out what I thought would be on the exam. This time around for all my master-level courses I won't have to do that. So, I approach it [program] simply to learn what I thought was good to know for my life or an assignment.

Interestingly, all participants independent of the number of years in online learning point out that they are still adapting and learning to learn online.

Participant 5

... there's been an evolution and I'm still figuring out what works with online learning three years later for information management and learning purposes.

Participant 1

I'm still figuring it out [online learning] even though I've been doing online stuff for a long time. I still learn with every course, new software, new strategy, or something another student mentions. Whatever it is, I am still learning all the time how to be more efficient and be better as a student.

Even though many participants report that they do well in their online program, and they work very hard to be successful, many of them would benefit from the support in adapting to an online learning environment and in developing study skills including note-taking. All participants have at least 2 years of online experience which may be a factor contributing to their

academic success in this online program as research suggests such non-teaching factor as perception of a successful prior online learning experience increases learners' confidence and positively impact online learners' course experiences (Cook & Thompson, 2014; Van Wart et al., 2020).

Participant 2

If I were to teach you how to take notes, I think I need to learn to take notes myself first.

Again, often online learners study at night and in a less favourable condition than they would wish which in turn affects the way they learn. This finding correlates with the prior research that discovered that bite-sized learning during pockets of time at night and on weekends may support busy adult learners in managing their studies and learning effectively (Ho et al., 2022).

Participant 7

Some people chew through the readings fast. They're like zooming and I can't. I'm not getting anything out of them [readings]. I think that is because it's often at night and I'm often tired.

Luckily, technologies enable taking notes and working with the learning materials in so many ways that everyone should be able to find their personalized way of learning and being successful in an online program. When there is no need to study for a test, learners are involved in the learning differently. Participants share that they enjoy thinking, reflecting, and thinking again. They like being in the moment and enjoying the time they have for learning, which is possible with the support of technologies.

Conclusion

Note-taking habits and related technologies are closely related to digital well-being and individual well-being as we see that note-taking strategies are full of emotions and the practice of taking notes serves not only the purpose of learning, but as a journaling activity, and even therapeutic purpose to let go of the emotions.

Burr et al. (2020) define digital well-being as the “impact of digital technologies on what it means to live a life that is good for a human being” (p. 2313). As this study demonstrated, the technologies online learners use to take notes and access their online study environment are not neutral, they affect the choices students make about their study approaches and the larger environment, life around them also influence their choices and limits their freedom. Well-being is a crucial part of everyone’s life and technology affects and influences this well-being. Note-taking is a personal activity, closely connected to the emotions of learners and their inner and outer world. So, individual and social well-being is closely connected to the technologies that mediate our interaction with the world.

Data analysis suggests that note-taking habits (such as using colour to convey meaning, crossing out the items that were done, and noting the page till the reading was done) allow learners to plan the work most efficiently. I saw that these strategies apply to both pen and paper notes and digital as well and are used by participants regularly.

Affordances of technologies also allow us to have the most enjoyable experiences and have esthetic pleasure in learning and taking notes. Some participants chose a tool that has beautiful colours so they could use the colour that they prefer when taking notes and enjoy the results. This allows learners to be a bit like an artist by using color palette in OneNote, for example.

Technologies are like a faithful partner that is always there for you when they are working, but you may notice their presence when they are broken or behave unexpectedly. A pencil that broke in the middle of a thought distracts from the learning process is upsetting. An Apple pencil that lost its last bit of energy and stopped working in the middle of taking notes on reading. Such events bring tools into learner's awareness.

Note-taking strategies with technologies (such as typing on a laptop) also support the health-related needs of learners. Some participants choose technologies for taking notes that allow them to feel less pain in their hands. They report that typing is less tiring for hands than writing with a pen. If one is so tired and one's hands are very achy then technology is here to support, and some learners are very much aware of this fact. Speech-to-text and text-to-speech are not only useful for people with special needs but are great friends of online tired learners. I discovered that such technology affordances are of great support for online learners.

When starting the study, I did not think at all about assistive technology and online learning, maybe because I have never used it myself, but I am considering using it in the future based on very positive feedback those tools received from some participants. Technologies let learners listen to an article read by a computer voice, then pause at any time either to think or to take notes. Also, if one needs to take notes but the body is so tired that one cannot type, speech-to-text is a way to still take notes and make progress in learning. Speech-to-text records it for you and saves it for you. Then it is up to the learner to do whatever is necessary with that text. One participant says that typos do not bother her because the note-taking and learning happening during this process matter, and not notes themselves. Such assistive technology capabilities add to the comforting effect of chosen tools.

All participants want to enjoy their learning process and make it enjoyable with various additional features of technologies that they have access to and know how to use. Other objects that might add to the comfort level of a learner and positive learning spaces are coffee, water, pretty binders, and a blanket. A blanket suggests that learning is happening not at the desk but on a couch at night; feeling comfortable supports motivation and self-determination to do schoolwork. I would never think about blanket in relation to note-taking though, this was an interesting connection that I made between feeling comfortable and feeling ready to learn. These discoveries made me investigate the topic of online learning and coffee. My brief search found that online learners do drink coffee, but moderation is key as usual to avoid the negative effect of coffee consumption on psychological well-being (Bajar et al., 2022).

Voice recording capabilities of a laptop or a phone are a useful feature and are supportive of taking notes on the go or saving time for typing them.

Technologies enable taking notes and working with the learning materials in so many ways that everyone finds their personalized way of learning and being successful in an online program. Learners are involved in learning, not just studying for tests or exams. It is being in the moment and enjoying the time they have for studying which is possible with the support of technologies.

The tools students have or like to use affect their approach to learning and note-taking. As we can see, technologies play an important role in human-world relationships. This analysis allows us to see the specific perspective on note-taking technologies learners use in online programs and how they make decisions about when and where to study. Note-taking technologies develop “contextual identity” and based on this contextual identity they help to shape human actions and experiences (Verbeek, 2009). According to Verbeek (2009),

technologies do not simply facilitate actions and experiences—they help to shape them, and how they do this cannot be reduced to context and meaning, even though they are entirely contextual. Technologies are not merely functional, they mediate human-world relationships.

Ethics of Note-Taking Technology and Academic Integrity

Postphenomenology is also concerned with the ethical use of technology and ethical issues that surround technology use (Hare, 2022; Rosenberger, 2017; Verbeek, 2008). If we assume that the tools that we use are neutral, then there is no need for ethics. But if we think of technologies as not neutral but mediators between humans and the world, then there is a need for ethics.

After interviewing the first participant, I noticed that the ethical concerns and technology use in their note-taking practices did not come out. Often ethics is a secondary thought or an aspect that never comes to mind unless attention is drawn to it. An example of Generative AI (e.g., chatGPT) comes to mind with revelations of the environmental impact such a tool has as well as the human labour practices that it employs. These important considerations often come second after the talk about the affordances of such a tool. To draw participants' attention to ethics-related aspects of note-taking, I added one more question to the interview about whether participants have any ethical concerns related to their note-taking practices and related technologies.

I will discuss the following subthemes in this section:

- Behaviour choices in an online environment
- Plagiarism and Academic Integrity
- Use of Cloud Storage and Tools
- Notes for Learning are Private.

Behaviour Choices in an Online Environment

Technologies “start to interfere openly with our behaviour, interacting with people in sophisticated ways and subtly persuading them to change their behaviour” (Verbeek, 2011, pp. 1-2). Concrete technologies mediate human-world relations and affect the moral decisions we make daily. This idea applies to the decisions that online learners make while taking notes of their reading or listening to a presentation or a webinar. Such decisions depend on whether the event is attended in person or virtually.

While discussing participants’ note-taking strategies, I noticed that learners do employ various strategies in various learning situations. In addition to taking notes on reading materials (which was the most often mentioned by participants) learners also take notes while watching videos or listening to presentations. I discovered that there are differences in technology use during in-person vs online events such as presentations or webinars related to technology etiquette. Participants have different perceptions regarding in-person etiquette and technology use while attending a live presentation during an in-person conference and while attending an online event.

Participant 3 shared:

Recently I attended a conference, and I didn't want to be perceived as rude having my laptop open the whole time. I did bring a physical notebook and a pen, and I took paper-based notes which felt a bit foreign to me. So, I think the beauty of distance education for me is it suits my disposition as a learner. I like to be able to take screenshots.

Even though this person prefers taking digital notes, while attending in-person presentations she always takes notes with pen and paper to be perceived as being more polite by a presenter and other people. The reason for that is that a person who takes notes on a device

during the live presentation may be perceived as doing non-presentation-related activities on their devices (e.g., checking emails). However, many participants mentioned that they take notes during live online events such as webinars or meetings with professors and other learners. As Participant 3 shared, taking screenshots is a very common way to take notes during an online event with or without one's comments.

Participant 3

The other cool thing about distance learning ...is we're online. So sometimes the professor would pull up a great slide, I just do a quick screen capture and dump that screen capture into my document with a little bit of explanation.

Participants who take digital notes admit that they take screenshots of an image, a table, or a passage of text and place them in their notes. Often such screenshots are from copyright-protected sources like a digital course textbook for example. Participants explained that because they use their notes only for their learning and do not share their notes with other people, this is a legal thing to do, and it is also possible to be ethical, though some of them admit that they do not ask permission to do this. All participants emphasize that when adding material to an assignment they paraphrase or give credit for quotes used and always cite the source of ideas.

When video conferencing tools (e.g., Zoom or MS Teams) are used together with note-taking tools (e.g., Google Docs or MS Word) is another example of human-technology relation that involves well-developed bodily habituation. It is easy to use a mouse to select part of the screen and paste in the notes or push on a 'prt sc' button and again paste an image in one's notes. So, ethical issues of use of someone's work, permissions to re-use someone's work, and copyright issues arise. Participants mentioned no policies for attending virtual events or any discussion about what they can or cannot do during a virtual event. None of the participants

mentioned any copyright rules or permission discussed at the beginning of a virtual meeting. So, participants make their judgment of what they can and cannot do with the material presented on screen.

Many participants mentioned that they take screenshots while listening to a presenter, though none of them asked a presenter for permission to do this. Since the presenter shares the slides, then they think it is OK to take a screenshot and save it as notes for personal reference. All participants mentioned that an additional reason why they did this was the fact that they used their notes for their study process and did not share notes with other people.

Participant 4

I think you could take screenshots of stuff. I don't know what could ethically be wrong if I take a screenshot of something.

In addition to taking screenshots, another common practice that emerged is to keep the camera and microphone off during a live event. This way it is not visible what an attendee is doing during the event and gives freedom to take notes the way the attendee prefers. This example gets us back to Verbeek's idea of how technologies affect our daily behaviour. Often, such an effect is not noticed by learners. They just take such behaviour and such an opportunity for granted and do not give credit for this decision to the technologies they use. Also, keeping cameras off may contribute to a psychological perception of a safe learning environment. "Cameras off, coffee on" is the title of one of the chapters in a book on virtual art therapy (Rattigan, 2022) that discusses new norms in online teaching and learning in post-COVID times and the need for educators to reconsider ways of designing learning environments to meet online learners where they are and support their various needs (Rattigan, 2022).

Participant 5

[In a synchronous meeting] my microphone is off, my camera is off, and a speaker, for example, is showing slides and speaking, I will just open another tab and a Google Docs to make my notes. I am typing in Google Docs. I will summarize. I sometimes go to the whole extent that I'll summarize basically, the whole outline of their speaking and major points. Sometimes I'll just record some things that stood out to me.

Learners may make poor decisions about copying other people's material without asking permission while being unaware of what factors influence them. One of the factors may be that the technology they use makes it very easy to take a screenshot and paste it into their notes, so this action becomes almost mechanical and is done without much thinking. This returns us to the idea that technology and its affordances and design may be transparent to users but not neutral.

Plagiarism and Academic Integrity

Another aspect that came out during the analysis was related to participants' views on plagiarism and academic integrity concerning their notes.

Participant 6 shares:

The first thing I think of is to be very careful about plagiarism, be very careful about copyright issues.

All participants clearly state that they try and avoid dishonesty in their work. Plagiarism is the most frequently articulated ethical concern that came to mind of all participants during the first interview when asked about ethics-related concerns with their note-taking habits. One learner who uses chatGPT emphasized that this tool was used only as an extra resource partly to learn how it works and partly to help brainstorm ideas. As an adult and experienced learner, she understands that a student may be accused of academic misconduct if an AI tool is used for an assignment. Universities worldwide are still rethinking their Academic Integrity policies concerning the use of Generative AI by students, and there is no common decision about this yet.

Debates on academic integrity and such breaches of academic integrity as “cut and paste” practices or the use of AI tools for schoolwork are on the minds of educators around the world (Eaton, 2023).

Participant 1

There's the plagiarism issue, making sure you have your sources and that you are paraphrasing properly, and staying organized. You need to know where all the ideas came from. It's important to know what your idea is and what somebody else's idea is. That's the whole point of academic ethics.

To avoid plagiarism, all participants pay close attention to references and keep references organized when taking notes for assignments. Some participants always highlight bibliographic information (in printed or digital articles).

Participant 3

I guess in terms of ethics, I use the strategy: I'm trying to clearly differentiate visually my thoughts and reactions from what I'd call primary source information, whether that's the professor or another student.

Also, participants always record the source information while taking notes to make sure that they did not plagiarize the authors and include all necessary references in the assignments.

Participant 1

I would say that one important thing when you take your notes is to always write down what the source is. You never want to have a note that you took from somewhere that you don't know where you took it from, because then you can't use it.

However, when participants take notes for learning, they do not necessarily cite the sources properly. Analysis showed that references in digital notes for learning are not always in APA 7 format. Just some notion of the resources is included in the notes. Full references are stored (in Zotero, MS Excel, and Google Sheets) or indicated in the notes for assignments.

Participant 7

My background for the last four to six years has been in communications. So, the moment that I copied someone else's work and pasted it into a document, my heart was like pitter-patter, pitter-patter. I'm being a bit dramatic, but obviously, you would never do that ethically, in both professional communications for copyright reasons and in academics for plagiarism reasons. I think it's vastly different [for my notes] because I'm simply taking personal notes to help me remember material and to focus on the definitions and models and theories that I need to learn.

In addition, the 'copy & paste' strategy is often used when taking digital notes by participants. Learners might copy a table or an image from a source and place it in their digital notes. Interestingly, participants considered such a strategy as a good solution when taking notes for learning (e.g., tables often contain summarized information and participants seldom draw in their notes) and no ethical concerns were reported. This action was not perceived as plagiarism.

Participant 7

I would copy and paste, read aloud, or somehow transcribe interesting passages. Those would serve well as references for upcoming assignments.

However, all participants are aware that the 'copy & paste' strategy does not work when creating the assignment to submit for marking.

Participant 4

I might find some quotes I like and write things that I want on the side of the paper.

I'll put a little note saying how I should word it so that I don't accidentally plagiarize.

So, it seems that the same action, the 'copy & paste' strategy, may be perceived as ethical in one situation and not ethical in another situation while taking notes.

I also would like briefly to mention here the concerns that have been recently discussed in academic literature about the use of generative AI. One of my participants uses chatGPT as one of the learning activities in this online program.

I would like to digress here and explain how I came upon the work of Sarah Elaine Eaton, Ph.D., an Associate professor of education at Calgary University, that I find appropriate to reference here in relation to this study. I attended the OTESSA 2023 conference in May 2023 and Sarah Elain Eaton was a plenary speaker. Then I read her blog to learn more about her work in Academic Integrity and Artificial Intelligence (<https://drsaraheaton.wordpress.com/>).

Sarah Eaton (Figure 8) provides thought about the use of AI tools and academic integrity. At the moment of the study chatGPT just started to be popular and it seems that not many ethical concerns have been discussed in the literature and by the participant as well. The participant who uses chatGPT recognizes the responsibility as a learner to properly cite sources and create original work, so she uses this tool more as a source of new ideas and resources like a very intelligent library database that can not only provide a list of sources but also summarize.

Figure 8

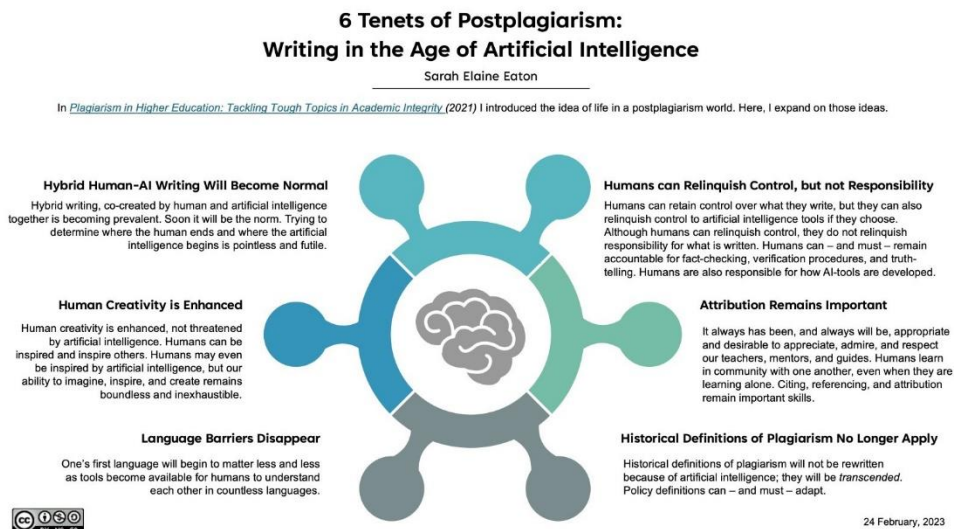
Dr. Eaton’s thoughts: artificial intelligence and academic integrity (Eaton, n.d.)



Sarah Elaine Eaton (2023) also provides some thoughts about the postplagiarism era in education (Figure 9). I agree with this point of view. I also see that one of the participants of this study uses the tool within this framework.

Figure 9

Dr. Eatons’s thoughts: postplagiarism (Eaton, 2023)



It is clear to me that the participant remains accountable for the work that may result from the collaboration with chatGPT and recognizes that such a tool may enhance creativity and support the generation of new ideas.

Use of Cloud Storage and Tools

All participants are aware of cloud-based tools. Some use them and some do not use them for schoolwork. I did not ask participants to explain in detail their reasoning behind such decisions, though some answers I received such as lack of stable Internet connection, for example. I am not going to do any analysis here, but for future research, it may be interesting to apply the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) and explore note-taking habits and related technologies from this perspective. In short, this theory states that the perceived likelihood of adopting the technology is dependent on factors related to technology such as performance expectancy (perceived possibility to increase performance), effort expectancy (perceived ease of use), social influence (perceived need to be socially compliant), and facilitating conditions (perceived existence of technical support infrastructure); those factors are mediated by a user age, gender, experience, and voluntariness of use.

Participants recognize the advantages and disadvantages of using cloud-based tools. Many of them use such tools for collaboration, for taking study notes, and for storing information because they can increase the accessibility of digital materials across devices and remove some worries about storage reliability. However, some participants recognize that without reliable Internet such tools are useless to them and stick to the local storage and software for desktop use.

Participant 3

I liked the cloud hosting strategy just because it alleviated the concern about saving or worrying about backups.

For me, it was better to expose that data to some sort of online breach than to rely solely on, like, locally stored Word documents and the like. There's a risk-benefit analysis there.

Participant 7

I don't use the cloud for my notes. I say it's on my device. I didn't make a choice. The choice to do that was not driven by any ethical or security concerns. I live in a remote area and if I can't access the Internet, I can't get to the cloud.

However, the concern related to privacy and who owns and has access to data that participants store on the cloud (Google or iCloud) did not bother participants in case of their notes taken for learning, course materials, and their assignments that are stored on the cloud. Concerning the use of cloud-based tools, participants do not report any privacy-related issues or concerns about accidental hacking of their accounts.

Participant 3

Who owns it? Who has access to it? It is cloud-based. For me, it wasn't enough of a concern to prevent me from enacting that strategy [using cloud storage].

Some participants noted that people who are not supposed to read their notes and other school-related work may receive access that way and that these materials are not designed to be publicly available.

Participant 5

If someone hacked into my Google account and had access to my documents,

I don't think there would be a high potential for harm.

But there may be a potential for an unintended audience, for a public presentation.

All in all, cloud-based tools may be very convenient and versatile tools for note-taking practices of online students but only in the areas with reliable Internet connection.

Notes for Learning are Private

Last, all participants consider their notes private and not for the eyes of other people. What is written in notes stays in notes. Also, they do not perceive that there may be harm done if their notes are accidentally looked at by another person, but participants recognize that some people may be uncomfortable with some aspects of their notes.

Participant 7

Sometimes I do put in [notes] how I'm feeling and thinking with the expectation that no one else is going to read that.

Again, considering the intended private nature of notes, notes may contain personal opinions that are different from other people as well as notes may not be accessible to some viewers. For example, the choice of colours may be not suitable for a color-blind person, or alternative text for images is not included.

Participant 3

I don't have experience with color blindness or anything that would prevent me from making meaning out of the color coding. And because I'm not sharing with anyone but myself, I'm not worried about solely representing meaning through color. It works for me.

The notion that participants take notes for learning and treat them as private connects to the previously discussed idea of notes as intimate practice for many participants. They feel that their notes are a safe place to add what they think and feel sometimes. Also, participants' style of notes is unique to each learner which may not be suitable for another person.

Results of Artefacts Analysis

In addition to interviews and written responses, I asked participants to share their notes. I think artifacts of learners' work help get additional insights into the world of note-taking and technologies used for taking notes. Also, If I asked a participant to tell me all about their notes it would take too long to describe in detail how a person takes notes but also it may be impossible for the person to attend to every aspect of their notes because often learners are not aware of their habits. Images can tell many interesting stories about learners and their note-taking habits. This returns us to the postphenomenological ideas of transparency and embodiment of technologies. When a person writes with a pen, they think about what they write and not necessarily about the tool until it breaks down.

This section presents the results of the analysis of images of digital and paper notes shared by participants. To analyze images of notes/documents/artifacts I used both qualitative and quantitative methods.

To explore the images qualitatively, I returned to the original images and responses to the reflective exercise about experiences with digital and pen and paper note-taking and examined complete responses. The qualitative analysis enables further understanding of the findings of the qualitative analysis that participants told more narratives about strategies for taking notes than technology tools. The small gallery of artefacts is displayed further in this section.

To do the quantitative analysis I employed a visual methodology approach, content analysis, to get some descriptive statistics about images. This quantitative analysis allowed me to gain an understanding of what technologies and their affordances are employed by learners when taking notes. These aspects might be challenging to articulate during the interview but are easily

identifiable by looking at the images of notes. Also, there are interesting differences between the way learners take pen and paper notes and digital notes that content analysis made visible.

This section consists of the following subsections:

- Content analysis
- Digital notes
- Paper notes
- Notes on iPad
- Notes with ChatGPT.

Content Analysis

As was explained in the Data Collection section, there are several steps in visual analysis.

Let's discuss the results for each step.

Step 1: Finding Images

I asked participants to take notes on paper and digitally while studying on their courses and share some images with me. The sampling method is census: I used all the images that were sent by participants in my analysis. The images were stored in a separate folder in MS OneDrive. I applied the content analysis technique to 28 images (Table 4).

Table 4

Images Used in Document Analysis

Types of notes	Number of images
digital notes (notes in Google Drive, OneNote, MS Word, MS Excel, Mac Note app; chatGPT prompts and responses)	13
paper notes	15

(notes with a pen in paper notebook; notes on a printed article, notes in a paper textbook; on sticky notes)

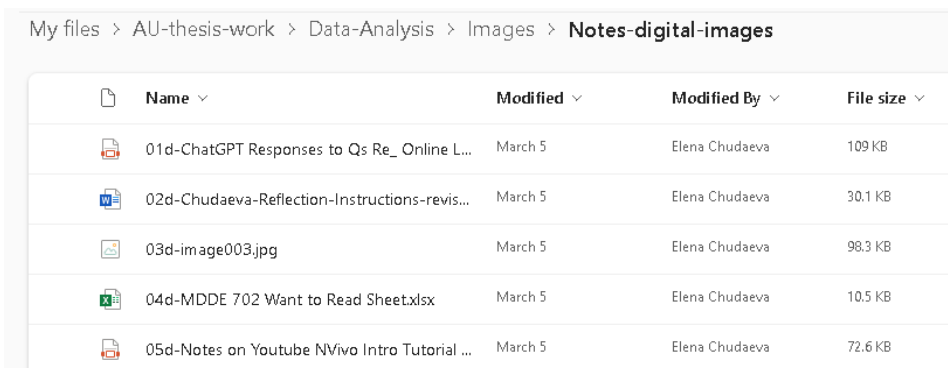
Eight reflective exercises (responses typed as text in an MS Word document with questions provided by a researcher or voice recordings of responses) were considered as digital artifacts to get additional insights into learners' practices.

Initially, the images were collected into two collections: images of notes on paper and digital images. Images were anonymized and referenced using the same master list as was used for anonymizing interview transcripts and either the word "paper" or "digital" and a number (in case more than one image was sent by the same participant). This decision was made after reading Rose's book and her suggestions about the importance of referencing one's images.

For content analysis, however, I numbered images as they were in order in their respective folders. For example, 03d means this image is third in the folder with digital images; 05p means image number 5 in the paper notes folder; 03r means reflective exercise 3 in the reflective exercise images folder (Figure 10).

Figure 10

Elena's Organization of Image Files in MS OneDrive



Name	Modified	Modified By	File size
01d-ChatGPT Responses to Qs Re_ Online L...	March 5	Elena Chudaeva	109 KB
02d-Chudaeva-Reflection-Instructions-revis...	March 5	Elena Chudaeva	30.1 KB
03d-image003.jpg	March 5	Elena Chudaeva	98.3 KB
04d-MDDE 702 Want to Read Sheet.xlsx	March 5	Elena Chudaeva	10.5 KB
05d-Notes on Youtube NVivo Intro Tutorial ...	March 5	Elena Chudaeva	72.6 KB

Step 2: Devising Categories for Codes

I looked through all the images and came up with initial code categories. Then I coded a sample set of images to test my codes. To develop the code, I used research questions, my observations, and analytic notes about interview I, and postphenomenological concepts.

First, I tried and make my coding process replicable. I did this by selecting three images and showing them to family members and asking them to code using the codes I developed (Appendix F). I coded the same images using the same codes, too. Then we compared our coding results and discussed them. This way the codes were refined. Then the codes were shared with my supervisor with the sample images. This adds to the intercoder reliability. It also increases the chances for the coding process to be replicable. Replicable means that any other viewer of images should code the same images using the same codes as I used.

I just put all the images together and looked through them and created a list of code categories that covers both paper and digital images.

Step 3: Coding the Images

After this process, the coding process itself began. I did my best to apply the set of coding categories carefully and systematically to all the images in my collection. I carefully examined each image and applied codes to it. I recorded the coding process in an Excel spreadsheet (Figure 11). Image ID was the rows and code categories were the column names.

Figure 11

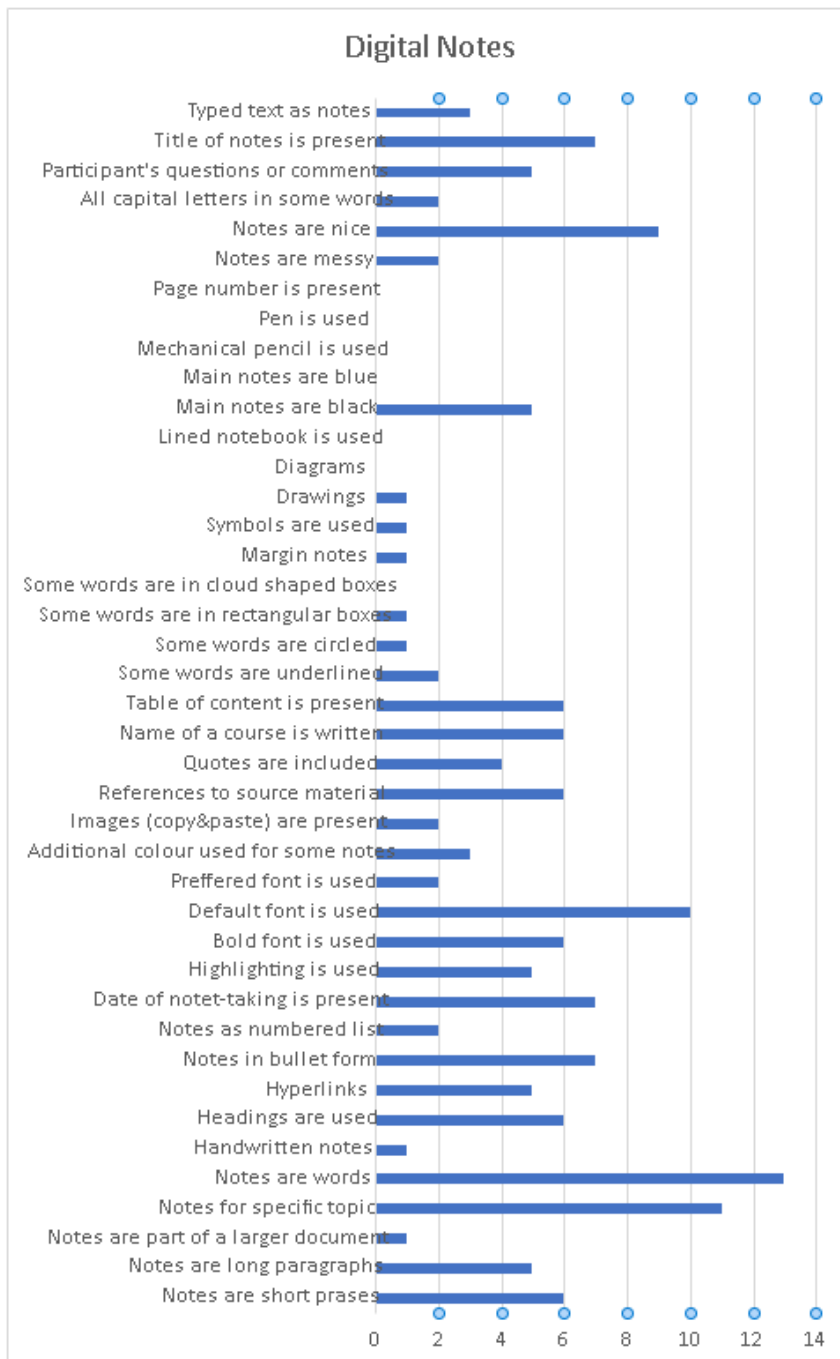
Part of Elena's Excel File Used for Image Content Analysis

Image ID	type	Notes are short	Notes are long	Notes are part	Notes for specific topic	Notes are words	Handwritten notes	Headings	Hyperlinks	bullet form	numbered list	Date is present	Highlighting
01d	digital		1	2	3	4	5	6	7	8	9	10	11
02d	digital		1			1	1		1	1	1		
03d	digital					1	1						
04d	digital					1	1						
05d	digital		1		1	1	1		1	1	1		
06d	digital		1			1	1				1		
07d	digital			1		1	1						1
08d	digital			1		1	1			1			1
09d	digital		1			1	1		1	1			1
10d	digital					1	1		1	1			1
11d	digital		1			1	1	1	1	1	1	1	1
12d	digital			1		1	1		1	1			1
13d	digital		1			1	1			1	1		1

Step 4: Analyzing Results

As a result of the coding process, each image had several codes attached to it. Then I counted codes for each image to get frequency counts. Each image has from 5 to 25 codes applied to it. In addition, I count the frequencies of various codes for both pen & paper and digital notes. Then, I used graphs to visualize the results of this descriptive analysis (Figure 12 and Figure 13). There are interesting differences between and within these notes that analysis made visible.

For digital notes (Figure 12), the most applied codes are “Notes are words” (frequency = 13), “Notes for specific topic” (frequency = 11), and “Default font is used” (frequency = 10). Analysis shows that when taking notes with a digital device learners use such features as a variety of fonts (default or bold, for example), font and highlighting colours, and highlighting, inserted images or quotes from other sources, table of content, linking notes for a specific topic to other notes, hyperlinks. These features in notes are used to convey some meaning or make some parts more visible. Also, often notes are long paragraphs. Diagrams are rare; however, drawings are present when notes are taken with an iPad and Apple pencil. It is easy to re-work digital notes, too. Participant 7 explains “In a digital format, I could clean that up and make it nice and orderly.”

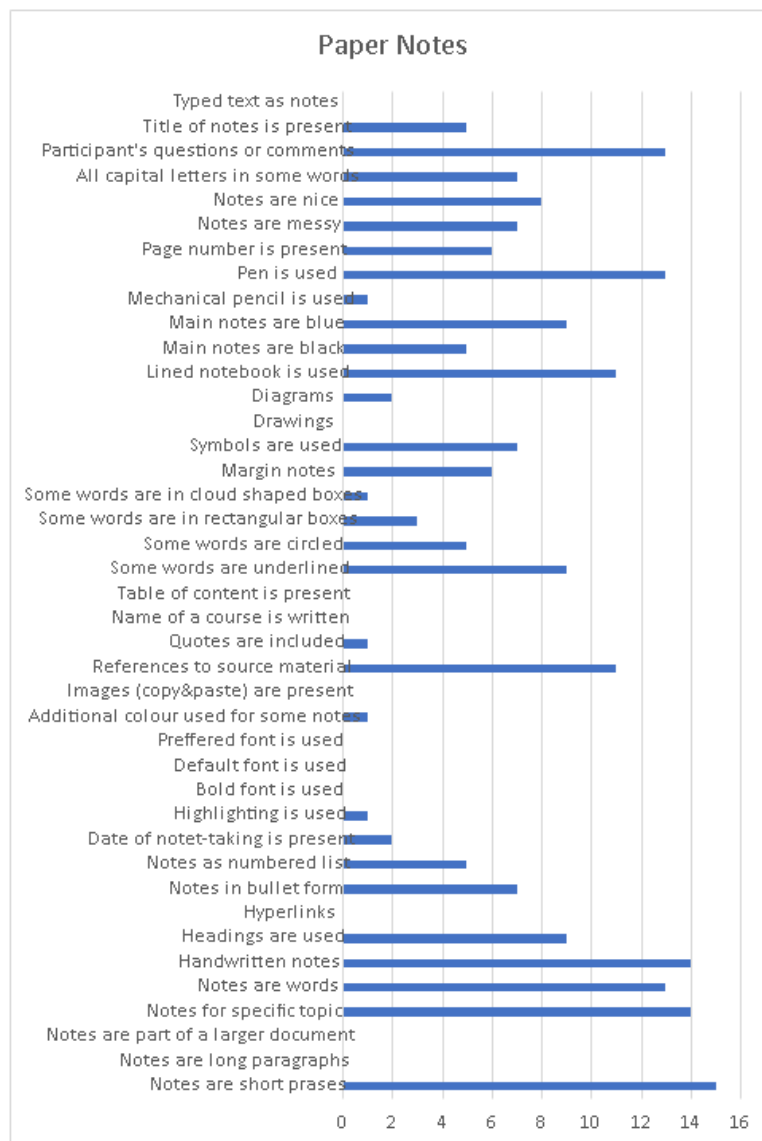
Figure 12*Codes for Digital Notes*

For notes on paper (Figure 13), the most applied codes are “Notes are short phrases” (frequency = 15), “Notes for specific topic” (frequency = 14), and “Notes are words” (frequency = 13).

Analysis shows that notes on paper are mostly done with a pen, though a pencil is used sometimes, too. Participants use lined paper for taking notes. Notes are often in a list form. Such note-taking strategies as using all capital letters, and symbols (for example, stars), underlining, and using boxes around words are used to convey meaning or direct attention to the parts of printed text or notes on lined paper.

Figure 13

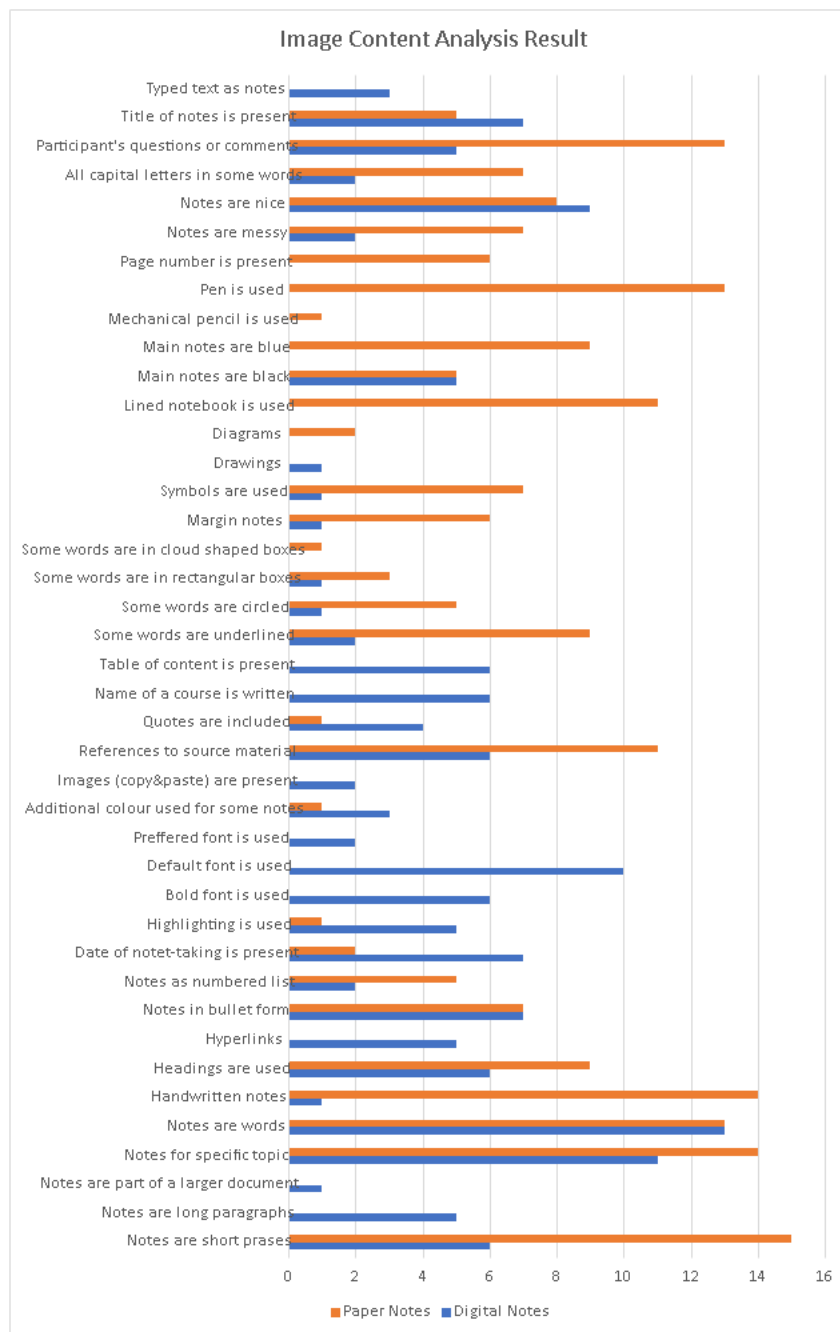
Codes for Notes on Paper



To better see the differences in the frequency of codes in all images, a comparative analysis of digital and analog notes is shown in Figure 14.

Figure 14

Results of Quantitative Analysis of Images



Some codes are more frequent features of paper images (e.g., ‘notes are short phrases’ and ‘some words are underlined’), some features are more commonly used in digital images (e.g., ‘table of content present’ and ‘notes are nice’), and some features of notes are used both in analog and digital notes (e.g., ‘Notes are words’ and ‘Main notes are black’).

I attribute the results to the different affordances of technologies used by participants. For example, the affordances of digital tools for note-taking makes it easier to make notes look nice, less messy, to connect notes with other resources via hyperlinks or with other notes. Digital note-taking habits include dates, course titles, and table of contents more often than in paper notes. A table of contents is usually present in digital notes as it is easy to create it and it functions as a quick reference to the materials in digital notes (which are often long) and allows one to go to a page of interest just by clicking on the entry in the table of content (if they are links). Interestingly, some participants create their own structure in the notes or no structure at all (Figure 15), and some follow the familiar organization of material (for example, as in a textbook).

Figure 15

Digital Notes (Image 06d)

Notes on adult education

- Diversity and in students ages and background is important to consider when teaching adults (Textbook by Nesbit 2004)
- Teacher effectiveness is equally important as it impacts on how the students learn. It is through thorough preparation and careful lesson structure that students are able to learn (Textbook by Nesbit 2004)
- Learning context- the way knowledge is presented to learners and learning strategy the way learners learn. Meaningful learning occurs when learners are able to relate new knowledge to their existing framework. If learners cannot do this then they rote learn.
- Whether meaningful learning occurs or rote learning occurs all depends on how the knowledge is presented to the students and the learning strategies used by the students (Textbook by Nesbit 2004).

One participant mentioned that they follow the structure of the course when organizing their digital notes and try and make the notes look like a course textbook.

Participant 8

If I'm reading a book, I will normally structure my notes the way that the book is structured, so a chapter heading and then subheadings for different aspects of content, and then within that content I will use bullets, dashes, and then words that are bolded or all caps and write out definitions.

Participant 5 explains about using some features of Google Docs:

One thing about that was when I created in Google Docs, and I create a table of contents. The table of contents is each a link. So, you can click on that. And the reason I put that content in there is because then I can quickly link to each of those sections.

All these strategies make digital notes a collection of personal notes, passages or images copied and pasted from other sources, and links to other relevant resources that can be easily searched through and organized in a way that suits every learner. In a way digital note-taking supports information management and information organization, the need for which was emphasized by all participants. Copy & paste strategies are used often in digital note-taking to save relevant images or quotes. Also, digital affordances allow one to make notes personal in terms of preferred colours and type of font and highlighters and layout of notes. Strategies for conveying meaning or directing attention in paper notes are less dependent on the colour but are more dependent on the use of various symbols and underlighting or circling the words or phrases of interest.

One interesting discovery was that participants included more personal questions or comments in paper notes than in digital notes. This may be explained that notes on paper are used often for supporting information processing and comprehension and reflection on concepts, whereas digital notes often serve as a collection of materials to be used later when working on

assignments or research activities. Participant 1 explains “If it is to help you process and ask your questions about what you're reading, then I use paper. I could copy and paste the whole thing, but that doesn't help me. That's not processing it in my brain.”

In addition, it is not directly coming from image analysis, but another feature of digital note-taking tools was mentioned which is spelling correction.

As Participant 2 explains:

... it allows me to change my spellings. So, it corrects my spelling. because the pen does not have correction of spellings.

Also, another participant mentioned:

And I don't know whether that's a fact or a psychological trick of the mind. I like seeing a product. You've done your readings, but when you're taking paper notes, you have something to put in your binder. And you know I did my schoolwork this week. I got done everything that I needed to get done.

Overall, image content analysis shows that there are differences in the ways participants take notes depending on the tools they use. Also, the affordances of the tool affect the strategies learners use to make notes and think about the purpose of the note-taking activity. This again returns us to the postphenomenological ideas of the non-neutrality and transparencies of devices.

The digital notes are nice and mostly contain words and may consist of long paragraphs. The title of the note-taking unit is present more often than in paper notes. Colour of font is used often to convey meaning and support the practice of note-taking. Notes contain a table of contents and links to other parts of notes or other learning materials. Notes contain images from e-textbooks, for example.

Digital Notes

Digital notes may be words, drawings, or diagrams that were the result of reading course material and used as strategies to support comprehension. Digital notes may provide an overall structure to the learning process and organization of notes within larger units of study (Figure 16).

Figure 16

Sample Note Organization (Image 07d)

The screenshot shows a digital note-taking application interface. On the left is a sidebar with a search icon and a clock icon. The sidebar contains a list of navigation options: "Schedule assigns", "Week 1 -2", "Week 3 -4" (highlighted), "Assignments", "Module 3", "Reflective Journal", "Theorists Practitioners", "Authors Researchers", "Research Journal", "Nvivo", and "Glossary". At the bottom of the sidebar are "Add section" and "Add page" buttons. The main content area is titled "Schedule & Readings" and shows the date "Wednesday, January 11, 2023" and time "10:45 PM". Below this is a note with a pink highlight: "Notice in this definition that the process of research is described as flowing from philosophical assumptions, to interpretive lens, and on to the procedures involved in studying social or human problems. Then, a framework exists for the procedures—the approach to inquiry, such as grounded theory, or case study research, or others." Below the note is a section titled "Weeks: 3 -4 Introduction: Foundations, Assumptions, and Frameworks" with a citation: "Creswell, J., & Poth, C. N. (2018). *Qualitative Inquiry & Research Design* Chapter 3—Designing a Qualitative Study: p. 42-64". Below the citation are several hyperlinks: "p. 46 Figure 3.1 When to Use Qualitative Research", "p. 51 Figure 3.2 Phases in the Qualitative Research Process", "p. 55 Table 3.2 Ethical Issues in Qualitative Research", and "Chapter 7 - Data Collection - Interviewing and Transcribing".

In addition, digital notes may be constructed as a linking piece to other resources via hyperlinks (Figure 17 and Figure 18) and as storage (e.g., as MS Excel file) for additional resources that are relevant to the topic of notes (Figure 19).

Figure 17*Digital Notes (Image 14d)***Objectives**

Upon completion of this unit you should be able to:

1. Work from desired outcomes.
2. Determine tasks and order of tasks for making a work breakdown structure.
3. Create a project schedule and/or blueprint.
4. Manage client expectations during the planning phase.

Readings

Jenkins, N. (2005). [Planning](#). In, *A project management primer or "a guide on how to make projects work"* (v 2.0). (pp 23-28). (pdf)

Read [Chapter 9 "Scope Planning"](#) and [Chapter 10 "Project Schedule Planning"](#) in your text, *Project Management*.

Project management primer

The Purpose of a project plan - The purpose of a project plan is to maintain control of a project.

The Elements of a Project Plan – what is to be done, when it needs to be done, who is to do it, how it is to be done

Principles of scheduling

- Never give unconsidered responses
- Eliminate uncertainty whenever possible
- Build in contingency
- Pick the right level of granularity
- Schedule for the unexpected

Formats – milestones/Gantt charts,

Figure 18

Sample Note Organization (Image 12d)

The image shows a screenshot of a note-taking application interface. On the left is a sidebar with a folder structure under 'iCloud'. The main area displays a list of notes on the left and the content of a selected note on the right.

Left Sidebar (iCloud):

- All iCloud
- Notes
- NEXT ACTIONS
- [Redacted]
- [Redacted]
- Classes
 - Finished Classes
 - Thesis Ideas & Litera...
 - MDDE 603
 - Assignment 1
 - MDDE 610
 - Assignment 2
 - Assignment 1
- [Redacted]
- Old Stuff
- Info
- Recently Deleted

Main Note Content:

January 23, 2023 at 4:15 PM

Unit 2 Reading: Keller PSI

Polson (2000a) (AU psych website)

From its description, I love this approach. It is very much like what we do at AU. It's also much like what happens in a homeschool, with the homeschooling parent or tutor serving the role of the 'proctor' (an indication that the education of the parent is an important factor).

Grant & Spencer (2003).

Elements of the PSI approach:

- Written text over lectures (textbooks and study guides). [We use video - for young kids who can't be expected to learn from text. Image slides, short videos, hopefully engaging ... could be broken up into even shorter videos or with interactive elements.]
- Clear indication of behavioural outcomes - what the students are expected to *do* in the unit.
- Unit MASTERY - no moving on until unit is mastered with a high grade (80-100%).
- Self-paced movement through the course, with chances to re-do failed quizzes until successful. Usually in an institutional setting there is a limit on the total time, e.g. a semester. In homeschooling this is not an issue - students can work at their own pace until they complete the material.
- Use of proctors to answer questions, help with learning the material, and provide feedback on quizzes. In homeschooling the parent performs this role.
- Lectures and demonstrations are not the main transmitter of concepts but are supplementary and motivational.
 - Lectures are the only element of PSI that have not been shown in research to improve student performance. Therefore they are optional and best used when the teacher is an exceptionally good lecturer.]

"If teaching methods do not matter, then why not allow students to work on their own in independent-study or distance education formats, which provide more convenience to students?" - This question will be increasingly asked with regards to homeschooling. As parents are increasingly able to meet children's educational needs without using traditional schools, the popular conception of the purpose of schools seems to be shifting. Do we send children to school so that they can learn to read, write, do math, and learn basic facts about the world? Or do we send them in order to force them to bond with a group of same-age peers and to be taught values that are endorsed by the wider society but not necessarily by all parents? If school exists for academic reasons then it may soon become obsolete.

Figure 19*Notes in Excel (Image 04d)*

Search Date	Search Term	Search Location	S	Search Result Name	Authors	In-text Citation	Submission/Date	Release/Public	Full Citation	Link/URI	Contact	Notes or quote	Notes or q.
2023-01-29	cognitive load theory	ChatGPT		John Sweller. He is one of the foremost experts on cognitive load theory and has written numerous articles and books on the topic, including "Cognitive Load Theory".	Paul Kirschner, John Sweller, and Richard Clark. These authors co-wrote the book "Efficiency in Learning: Evidence-Based Guidelines to Manage Cognitive Load".								
2023-01-29	emotional self-regulation for learning:	ChatGPT		Gross, J. J. (1996). The emerging field of emotion regulation: An integrative review. <i>Review of General Psychology</i> , 2(3), 271-299.	Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), <i>The development of emotion regulation and dysregulation</i> . Cambridge University Press.								
2023-01-29	emotional self-regulation in online, open, or	ChatGPT		Chen, W., Liang, Y., & Liang, Y. (2012). The effect of an online support group intervention on emotional self-regulation and social presence. <i>British Journal of Educational Psychology</i> , 83(1), 1-15.	Marttunen, M., & Paukku, M. (2015). Emotional regulation and e-learning: Students' experiences and support mechanisms. <i>Journal of Educational Technology Development</i> , 28(1), 1-15.								
	Social Presence Theory			Yoon, H. J., Lee, M. J., & Kim, Y. K. (2017). The effects of online learning support on emotional self-regulation and satisfaction in massive open online courses. <i>Journal of Educational Technology Development</i> , 30(1), 1-15.	Jay Howard Rheingold and Richard Garrett.								
	Community of Inquiry (CoI) theory			Schunk, D. H. (2017). <i>Learning theories: An educational perspective</i> . Routledge.									
	Online Self-Regulated Learning (OSRL) model.			Liu, Y., & Chen, W. (2015). The impact of online self-regulated learning strategy use on college students' learning performance. <i>Computers & Education</i> , 80, 1-15.	Chen, W., Liang, Y., & Li, Y. (2013). A meta-analysis of the relationship between online self-regulated learning and academic performance. <i>Journal of Educational Technology Development</i> , 26(1), 1-15.								

In terms of complexity of notes, digital notes may be very sophisticated (Figure 17), but also can be very simple (Figure 15). This shows that learners approach the task of taking notes differently: some not only take notes while reading but also create as a result a supplementary course material that reflects their personalized learning process and could be used later when needed. More simple notes serve a more immediate need to write something down to be used soon. Features of notes depend on the preferences of a person, a learning task, and digital literacy level of a learner as well as access to technology and ability to use it. All these attributes vary among participants.

Paper Notes

Paper notes often contain symbols, sometimes drawings or maps, underlining words to convey meaning is used often. Such notes are used to connect ideas to work-out the material, to make connections among ideas and highlight ideas in readings such as articles of paper textbooks that are relevant to the current task or to the future tasks (Figure 20, Figure 21, and Figure 22).

Figure 20

Paper Notes (Image 02p)

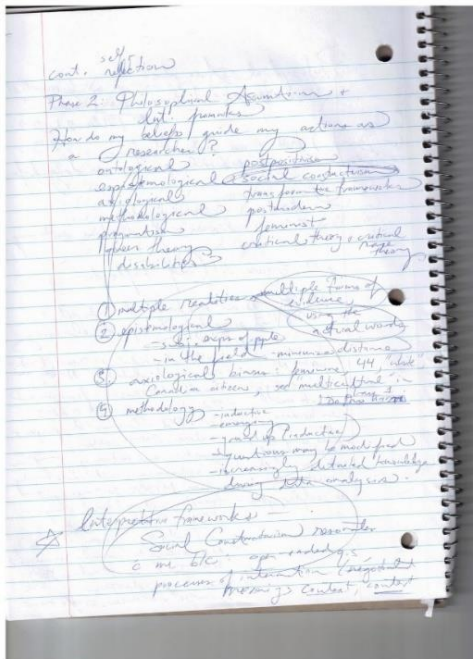


Figure 21

Paper Notes (Image 06p)

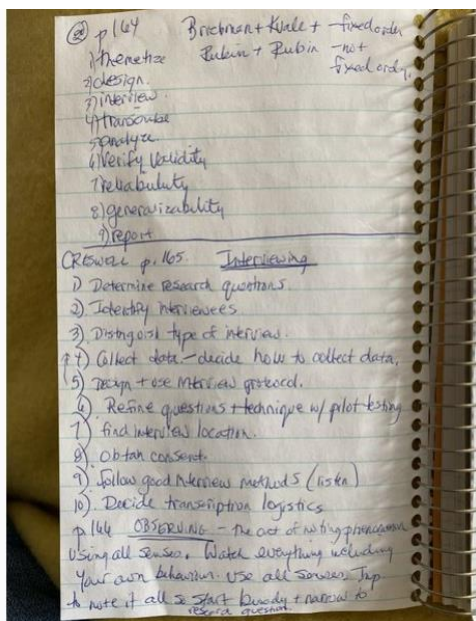
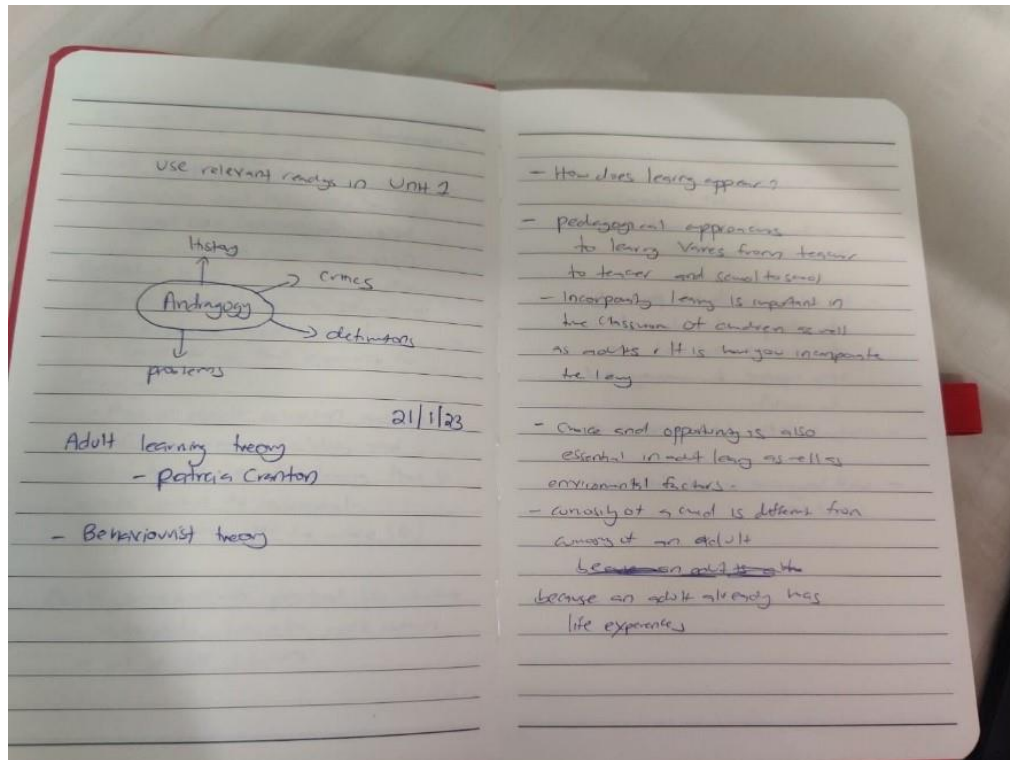


Figure 22

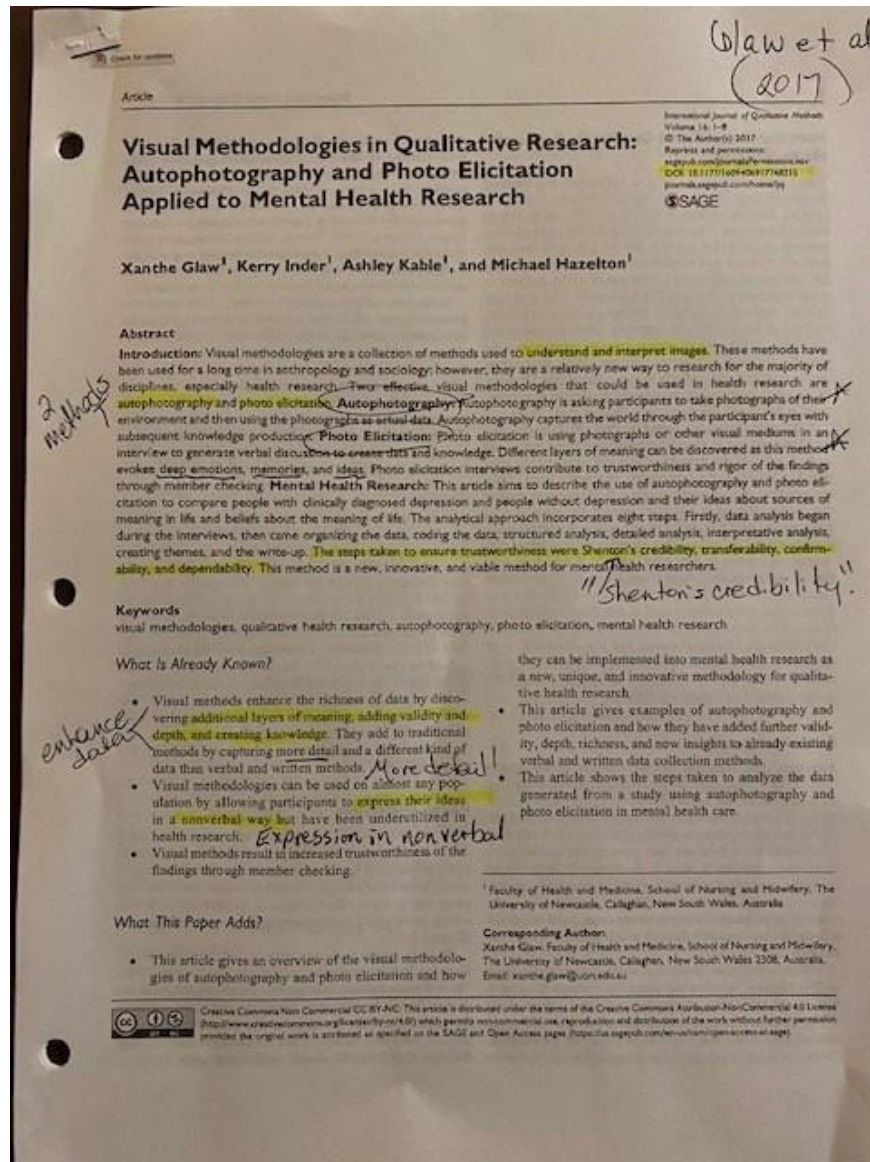
Paper Notes (Image 10p)



Notes taken with pen and paper on a printed article or in a paper textbook are often only a few words or shorter sentences. Such notes also contain highlighting and margin notes (Figure 23).

Figure 23

Paper Notes (Image 09p)



I infer that it takes some thinking and synthesizing of information, rather than just writing down everything. In most digital notes, we see a lot more content than in paper notes. So, technologies for note-taking affect learners' decisions on how to take notes and how to work with the learning material. Technologies may also provide some expectations about the length, number of details, and features of notes.

One participant explains that such very short notes serve as an “*indication of the main idea*” and a quick reminder of “*what was meaningful in that article*” (Participant 6). This learner uses notes to prompt memory quickly when looking at material later. When notes are taken on lined paper, they tend to be longer sentences with symbols like arrows and starts that are used to connect various parts of notes. Often such notes are messy because of making sense of the information and integrating ideas.

Another finding is that participants who take notes with pen and paper draw or doodle more, than those who take notes digitally (Figure 24 and Figure 25).

Figure 24

Drawing as a Margin Notes on Printed Article (Image 03p)

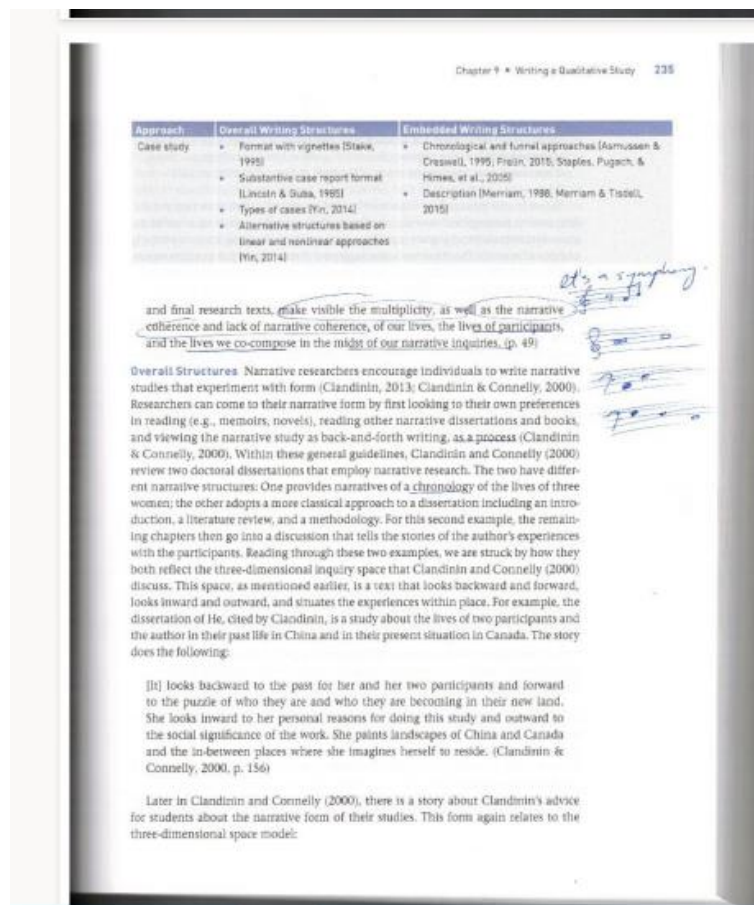
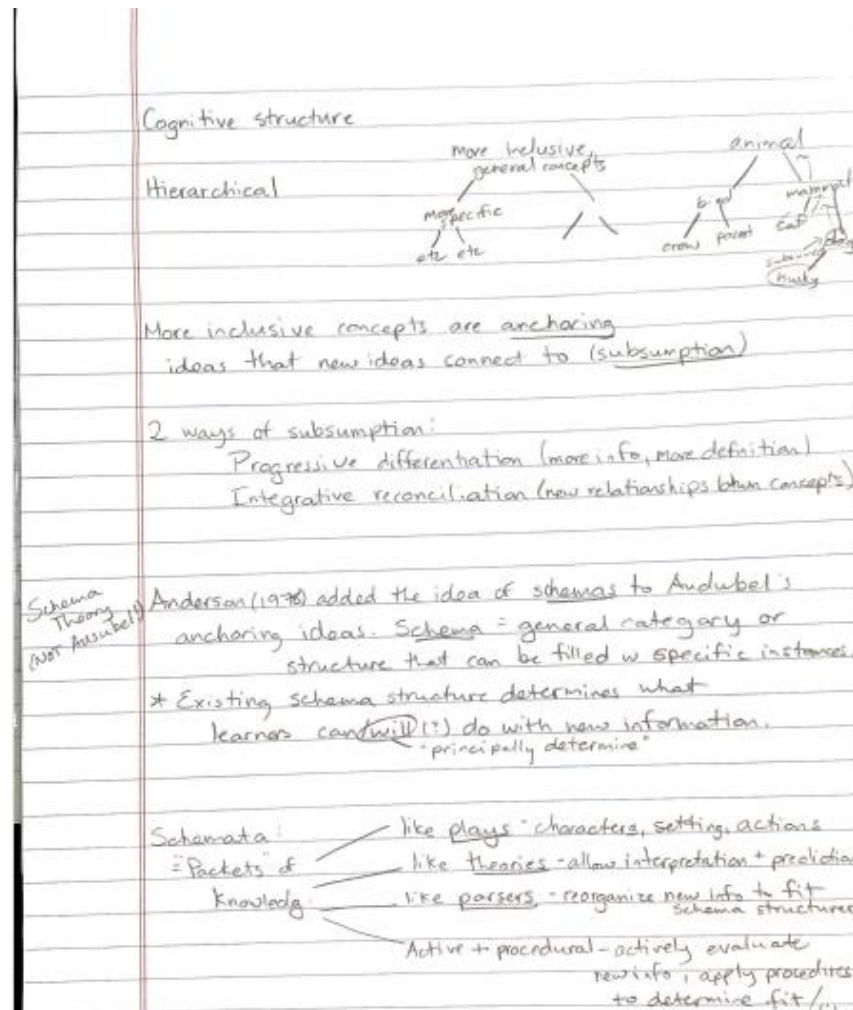


Figure 25

Paper Notes (Image 12p)



Participant 2 explains the reason for using drawing in her pen and paper notes:

Sometimes it's something that I want to remember or understand. So, there may be a metaphor in the text that suggests a picture to me.

Only a participant with an iPad draws in digital notes. Participant 4 shares:

Seeing that picture helps that concept to make sense to me so that I don't think I'll forget it now.

Figure 26

Digital Notes with iPad (Image 10d Part 3)

and spuriousness in relation to causal hypotheses.

-3rd unknown cause

ie. (about 10 children need to inform causes about all children) ie. (look at towns ; describe countries)

category mismatched

xyzy zxy

Explanation of phenomenon in terms of purpose of series instead of causal

3. Identify the differences and similarities of quantitative and qualitative methods in terms of the following:

- o Epistemology
- o Sampling in qualitative and quantitative designs.
- o Quantitative levels of measurement.
- o Validity and reliability in quantitative designs. *reliability = significance (either 95% or 99%)*
- o Verifiability and authenticity in qualitative designs.
- o Hypothesis and null hypothesis in quantitative designs. *Testable, precise & measurable*
- o Context in qualitative designs. *believe hypothesis is "false" unless significance proven*

sound, logical & info error (ie fallacy, spuriousness)

Population, Sample & Sampling

all the soup = population

one spoonful = 1 sample

more than 1 spoonful = sampling(s)

When taking notes on the note pad or lined paper, participants used black or blue ink (a pen that glides smoothly preferably) to take notes, and yellow highlighter is most often used with paper notes. Notes of some participants are messy (a display of a thinking process and connecting various ideas) and are to support the learning process. However, some participants like to take notes with a mechanical pencil so that they can use an eraser to correct mistakes and keep notes neat.

When making notes on printed material, notes are also short, and a yellow highlighter is used often. Yellow because it is easier to read what is written under it.

Notes on iPad

Interesting that participant who takes digital notes with an iPad believes that such a way of taking notes is a combination of both worlds: pen & paper and digital notes as iPad allows freedom to draw as you would do on paper, and freedom to easily move notes around in a document and link it to other resources and organize notes as part of a larger structure of course notes (Figure 26, Figure 27, and Figure 28). It is easy to add margin notes and use the same techniques as one would use when taking notes on paper. Plus, additional affordances of technologies including saving on the cloud.

Participant 4

I use my iPad. I even have a laptop, but I use my iPad exclusively, so there are certain apps I like that allow me to treat it like paper but with many enhancements that you cannot do on paper.

Figure 27

Digital Notes with iPad (Image 10d Part 2)

Introduction

This unit marks the transition from abstract discussions about the scope and nature of research to the technical details of conducting research procedures. Once a research question is identified and the concepts in the question are defined, decisions about sampling and measurement strategies are made. Details about procedures and alternatives are presented in this unit. In addition, the readings in this unit add further detail to the Research Process diagram presented earlier in the course.

The term data applies equally to information in the form of numbers and qualitative forms such as words, pictures, sounds, visual images, and objects. In light of this definition of data, consider the term "factual information." What counts as factual information will vary based on the knowledge paradigm in the research project. Neuman's discussion of the meanings of methodology identified the impact of varying knowledge paradigms that inform the research process.

Note: **Data** is plural, so we say, "these data are...." **Datum** is singular, so we say, "this datum is"

Consider how data must differ in order to stay aligned with beliefs about what counts as knowledge. Large amounts of data summarized into numbers require that we accept the idea that there is a shared universe of social reality that exists separate from the people who act in them. Numerical data and statistical analysis provide a highly abstracted template for understanding the general experiences of large numbers of people.

Qualitative data captures a different level of reality and is made up of elements much different than numbers. From the general to the particular, qualitative data creates a picture of lived experiences, interpretations, feelings, and meanings. While some data may overlap and describe similar situations, unique experiences are also identified and valued.

Note: There is a great deal of new terminology in this unit. Learning the meanings of these new terms will aid understanding.

Learning Outcomes

Upon completion of this unit, you should be able to

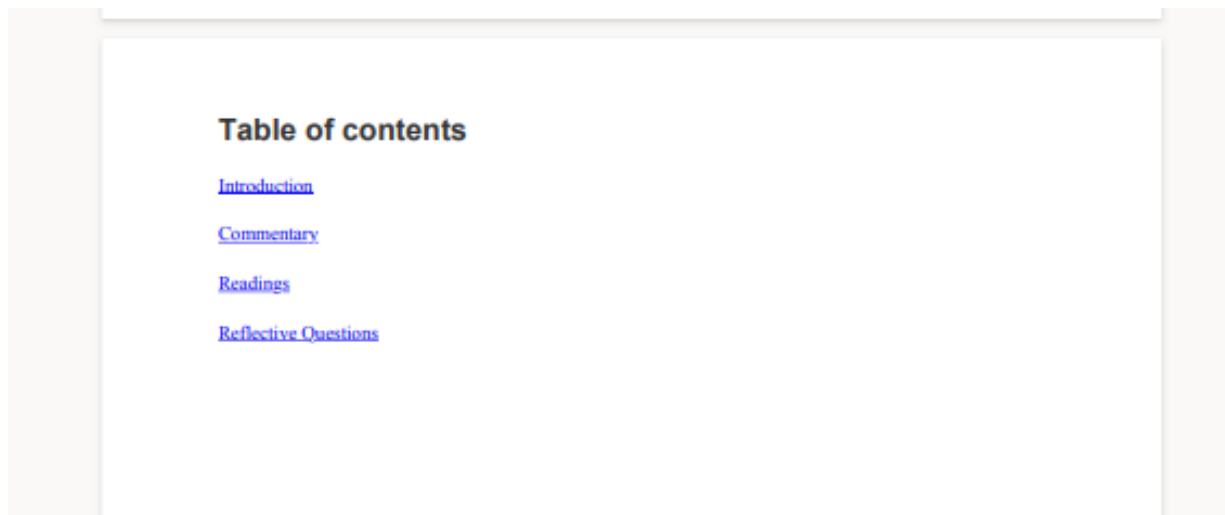
1. Discuss research design issues in the field of distance education.
2. Explain what is meant by units of analysis, ecological fallacy, reductionism, tautology, teleology, and spuriousness in relation to causal hypotheses.

Handwritten notes:

- faulty reasoning / argument (ie circular)
- category mismatched
- ie (about 10 children to infer all children) cause about
- ie (look at fruit to describe countries)
- 3rd unknown cause
- phenomenon in terms of purpose instead of
- explanation of
- teleology
- teleology

Figure 28

Digital Notes with iPad (Image 10d Part 1)



Apple pencil transforms taking notes: it is used as a pen, a pencil, a highlighter, an eraser, a ruler, and an enhancer (a person draws a vague circle and the device makes it a perfect circle). With more use Apple pen becomes transparent and all attention is on learning and taking notes. iPad is used for reading and for taking notes as well as for searching other resources if necessary. Also, it is a device to access online course content as well as a tool with many tools available through it, a connector to the cloud for storing information. It is also an enabler to study in bed at night. Once a person becomes accustomed to using an Apple pen, they become less and less aware of the device. They think less about how to use these tools and more about what they read and write.

An Apple Pencil may feel like an ordinary pen when holding it but feels different when writing with it on an iPad. The surface of an iPad is smooth and the pen glides on it with less effort than a pen or pencil on paper (Gerth et al., 2016). Also, when writing with a pen on paper, whatever you write stays there whereas with an Apple pencil, you can easily erase the text and

start again. Also, the research found that there are differences in the muscles that work and the way they work when writing with different tools (Vongjaturapat & Chotikakamthorn, 2022). Also, there are indications of potential lower energy consumption and lower health risks with digital handwriting technology (Vongjaturapat & Chotikakamthorn, 2022). Some participants in my study also mention that in the case of health issues with hands (e.g., carpal tunnel), it is less painful for them to type than to write with a physical pen on paper.

Notes with chatGPT

Another interesting aspect that arose from the interviews is the use of Artificial Intelligence (AI) powered tools and Generative AI such as chatGPT (<https://openai.com/>). Generative AI tools are not new, however, there are still a lot of unclear areas when it comes to using those tools in education. While higher-education institutions decide what to do about this technology, learners use it. Interestingly, at the time of the interviews being conducted in winter 2023, only one of eight participants was familiar with chatGPT, about three months after chatGPT was popularized in the mainstream media. ChatGPT was released on November 30, 2022 (<https://openai.com/blog/chatgpt>).

Halaweh (2023) discusses concerns related to text generation and ideas generation that usually are raised among educators. However, such a tool was used by the participant as extra support while studying the topic and as a source of additional resources and perspectives on the topic. The participant was amazed by the language abilities of the tool but recognized its limitations also. The tool was used as a support and possible brainstorming tool, not as a tool to give all the answers.

Participant 5

I was interested to see it because I've been playing with chatGPT. I was interested to see what kind of synthesis or summary it might have and compare it with what I found when I'm going through my library databases, right? And if it would produce any kind of new sources, I was using it a little bit like a very intelligent Internet search engine or very intelligent library database kind of system and very intelligent summarizer of existing research out there.

Figure 29

Sample Dialog with chatGPT (Image 01d)

Thank you. Can you tell me which authors or publications might be important for me to read and understand about cognitive load theory?

Cognitive load theory

is a widely studied theory in the field of education and instructional design, and there are several authors and publications that are considered important for understanding this theory. Some of the key authors and publications in this field include:

1. John Sweller: He is one of the foremost experts on cognitive load theory and has written numerous articles and books on the topic, including "Cognitive Load During Problem Solving: Effects on Learning" and "Instructional Design in Technical Areas."
2. Paul Kirschner, John Sweller, and Richard Clark: These authors co-wrote the book "Efficiency in Learning: Evidence-Based Guidelines to Manage Cognitive Load," which provides a comprehensive overview of cognitive load theory and its practical applications.

chat GPT
response

This participant uses chatGPT as a search tool for new resources and ideas that can be explored later and, in more detail, (Figure 29). The notes/conversations will be saved and may be used at any time. This example illustrates that generative AI can be used as a personal tutor or as a learning tool (Hwang & Chen, 2023). I think it can be also used as an agent that supports learning by providing additional channels for conversation which may be especially important for online

students. Some participants mentioned that they would like to have more synchronous interactions with peers and professors.

Participant 5

Now I know I can go back to this conversation, and I can look those up so I can look up the sources that chat GPT.

To conclude, visual research methodology allows us to explore images of notes shared by participants. Such analysis provided more insights into the world of note-taking in online learning and allowed us to see it through the eyes of the participants themselves because they chose those images for us to see. In general, notes with pen and paper and digital notes differ in several aspects:

- Usually notes on paper are more condensed and digital notes have more content in them.
- Often digital notes have features that allow easy search of notes, connection between parts of the same document, or links to other documents and resources.
- Digital notes often use copy & paste strategy for text passages, tables, or images.
- Notes on paper contain more drawings, diagrams, and margin notes.
- iPad seems to combine both worlds, paper and digital and allows a learner to benefit from both approaches and switch to either of them when needed.
- Some online learners use emerging technology tools such as Generative AI (e.g., chatGPT) to support their learning.

All in all, learners' decisions about what note-taking strategy to choose depend on the purpose of notes (for an assignment or pure learning) and are mediated by the technologies that learners have at hand and their knowledge of how to use all the features of such technologies for more efficient and effective note-taking and learning.

Conclusion

Technology is therefore no mere means. Technology is a way of revealing. If we give heed to this, then another whole realm for the essence of technology will open itself up to us. It is the realm of revealing, i.e. of truth. (Heidegger, 1977, p. 12)

Exploring online learners' note-taking habits and related technologies allowed me to glimpse into an online graduate student's life and showcase the interconnectedness of technologies that learners use for taking notes and online learning with the decisions they make about when, where, and how to take notes and approach their online programs.

The interview data and responses to the reflective exercise were analyzed. The analysis revealed three main themes within data:

- Being a human note-taker
- Being a user of technology
- Being an online learner.

Also, the participants' study environment and ethical considerations when taking notes were explored. The analysis shows that all participants are still figuring out what it means to be an online learner and what role technologies play in online learning even though all of them have some experience with online learning. Participants describe their study routine and emphasize that these activities should fit other responsibilities in life (e.g., full-time job, family, health-related issues). Often the affordances of the technologies that they use for studying and for taking notes support their varied and diverse needs. By adapting to new technologies and evolving as online learners during their online studies, participants learned the features of their preferred technologies to make learning comfortable and pleasant, and manageable even in unfavorable contexts for learning.

Also, the study revealed that all participants experienced an evolution of their note-taking practices to some extent when enrolled in online graduate programs. Initially, many participants used pen and paper, then with the development of understanding of what it means to be an online learner including finding the balance between school and other life commitments, what technologies are involved in learning, the availability and reliability of electronic devices, and embracing assistive technology many of them shifted to digital notes (partially or completely). The fact that their graduate online program does not have tests and exams and has only written assignments affected their choice of tools and strategies for taking study notes and approaching their courses. Many participants explain that they take notes to support their learning, make connections between ideas, and explore various topics. Participants enjoy taking notes because they have the freedom to take notes the way they like and to write down only what they think is relevant to the task at hand or what supports their understanding.

Many participants say that they use their notes for learning and never review their notes. However, some participants use their notes (digital or analog) as a form of external memory that they would use at a later stage in a task (for example, when writing their thesis). This use of notes eases the load on working memory (Boch & Piolat, 2005).

All participants mentioned that they were not taught how to take notes in an online program, so they faced the need to try and learn to take notes in online courses, develop their method, and select the tools for taking notes that meet their needs. However, participants have only partially become aware of their note-taking habits during their education; most of the time participants were focused on learning material and did not think about how they take notes and why. Only by doing an exercise when asked to take notes in two different ways, with analog

tools and digital tools, they reflected on the consequences and contradictions in their choices of note-taking strategies.

Also, I noticed that participants' reading preferences might affect the choice of note-taking strategy and tools. Many participants mentioned that the program has a lot of digital reading, that they read from a screen. However, some mentioned screen fatigue and their preferences to read from printed text. So, some participants go completely paperless, and some buy printed textbooks even when provided with digital textbooks. Also, it seems that preferences on where to read (on screen or paper) affect the choice of tools for note-taking. I observed that those who like to read from a computer screen take mostly digital notes. Those who like to read from paper tend to take paper notes but still take digital notes when working on an assignment.

All participants enjoy learning and see note-taking as an integral part of the learning process though taking notes is a highly personalized and individualized activity. To be successful in their online graduate studies, all participants believe it is very important to stay organized and motivated. Note-taking strategies they employ allow them to organize information, stay on track with all the required work, and monitor their study progress. The process and the product of taking notes support self-motivation and self-organization and often utilize several technologies at the same time. Concerning ethical use of note-taking and related technologies, all participants pay special attention to academic integrity and try and avoid plagiarism in their notes. However, sometimes they do not do proper citations because they believe that their notes are for their personal use only.

The study shows that note-taking is not only about recording and storing information. Note-taking for online learners is connected to their personality, their familiarity and comfort level with various technologies, and their out-of-school life. Technologies play an integral role in

note-taking activities and are often situated in the background but jump to learners' awareness when breaking down. Such occurrences tend to lead to adopting new technologies or adapting to new technologically mediated environments.

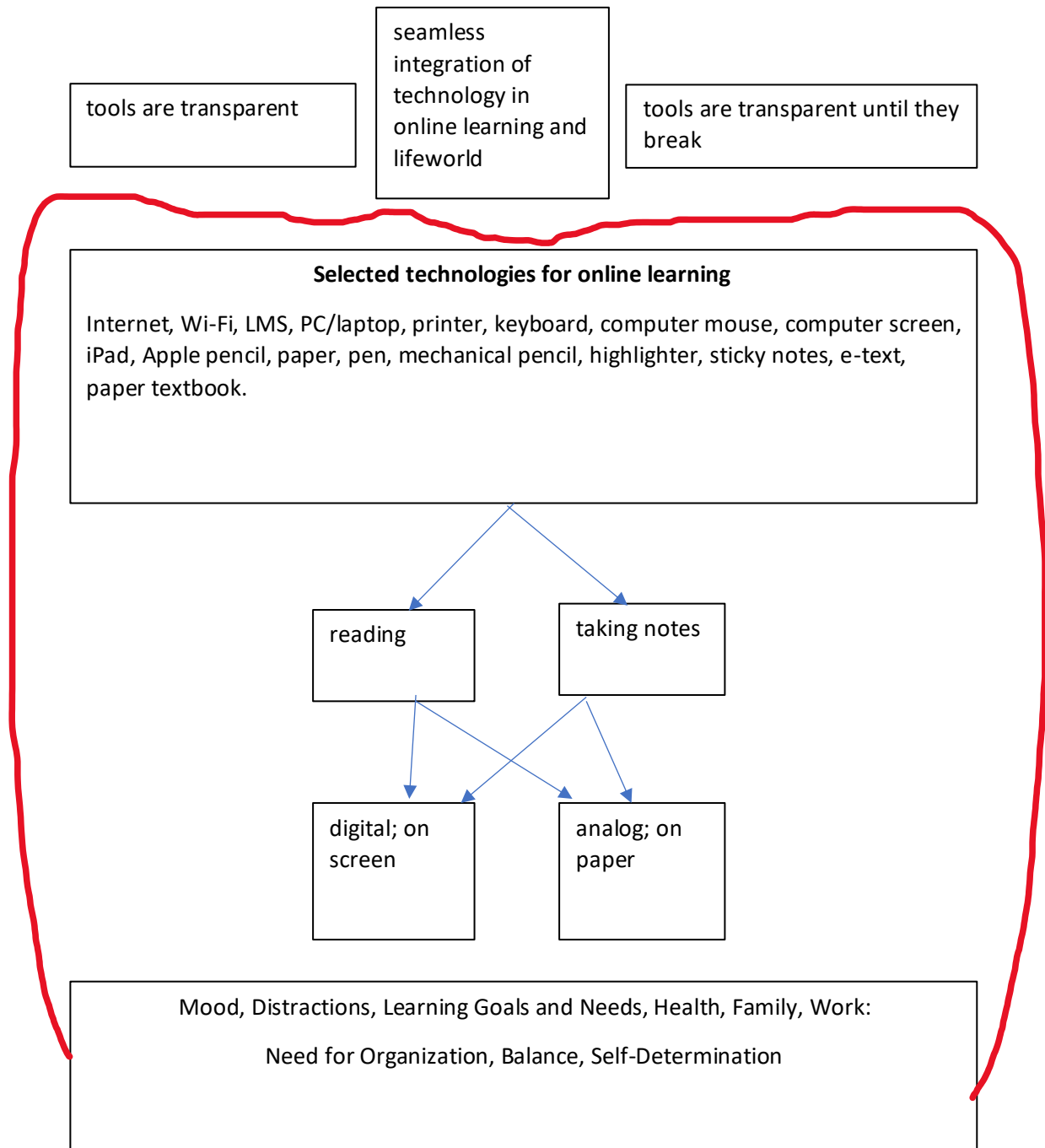
Chapter V – DISCUSSION

A postphenomenological approach to the exploration of note-taking habits and related technologies allows me to glimpse into the world of online students: how they take notes, how they approach learning, and how they live. According to Verbeek (2009), when people use technology, this technology starts to organize their lifeworld in a technologically mediated way, impacting their actions, decisions, and experiences.

Palmatier and Bennet (1974) found that for most students note-taking was a common practice but in the opinion of some students, it was not essential for learning success. In 2021, research paid attention to note-taking from the perspectives of evaluating notetaking technologies recognizing that note-taking is an essential academic skill and must be supported by teachers textbook authors and developers of learning systems (Kondo et al., 2021; Siegel, 2021). This study confirms that note-taking is a very common learning strategy for online graduate students and is essential for the learning process, academic success, and satisfaction. Also, the study discovered that all school-related activities for online learners are technology-mediated and interconnected with the lifeworld of learners (Figure 30). Participants take some human-technology-world relationship for granted (technologies are transparent for users). At the same time, participants are aware of some technologies and realize how they affect their decision-making process.

Figure 30

Mind Map of Discovered Himan-Technology Relationship in the Study



Together, the results of data analysis (Figure 30) paint a multidimensional understanding of online learners' study habits, note-taking strategies, and related technologies which confirm

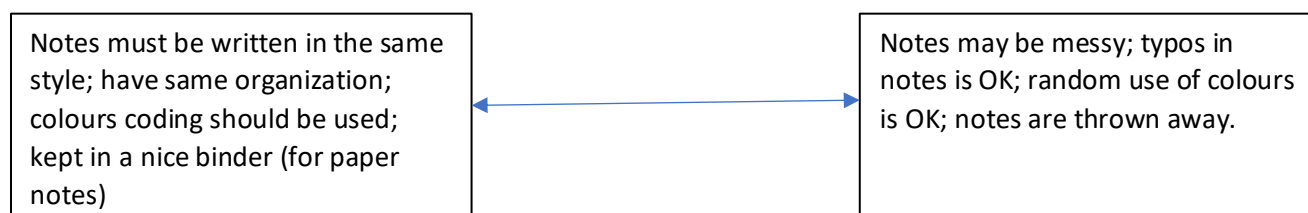
other research findings (e.g., Freo, 2022; Zhan, 2022). Note-taking in online learning is part of learning and is closely connected with technologies and is situated in all other aspects of learners' lifeworld.

The methodology is grounded in a method of data collection that allows participants to interrupt their usual study activities and make them reflect on their ways to approach online learning and ways to take notes for learning. Using interviews and image analysis I learned that taking notes was a natural way for participants to learn online and make sense of study materials and tasks. As one participant said: "It did not occur to me not to take notes" (Participant 7).

However, note-taking experiences vary among participants and depend on their preferred method and technologies used for taking notes and on their life circumstances and preferences. For example, the study revealed that quality, look, and way of storing notes vary from learner to learner (Figure 31).

Figure 31

Notes Quality/Look/Storage Continuum



This study illustrated that online learners are human, and emotions are part of their identity as learners and note-takers for learning. So, educators and instructional designers should consider all aspects of course design (including course materials, course activities, and course interactions) from such a lens as well in addition to their common practices. This finding is related to prior research on emotional presence in online courses (e.g., Telli et al, 2022; Yu et al., 2020). Emotions are considered important factors in successful online learning (Telli et al., 2022)

and emotional engagement also mediates the relationships between student-instructor, student-content interaction, and learning persistence in online learning environments. The study also confirmed that online learners use assistive technology. Hence, we need not forget the emotional aspect of such technologies. For example, humanizing text-to-speech, and adding emotions to the synthetic voices that support reading content may positively impact online learners' experiences (Hillaire et al., 2019).

Like the findings of Nakayama et al. (2014), I discovered that note-taking is a very personalized activity. Also, I discovered that all participants want to enjoy studying and taking notes, so they do everything they can to create conditions not only conducive to learning but also allowing them to enjoy the process. Such a finding fills the gap in prior research on note-taking since a lot of the existing research (e.g., Boch & Piolat, 2005; Kiewra et al., 1991; Nakayama et al., 2014; Shier, 2020) explores note-taking from an impersonal perspective not talking about learners who take notes as humans with emotions and personality. Interestingly, the relationships between learner emotions and their notes are of interest to educators when exploring the use and development of adaptive learning technologies (Taub et al., 2018). Researchers believe that it is worth exploring relationships among emotions, learning outcomes, and self-regulated learning in postsecondary education to develop better Intelligent Tutoring Systems (Cloude et al., 2021; Taub et al., 2018).

Digital note-taking appears to be a common practice among online learners utilized to various extent. Digital note-taking allows a learner to have strategic control over the whole understanding activity when reading course materials. It is easy to spatially organize and re-organize information on a page. This way it is easier to build conceptual links between pieces of

material. This, in turn, will make stronger connections between the information being received and that already stored in a learner's long-term memory (Boch & Piolat, 2005).

This study revealed that participants mostly take notes on reading materials, as this is a recommended practice as part of the program. Even though many post-secondary education institutions provide support to learners with tips for both digital and analog note-taking strategies (University of Saskatchewan Library, 2022; University of Washington, 2022; University of Waterloo, n.d.; University of York, 2022), none of the participants mentioned using a specific note-taking practice, for example, Cornell notes (Pauk & Owens, 2010). A reason for these findings may be that I did not ask specifically what note-taking techniques participants used during the data collection process. However, one participant reported that they would appreciate the training on the best practices in note-taking at the start of the program because they did not know any note-taking techniques.

All participants view note-taking as an individual activity and do not do collaborative note-taking. However, research shows that using technology for collaborative note-taking as well as supporting collaborative note-taking by scaffolding the process may support online learners and increase engagement and collaboration among them (Costley & Fanguy, 2021; Fang et al., 2021).

It seems that the way participants take notes is affected by the affordances of the technologies they use. Participants who use iPads or take paper notes draw in their notes more often than those who take notes on a laptop or PC. Also, the area of study (graduate study in humanities and education) may suggest taking more text notes in comparison for example medical studies where it may be more natural or beneficial to take visual notes (Courneya & Cox, 2020). Taking notes as text may be not only related to the way they were taught to take

notes in previous education but also to the different neural activities when typing and writing. The physical sensation of a tool (embodiment) is different when using a pen and a keyboard. When young adults use a pen (analog or digital) to take notes, such a tool leads to sensory-motor integration due to the larger involvement of senses as well as activates the areas of the brain that are responsible for encoding information and memory, therefore providing optimal conditions for learning (Askvik et al., 2020).

The findings of this study support the complex theory of adult learning as self-determined and grounded in socio-economic situations (Knowles, 1960, 1970; Mukhalalati & Taylor, 2019). Also, technologies online learners use are not neutral tools but affect how learners behave in the world. The study confirms that note-taking is a complex learning activity that requires several cognitive operations as well as metacognitive knowledge about these operations and the ability to consciously manage the note-taking activity as a whole. Note-taking habits for all participants have evolved to some extent when starting learning in an online graduate program. Learning to take notes takes time (Boch & Piolat, 2005).

Postphenomenology is also concerned with ethical issues related to technology (Verbeek, 2023). One of the aspects related to the ethical use of technologies and the lifeworld of their users is digital well-being. Burr et al. (2020) define digital well-being as the “impact of digital technologies on what it means to live a life that is good for a human being” (p. 2313). As this study demonstrated, the technologies online learners use to take notes and access their online study environment are not neutral, they affect the choices students make about their study approaches and the larger environment, and life around them also influence their choices and limit their freedom. Well-being is a crucial part of everyone’s life and technology affects and influences this well-being. Note-taking is a personal activity, closely connected to the emotions

of learners and their inner and outer world. So, individual and social well-being is closely connected to the technologies that mediate our interaction with the world.

Burr et al. (2020) identified three main themes in the literature related to digital well-being: positive computing, personalized human–computer interaction, and autonomy and self-determination. In this study, we can apply these themes to the social domain of education. We will not discuss positive computing here as it concerns the design of technologies that promote well-being. However as we see here the design capabilities of various technologies for taking notes and accessing the online learning environments affect the choices online learners make, for example, the places they choose to work on their courses. Autonomy is about the interactions between human users and digital technologies that seek to learn about user’s preferences and cater to them. I think this autonomy theme is closely related to the question of agency discussed in postphenomenology (Rosenberger, 2014) as well as in actor-network theory (Latour, 1992, 1994).

Concerning well-being, freedom to choose and self-determination is understood as an intrinsic good. As I saw in this study there are some aspects of online learning and technologies in which learners have agency and freedom to choose, and some aspects that online learners do not have agency in. For example, the Learning Management System, the file format for assignment submission, and the textbooks (digital or paper) are the areas where learners have no agency. However, the way and the technologies to choose when making notes and the ways and technologies they choose when reading course materials online learners can choose.

We need to keep in mind though that still their choices might be limited by technologies that they have access to and more broadly their socio-economic status which affects the learning environment and technologies (digital and analog) that learners can afford to buy. As Verbeek

(2009) noted technologies do not have agency and intentionality in themselves but when humans use technology in technologically mediated situations, the agency becomes distributed among humans and nonhumans. To conclude, autonomy is one of the basic psychological needs in addition to competence and relatedness of a person (according to a self-determination theory (Ryan & Deci, 2017)) which needs to be satisfied so that an individual experiences well-being and a sense of integrity.

All in all, this study supports the prior research conclusion that “learning happens anywhere, anytime, and it is the learners’ needs that matter, not learning defined and bound by so-called authorities (Blaschke et al., 2021, p. 7).

Conclusion

The study explored the experiences of online learners with note-taking and using various technologies. Note-taking is one of the very important skills and strategies for learning that impacts academic success and knowledge acquisition and retention. To describe what note-taking means for online students and how technologies mediate online learners’ lifeworld a postphenomenological approach was used. Considering the focus of this study, postphenomenology will allow us to explore the lived experiences of online students as well as the intertwined relationship between human and technology.

This study explored the experiences with note-taking by collecting data from graduate students in an online Canadian University. Online students rely on technology to get access to education. Since online learning is here to stay, the importance of understanding the habits of successful online learning experiences is very important for both educators and students. This study helps us understand not only the role of traditional and digital note-taking in online learning environments, but also how various technologies that online students have access to

mediate their relationship with the world and impact decision-making processes about school-related activities and balancing school, family, and work commitments.

The findings of this study extend our understanding of how online graduate students use technology for learning and taking notes and what note-taking means for online students. Also, the study sheds light on how the choice of technology tools may affect study habits, alter the study approach, and affect the self-efficacy of online learners. The findings will be useful for instructional designers to support course development, educators to support students in learning effective study strategies and designing warm and inviting learning climate in their courses, and learners to become expert learners.

We experience things technologically; technology modifies both what and how we experience the world (Ihde, 2006). The study revealed that online graduate learners experience note-taking for learning, places to study, and school-related activities through technologies, with their affordances and limitations. In addition, by doing this study, I learned not to generalize about learners' experiences in online learning and their note-taking habits; I learned that every learner is unique and has unique online learning experiences and unique human-technology-world relationships.

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Appendix A: Consent Form

Note-Taking Habits of Online Learners: A Postphenomenological Approach

November 23, 2022

Principal Investigator (Researcher):

Supervisor:

Elena Chudaeva, echudaeva1@learn.athabasca.ca Dr. Levina Yuen, cyuen@athabasca.ca

About the Study: You are invited to participate in a research study about the note-taking habits of distance education students. The purpose of this research is to explore the perceptions of online students and their note-taking habits and related technology use. I am conducting this study as a requirement to complete my Master of Distance Education at Athabasca University.

Study Procedures: As a participant, you will be asked to take part in one-to-one online interviews with the researcher, which will be video and audio recorded for data transcription and analysis purposes. The interviews will help us understand the phenomenon of note-taking as distance education students experience it. Following the first interview, you will also be asked to take part in three guided reflective activities on your own time. These reflective activities will involve note-taking in different scenarios (e.g., using pen and paper, electronic device), and then reflecting on this process using the open-ended questions provided. This may also involve capturing images, audio/video, or other materials as it relates to your note-taking process.

Overall, your time commitment to this study will be as follows:

- Online Interview I with the Researcher (up to 1 hour)
- Three Reflective Activities (up to 3 hours total, on your own time)
- Online Interview II with the Researcher (up to 1 hour)

TOTAL: 5 hours maximum

Benefits and Risks: This study will benefit you as a learner by allowing you to explore how you learn and your study habits by taking notes for learning. There is no identified risk in addition to the everyday risk in doing this interview. Involvement in this study is entirely voluntary and you may refuse to answer any questions or to share information that you are not comfortable sharing. You may withdraw from the study at any moment. At this point, your permission will be asked about using the data collected up to that point.

Withdrawing from the Study: The transcripts of the interview will be sent to you for review within 5 business days after the interview, with your permission. You will have 1 week to provide comments, clarifications, or request to have your data withdrawn from the study.

Dissemination of Results: All data collected from this study will be anonymized prior to the reporting of aggregate or individual findings. The study abstract and final research paper will be available online via Athabasca University Library's *Digital Thesis and Project Room*.

If you have any questions about this study or require further information, please contact Elena Chudaeva or Dr. Levina Yuen using the contact information above.

This project has been reviewed by the Athabasca University Research Ethics Board. Should you have any comments or concerns about your treatment as a participant, the research, or ethical review processes, please contact the Research Ethics Officer by e-mail at rebsec@athabascau.ca or by telephone at 780.213.2033.

Thank you for your assistance with this project.

Consent

I have read the Letter of Information regarding this research study, and all of my questions have been answered to my satisfaction. I will keep a copy of this letter for my records.

My signature below confirms that:

I understand that:

- This study is for use as part of the Principal Investigator's Master's degree requirements.
- The confidentiality of my participation is assured. My name will never appear in any results. Only the student and the student's research supervisor will see my responses.
- I understand that the data I provide will be anonymized and that the data set from this project will be deposited in the Athabasca University OneDrive password-protected account of the Primary Investigator.
- I am giving my consent to participate in this study when I answer questions during an interview.
- My interview will be recorded (audio and video). The interview will be transcribed and used for data analysis.
- I understand that I am free to withdraw my participation in the research project without having to give a reason and that doing so will not affect me now, or in the future.
- I understand that if I choose to end your participation during data collection, any data collected from you up to that point will be destroyed unless I give permission to use it in the study.
- I understand that if I choose to withdraw after data collection has ended, my data can be removed from the project at my request, up to 2 weeks after the last interview.

- I am aware that I may contact the researcher, research supervisor, or Research Ethics Officer if I have any questions, concerns, or complaints about the research procedures or ethical approval processes.

	YES	NO
I agree to be audio-recorded	<input type="radio"/>	<input type="radio"/>
I agree to be video recorded	<input type="radio"/>	<input type="radio"/>
I agree to the use of direct quotations (my identity will be anonymized)	<input type="radio"/>	<input type="radio"/>
I allow my real name to be identified in any publications resulting from this project	<input type="radio"/>	<input type="radio"/>
I allow the alias (not a real name) that I choose (to maintain anonymity) to be identified in any publications resulting from this project	<input type="radio"/>	<input type="radio"/>
I allow the images and/or videos of my work to be used in the dissemination of the study results	<input type="radio"/>	<input type="radio"/>
I am willing to be contacted following the interview to verify that my comments are accurately reflected in the transcript.	<input type="radio"/>	<input type="radio"/>

Your signature confirms:

- You have read what this research project is about and understood the risks and benefits.
- You have had time to think about participating in the project and had the opportunity to ask questions and have those questions answered to your satisfaction.
- You understand that participating in the project is entirely voluntary and that you may end your participation at any time without any penalty or negative consequences.
- You have been given a copy of this Informed Consent form for your records; and
- You agree to participate in this research project.

I have read and understood the information, and I agree to participate in the study, on the understanding that I may refuse to answer certain questions, and I may withdraw during the data collection period.

Full Name (Please print/type):

Signature:

Please sign and return this form to Elena by email: echudaeva1@athabasca.edu

Thank you for your participation in this study.

By initialing the statement(s) below,

_____ **I would like to receive a copy of the results of this research study by e-mail.**

e-mail address:

If you are willing to have the researcher, contact you later by e-mail for a brief conversation to confirm that I have accurately understood your comments in the interview, please indicate so below. You will not be contacted for more than six months after your interview.

_____ **Yes, I would be willing to be contacted.**

Principal Investigator's Signature:

I have explained this project to the best of my ability. I invited questions and responded to any that were asked. I believe that the participant fully understands what is involved in participating in the research project, and any potential risks and that he or she has freely chosen to participate.

Signature of Principal Investigator

Date

Appendix B: Interview Questions

Note-Taking Habits of Online Learners: A Postphenomenological Approach

Interview I

Duration: 60 minutes.

Interview I will seek to answer the following general questions:

What have you experienced in terms of the phenomena?

What contexts or situations have typically influenced or affected your experience of the phenomena?

Participants will be asked the following questions:

Demographic Information

1. What is your age range?
 - 20 – 29
 - 30 – 39
 - 40 – 49
 - 50 – 59
 - 60 - 69
2. What is your gender? (to identify any gender differences)
 - Female
 - Male
 - Non-binary/third gender
 - Prefer to self-describe

- Transgender
 - Cisgender
 - Agender
 - Genderqueer
 - A gender not listed
 - Prefer not to answer
3. How many year(s) of Study in Post-Secondary Education do you have? (to get a better sense of how long they have been in higher education)
 1. How many years of study in an online program do you have? (to determine their familiarity with online courses)

Conceptualization

1. Think of a time when you took notes for learning in your program and describe that in as much detail as possible.
2. Tell me about the ways you take notes for learning.
3. Tell me about your typical way to study in the program.
4. How would you describe the experience of taking-notes?

Apprehending the phenomenon

5. Tell me about what you do when you decide to make notes.
6. Tell me how you decide what tool to use to take notes.
7. Tell me what you do with the notes.
8. If you wanted to teach me how to take notes, what would you tell me?
9. What, if any, are ethical questions that maybe related to your note-taking process?

Interview II

Duration: 60 minutes.

Clarifying the phenomenon

Interview II will be conducted with the goal of clarifying the phenomenon of note-taking and results of the preliminary analysis of data collected during interview I, the reflective exercise, and the images of participants' notes.

Questions adapted from

- Roulston, K. (2010). *Reflective interviewing*. Sage
- Bevan, M., T. (2014). A method of phenomenological interviewing. *Qualitative Health Research*, 24(1), 136-144. DOI: 10.1177/1049732313519710

Appendix C: Interview Procedures

Note-Taking Habits of Online Learners: A Postphenomenological Approach

I followed the procedures for preparing and conducting interviews Creswell & Poth (2018) suggested.

Interview I

Questions to be answered during the interview I are in Appendix B.

Before the interview, Elena will explain what the study is about, its purpose and data collection tools.

Elena will inform the participant that the transcript and the recording of this interview will be stored in AU (Athabasca University) MS Teams for 60 days, then the files (MS recordings and transcripts) will be stored in the password-protected Elena's account provided by AU till her graduation. Data collected will be stored in Elena's password-protected personal device for 5 years.

Elena will inform the participant that the transcript and recording will be used for data analysis purposes in this study only. And Elena may contact participants later via email to check her interpretations and understanding of the collected data.

Elena will tell a participant before the interview that they can choose not to answer any question if they might feel uncomfortable answering.

Interview II

Elena will ask a participant to orally confirm their consent to participate in this interview.

Before the interview starts, Elena will remind the participant that the transcript and the recording of this interview will be stored in AU MS Teams for 60 days, then the files (MS recordings and transcripts) will be stored in the password-protected Elena's account provided by AU till her graduation. Data collected will be stored in Elena's password-protected personal device for 5 years.

Elena will remind the participant that the transcript and recording will be used for data analysis purposes in this study only. And Elena may contact participants later via email to check her interpretations and understanding of the collected data.

Elena will tell a participant before the interview that they can choose not to answer any question if they might feel uncomfortable answering.

Questions to be answered during the interview II are in Appendix B.

Interviewees: graduate students from MDE program, Athabasca University.

Mode of interview: online via MS Teams. Interviews will be recorded (video or audio, and transcripts if available). Interview protocol (see Appendix D) was designed.

Next step, refining interview questions and procedures through pilot testing, was omitted in this assignment.

Locating a distraction-free place for the interview: in our case an online video call on day and time preferred by an interviewee.

Consent was obtained before the interview by signing a consent form (see Appendix A).

Good interview procedures were followed during an interview:

- stay within the study boundaries you have reviewed,
- use the protocol to guide your questions,
- complete the interview within the time specified,
- be respectful and courteous,
- offer a few questions and advice.

The following decisions about transcriptions will be made:

- During the interview MS Teams captioning will be used. Then the transcripts will be checked and corrected manually by the interviewer.
- Decisions here need to be made about verbal cues and extraneous words and utterances (e.g., “hmm”). These cues and extraneous words will be then converted into words/phrases that describe the emotional response or the implicit meaning of the context in which they were exhibited by an interviewee.

Recognizing that the interviewee may not always respond directly to the questions being asked, an interviewer is prepared to make notes during the interview.

Memorize questions and provide verbal transitions from one question to another.

Thank the interviewee at the end.

Appendix D: Sample Interview Protocol

Note-Taking Habits of Online Learners: A Postphenomenological Approach

Time of interview: 11am – 11: 25am

Date: February 4, 2022

Place: via MS Teams

Interviewer: Elena

Interviewee: Sara

Position of interviewee: MDDE student

Description of the study

The purpose of the study is to explore the experiences with note-taking as a learning strategy of graduate students. This is a qualitative research study following a phenomenological approach. Phenomenologists are interested in lived experiences of individuals and seek to describe the common meaning of a phenomenon. In this case, the phenomenon under study is note-taking.

The central question that guides this study will be:

What is the meaning of note-taking for graduate students in a distance education program at a Canadian online university?

Phenomenon-oriented subquestions:

- *What role does note-taking play in studying?*

- *What is difficult or easy when taking notes?*
- *What factors affect the choice of tools for note-taking?*
- *To what extent are students aware of or intentional about their own note-taking habits?*

Context-oriented subquestions:

- *What are the learning situations in which students employ note-taking?*
- *What processes are involved in note-taking?*
- *How did students first become aware of their note-taking habits?*

To collect qualitative data, the following questions will be asked during the interview I.

Questions for interview I are in Appendix B. Interview II will be conducted with the goal to clarify interview I preliminary findings and explain the images of notes.

The responses to these questions will be recorded with the permission of the participant. A consent form will be signed before the interview. An interviewer will say thank you to the individual for participating in this interview and assured her of confidentiality of responses and potential future interviews.

Appendix E: Reflective Exercise Instructions

Note-Taking Habits of Online Learners: A Postphenomenological Approach

Dear Participant,

Please follow these instructions while doing the reflective activity.

This exercise has three parts:

Part 1: answering questions;

Part 2: taking notes by hand with pen and paper and answering questions;

Part 3: taking notes using electronic devices and answering questions.

Choose a course that you are currently taking and need to learn new material. Spend 1 hour reading or watching course materials and taking notes for each part of the exercise. While taking notes or right after you finish learning, answer the following questions, and include as many details as possible.

Then send the document and sample of your work (image of handwritten notes and screenshot of notes on an electronic device) by email to Elena.

No individual responses will be revealed, just the aggregate results.

Your images will be shared only with your written permission. See the image release form.

Reflective Exercise

Part 1

Why does note-taking matter?

Spend about 10 minutes using the questions below to think about your experience of note-taking on your current course(s). Write down your thoughts.

- a. **What?** Make a quick list of ideas you have needed to study recently.
- b. **Where?** Where do you do learning-related activities? How good are these place(s)? Why? Why not?
- c. **When?** When do you study (what time of the day/night/week)? How long do you spend reading/watching? How do you know if you are spending too little time or taking too long? Does it matter? Are there any distractions?
- d. **How?** Think about the last couple of things you read or watched in your course. How did you study the material? Think about what you do before, during and after a piece of reading or a video? How do you decide if it's necessary to take notes? What do your notes look like?

Why takes notes? Why do you take notes?

How do you decide what tool to use or what type of notes to take (for example, by hand, images with a smartphone, draw, or create a map)?

Part 2

Taking notes with pen and paper

Choose a section of the course that you will be studying. Prepare the tools that you will be using.

What did you prepare for taking notes? Why?

Start learning the material and take notes for 1 hour. Then answer the questions.

Look back at your notes. What do they look like?

Are they good notes? How do you know?

What will you do with your notes afterwards?

How do you feel about learning by taking notes?

What was hard or easy about taking notes?

Are you comfortable taking notes by hand? Why?

What have you learned about the way you learn by taking notes?

What is note-taking?

Part 3***Taking notes with an electronic device***

Choose a section of the course that you will be studying. Prepare the tools that you will be using.

What did you prepare for taking notes? Why?

Start learning the material and take notes for 1 hour. Then answer the questions.

Look back at your notes. What do they look like?

Are they good notes? How do you know?

What will you do with your notes afterwards?

How do you feel about learning by taking notes?

What was hard or easy about taking notes?

Are you comfortable taking notes by hand? Why?

What have you learned about the way you learn by taking notes?

What is note-taking?

Send the document with answers and images of your work to Elena by email. Also, attach a signed release form if you give Elena permissions to use your images in her thesis.

Thank you very much for participating in this study.

Note: The questions were adapted from Bates, D. (2000a). *Student Toolkit 4*. The Open University.

Image Release Form

Elena Chudaeva has my permission to use images of my notes publicly to include them as part of her research on note-taking. I understand that the images may be used in print publications, online publications, presentations, and websites. I also understand that no royalty, fee, or other compensation shall become payable to me by reason of such use.

Signature: _____ Date: _____

Name: _____

Appendix F: Image Codes

Note-Taking Habits of Online Learners: A Postphenomenological Approach

According to Rose (2007),

The coding categories used must have several characteristics regardless of their status as descriptive or interpretive, however. They must be

- Exhaustive – every aspect of the image with which the research is concerned must be covered by one category;
- Exclusive – categories must not overlap;
- Enlightening – must produce breakdown of imagery that will be analytically interesting and coherent.

These are the combined codes that were created both for notes on paper and digital notes:

1. Notes are short (a few words per line or a few phrases per paragraph)
2. Notes are long (long sentences, many sentences in a paragraph)
3. Notes are part of a big document/notepad/binder for the whole course
4. Notes are for a particular topic or article or chapter
5. Notes are text/words
6. Handwritten notes (can be on paper or digital)
7. Notes contain headings
8. Notes contain hyperlinks
9. Notes are in bullet form
10. Notes are a numbered list

11. Date of notetaking is present
12. Highlighting is used (mostly yellow, sometimes pink, or light blue)
13. Bold font is used
14. Default font is used
15. Preferred font is used (e.g., looks like handwriting or not black)
16. Additional colour is used for some notes (additional colour to main notes colour)
17. Images (copy & paste) are present in notes
18. References to source material are present (e.g., page numbers, title)
19. Quotes are present
20. Name of a course is present
21. Table of content is present
22. Some words are underlined
23. Some words are circled
24. Some words are in rectangular boxes
25. Some words are in cloud shaped boxes
26. Margin notes are present
27. Symbols are used (stars, arrows, small numbers in circles above some words in text)
28. Drawings are present (done by a participant)
29. Diagrams are present (done by a participant)
30. Lines notebook is used
31. Main notes are black (black pen is used for paper or black font)
32. Main notes are blue (blue pen is used for paper or blue font)
33. Mechanical pencil is used

34. Pen is used
35. Page number is present
36. Notes are messy
37. Notes are nice (looks good and not messy)
38. All capital letters
39. Participant's questions or comments
40. Title is present
41. Typed text (participant typed words/text)

Additional codes

Sticky notes are used in a textbook on paper

Notes as MS Excel file

Strikethrough is used (for text notes)

These codes were used to code all artifacts and the analysis was done in an Excel file.

Appendix G

CERTIFICATION OF ETHICAL APPROVAL - RENEWAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

Ethics File No.: 24944

Principal Investigator:

Mrs. Elena Chudaeva, Graduate Student
Faculty of Humanities & Social Sciences/Master of Education in Open, Digital, and Distance Education (MDDE)

Supervisor/Project Team:

Dr. Levina Yuen (Supervisor)

Project Title:

Note-taking Habits of Online Learners: A Postphenomenological Approach

Effective Date: June 12, 2023

Expiry Date: June 11, 2024

Restrictions:

Any modification/amendment to the approved research must be submitted to the AUREB for approval prior to proceeding.

Any adverse event or incidental findings must be reported to the AUREB as soon as possible, for review.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

An Ethics Final Report must be submitted when the research is complete (*i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable)*) or the research is terminated.

Approved by:

Date: June 12, 2023

Paul Jerry, Chair
Athabasca University Research Ethics Board

CERTIFICATION OF ETHICAL APPROVAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

Ethics File No.: 24944

Principal Investigator:

Mrs. Elena Chudaeva, Graduate Student
Faculty of Humanities & Social Sciences\Master of Education in Open, Digital, and Distance Education (MDDE)

Supervisor/Project Team:

Dr. Levina Yuen (Supervisor)

Project Title:

Note-taking Habits of Online Learners: A Postphenomenological Approach

Effective Date: October 20, 2022

Expiry Date: October 19, 2023

Restrictions:

Any modification/amendment to the approved research must be submitted to the AUREB for approval prior to proceeding.

Any adverse event or incidental findings must be reported to the AUREB as soon as possible, for review.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

An Ethics Final Report must be submitted when the research is complete (*i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable)*) or the research is terminated.

Approved by:

Date: October 21, 2022

Katie MacDonald, Chair
Faculty of Humanities & Social Sciences, Departmental Ethics Review Committee