Steinerhøyskolen

Master Thesis

Acquiring basic literacy and numeracy:

make it tangible, personable and personal.

Gabriela Scholter

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No man is an island,
Entire of itself;
Every man is a piece of the continent,
A part of the main…
John Donne [1572-1631]

To all the parents who have entrusted their children to me over the course of many years, I owe you a profound debt of gratitude. It started in the kindergarten and continues in my private practice today. Having been privileged to accompany all your children, I was eventually able to identify certain similar phenomena, leading to the research topic I have chosen here.
The journey was long, interesting and enlightening.
New perspectives, new thoughts, new ideas,
I am grateful

To everyone at Steinerhøyskolen,
you created a place and a time for this to happen.
I am grateful

To my dear Mother,
You witnessed but the beginning of the journey…
your support for it was unwavering.
I am grateful

To all those who accompanied my journey – family and friends,
I am grateful

To my interview partners, your contributions are invaluable.
I could not have done this without you.
I am grateful

To Manya Kagan, you supported my writing, nudging me
towards doing better than I could have ever done without your suggestions.
I am grateful

Abstract

This qualitative research study with a phenomenological approach explores the efficacy of creative processes, like clay work, drawing, painting, building models or other 3-D activities in supporting the acquisition of the alphabet, reading, writing and basic arithmetic. I explore the research on different ways pf conceptualization and the effect of such differences on learning. Semi-structured interviews with five teachers from four different schools elicit a range of different approaches and methods. Stories teachers recount concerning the variety of such methods and the attained results underscore the importance of using methods of teaching in alignment with individual students' thinking and learning styles. I start by describing the methods as well as my positionality. A review of pertinent literature concerning teaching and learning strategies follows, and subsequently extensive discussion of the data and the findings. I close with an evaluation of the study, its limitations and implications for future research.

The following research questions are the guide for the study:
1. Do creative processes, like clay work, drawing, painting, building models or other 3-D activities support the acquisition of the alphabet, reading, writing and basic arithmetic?
2. Do such methods support the retention of these skills?

The purpose of this research is two-fold:
1. Explore efficacy of creativity in the teaching of basic literacy and numeracy.
2. Enrich our understanding of differing strategies that may later inform recommendations for greater diversity in methods of teaching, including embodied learning and the use of didactic material in 3-D.

The findings may be the basis for further studies and recommendations regarding the actualization of didactic material, and enrich our understanding of how such material might evolve. As such, the study argues for the increased use of creative methods. Findings indicate that learning with a range of different types of material is enjoyable, which in turn could enhance retention.

Contents

Chapter 1: Pestalozzi, an early visionary in education

One of early visionary pedagogues was Johann Heinrich Pestalozzi. He spent a significant part of his life talking and writing about teaching and learning. One of the books he wrote was "How Gertrude teaches her children: An attempt to help mothers to teach their own children and an account of the method" (1820, translation Bardeen, 1898). This book is the basis for the famous 'head, heart and hands' quotation, which is oft repeated like a mantra. It was written to support mothers in teaching their own children and rapidly became a book teachers read. He starts by telling mothers to observe their children, "… in order to *know*, you must, in many cases, *keep passive*; you can only see and hear" (Pestalozzi, 1898, p. 278). In other words, observe the child, get to know it well through observation. Then you may ask yourself the following:

> How can the child, considering the nature of his disposition, and the changeableness of his circumstances and relations, be so trained that whatever is demanded of him in the course of his life by necessity and duty may be easy to him, and may if possible become second nature to him? (Pestalozzi, 1898, p. 281)

This is a central question – and he poses it to the mother, the mother who loves the child. She will facilitate the learning in a way that is easy for the child to grasp because she loves the child. "The primary law... is this: the first instruction of the child should never be the business of the head or of the reason; it should always be the business of the senses, of the heart..." (Pestalozzi, 1898, p. 294). The beginning of the learning path is the heart, the loving engagement with the world by the senses. When this has been practiced, it is time to engage the feelings that arise through the senses, using the heart. Only then is it time to engage the head, to think about what was previously only observed.

> The second law, that follows it, is this: human education goes on slowly from the exercise of the senses to the exercise of the judgement. It is for a long time the business of the *heart*, before it is the business of the *reason*. (Pestalozzi, 1898, p. 294)

As the child develops, having engaged all the senses and experienced the feelings that arise thereby, it will eventually be time to think about what has previously been observed, time for the head to participate. The process is a delicate one, that must be accompanied carefully. "The necessity of great care for the psychological manner of

developing and cultivating our powers of doing as well as the psychological training for the development of our power of knowing, is obvious" (Pestalozzi, 1898, p. 280). Being gentle and loving, progressing slowly and carefully, is essential for learning. He suggests that this process takes time: "human education goes on slowly from the exercise of the senses to the exercise of the judgement. It is for a long time the business of the *heart*, before it is the business of the *reason*" (Pestalozzi, 1898 p. 294). The teacher – here the mother – accompanies the process, facilitates experiences. It is the teacher who guides the process, which starts with feelings, with the heart, continues on with reflecting, thinking about what was experienced by the senses and only then progresses to doing, using the head to direct the hands.

1.1 My path

All children, even when quite young, want to experience new things, want to learn. As a kindergarten teacher, I was able to observe this in all of the children in my care, and there were many in the course of about 20 years. It was magical to see them finding out about something like gravity, as they built various structures in the room, out of wooden supports and big, colored cloths. Discovering new things is part of kindergarten. Watching me peel an apple for them, keeping the peel intact and turning it into a continuous spiral charmed children who had always refused to eat unpeeled apples but now wanted to eat the pretty spiral, discovering it was delicious. Climbing into a tree and looking down… thus experiencing heights and again, potentially gravity if slipping a bit, was another amazing way to learn more. Learning to knit helped develop fine finger motions for writing and logical sequencing, because knitting is a predetermined sequence of small actions that needs to be respected in order to experience success. Listening to the same story for many days in a row helped develop good speech patterns and an attention span that lengthened significantly within the time they were students in the kindergarten.

All of this practical learning, done so joyfully, helped create a good foundation for my students' more formal learning in school, for learning the alphabet, learning to read and learning to do arithmetic. Many of the children came back to see us if the kindergarten was open on days when there was no school. Many of them were happy with school, proudly showing that they were already reading and writing words, even doing small sums.

Unfortunately, this was not true for all of them. In the course of my time in the kindergarten, I discovered that an ever-increasing number of former students were actually starting to be unhappy with school. For them, reading, writing and arithmetic were turning out to be very hard to do, perhaps even seeming to be impossible. Hearing about this more and more often in the course of those years was sad. This was what eventually led me to Steinerhøyskolen and a Master in Educational Research.

1.2 Choice of topic

During all the kindergarten years, one question never went away: what happens between kindergarten and school to change some of the happy, inquisitive children into sad little ones, who soon realize learning to read and write, or maybe learning how to do arithmetic, is not working out. It was not a question of motivation. All children I have ever met want to learn new things all the time. As I researched ideas to help my former students and read more about students who were struggling, I found a book that contained a description of dyslexia. "Dyslexia is primarily a language-learning deficit. It was most evident for me in my inability to spell, read, and speak the English language, the primary purpose of the educational systems into which I was thrust" (Schmitt & Clemens, 1994, p. 118). This was a very new idea for me, and explained much of what I was seeing: children, whom I had known for years, who were excited about going to school, who were motivated to learn to read, and who were now struggling. They were overwhelmed by the task of making any kind of sense out of alphabet letters, let alone written words. This was not about laziness. They were working hard, wanting to succeed, but were already significantly behind their peers after two months in school. Inexplicably, their teachers' initial reaction was usually that these students simply needed to work a little harder.

I knew these students had been highly motivated when they started school, and I had first-hand knowledge of the fact that they had been adept at many of the practical activities we had cultivated during the time in kindergarten. These children, who had excelled at the projects in kindergarten, were failing to learn the alphabet, let alone reading, in first grade. We had sewn, knitted, done woodwork, and of course, watercolor painting on a regular basis. All this had been quite easy for them. I was aware of the strengths these students had. Their failure to

learn to read at the same rate as their peers was a mystery. There had to be a reason however. In the foreword to McGuinness, Pinker posits:

> Language is a human instinct, but written language is not. Language is found in all societies, present and past… All healthy children master their own language without lessons or corrections. … Compare all this with writing. Writing systems have been invented a small number of times in history… Until recently, most children never learned to read or write; even with today's universal education, many children struggle and fail. … Children are wired for sound, but print is an optional accessory that must be painstakingly bolted on. This basic fact about human nature should be the starting point for any discussion of how to teach our children to read and write. (Pinker, in McGuinness, 1997)

Notwithstanding the idea of printed language being optional, the ability to read and write correctly is an invaluable skill and many children do learn to read quite easily. What hinders the ones who do not? Reading requires knowing the alphabet. It also requires knowing how written speech looks, how it is spelled. The third aspect is how it sounds when spoken. If one of these elements is missing, reading is very hard or not possible, and working harder does not seem to help. As Marina points out, "it is relevant for teachers to be aware that dyslexia is not a problem related to laziness or lack of motivation, neither to a low level of intelligence" (2015, p. 74). Considering the many students who struggle and work hard, without significantly ameliorating their ability to read, there has to be a better way of attaining literacy.

The search for a simple definition elicited the following, "Dyslexia is a product of thought and a special way of reacting to the feeling of confusion" (Davis, 1997, p.8). Could the integration of the ideas of both Pinker and Davis inform a change or addition to teaching strategies in elementary school? I envisaged finding something that was interesting and easy for all students to do, using the creative abilities I had been observing in those who often later struggled at school. Inexorably, this quest led to the following research questions.

1.3 Research questions

RQ 1. Do creative processes, like clay work, drawing and painting, building models or other 3-D activities support the acquisition of the alphabet, reading, writing and basic arithmetic?

RQ 2. Do such processes support the retention of these skills?

1.4 Methods

Jonker explains methodology as the way in which researchers conduct their research, defining a research question and the research design (2009, p.v). For this thesis, the method is qualitative research. Willig describes such research as focused on meaning and on understanding experiences. (2012, p. 5)

> Qualitative research is primarily concerned with meaning. Qualitative researchers are interested in subjectivity and experience. They want to understand better what their research participants' experiences are like, what they mean to them, how they talk about them, and how they make sense of them. (Willig, 2012, p. 5)

Stories of personal experiences recounted by teachers facilitate the exploration of the efficacy of their daily work. I suggest such stories are well suited to accurately reflect their methods of teaching.

For my research regarding the potential of creativity in addressing learning problems related to dyslexia and dyscalculia, I adopt a phenomenological approach. "Phenomenology is a form of qualitative research that focuses on the study of an individual's lived experiences within the world" (Neubauer et al., 2019, p. 90). I consider a study that looks at the personal experiences of individual teachers, who have been using various different methods, could inform changes to elementary school teaching, specifically new ways of teaching how to read, write and do basic arithmetic.

> Phenomenological methods are particularly effective at bringing to the fore the experiences and perceptions of individuals from their own perspectives, and therefore at challenging structural or normative assumptions. Adding an interpretive dimension to phenomenological research, enabling it to be used as the basis for practical theory, allows it to inform, support or challenge policy and action. (Lester, 1999, p.1)

Teachers are the ones working with the students, and I propose that they are well positioned to recount specific teaching strategies and the observed effects on learning for their students. I interviewed teachers who work with a variety of different students and methods. They were happy to recount such methods and how they affect the learning of their students.

Interviewing allows for spontaneous comments by the participants, appropriate for my research based on phenomenology. This method "assumes that knowledge is rooted in

experience" (Savin-Baden & Major, 2012, p.223). Since my goal was in line with "intentionally gaining understanding of the lived experiences of others" (Savin-Baden & Major, 2012, p.223), I determined this as a good path for what I was hoping to discover: if or how expanding methods of classroom instruction by including visual and kinesthetic methods would affect the learning and retention of such instruction for all students.

I posit here that teachers are the people best situated to comment on the efficacy of specific teaching methods. Reading about possibly unusual methods of teaching might inspire other teachers to try different approaches. They are the ones that live the stories about teaching and learning, and they recount them. In the end, all we have are stories and methods of finding and using those stories. "Knowledge, then, is experiences and stories. Intelligence is the apt use of experience, and the creation and telling of stories. Memory is memory for stories, and the major processes of memory are the creation, storage, and retrieval of stories" (Schank & Abelson, 1995, p. 8). Stories are what I was told when I interviewed teachers. Not one of them offered purely theoretical ideas. Everything they said was couched in a story.

Orland-Barak and Maskit suggest that what we know in education comes from recounting educational experience (2017). "Story and narrative have long been commonly promoted methodologies in teacher education and teacher development courses. As they tell their stories of lived experiences, teachers create meaning and construct understandings of their professional identities" (Orland-Barak & Maskit, 2017, p. 11). Hence, the personal experiences of teachers are an important element for the determination of the efficacy of different teaching approaches. "The goal of gathering…qualitative data is to examine how individuals can perceive the world from different vantage points" *(APA Dictionary of Psychology*, 2023). Talking with different teachers from different schools about their students and methods of teaching yielded a spectrum of such methods.

Phenomenology was therefore an excellent fit for my qualitative research about discovering new methods of teaching and learning. "Phenomenology does not explain, but rather it creates understanding among the set of observers and observed. In this sense, it is not a research procedure but a means of cocreation that makes public and manageable the lived experience" (Bentz & Shapiro, 1998, p.100). Lived experiences of teachers were what I hoped to hear about by interviewing teachers for the study. Some of them were already aware of differing

modes of thinking, producing a variety of perceptions Awareness of differing modes of perception may be a contributing factor for successfully teaching individual students. This possibility informed the following interview guide.

1.4.1 Interview guide

1. I am interested in hearing about how you teach students who are starting to learn the alphabet and to read, or learning to do arithmetic. Do you use any creative, hands-on activities or methods to support their learning these skills? If yes, could you share with me some of what you do with students?
2. In your experience, do such creative activities contribute to students' learning? If so, what have you observed about such learning?
3. How do such creative activities contribute to the overall success of your students' retention of what they are taught?

These were the original questions. Some of the individual interviews elicited more that the participants wanted to add or that I was interested in hearing more about, and the conversation expanded accordingly.

1.5 Positionality statement

Teaching students who are learning the alphabet, learning to read, write or do simple arithmetic is something I did for a short time during my training as a Waldorf teacher. I went on to teach kindergarten. In a Waldorf setting this usually does not include the teaching of basic literacy. For more than 20 years, I have been working with students in private practice as a trained facilitator for dyslexia and dyscalculia. Most of the students come with a diagnosis made by a child psychologist. I have absolved more than 350 hours of specialized courses for this work. Positionality "reflects the position that the researcher has chosen to adopt within a given research study" (Savin-Baden & Major, 2012 p.71). Given my life experience, my positionality can only be that of an *insider.*

> This insider role status frequently allows researchers more rapid and more complete acceptance by their participants. Therefore, participants are typically more open with researchers so that there may be a greater depth to the data gathered...the core ingredient is not insider or outsider status but an ability to be open, authentic, honest, deeply interested in the experience of one's research participants, and committed to accurately and adequately representing their

> experience. (Dwyer & Buckle, 2009, p. 57)

For interviews with teachers, I perceived my positionality as an asset. This was significantly the case when we were talking about students who acquire the alphabet substantially later than first or perhaps second grade. It was easy to follow the explanations and realize the importance of what was described. Nonetheless, it is quite possible that my perception of positionality was not shared by all the interview partners, as I refrained from commenting as much as possible, striving to create an interaction that was as neutral as possible to facilitate their candid storytelling.

> While a researcher might have the illusion of being an insider, that sentiment might not be shared by participants. Contemplating researcher insider–outsider positioning is an essential investigator attribute, as it can enhance rapport with the participants and lead to more thorough findings. (Bukamal, 2022, p. 346)

I perceive my research, specifically the literature review, to at least partially reflect my insider positionality. Here too, this may be an asset, as my knowledge of dyslexia and dyscalculia facilitated the choice of research to be studied. I will point this out appropriately in this thesis.

1.6 Epistemology

My epistemological approach is phenomenological, which Willig describes as descriptive and interpretative, with the researcher as a facilitator whose goal is to understand something in a world filled with diverse experiences (2012, p. 10). She indicates that "the researcher aspires to capture something that exists in the world, namely, the participants' feelings, thoughts, and perceptions—that is, their experiences" (Willig, 2012, p.11). What I am looking for in this thesis are teachers' perceptions and thoughts about their didactic methods. I am interested in hearing how effectively the methods chosen promote successful learning, and how students react to the application of such methods.

Chapter 2: Literature review

In this study, I focus on learning as a process, not as the result of something, As such, it takes place in time, and there can be different ways of achieving it. I adopt Ambrose et al's definition: "Learning is a process, not a product. …this process takes place in the mind…is not something done to students but rather something students themselves do…" (Ambrose et al., 2010, p. 3). I look at the ways creative processes in instructional learning used by the teachers I interviewed might support learning in general, including students who struggle with learning. Learning for all students has been a goal of education for a long time. In 1818, Thomas Jefferson was already promoting the following:

> A system of general instruction, which shall reach every description of our citizens, from the richest to the poorest, as it was the earliest, so will it be the latest, of all the public concerns in which I shall permit myself to take an interest. (*Extract From Thomas Jefferson to Joseph C. Cabell, 14 Jan. 1818 [Quote] | Jefferson Quotes & Family Letters*, n.d.)

Some 200 years later, the question whether this has been realized remains open.

2.1 Conceptual framework

When we look at phenomena, wanting to understand what we are seeing, we choose certain ideas with which to examine what we are observing. In this section, I define vocabulary used in this study to describe difficulties students might encounter in the acquisition of basic skills like learning the alphabet, reading, spelling and basic arithmetic. I also discuss vocabulary that serves to explain and clarify learning and thinking strategies, and provide contextual definitions. To facilitate the use of specialized vocabulary, I introduce such vocabulary here, providing definitions. Starting in section 2.2 this vocabulary is used in context to examine not only the difficulties students might encounter but also what might be contributing factors to such difficulties.

I focus here on the experiences of teachers who realize one of the important elements of learning is curiosity. It fosters the desire to learn the alphabet, to write, read, and learn arithmetic skills. Concepts chosen to explain and clarify the difficulties struggling students might encounter include the following:

Dyscalculia: "a specific and persistent difficulty in understanding numbers" (British Dyslexia

Association, retrieved 11 May 24).

Dyslexia: "any of various reading disorders associated with difficulty decoding written language and integrating auditory and visual information, such as the association of phonemes with letter combinations in spelling" (Dictionary.com | Meanings & Definitions of English Words, 2021).

Learning-styles: Visual**:** "…a visually dominant learner absorbs and retains information better when pictures, diagrams, and charts are presented to them" (Subia et al., 2019, p.432). Auditory**:** "An auditory-dominant learner prefers listening to what is presented to him or her and responds best to voices in a lecture or group discussion" (Subia et al., 2019, p.432). Kinesthetic**:** "…a kinesthetic-dominant learner prefers the physical experience or hands-on approach" (Subia et al., 2019, p.432).

Masking:

> It is often the case that a students' strength may mask a weakness, and vise-versa. A child who has a high vocabulary and very strong auditory skills for instance, may master content in the classroom very quickly. However, if that same child struggles with a learning disability that affects his/her reading, academic output may not match conceptual understanding. This can cause the child to appear average, or even below average in terms of actual classroom achievement. (Cannaday, 2017, p. 220)

Twice-exceptional: "The term "twice-exceptional… is used to describe gifted children who have the characteristics of gifted students with the potential for high achievement and give evidence of one or more disabilities" (*Twice Exceptional Learners (2E) | GT Equity*, retrieved 11 May 24).

Concepts that serve to explain and clarify learning include

Competence: "possession of required skill, knowledge, qualification, or capacity" (Dictionary.com | Meanings & Definitions of English Words, 2021).

Comprehension: "capacity of the mind to perceive and understand; power to grasp ideas; ability to know" (Comprehension, 2024).

Creative teaching: "At its best, creative teaching focuses on finding new ways to 'make learning visible', promote inquiry, engage learners and nurture their own creativity and stretch their capacity to develop original and high-quality work" (Collard & Looney, 2014, p.4).

Embodied learning: "refers to pedagogical approaches that focus on the non-mental factors involved in learning, and that signal the importance of the body and feelings" (Paniagua & Istance, 2018, p. 117).
Visual learning: "Visual learning is defined as the assimilation of information from visual formats" (Raiyn, 2016, p. 115).
Visual thinking: "Visual-spatial learners are individuals who think in pictures rather than in words" (Aini et al., 2020, p.3).

The concepts defined above will be revisited in-depth in section 2.2 of the literature review.

I focus here on the experiences of teachers who facilitate learning the alphabet, writing, reading, and arithmetic skills by employing creative processes. Among others, this might be rhythmical activities to aid in the learning of the times tables and clay work to support learning the alphabet. Curiosity could also be a factor of learning. "Curiosity … is best predicted by a learner's estimate of their current knowledge … Learning is best predicted by both curiosity and an objective measure of knowledge" (Wade & Kidd, 2019, p. 1377). Being curious about anything is a good foundation for wanting to know more about it. Davis identifies curiosity is the basis of knowledge (1997). He considers that "Curiosity is more important than knowledge. … Curiosity is the dynamic force behind creativity. Without creativity, mankind would still be living in caves" (Davis, 1997, p.106). In light of this, awakening students' curiosity could lead to their being creative and "creativity is the means by which real learning takes place" (Davis, 1997, p.107). Encouraging students to be creative with subjects we want them to learn, using various mediums to be so, physically doing something rather than just thinking about it, could therefore sponsor mastery. "Mastering something is really learning it" (Davis, 1997, p.111). If we have truly mastered something, forgetting it is inconceivable.

Learning from teachers about different ways of teaching with creative processes, hearing what they observed because of such processes, could provide insights into the opportunities and challenges of this educational approach. Conceivably, this might serve to initiate a change in didactic practices in elementary schools.

2.2 Review of literature informing the concepts

This chapter discusses personal difficulties students may encounter with regard to learning. It is also concerned with theoretical and relevant research concerning different thinking styles and learning styles along with various different teaching strategies that may cater to such differences. I provide an overview of teaching styles for basic skills like reading, writing and basic arithmetic, while considering how creative methods of learning could contribute to the overall success of all the students.

> In order to achieve the ultimate goal of student learning it is important to use a combination of teaching methods and to make the classroom environment as stimulating and interactive as possible. Students learn in many different ways. Some students are visual learners, while others are auditory or kinesthetic learners. Visual learners learn visually by means of charts, graphs, and pictures. Auditory learners learn by listening to lectures and reading. Kinesthetic learners learn by doing. (Gilakjani, 2011, p.105)

There are different ways of learning. One is auditory, using speech. Students who are auditory thinkers and learners profit from being instructed verbally, listening to explanations, listening to lectures, being asked to contribute verbally to a lesson and reading pertinent material in textbooks. Another possibility is visual, using charts, graphs, pictures. Students who are visual thinkers learn best when teaching methods supply pertinent visuals, enhancing what is taught verbally or by reading assigned texts. A third method is kinesthetic, learning by using creative activity, with students actively engaged, using their hands, perhaps their whole bodies, to create representations of what is being taught, be it by drawing, painting, modeling or actively building or creating something in 3-D. We will explore all three.

2.2.1 Dyscalculia, Dyslexia, Twice-exceptional, and Masking

There are students who struggle with certain subjects but excel at others. They have long been encouraged to apply themselves, to pay attention, and work harder. Our perception of them is starting to change however. “Gifted children with learning disabilities are known as twice-exceptional” (Hamzić & Bećirović (2021, p.13). They are exceptional because they excel in some areas of learning, exceptional again because they struggle in others. A failure in arithmetic might be compensated with excellent grades in other subjects. A student could thereby achieve an acceptable grade point average. This might mask the problems with arithmetic. However, the discrepancy between the high and low grades could alert teachers

and parents to the fact that the student might experience dyscalculia and might benefit from a visual or kinesthetic approach for learning basic math facts.

There could also be students who excel at arithmetic, science and perhaps music, but struggle for years with reading and writing. These students might be dyslexic, have a visual thinking style and be easily confused by words whose meaning cannot be visualized. Cannady suggests these students may be able to achieve a certain amount of success in school by depending on the good grades in the subjects that are easy for them to compensate for near failure in others (2017). If teachers do not question the possibly great discrepancy of the performance in some subjects relative to others, students will not receive additional help where they need it. “The masking effect allows twice exceptional students to sit in the regular education classroom indefinitely, without receiving support for or even identification of either their disabilities or their gifts” (Cannaday, 2017, p. 220). Taking into account the frequently outstanding performance in some subjects, the experience of frustration with, or near failure at other subjects might be alleviated by different didactic approaches, empowering students to learn what previously seemed illusive.

2.2.2 Comprehension, Creativity, Visual Learning and Visual Thinking

Many of us can surely remember school days that were filled with verbal instruction, reading of textbooks, and subsequent tests. As Macedonia points out, students “sit, watch, listen, and write” at school (2019, p.1). The process relies on students’ ability to read at grade-level, understand verbal instruction easily, memorize facts that can be recalled, whether they are understood or not, and have the ability to document such knowledge by getting good grades. Freire calls this the “banking process” (1970). He points to a system of learning that requires the students to simply absorb what the teacher imparts, demonstrating the completion of the process through repeating back what was deposited, which, denuded of comprehension, requires memorization. (1970)

> Education thus becomes an act of depositing, in which the students are the depositories and the teacher is the depositor. Instead of communicating, the teacher issues communiques and makes deposits, which the students patiently receive, memorize, and repeat. This is the “banking” concept of education, in which the scope of action allowed to the students extends only as far as receiving, filing, and storing the deposits. (Freire, 1970, p. 72)

This model of teaching makes no allowances for thinking about or questioning content, with students treated as receptacles for what the teacher recounts. It ignores comprehension, considering the teacher to know and the student to memorize. “In the banking concept of education, knowledge is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing” (Freire, 1970, p. 72).

If students are simply required to absorb transmitted information and repeat it back there will be no possibility of knowing if such information actually becomes acquired knowledge that might subsequently be useful. Real knowledge however is a process, not an end-result, and it is produced by comprehension. The more it is useful, the more it will be used, serving to enhance the lives of those who have acquired it. Freire may not have considered learning styles, but he envisaged real learning, learning which creates knowledge: “Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other” (Freire, 1970, p. 72). Such learning might be supported through the introduction of creative processes in teaching, encouraging students to create models, pictures, or other representations of what is to be understood and learned, reaching all students, regardless of learning style.

2.3 Teaching and Learning

There are models of teaching and learning that are centered on the interests of the student. Yánez-Moretta and Loaiza-Ramírez contend that the motivation of the students, their personal interests, needs to be a factor in their learning for it to be successful (2023).

> …it is very important that in the formal teaching-learning process the individual interests of the students are taken into account, take advantage of them as motivating elements, making them consciously contact their interests and learn to develop academic activities that cover or satisfy them. (Yánez-Moretta & Loaiza-Ramírez, 2023, p.5)

This perception of learning and teaching focuses on the abilities and interests of the individual student and promotes innovative thinking about teaching and learning. It facilitates comprehension, which is the basis for competence.

Henry Barnes talks about the Waldorf School curriculum, another way of schooling altogether. He points out that students comprehend and retain better if a subject is presented by a method that relates to the students' own bodies, with movement, recitation, perhaps drawing or painting (1991). "When children relate what they learn to their own experience, they are interested and alive, and what they learn becomes their own" (Barnes, 1991, p.52). Examples of such experiences of embodied learning could be as simple as clapping to underscore the rhythm of a poem, drawing or painting a picture to depict content from a lesson, creating a model of something to clarify details.

The purpose of a lesson is exposure to, and comprehension of, something that may not have been known previously. Barnes suggests that students who are allowed to move during lessons, who are offered creative activities such as painting, drama and movement to clarify or support understanding of the content, more easily understand the material presented (1991). Subject matter learned visually, kinesthetically and verbally becomes part of the students' lived experience. It becomes part of each student and is retained better than something that is merely read or heard.

> Students who have worked throughout their education with color and form; with tone, drama, and speech; with eurythmy as an art of bodily movement; with clay, wood, fiber, metal, charcoal and ink, (and, ideally, with soil and plant in a school gardening program), have not only worked creatively to activate, clarify, and strengthen their emotions, but have carried thought and feeling down into the practical exercise of the will. (Barnes, 1991, p. 54)

Learning with creativity, by using movement for example, or 3-D representation, painting, drawing and perhaps even theater productions, seems to support understanding and retention of the ideas presented. "Results suggest a direct causal link between drama-based instruction and improved reading comprehension" (Rose et al., 2000, p.55).Using drama to physically experience the content to be learned provides an embodied learning experience and facilitates improved reading comprehension.

Learning arithmetic with movement and rhythm supports the learning and retention of counting and learning the times tables.

> Counting in a first or second grade Steiner school classroom is often done in circle formation with stamping and hand clapping on the proper number: 1-2-3-4-5-6. This rhythmic play in which voice, large-muscle activity, and intellect interweave is a source of keen delight and counting by three's and then the three-times table

> often enough are learned thoroughly without the child's realizing that this is mastery of tools he will be using for the rest of his life. (Ginsburg, 1982, p. 333)

Students enjoy this, and are often not even aware of the fact that they are actually learning something new. They are caught up in an embodied experience that includes whole-body activity, creativity, and visuals, learning effortlessly.

Studies done many years later corroborate what is described above. Macedonia points to the fact that appropriate hand gestures clearly support learning and retaining math facts (2019, p. 4). Using one's body creatively, inventing suitable hand gestures to experience something to be learned, appears to alleviate the need for memorization. Students retain content learned via their body more easily.

> Empirical evidence shows that in at least two educational domains, i.e., second language and mathematics, embodied strategies lay the base for enhanced understanding and learning. The body - via action and gesture - is a powerful tool to understand and to learn school subjects. (Macedonia, 2019, p.5)

Ginsburg and Macedonia share the views of Barnes who points to creativity and visual learning to enhance students' comprehension, and retention. (1991, p.52) They underline with appropriate research what he found empirically.

Embodied learning may be more satisfying than sitting and listening, which in turn means greater motivation for students to be attentive and thus understand and retain the material presented to them more easily. Schmidt points to such learning as being enjoyable for students, which enhances their motivation. (2019)

> Physical activity during learning is recommended to receive a prominent place within the traditional sedentary curriculum. Academic content is not compromised, instead it is enhanced and empowered as children learn better and more profoundly using this physically active approach. Concomitantly, children seem to enjoy physically active learning more than the traditional sedentary type of learning, thus their motivation to participate in learning might be higher. Additionally, embodied learning in the form of task-relevant movements seems to produce even greater effects than infusing simple task-unrelated physical activities in the curriculum. (Schmidt et al., 2019, p. 52)

Not surprisingly, subject-related activity, such as rhythmical clapping for math facts strengthens recall. Using the whole body as a tool for learning rather than only seeing and hearing lesson content – using embodied learning – enhances retention and understanding for all students. It is also enjoyable.

2.3.1. Thinking and learning styles

Although we probably spend a large amount of time thinking every day, we usually do not seem to be aware of the *proces*s, focusing more on the *results*. Moore suggests that we do it, perhaps without conscious awareness (2015, p.376). "Thinking skills are the mental processes we use to do things like solve problems, make decisions, ask questions, make plans, pass judgments, organize information, and create new ideas. Often we're not aware of our thinking – it just happens automatically" (Moore, 2015, p.376). How we think, rather than what we think about, might also be a factor in the acquisition of learning. Some students learn best by *listening* to verbal instruction. Their thinking is in line with *auditory* learning. For students who think with *pictures*, *visual representations* are important. Depending on the subject, others may learn better with a *kinesthetic* approach, like *clapping* or *creating* something concrete.

The idea that we are not conscious of our thinking process is an interesting one. Steiner draws attention to this when he points to the "peculiar nature of thinking…that it is an activity which is directed solely upon the observed object and not on the thinking personality" (1972, p. 26). Many of us are not aware of the different strategies used for thinking because we do not actively examine the process, being primarily interested in the results.

Thinking is humanity's way of making sense of the world. Steiner indicates that thinking is the basis for learning and understanding. "Before we proceed with the introduction of ideas we want someone to understand, it would be beneficial to find out how the individual thinks" (1972, p. 35). We could examine different modes of thinking. Does someone think with the sound of words, or with images created in the mind by words? Does everyone think in the same way? The answers to these questions might reveal what we are looking for: "…before anything else can be understood, thinking must be understood" (Steiner, 1972, p. 35). Accepting that the thinking process varies from one person to another opens the door to discovering others may have surprisingly different ways of doing so. Conceivably, different ways of thinking could be a factor in comprehending and learning.

We send children to school in order to learn, ideally in an interesting, safe and comfortable environment. Biesta suggests school could be such a safe place for exploring (2015, p.1). Perhaps it could be a place to explore modes of thinking and find out what works best for an

individual. As Biesta points out "…school is a place where we are allowed to practice, to try out things, without everything having to be perfect…" (2015, p.1). Hopefully school is a place where students can discover their own best way to learn, their personal way of thinking.

Albert Einstein is considered a brilliant thinker. When he was asked about thinking, he characterized his personal way, pointing out that, for himself, words were not part of the reflective process (1995, p. 25).

> The words or the language, as they are written or spoken, do not seem to play any role in my mechanism of thought… elements in thought are certain signs and more or less clear images which can be "voluntarily" reproduced and combined. (Einstein, 1995, p. 25)

For Einstein, finding logical concepts and ways to combine them, using what he termed "productive thought" was a completely different process from communicating them (1995, p. 25). He argued that "…this combinatory play seems to be the essential feature in productive thought – before there is any connection with logical construction in words or other kinds of signs which can be communicated to others" (Einstein, 1995, p. 25). Nevertheless, his desire to communicate caused him to search for ways of letting others know his thoughts, and for this, words were indispensable.

What would it be like if words were even more elusive? Grandin discusses the question at length (2006). She reveals that it was confusing for her to understand that some people do not visualize everything they think. Eventually she came to realize that "… people throughout the world are on a continuum of visualization skills ranging from next to none, to seeing vague generalized pictures, to seeing semi-specific pictures, to seeing, as in my case, in very specific pictures" (Grandin, 2006, p 12.). The idea of a spectrum for modes of thinking is an interesting one, allowing for even more variations of conceptualization. Observing students in a class and becoming aware of their particular mode of thinking, be it visual, auditory or kinesthetic, could open the door to successfully facilitating literacy and numeracy for all.

Already, there is some awareness of different ways of thinking. Even if teachers did not spend significant amounts of time identifying them in their classes, Marina indicates the possibility of using different teaching methods to support successful learning for all students in a class, no matter their strengths (2015). She proposes a simple way to integrate students with varying abilities.

> If dyslexics commonly perform worse than the average students when tasks are given on pen and paper, our educational system can give them a way to express and value their superiority in areas like creativity, reasoning, listening comprehension and spatial memory. (Marina, 2015, p.82)

Being aware of how we think in addition to what we think about, might support using a variety of strategies for teaching, learning and assessing progress. Enhancing learning methods could consist of teaching and explaining by employing both verbal instruction and creative approaches. Macedonia posits embodied learning as such a possibility. (2019) "Empirical evidence shows that in at least two educational domains, i.e., second language and mathematics, embodied strategies lay the base for enhanced understanding and learning" (Macedonia, 2019, p. 6).

For some students, learning something specific by using their body supports kinesthetic retention of a concept or an idea, such as a times table. Some might learn best by being creative, drawing, painting, modeling – with a visual thinking and learning style. Some excel when given verbal instruction, learning auditorily. Would elementary school age students find out by themselves what works best for them? Might it be the responsibility of the teacher to help them discern how best to achieve learning?

2.3.2. Exploring teaching strategies

In every school, there are students who struggle with learning to read. They may be considered lazy or less intelligent than their peers. However, a possible reason for this could be dyslexia. Pugh & Verhoeven draw attention to this, stating:

> …reading reflects a learned sensitivity to the systematic relationships among the surface forms of words and their meanings. This is a universal aspect of reading, and the causes of failures in learning these relationships are the core causes of dyslexia as a universal disability. (Pugh & Verhoeven, 2017, p. 3)

In other words, there are probably some dyslexic students in every classroom, no matter the country, no matter the language, no matter the type of alphabet. This knowledge might be the foundation for a new way of viewing struggling students.

If we accept that dyslexia is ubiquitous, the stigma becomes irrelevant. From being something a student should control, it becomes a commonplace facet of learning and teaching. As Marina specifies, "…it is relevant for teachers to be aware that dyslexia is not a problem related to laziness or lack of motivation, neither to a low level of intelligence" (2015, p 74). A

visual way to present new content might alleviate the hardship for students who struggle if the presentation of such content is only in writing or through verbal instruction.

For learning written English, students must grasp significantly more phonemes, individual sounds created by letters or letter combinations, than there are letters of the alphabet.

> Phonemic Awareness is the understanding that words are made up of individual sounds. These individual sounds are referred to as phonemes. Within the English language, there are about 44 sounds, and several of these are rather difficult for children to grasp. Mastery of phonemic awareness is a foundational skill for reading, yet is often skimmed over or not reinforced within today's classrooms. (Carruth & Bustos, 2019, p. 55)

Exposing students to phonemes by teaching the sounds auditorily and supporting this with visuals and kinesthetic elements has the potential to expedite the mastery of phonemes, thus aiding beginning readers in becoming fluent readers more easily.

> Children learn these skills through a variety of contexts and no child will learn in the same mode as another. With that in mind, teachers need to provide multiple opportunities for children to discover phonemic awareness through engaging activities. Physical activity, music, poetry, and games are means by which to enlighten children's language skills and put them on the path to become independent readers. (Carruth & Bustos, 2019, p. 56)

Independent reading is the goal. Recognizing the individually different paths to personal literacy makes learning not only simpler but also more enjoyable.

Students who profit from having new knowledge presented visually may show a markedly increased attention span once teaching includes strong visuals. Hruskocy and Foster discovered that adding visual elements had a positive effect on students' engagement with the material (2012). Significantly, there is no mention of only struggling students being more engaged.

> A universal finding … was that student engagement increased when 3D simulations are integrated into the curriculum. Student engagement is defined as high focus and attention on the learning task. Teachers acknowledged that 3D technology had an impact on student engagement and described how this increased engagement had a positive impact on the learning environment. (Hruskocy & Foster, 2012, p. 3)

Finding ways to foster stronger engagement during lessons supports learning. We can reasonably assume that written material with content that does not provoke visual stimuli

would undermine comprehension for a person who uses visual thinking and who learns primarily through visuals, significantly affecting motivation. Adding visual information to such content would seem a relevant strategy to ensure that more students become competent learners. Lovelace reminds us that experiencing teaching in a way that takes learning and thinking styles into account would assist all students in achieving their maximum potential (2005).

> …learning-styles responsive instruction increased the achievement or improved the attitudes toward learning, or both, of all students. … results overwhelmingly support supported the position that matching students' learning-style preferences with complementary instruction improved academic achievement and student attitudes toward learning. (Lovelace 2005, p. 176)

Comprehension of a significant amount of the lessons taught has the potential of motivating students to be attentive. This underlines the importance of flexibility in the presentation of subject matter.

Cognizance of the possibility of engaging all students in a class equally by the simple addition of methods of presentation that cater to various different learning styles, could significantly affect teaching efficacy and allay the wastage of teaching energy.

> Taking the abilities of the students who think and learn visually into account, adding creative elements to the learning process could ensure that all students have the opportunity to comprehend the lessons and learn competently, regardless of their preferred reasoning strategies, regardless of their personal mode of thinking. (Lovelace, 2005, p. 176)

As we have seen, thinking and learning styles are personal, whether visual, kinesthetic or auditory, and changing them significantly does not seem feasible. Bearing this in mind, choosing different ways of presenting content to be mastered, be it by listening to instruction, adding visuals to explain a subject, or suitable movement like rhythmical clapping, conceivably serves to augment successful learning for all students.

Supporting students by comprehending that thinking is an activity with a number of different possibilities could also open the door to universal acceptance of the idea that there are strengths and weaknesses in every mode of conceptualization. Realizing this might also foster inclusive thinking, and lay the groundwork for all students learning together: “inclusive education is the most effective way to give all children a fair chance to go to school, learn and

develop the skills they need to thrive. Inclusive education means all children in the same classrooms, in the same school" (*Inclusive Education*, 2022).

Lentini discusses this in the context of calculus, which appears to be a challenge for some students, namely those who do not necessarily visualize information. She suggests supporting them in recognizing the meaning of the visual representations of the subject (2011).

> ... many of the difficulties in calculus would be overcome if students were taught to internalize the visual connotations of the different concepts. The situation described above raises the need for the search for elements that can make learning meaningful in a way that allows the student to construct knowledge. (Lentini et al, 2011, p.2) (Translation from Spanish, DeepL, 18 Nov. 23)

This is a suggestion for a proactive strategy: offering support to students before a problem arises, avoiding possible difficulties. If all students in a class experience lessons as easy to comprehend, teaching would become more enjoyable.

Using embodied learning strategies in elementary education is similarly proactive. "The embodied learning approach provides the opportunity for children to form new knowledge in a mobile way according to the demands of their development… to improve the ability of children and early adolescents to interpret the teaching material provided" (Sani et al., 2021, p. 14). Using the whole body by including physical experiences supports learning. As Rawson indicates in his study of Waldorf education, practical engagement allows pupils to immerse themselves fully in new domains of knowledge, giving them a "bodily experience that stimulates all the senses" (Rawson, 2019, p.10). Significantly, embodied learning is here considered a strategy for learning, not for remediation. Routinely adding such elements to the way subjects are presented allows for all students to profit equally, no matter their mode of conceptualization.

Making learning accessible for all students is often understood as meaning, they should be able to go to a school. Of course attendance is a prerequisite, but simply being present does not guarantee learning, and not all students find their own ways to "construct knowledge" (Lentini, 2011). Supporting them in doing so could be an important step towards overcoming the discrepancy between the struggling students and the successful ones. Being creative with the subject matter might be as simple as deciding to:

> …encourage the students to imagine, describe, observe, collect, assemble, mix, create, combine, fill in a blank sketch, analyze and compose a story with details, modify the use in an object, show unusual uses of an object, construct, trace, disassemble, organize, revise, plan, modify, compare, form, integrate, resolve, present, revise, specialize, propose, distinguish… .(Ioannidi & Malafantis, 2023, p. 4)

Oral or written information with content difficult to be pictured could undermine comprehension for a person who uses visual thinking and who learns primarily through visuals, just as visuals with little or no explanatory words might have a detrimental effect on the success of students whose thinking and learning is primarily auditory. Students who are encouraged to discover their personal way of thinking and learning and are supported by suitable didactic approaches will recognize learning strategies that work for them, facilitating successful acquisition of the material rendered. Adding visual information to content that teachers present verbally and want all students to learn would therefore seem a reasonable strategy, supporting all the students in becoming competent learners.

Teachers who seek to augment students' comprehension by the choice of suitable methods of cognition in accordance with their mode of conceptualizing, will observe them and guide them towards personal best strategies. This needs to be part of the individual preparatory work of the teacher, not a theoretical discussion between colleagues, since "…putting too much emphasis on the system level within educational discourse easily results in deafness towards day-to-day educational practice" (Tjärnstig & Mansikka, 2021, p. 67). In other words, discussing at great length with others may not necessarily improve didactic practice, whereas observing students and recognizing the way they individually learn would serve to guide them towards successfully constructing personal learning.

It could be opportune to ask who makes the decisions about the subject matters and their presentation. Granting teachers a certain amount of freedom to choose such content and didactics for their classes appears prudent, since they are in direct contact with their students on a daily basis. "If the true interest is to do what is best for students and make sound, sustainable educational policy, securing a way for teachers to have their voices heard in the political arena is vital" (Watkins, 2022, p. 18). In a world in which teaching seems to align more and more with goals formulated by politicians, identifying a way to restore the power of educators to adopt ways of teaching they find helpful, ways that facilitate learning for

individual students, is paramount. Ignoring the pedagogical knowledge of experienced teachers in favor of theories propounded by legislators seems counterintuitive.

> …the rhetoric and politicized discourses of educational equity tend to reduce the pedagogical space of the teacher in two ways. Firstly, it diminishes autonomy by increasingly focusing attention on compensatory measures towards achieving defined goals; and secondly, it silences the voices of teachers by ignoring informal educational practices as an important element of their professional knowledge. (Tjärnstig & Mansikka, 2021, p. 63)

Encouraging teachers to be attentive to their students' modes of thinking and learning enables them to support individual students by facilitating strategies that work well. Renouncing the idea of separate educational settings for students, based on their presupposed abilities, expedites enhanced achievement for all students. Taking students' ways of learning into account emphasizes their strengths, providing each one with suitable tools for learning, be it words, images or manipulatives. In other words, verbal learning, visual learning and kinesthetic learning could all be utilized and contribute to successful learning.

As we have already seen in the context of Waldorf Education, including artistic and creative activities fosters different ways of learning and remembering. This is also a valuable component of inclusive education.

> Art, drama, music, dance and literature activities are part of the basic components … They do not rely heavily on oral language or English proficiency and this makes them accessible to all children regardless of language differences or language abilities. Teachers can use creative expression and art to practice cognitive, language, social, emotional and motor skills while integrating them into themes and relating them to content. This provides natural opportunities for children to learn through play without feeling anxious over failure. The arts are child-friendly and engaging because they are as natural as play. (Henderson & Lasley, 2014, p. 11)

The arts are not only enjoyable. They are also an activity all children can do together, thus supporting true inclusion and integration. Adopting methods that foster relaxed and suitable process-oriented methods of teaching contributes to successful learning for all.

Moore posits the following, "The effective teacher is one who constantly reflects on his or her practices and makes instructional decisions based on a clear conception of how theories and practices affect students" (2014, p. xvii). For the teacher to have the means to do so there must be a certain amount of observation, as well as the freedom to choose methods and

material that aligns with the individual student's learning style. As Macedonia points out, "…neuroscience has unveiled … brain patterns behind language and mathematical thinking and they are grounded in action and perception, in the body" (2019, p.6). Such successful learning might be attained by simply revising didactic material to allow for various individual learning styles.

There would be a simple requirement: presenting material suitably, with visual elements for visual learners, appropriate written elements for the auditory learners and perhaps a concrete suggestion for movement for the kinesthetic learners. "…writing a text that is cohesive, easy to understand, vivid without being sensational, and draws on concrete examples may lead to a noticeable increase in interest and text learning" Schraw et al., 1995, p.13). A suitable text allows students to focus on understanding the content instead of on the method, the material or the outcome, simply reaping the benefit of the instruction. Therefore, the choice of meaningful material could be paramount to successful learning.

This view of education, centered on the student, denotes the necessity of granting teachers the freedom to choose didactic material suitable for accomplishing their students' successful learning.

> …a student-centered teaching system that requires of a teacher to be attentive to learning styles goes beyond the method, beyond the textbook, beyond the classroom, and even beyond the teacher since it is focused on the source of success or failure in learning – on the student himself. (Leaver, 1994, p. 374)

Taken together, these studies suggest that it could be possible to help more students achieve successful learning by adjusting teaching strategies to align with different ways of learning: by listening, by seeing, by doing, thus catering to auditory learners, visual learners and kinesthetic learners together.

The prevailing attitude towards students who struggle with reading, writing and/or arithmetic is that they need personally tailored intervention. "Having dyslexia or dyscalculia means that students are resistant to general evidence-supported practices. There is certainly no cure and interventions must be targeted and focused specific to their needs" (Witzel & Mize, 2018, p. 32). The idea that a different didactic approach within the regular classroom might be valuable and helpful for such students is clearly not part of the discussion. Seeing an increasing number of students who are resistant to 'evidence-based methods' has not caused a

re-thinking of such methods. “The purpose is to ensure that all students identified with learning disabilities, including dyslexia and dyscalculia, receive the appropriate assessment and intervention services” (Witzel & Mize, 2018, p. 32). Appropriate intervention in this context means the student is taken out of class and worked with one-on-one, memorizing the appropriate steps for solving an arithmetic assignment, for example. The problem is wide-spread, and increasing. Solving it by one-on-one interventions does not seem realistic.

> 2019 scores decreased in mathematics and reading for lower-performing students, those at the 10th and 25th percentiles, compared to 2015. ,,, Scores declined in reading for male students overall and at the 10th and 25th percentiles since 2015… The 40 percent of students performing below NAEP Basic in mathematics was higher in 2019 than in all previous assessment years except for 2005. The 30 percent of students performing below NAEP Basic in reading was higher than in all previous assessment years” (*The Nation’s Report Card*, 2019).

I have chosen to use the statistics for 2019 here, since the more recent ones are worse. However the interrupted schooling due to Covid restrictions may be a factor and the 2019 results already show declining performance among the students who might need help most.

The decrease in performance is accompanied by an increase in spending per student. “In 2019–20, public schools spent an average of $14,789 per pupil in constant 2021–22 dollars on current expenditures. Current expenditures per pupil increased by 9 percent from 2010–11 to 2019–20, after adjusting for inflation” National Center for Education Statistics. 2023). Continuing to do and pay for more and more of what has demonstrated only limited success seems counterintuitive. Perhaps the time has come to recognize that trying something new might be opportune. As we have seen, there are teaching strategies that might alleviate the need for one-on-one intervention for at least some of these students, those with diverging learning styles. They are simple to implement and have demonstrated their efficacy. I argue here that the time for them is now.

2.4 Conclusion

In this chapter of the thesis, we have looked at different theories related to the question of the relationship between modes of thinking and their influence on learning. We have explored different teaching strategies, which either implicitly or explicitly align with various possible approaches students might use to process new information. We have also discussed practices

that could significantly affect a person's ability to focus on written material for longer stretches of time. Liang and Baw point out these are not chosen consciously. (2021)

> Many … behaviors are innate or instinctual and have been "hard-coded" through evolution. Current approaches to understanding these behaviors model evolution as an optimization problem in which the traits of organisms are assumed to optimize an objective function representing evolutionary fitness. (Liang & Baw, 2021, abstract)

If we consider behaviors with regard to learning as innate, the question of optimizing learning is no longer in the realm of a personal choice of the student. Instead, we as teachers have a responsibility to explore which approach might work best for an individual student, facilitating real learning for each student.

On every day of our lives, we could be introduced to something new, to a new idea, a new thought, a new experience. This is also true in schools, and not just for the students. "…adults in schools are in the process of learning, too, and time must be made for them to learn from and with each other" (Meier, in Krechevsky et al., 2013, p. 18). If we believe in exactly this possibility of learning for everyone, no matter who they are, no matter what their role is, then we can look confidently towards a future for education that serves both teachers and students.

The next section of the thesis will discuss the methods for gathering narratives of teachers' experiences with different strategies for presenting the subjects taught as well as their reflections on how this informs their daily didactic processes, shaping their role as teachers who strive to include all of their students.

Chapter 3: Data

3.1 Choice of participants

People personally known to me referred participants in the research for this thesis to me. We had spoken about my research subject and had discussed the role of creative processes, like clay work, drawing, painting, building models or other 3-D activities, in support of learning the alphabet, reading, writing or basic arithmetic. However, I knew none of the interview partners personally before I contacted them about the study.

They were asked to participate because they are experienced teachers who expressed an interest in having a conversation about methods they use for teaching basic literacy and/or numeracy. During their years as teachers, all of them had encountered students who found certain material difficult to absorb and retain. They all described searching for ways to make sure the students they were teaching were truly learning. The participants came from four different private schools in the United States. They use a variety of different methods to teach basic literacy and arithmetic skills. I communicated with them about the thesis and what I was interested in finding out well before the interviews were actually done, sending them my tentative interview guide; see appendix 2. Originally six agreed to participate in the gathering of material by interview. One eventually withdrew, citing work requirements.

3.2 Choice of methods

The material used in this study was gained by five semi-structured interviews, which Adams defines as “Conducted conversationally with one respondent at a time, the semi-structured interview employs a blend of closed- and open-ended questions, often accompanied by follow-up” (2015, p 493). This method was a good fit for my research. It allowed both my interview partner and me to delve into the subject of the research and freely discuss additional questions that came up. Each interview partner had the space to recount her personal views, opinions and own methods of teaching fundamental elements of literacy and numeracy. My questions were in line with the proposed interview guide, see appendix 2. I was also able to ask clarifying questions during the interview whenever necessary.

3.2.1 Bias, reflexivity and validity

I have worked with students as an early childhood educator for 20 years, and subsequently in private practice with students ranging from elementary school through high school, who were struggling in school. For more than 20 years I have also been working as a trainer, teaching methods to support such students. Consequently, I have an insider view of the subject I am studying, which might risk interpreting observed phenomena in a limited way. My choice of research topic and methods could therefore be considered as being biased.
Being aware of this, I claim that the research topic and my methods are valid for the specific reason that I have insider knowledge of the difficulties some students may encounter with the acquisition of basic literacy and numeracy, of their struggle to retain what is taught. This knowledge facilitates an in-depth understanding of the significance of the various learning strategies the interview partners related. It allows others, who are not insiders, to profit from my insider views, perhaps broadening their understanding of the related phenomena.

3.2.2 Protection of participants

The thesis does not reveal where in the United States the various schools that participants work are located, or what the names of the schools are. To protect privacy, the participants use pseudonyms. As Kvale points out, “The protection of subjects’ privacy by changing … identifying features is an important issue in the reporting of interviews” (Kvale, 1996, p.114). However, one participant requested to use her real name. As using her name might lead to identifying her school as well, I requested the school’s agreement, which was duly given. Kaiser suggests such decisions can be personal. “A more nuanced view of consent means moving away from the assumption that every respondent desires complete confidentiality and instead recognizing that a research participant might want to receive recognition for some or all of what he or she contributes” (Kaiser, 2009, p. 9). As this participant asked for her real name to be given, it is being used in this study.

3.2.3. Data Collection

The material used in this study was gained by semi-structured interviews, which Adams defines as follows, “Conducted conversationally with one respondent at a time, the semi-structured interview employs a blend of closed- and open-ended questions, often accompanied by follow-up why or how questions” (Adams, 2015, p. 493). Five elementary school teachers

were interviewed, from four different private schools in the United States. These teachers use a variety of different methods to teach basic literacy and arithmetic skills. The interviews were done via Zoom, and transcribed by Read AI (https://www.read.ai › transcription).

Data was collected by interviewing the teachers one-on-one and recording the stories they told. The length of individual interviews was between 30 and 45 minutes.

Studying the transcripts facilitated a deep understanding of their experiences as teachers. During the interviews, I had the privilege of hearing a large variety of fascinating stories about teaching and learning. As Fréchette states, "phenomenology presents a unique opportunity for capturing the lived experience of participants" (Fréchette et al., 2020, p.1). My interview partners came from a variety of schools, with different approaches used in the respective schools. This provided a spectrum of options for didactic methods and perceptions that were shared with me. These inform the analysis chapter.

3.2.4 Coding

Coding was done manually. After all the interviews were completed, a thorough re-reading of the transcripts elicited certain content that was common to more than two interviews. One of these was that the teaching of certain subjects was discussed. I used colors to differentiate the subjects, i.e. reading, writing, arithmetic, highlighting them directly in the copies of the transcripts. A further reading provided a more nuanced view, as I became aware of other similarities. Parts of the transcript texts referring to these different similarities were highlighted appropriately by adding a text color to the first word of such sentences. This meant that some parts of the transcripts now had two colors, some had one, and some had none. When I re-read the 'no color' parts of the transcripts, I reflected that they belonged to two categories.

1. They were redundant and did not need to be used.
2. They were important and clear but were more general in nature. These were assigned a separate color. I realize such decisions are subjective.

> Not everything we investigate and document as qualitative data can be objectively ranked from the most important to the least relevant. Those are subjective interpretations and judgement calls by the researcher…There will be some data in the corpus that seem relevant or salient for analysis, while the rest must fall to the wayside. (Saldana, 2014, p. 37)

Reflecting on the transcripts once more in light of the codes informed my decisions as to whom to quote, what to quote and where. See appendix 4.

3.3. Data analysis

Starting with the interview phase of the study, I became aware of recurring themes across all of the interviews conducted. In analyzing the data, I therefore started by looking for such common themes. Braun and Clark suggest that "A theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (2006, p. 82). It became apparent that there were a number of themes common to all of the interviews. Subsequent re-reading and comparison of the content informed my choice of a thematic analysis. Braun & Clark point out, "to provide a rich thematic description of your entire data set… the themes you identify, code, and analyze would need to be an accurate reflection of the content of the entire data set" (2006, p. 83). This becomes evident in the analysis.

Reading and re-reading the transcripts allowed me to gain insights into the participants' experiences in their respective classrooms, and compare/contrast what was said. Fréchette observes, "…phenomenology presents a unique opportunity for capturing the lived experience of participants" (Fréchette et al., 2020, p.1). It was these 'lived experiences' that I was looking for, and many such experiences were shared with me. I was privileged to study and subsequently recount quite a variety of different methods of teaching, including clay work, building models, making a narrated video of learning something, painting, drawing, clapping, and even eating fractions.

3.4 Quality considerations

What constitutes quality in qualitative research? Various researchers express this differently. Braun and Clark (2006, p. 82).suggest it has to do with whether something is important. They affirm that "…the 'keyness' of a theme is not necessarily dependent on quantifiable measures but rather on whether it captures something important in relation to the overall research question" (2006,p. 82). Answering the research questions is paramount. Data supporting this is relevant, and therefore augments quality.

Using the material gathered from the interviews responsibly and accurately also supports quality. Savin-Baden and Major assert that "the researcher must strive for integrity, which may be accomplished, for example, by ensuring that the interpretations are grounded within the data and reflected in the text"(2012, p.475). Making sure that the collected data is used to facilitate understanding, simultaneously creating a text that is true to the transcripts, is the goal of the analysis.

Willig speaks about the goal of the research, which she notes is understanding something that may serve others. (2012, p.5) An insight gained through this thesis, serving to guide a teacher towards looking for a more creative approach to teaching, could cause a positive change for this teacher's students. If becoming acquainted with the experiences described here supports understanding how that might be done, the thesis will have served its purpose. "Qualitative researchers try to capture the quality and texture of their research participants' experiences and aim to understand the implications and consequences of those experiences, for participants and for other people" (Willig, 2012, p.5). Interviewing with the goal of better understanding a phenomenon being studied may result in a significantly better overview of said phenomenon. This may be due in part to the fact that interview partners may have new or surprising views of something the researcher may not have encountered before, thus broadening the scope of what is considered. As Adeoye-Olatunde and Olenik point out, "a primary benefit of the semi-structured interview is that it permits interviews to be focused while still giving the investigator the autonomy to explore pertinent ideas that may come up in the course of the interview" (2021, p. 1358). In other words, the researcher's open mind safeguards the quality of the interviews. This allows interview partners to present new ideas. In all of the interviews, teachers described creative approaches I had never considered or even heard of. Through the transcripts, they became part of this study.

3.5 Ethical considerations

At each stage of interviewing, there are ethical considerations to be aware of. Therefore, it seems prudent to address them thoroughly. For this thesis, I have chosen "Ethical issues of the seven research stages" (Kvale, 1996, p.111), as my guide.

3.5.1. Thematising

Spending time on research should be for more than simply gaining scientific knowledge. It should also "be considered with regard to improvement of the human situation investigated" (Kvale, 1996, p.111). In other words, the interviewer hopes to discover something that will be beneficial to others. This was the reason for my desire to write a thesis, even before the subject of said thesis was clear.

3.5.2. Design

The second issue addresses the design of the study. Potential participants for interviewing were informed about the scope of the study and the subjects that were to be discussed. They were assured that the names and locations of their schools as well as their real names would remain confidential. As our conversation would be centered entirely on their work, nothing from the interviewees' personal life would be discussed. This ensured their informed consent. One participant chose to use her real name. I requested the agreement of her school, in addition to her own, to assure informed consent.

3.5.3. The relationships involved

The interview itself is the third ethical issue considered. Confidentiality of the transcripts is a key ethical requirement. It is assured by storing the material securely on an external device while working with it, and discarding it once the thesis is done. Kvale also discusses the relationship between the interviewee and interviewer, noting that an interview has the potential to touch upon the interviewee's self-image (Kvale, 1996, p.111). Refraining from value judgements during the interview and the analysis satisfies this requirement.

3.5.4 Transcription

The transcripts are the fourth potential issue for concern. They need to remain confidential, not be associable with their respective authors, but at the same time be "…a loyal written transcription of an interviewee's oral statements" (Kvale, 1996, p.111). Saving transcripts to a separate and unique folder ensures that they will be safe for the duration of the writing of the thesis. They will be discarded once the thesis has been accepted.

There remains the question of what to do with filler words used during the interviews. These conceivably influence the message the interviewee communicates.

> …conscientious people are generally more thoughtful and aware of themselves and their surroundings. When having conversations with listeners, conscientious people use discourse markers, such as I mean, and, you know, to imply their desire to share or rephrase opinions to recipients. Thus, it is expected that the use of discourse markers may be used to measure the degree to which people have thoughts to express. (Laserna et al., 2014, p.335)

Considering such words as communicating something to the person actually present when they are spoken suggests they are important in spoken speech. However, there is some disagreement as to their value in written speech. "It appears… that the recording and representation of various types of paralinguistic feature in transcription is somewhat idiosyncratic, and thus unreliable, suggesting that they should be removed in the interests of consistency" (Garrard et al., 2011, p. 400). A loyal transcription of oral speech does not seem to preclude deleting filler words. To augment readability, they were deleted from the quoted parts of the transcripts.

3.5.5 Analysis

Ethical issues might also arise during the analysis. Concerns might include the degree of the analysis as well as whether the interview partners should be given a role in their interpretation. For this thesis, I do not foresee any ethical issues about either of these questions. What was discussed during the interviews was not sensitive material, relating exclusively to the interviewees work, not their personal lives. During the interviews themselves, relationships were formed that would preclude any injurious use of the transcripts. All the interview partners were assured privacy through pseudonyms. Concerning the one who opted for using her own, I also consider the relationship formed during the interview as being a sufficient safeguard against misusing the content of the transcripts.

3.5.6. Verification

With regard to the sixth ethical issue, Kvale specifies, "…it is the ethical responsibility of the researcher to report knowledge that is as secured and verified as possible" (Kvale, 1996, p.111). Ensuring information gained during the interviews is grounded in the reality of the interview partners is my understanding of this concern. Asking interview partners about their daily work with students elicited stories of daily interaction. My positionality as an insider facilitated my ability to discern such content as being verifiable.

3.5.7 Reporting

The final issue Kvale addresses regards the reporting of the findings. Confidentiality is important, as well as considering possible consequences for interview partners and for the schools where they work. (1996, p.111)

The interview partner who chose to use her real name also secured the agreement of her school to do so. The other schools cannot be identified, since the teachers I spoke with cannot be identified. One of the conclusions of my repeated studying of the transcripts has been that all of them describe positive actions, results and feelings. Should this thesis be published, I foresee no serious problems regarding potential consequences, neither for the interview partners, nor for their schools. Considering all of the above, I identify no relevant ethical issues regarding the content of this thesis.

3.6 Data collection

The material used in this study was gained by semi-structured interviews, which Adams defines as follows, "Conducted conversationally with one respondent at a time, the semi-structured interview employs a blend of closed- and open-ended questions, often accompanied by follow-up why or how questions" (Adams, 2015, p.493). Five elementary school teachers were interviewed, from four different private schools in the United States. These teachers use a variety of different methods to teach basic literacy and arithmetic skills. Pseudonyms are used in the study to protect privacy. The interviews were done via Zoom, and transcribed by Read AI (https://www.read.ai › transcription).

Data was collected by interviewing the teachers one-on-one and recording the stories they told. The lengths of the interviews were between 30 and 45 minutes.

Studying the transcripts facilitated a deep understanding of their experiences as teachers. During the interviews, I had the privilege of hearing a large variety of fascinating stories about teaching and learning. As Fréchette states, “phenomenology presents a unique opportunity for capturing the lived experience of participants” (Fréchette et al., 2020, p. 1). My interview partners came from a variety of schools, with different approaches used in the respective schools. This provided a spectrum of options for didactic methods and perceptions that were shared with me. These inform the analysis chapter.

Chapter 4: Findings

4.1 Introduction

In this phenomenological study, five teachers share different methods of teaching the acquisition of the alphabet, basic literacy and numeracy. The indicated approach was chosen because "…phenomenologists describe what all participants have in common as they experience a phenomenon. In this way, phenomenologists work … from the participants' specific statements and experiences" (Creswell et al., 2007, p. 252). Although the teachers interviewed work at different schools and with different methods, the transcripts evidence a significant amount of commonality in their experiences.

I adopt such commonalities to present the findings, which becomes evident in the analysis by my choice of themes. The participants' meaningful descriptions of their methods of teaching allow for a vivid portrayal of the daily interactions with their students. Such descriptions may serve to inform the didactic choices of other teachers. Creswell et al. underline the importance of people's everyday experiences. (2007) "Across all these perspectives, however, the philosophical assumptions rest on studying people's experiences as they are lived every day" (Creswell et al., 2007, p. 253). Focusing explicitly on their everyday experiences, my interview partners furnished me with many concrete examples and stories about their daily work.

4.2 The interview partners

4.2.1 Anne

Anne is a class teacher at a Waldorf school. She has taught elementary grades one through five at different Waldorf schools in the United States. She shares Waldorf methods for learning to read, write and do basic arithmetic.

4.2.2. Tera Ellis

Tera is an experienced kindergarten teacher at a school in the United States. She teaches the alphabet and beginning reading and arithmetic in kindergarten. For the last three years, she

has been using a visual/kinesthetic approach to teach her kindergarten students the alphabet, augmenting it with guided auditory elements.

4.2.3. Caroline

Caroline works at a school in the United States that caters to students who struggled at their previous school, teaching mainly the alphabet and reading. The teachers at this school are free to use whatever methods they think will help an individual student learn something that she or he has found difficult or practically impossible to understand and learn previously.

4.2.4. Dorothy

Dorothy works at the same school as Caroline. She teaches flexibly, depending on the needs of students in any specific school year. She too uses various techniques to teach which may seem a bit unconventional, but facilitate successful learning for students whom this had previously eluded

4.2.5. Elizabeth

Elizabeth worked as a resource teacher at a K-8 Waldorf school in the United States, different from the one where Anne teaches. She searched out various different techniques to support her students, finding methods that incorporate visual and kinaesthetic approaches along with verbal teaching. She is now preparing to be a class teacher.

4.3 The schools

4.3.1 Caroline and Dorothy

Caroline and Dorothy both teach at a private school for students who are considered twice-exceptional. Wikipedia defines this as follows:

> The term **twice exceptional**, often abbreviated as 2e, entered educators' lexicons in the mid-1990s and refers to gifted students who have some form of learning or developmental disability. These students are considered exceptional both because of their giftedness (e.g., intellectual, creative, perceptual, motor etc.) and because they are disabled (e.g., specific learning disability, neurodevelopmental disability etc. or neurodivergent. (Wikipedia contributors, 2024)

For most of the students, this is not the first school they attend, meaning most of them did not attend first grade at this school.

4.3.2 Anne and Elizabeth

Anne and Elizabeth both teach at a very different kind of school, a Waldorf school. Anne is an experienced class teacher and Elizabeth was a resource teacher. They do not teach at the same school.

> Waldorf schools offer a developmentally appropriate, experiential, and academically rigorous approach to education. They integrate the arts in all academic disciplines for children from preschool through twelfth grade to enhance and enrich learning. Waldorf education aims to inspire life-long learning in all students and to enable them to fully develop their unique capacities. (*Waldorf Education - Association of Waldorf Schools of North America*, accessed 28.04.24)

In every grade of a Waldorf School being creative figures prominently. The Main Lesson books often replace printed textbooks, at least in the lower grades. Students create them themselves, by writing about the content of the lesson, often adding personally created drawings to illustrate their learning. Handwork, movement, recitation and perhaps drama are daily or weekly activities, tied in closely with the subject that is currently being studied.

4.3.3 Tera Ellis

Tera teaches kindergarten at a private school that aligns with the classical education movement.

> Classical education depends on a three-part process of training the mind. The early years of school are spent in absorbing facts, systematically laying the foundations for advanced study. In the middle grades, students learn to think through arguments. In the high school years, they learn to express themselves. This classical pattern is called the *trivium.* (Bauer, 2021)

She uses clay, among other things, to support her kindergarten students in learning the alphabet.

These teachers all share one very important ideal: each of them manifests the desire to support every student in their care to attaining the absolute maximum of their potential. They are willing to follow whatever path might be individually necessary to achieve this.

4.4 Presentation of the data

The goal of my research was to collect the experiences and reflections of a number of teachers who work in different school settings, using various different methods of teaching the alphabet, reading and beginning arithmetic. By comparing and contrasting methods and searching for what was common to all of them, I identified certain shared elements. These became my themes. Braun and Clarke point out that "A theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006, p. 82). Although the ideas discussed are not all expressed in the same way, they were present in all the stories the teachers shared with me.

The first theme I identified was a comment made by one of my interview partners. Tera suggested the following: for successful learning, the teacher should make the content being taught "**tangible and personable and personal.**" In other words, the content should be something that is "capable of being precisely identified", it should be "attractive", and there should be some kind of relationship between the content and the student, "relating to the person" (Merriam-webster.com, retrieved 01 April 24). I discovered these three components of learning repeatedly, in all the transcripts, albeit expressed by each interview partner in a different manner and different wording. Considering this, I identified the overarching theme of the analysis:

Make it tangible and personable and personal.

During the coding process, I identified six themes that contain elements in alignment with this. A nuanced reading of the transcripts uncovers certain elements of these themes in all the stories recounted during the interviews. In this study, I have chosen to use only particularly clear examples.

The six themes:

Focusing

Abstract elements made tangible

Using tangible elements to create meaning

Love what you do and you remember it

Stories make pictures

Creative processes facilitate learning

4.4.1 Focusing

All the teachers spoke about the need to support students in their ability to focus. This is also called executive attention, which is "a function that regulates the quantity and type of information that is either accepted into or blocked from short-term memory" (Memory | Definition, Retrieval, & Forgetting, 2024). Teachers may ask students to 'pay attention' when they want them to 'be focused' on a task.
Tera directs students to this explicitly. Here she describes what she does:

> First, we teach them something called focus. They have their hands down by their sides. They take in a deep breath and when they are taking in their deep breath, they are telling themselves, it's time to control my body and to control my mind. That way they're focused on exactly what they're looking at.

Asking students to focus and explaining exactly how to do this creates an embodied response, and is an alternative to simply asking them to 'pay attention.' Kontra suggests

> exploring embodiment from early childhood through adulthood will not only create a clear understanding of the mechanisms driving learning through action, but will also likely prove essential for narrowing the search space for targeted and optimally effective interventions within education. (Kontra et al., 2012, p. 738)

Embodiment augments retention with appropriate gestures or other physical activity.

Anne proposes a different method of ensuring students are focused, are paying attention. She shares how she fosters students' attention while telling stories. She suggests that telling the story, as opposed to reading it aloud, allows eye contact with individual students.

> I think rich storytelling in the world of curriculum supports the love of reading. I really believe that students live into the picturing and really appreciating it, that's very important. I think children get just that eye contact when you're telling a story and you can modulate the story.

Creating eye contact with a student is a subtle way of creating attention, without the need to address the student verbally. It is another way to communicate to the student that the teacher is aware of him. The student feels seen and acknowledged. He pays attention, and focuses on the story the teacher is telling.

4.4.2 Abstract elements made tangible

Anne and I chatted about the alphabet. She recounted different ways letters were introduced and practiced in her classes.

> There are some children that need more than just a story. So we definitely do more forming of the letters. We always use the sand trays and clay that doesn't dry out for most of the letters. I have them sculpt them. With every class, we do sign language, because some American Sign Language signs almost look like the letters.

Using sign language is an embodied learning activity. All the letters are made by shaping fingers a certain way or using gestures.
The signs below are American Sign Language. They illustrate clearly that some signs align quite well with the corresponding printed letters. This might support learning these letters.

W

L

O

Elizabeth describes teaching phonemes, “any of the abstract units of the phonetic system of a language that correspond to a set of similar speech sounds” (Phoneme,

2024). She describes her work from the point of view of a resource teacher, working in a K-8 school.

> I worked with two students and I used a program called Foundation in Sounds™. Before students were learning the names of letters, we were working with sounds. We used picture cards to associate a sound with a picture, like an apple for the sound æ. It was visual and we were saying it, so it was also auditory. There was a motor component as we were actually manipulating these sounds with picture cards. We would lay them down in certain orders, the way we spoke them, or rearrange them.

Arranging picture cards to associate sounds with pictures, creating words out of a series of pictures, utilizes visuals as a way to facilitate recognizing phonemes and support learning to read.

Elizabeth also speaks about a game some teachers at her school have students play to make letters tangible:

> I see teachers at our school who have one child standing behind the other and the one behind is drawing the letter on the back of the one in front. Then the child who had the letter drawn on the back has to guess what the letter is. The first and second grade teachers do that. The students love it.

By having one student use her finger to draw an alphabet letter on other student's back, that student now needs to use the sense of touch to identify it. For both students, this is an embodied experience of an alphabet letter. The letter becomes tangible. It is easy to imagine young students liking this and wanting to do it repeatedly – having fun and learning the letters all at the same time.

Tera has been using clay to teach the alphabet for three years. She recounts fearing at first that this was not necessarily a good idea, but is now convinced that it works very well indeed. Here is how she described the process.

> I introduce the letter **c**, and I don't call it the letter **c** at first. I have a card and I show them the letter. I ask students what it is and they say 'ks'. There's a lot of choral response in how we teach the students how to read. When they say, 'oh, this is ks', then that's day one. We go back to it several times throughout the day and I show them the card.

Teaching the *sound* a letter makes, the phoneme, before the students write it, lays the groundwork for being able to use that letter for reading, perhaps even for writing. Once they know the sound it represents, and associate its shape with the appropriate sound, it

could be written.

Introducing the *shape* of letter in 3-D ensures that what it looks like is seen correctly and remembered more easily than a 'flat' representation. Therefore, they create it in clay, to support correctly seeing it and subsequently writing it. This is a 3-D activity, enhanced by the sound the letter makes.

> The next day, we will build that letter using clay. So we take out the clay and we roll a rope. Then we have a mat that shows the top baseline, the dotted line, and the baseline. These things we have already gone over in great detail. I've quizzed the kids. We've played games with it. They know where the margin is. They know where the dotted line is, the baseline, and the top baseline.

Using a template for the size and the proportions of the letters ensures that they are shaped correctly and fit together in size once all are done. This allows them to be used to create words that have proper relationships between all their letters, creating a correct representation and subsequent perception of such words.

Photo © Tera Ellis, used by permission

> We roll out the clay rope, and they create the letter **c**, but I tell them, 'you are going to make the phonogram **c**.' I will tell them exactly how to create it. I'm using the clay, I tell them, 'you're going to take the tip of the clay. And you're going to touch number two on the clock.' I tell them, 'go ahead, take the tip of your clay, and move over a space just below the dotted line. We'll touch two on the clock.' Then they will take the clay and curve up, touch the dotted line, curve down, touch 10, touch eight, touch the baseline, curve up, touch four, then lift. When it comes to lift, I say, 'okay, take your cutter.' They each have a cutter, and they cut the clay rope right where the 4 is on the mat. Now they have created the letter **c**.

With very specific instructions and guided by the drawing on their clay mat, the kindergarten students learn to make letters correctly, out of clay, and associate them

with the sound they make. In this example, a phonogram is essentially the same as a phoneme, as defined above.

The goal of learning letters is writing, and reading, so the next step is using a pencil. The teacher is simply asking for the clay shape to be reproduced with a pencil, and identified with both the name and the phoneme.

> Later on that day, we make the letter **c** with a pencil. Then I will have them stand up, focus and I tell them, 'so ks has a name and her name' or his name, however you want to teach it, 'is **c**.' Then I'll ask the students, what's her name? And they'll tell me '**c**.' Now we're going to go through a process of 'c says ks.' After we focus, we'll take a mental picture of the clay letter, have the kids close their eyes, and try to visualize the letter inside their mind. If they can see it inside their head, then we give a thumbs up. And if they can't, then we refocus, and go through the whole process once more or, as many times as it takes, really, until they can visualize it

Here is an example of learning the letters and the sounds they make, not as a remedial intervention but as a primary learning strategy. The experience is tangible, possibly augmenting retention. Tera explained that the students really like this process and find it easy to remember clay letters.

She compares the process of learning with the clay to doing it with just pencil and paper, which was how they had done it previously.

> Before we implemented the Davis ® program into our curriculum, we used to have students just put their finger on a piece of paper and tell their finger what to do, and they were tracing 'nothing.' Half the time, the students didn't know what they were really doing, because they didn't have anything tangible to connect with when they were learning the phonograms.

Letters are symbols for certain sounds. Connecting such sounds with the appropriate symbol, the letter, is easier if the symbol, the letter, is in 3-D. This supports retention.

Letters learned with clay also seem more enjoyable to make and easier to remember than if the students were only writing them. Tera pointed out that they had not always done them this way:

> When the Davis program was introduced, I was not a fan right away… However, I have seen a dramatic difference in my students' ability to retain letters learned this way, not only visually knowing what the letters are but also what they sound like. Their penmanship is so much better, so much quicker after using clay this way.

Learning letters with clay, in 3-D, seems to ensure all of the students connect the shape of a letter with its name the first time it is introduced. They find it easy to remember the shapes of letters and to connect them with their names and the sounds they represent.

Tera's students were learning the alphabet for the first time. Caroline recounts her journey with students who had been unable to achieve learning the alphabet or to read at their previous schools. Now they were learned it, because it was being created in 3-D.

> I teach mainly reading, beginning readers, even some students that don't know their alphabet yet. One of the things that I utilize for that is based on the Davis ® clay method. I don't completely follow that protocol, but use the clay and some of their methodologies for it. I had two students last year that I worked one on one with, one was second grade, and one was fourth grade, and they were still not an able to recognize all of their letters. We worked on making the alphabet in clay, both in uppercase and lowercase.

Being exposed to content does not necessarily guarantee learning it. Successful learning will depend almost entirely on the method chosen to expose students to such content, respecting different modes of thinking and learning by using different modes of teaching.

Some students do learn the alphabet by looking at it and writing it on paper with a pencil. Others need more; they need something tangible, something in 3-D. Caroline added,

> We took quite a bit of time to go through each letter. I find the kids take to that and it seems to really click for them. And they also seem to enjoy the actual, hands-on kinetic working with the clay. What I find with them, it really helps them solidify the visual and the picture in their head of these letters.

In order to remember the shape of letters, one must internalize them. Depending on the method used, this might be easy for some students and very difficult or well neigh impossible for others.

Making mental pictures of something presented in 2-D is simple for students if they are auditory learners. For the ones who are not, this appears to be very hard to do. The pictures in their minds may differ significantly from what is printed on the page.

> When they start making the letters, you can quickly see how they might currently be visualizing them. Sometimes the letters can look quite interesting to someone like me, who knows my letters, because they often won't look like, for

> example, an **a**. Maybe it looks more like a **q**, so we would look at the letter strip. Does that look like yours? Helping them see it, so they can begin to really recognize the differences. Then they create it the way that they are seeing it, and it seems to start to shift after a bit and they start to perceive it closer to what we'd see in print. Working with the pathways, tracing the letter, looking at how a letter is formed with the clay, touching it, all those things really add to the multisensory approach. By the time we were done, both of those students solidly knew their alphabet.

Once it is easy to perceive a symbol and associate it with the correct sound it represents, what it means, it becomes easy to remember and use this symbol correctly. Using clay to form letters facilitates the process.

Dorothy shared the following about students who need help with phonemes for spelling and possibly reading. Not understanding phonemes would preclude writing, even if reading were to be correctly 'guessed.'

> Students who come to us are usually a little bit older and have been exposed to, but are not necessarily picking up, the phonemic awareness or the letter sounds or the symbol meanings. We use Davis ® Clay to create a 3-D model of each letter and the sounds that go with it. That's how we start. So they get a little bit of a 3-D picture of what that letter is and what it could say.

In order to be able to use a letter, a symbol, the perception we have of it must be correct, and the corresponding sound needs to be associated with it. A written letter is two-dimensional, making it adequate for the auditory thinker and learner. For the visual or kinesthetic learner, making its shape visual by creating it in 3-D can facilitate such correct perception and consequent attribution of the sound it represents. Being able to correctly attribute sound to form makes learning symbols easy and perhaps even enjoyable.

Dorothy explained what her school does to make learning attractive for the students. "We use project-based learning. And as far as retention goes, I think kids are more likely to retain things they're interested in, so we definitely use a creative approach in terms of meeting students where they are." Learning becomes attractive when students are allowed a certain measure of freedom in their learning, are accepted as they are and are allowed to incorporate their personal interests to support what was learned.

4.4.3 Using tangible elements to create meaning

Words have meanings. Learning the alphabet is important for the students because letters are the tools they will use in order to read and write, the tools they need in order to create written words that express the meaning they want. They will also need to know the letters so they can perceive the meaning of words others have written, which they may need or want to read.

I asked Tera about the time it takes for the students to recognize all the lower case letters and start being able to use them for reading.

> …they're reading by Christmas. And reading by Christmas is not solely due to the clay program. It's the combination between the clay program and Literacy Essentials ©. Literacy Essentials* is amazing on being able to get your students reading. I would say I have probably about 85% of the students reading nonsense basic code words by November, by Thanksgiving…

The alphabet is not an end in itself. It is merely a tool for the next step, reading. Using clay to learn the alphabet, and a reading program, virtually all students in this kindergarten class are able to read simple words by Thanksgiving or Christmas of the kindergarten year.

Dorothy discussed teaching spelling and reading by drawing attention to the different ways letters can sound, depending on the individual word. Here too, the goal is to be able to recognize the meaning of words. For this to work, correct spelling is necessary. In order to be able to spell and write words correctly, the letters and corresponding sounds must be remembered.

> As we teach them more high frequency words, we point out: this **e** sounds different from that **e**. So we teach them more and more, about the alphabet and the different sounds that a letter could make. We just add them to the word walls we have. So we might do a matrix. **

Students at this school are twice-exceptional. That means they may be exceptionally competent in one area of learning and struggle in another.

* "Through a multi-sensory process, Literacy Essentials explicitly teaches children how the spoken English language is written with 42 sounds represented by 26 letters that are combined differently to form 72 spelling patterns, which are referred to as phonograms" (*Literacy Essentials*, 2022). ** See Appendix 2 for an example of a matrix for *sleep*.

4.4.4 Love what you do and you remember it

Not every participant spoke with me about arithmetic. The two who did pointed out that you remember what you loved doing. Anne talks about arithmetic, describing some of what she does, not just to deepen her students' understanding, but also to assure that they will love learning it. "For the first glimmer of arithmetic, because it's such a huge thing, they'll have to love it."

Once you love arithmetic, learning it will be pleasurable. As we saw for the letters, creating the elements for reading and writing arithmetic in clay or beeswax made them tangible.

> When they were younger, they did model and do things in clay or beeswax. I personify the numbers. That seems to work well. I draw the numbers, and they're smiling at one another. So if three is facing a certain direction, her face looks out that way. Math for me is so much movement and then it settles its way onto paper or their little blackboard. For the first glimmer of arithmetic, because it's such a huge thing, they'll have to love it.

If the teacher can awaken love for arithmetic in the students, they will learn and remember what they learned. Anne helps them love it by using enjoyable ways to learn the numerals, by playing rhythmical games with them, by dancing or jumping rope.

> Arithmetic definitely is bodily learned, you know, from the tiny little kindergarten seesaw and pendulous movement and swinging and muscle bone bearing exercises, muscle numeracy is in their bones. We still do jump rope in fourth grade every day. We still do beanbags every day. We do movement with times tables, and practice every day. Right now we're doing the waltz, the box step to the melody of Edelweiss, and they do the nine times table to that. But you show the patterns and everything.

Dancing and swinging, tossing beanbags back and forth, these are physical rhythms. There are rhythms in the times tables as well. When such activities are connected to arithmetic, we see embodied learning strategies.

Fractions are different. Now numbers are being cut into equal pieces. Here too, Anne has a strategy: working with food, so all the fractions can be eaten. The students cut food into fractions by sharing it with specific numbers of classmates.

> The first fractions block that they got in fourth grade, it was all food. We were cooking and baking and cutting and measuring and they were eating it. By the end of the three and a half week block, every fourth grader said, 'I love fractions. I

love fractions.' Because they ate them all up. That was my trick.

> You show them they've seen fractions all around them, just showing how evident it is, and that they actually knew it, especially if there's several kids in a family and you're sharing things. So however many kids you have, that's the kind of fractions you already know, halves or thirds or quarters or whatever. I think making it edible is important, because there's a lot of 3-D in that, too.

Introducing fractions with all sorts of things that can be eaten, sharing them between different numbers of students to show how that works and then finishing by eating them all up – a brilliant strategy for loving a subject, literally embodying it, and thereby learning.

Elizabeth explains how she worked with beginning arithmetic. She too used embodied experiences to facilitate students' understanding.

> We use a number line that the students can walk on. It has the numbers 1 to 20. I actually have them walking on this number line. We place a circle on a certain number and we talk about the specific sequence and steps that we use. We go for different numbers and say the numbers and then they write the numbers, very large numbers, on the table, with their fingers.

Walking on the numerals, writing them very big with your finger – these are concrete examples of working with material that needs to be learned. For students who are just starting to work with arithmetic, using one's fingers and 'writing' arithmetic directly on the table is probably more enjoyable than doing sums on a piece of paper.

Caroline recounts observing the effect of allowing students to be creative with the material for learning, be it the alphabet or whatever else is taught. 'Being creative with material' here means, using one's body, by using clay, painting, drawing, creating models, and anew experiencing embodied learning.

> It seems that one of the benefits of doing these kinds of things, the creative things, is that they often don't feel like they're working. I think because they find enjoyment, that helps relax them and also make them more open to learning. So anytime I've used these types of creative methods, you see the stress reduce. And I also believe that that helps them retaining more of what they're learning.

Students 'retaining more,' points out that that they understand better as an effect of their embodied learning experience. If something is enjoyable and simple to do, understanding becomes effortless.

Dorothy as well touches on a hands-on method of learning and the effect it has on a student. “We use project-based learning*. As far as retention goes, I think kids are more likely to retain things when they're interested, so we definitely use a creative approach in terms of meeting students where they are.” If a student has the opportunity to personally create something that explains or teaches an idea, this constitutes enjoyable activity and is easy to do. Attending to something enjoyable is effortless and facilitates retention. * “Project-based learning (PBL) involves students designing, developing, and constructing hands-on solutions to a problem” (*Project-Based Learning | Center for Teaching & Learning*, 2024).

4.4.5 Stories make pictures

Stories are a special element of going to school. Several of the interview partners spoke about stories. This was expressed in different ways of course. Anne speaks about it in the context of what children love.

> I think that whatever we love to do, the children will love. And I think that the stories throughout the curriculum are really the richness of Waldorf education. I don’t always recapitulate a story through movement or theater or poetry. I'm not always having them work something through a sculptural element or painting. But what is continuous every single day is the storytelling.

Anne shared using stories for the alphabet letters. The way she described what happens through these stories is very much in line with the theme “make it tangible and personable and personal.” Here she discusses teaching the letters, specifically the F:

> I love one story in particular, the one with the flounder in the sea, because you can show the water and the flounder and it has a lot of sounds in it. Through pictures, they come to the symbol. After they hear the story and hear the sound of the watery waves repeated throughout the story, you bring the picture out of the water and they practice creating it, not just with their beeswax crayons in their main lesson book, but also through clay or beeswax.
>
> I have pictures of them making the letters with their bodies on the floor or drawing them on each other's backs. Through stories and the fairy tales, I build a picture.

The flounder, a fish, is here the source for creating a picture in the mind, and perhaps even in the main lesson book. Such pictures make the letters come alive; make them easy to remember.

(Photo © Franziska Scholter, used by permission)

In this example, the story was about learning the F by using a story about a kind of Fish called Flounder. Learning the alphabet with the help of stories for each letter is a technique often used by Waldorf teachers. Anne described it this way: the teacher would tell such stories, featuring elements that start with a certain letter, facilitating the acquisition of said letter. Subsequently drawing and writing strengthens retention. See above.

Students can also create their own stories about letters. Caroline shared an experience she had with a lad who had long endeavored to master the letters.

> There was a young man who would know the letters one day, but not the next. He loves to be the star of the show. So one day, I said, 'you know, you can do these clay letters and if you want, I can video you and you can introduce them all on video and tell everybody how you made each one' and he said, 'I'll make them.' He made them all in clay and then he went through and we have this whole video of him showing everybody how you make these letters and how he did it.

Here we have a different kind of story, one the student himself created around the theme of learning the alphabet. Through inventing his own story, an activity he loved, he finally learned the alphabet.

> I have him again this year and his recall for the letters is very solid now, he can write them and he recognizes them. Prior to working with the clay, he was very, very stuck. He had some kind of block, I think, around learning those letters and recalling them.

This story was about what the lad did himself in order to learn the alphabet. Making letters in 3-D and then creating his own story of doing so and recording that on video was clearly an excellent path for him to overcome whatever was holding him back from remembering them.

Dorothy shared an experience she had with a student who really tried to avoid letters and writing. This student finally made up his own story, sharing it with other students once it was completed.

> If a student loves boats, and they only want to talk about boats, they only want to read about boats, we will talk only about boats. We will only read about boats. We will only write about boats. 'You can build me a boat. You can label the boat.' So we are very flexible in terms of getting kids to do work they're passionate about and almost tricking them into reading and writing in the process. 'Not everyone understands your boat model, so we'd better label it. That means, you're going to need to do some writing, and it means, you're going to know how to read those words.'

This is a story about building a boat and writing about it. The student created the boat and the story of what all the parts of the boat are. He wrote the story, all six paragraphs.

If teachers are given the space to be flexible and adjust teaching methods to the students actually present at any one time, learning is practically assured. Does it matter later on in life, how or when they learned the alphabet, or something else that we consider important? Probably not. What matters is that it was learned.

> I think that is one of the beautiful things about this particular school: you can have that flexibility. And I think that really helps the academic retention because it helps with students' confidence. They can see that and they say, 'I did that. I did all of that. I did the reading. I did the writing.' So when they get to something that's not interesting, or that is very challenging, they can say, 'Well, I once wrote six paragraphs about boats. So I can probably write three paragraphs about this thing I really don't want to write three paragraphs about.'

When we guide a student to create something that will support learning, we see a process. He starts to believe he can truly influence his own learning with an activity he loves doing. His self-confidence improves, as does the motivation for mastering new skills.

4.4.6 Creative processes facilitate learning

What is a creative process? Vygotsky notes that it originates with something humans do, physically or mentally, that produces something that was not there before.

> Any human act that gives rise to something new is referred to as a creative act, regardless of whether what is created is a physical object or some mental or emotional construct that lives within the person who created it and is known only to him. (Vygotsky, 2004, p.7)

Being creative, using your hands, making something, be it in clay, by painting, sculpting building something out of cardboard or creating a story of making something, told via video recording – all of this supports learning. Not every teacher uses every medium described in the transcripts and not every medium is suitable for every student, but the idea of creativity in learning is mentioned by all of these teachers. Tera clarifies what she means:

> …when they create, they enjoy learning so much. I think it's so important, especially as a kindergarten teacher, to develop a love for learning in your students. The creative process instills that love for learning almost instantly… You know, hands-on experiences help children not only to hear a lesson, but they get to experience a lesson. You have to find what works for each child and you have to find out how they learn best. I feel like I've watched students, and they learn best by being a part of it and creating.

A student who is involved in personally creating elements to be learned, like letters, is truly involved in the process. It becomes *personal,* because the student made it, *personable*, because one can work on it until it 'pleases the eye' and *tangible* because it is 3-D. Each of these teachers was creative in different ways.

Among other techniques, Anne uses nursery rhymes and a novel painting technique to support learning individual letters.

> We had little chalkboards. I would give them a wet paintbrush. And in that dusty blackboard, they'd paint the black letter into the dust. We'd go outside and march big letters. They'd form some letters out of beeswax or clay…. the ones that have to go a certain direction: p b q d. And you know, beeswax will just stick right up. I remember having **J**'s above the door**j**amb: **J**umping. **J**ack be nimble. I'd have them **j**ump over a candle and pretend to be **J**ack with their feet picked up. There's a lot you can do in first grade. It was always different. It was always determined by the children in front of me. I've had first grade five times.

Pretending to be **J**ack and **j**umping over a candle is an example of embodied learning. It is a creative way to internalize the letter **J**. Using the whole nursery rhyme this image

comes from very likely supports retention, because **j**umping is *personal* and, as Anne points out, the students like doing it.

Caroline also discussed a host of different mediums she uses for letters or words, depending on her students' needs and likes or dislikes.

> We've used a sand tray. We've also used Wikki Sticks (Omnicor Inc.). I think it's a little piece of yarn, covered in wax, and they come in different colors. I would have them make a letter, or an actual word, depending on what we were working on. I'd have them make it in Wikki Sticks, because they're very bendable, and you can stick them together.
>
> It seems that one of the benefits of doing these kinds of things, the creative things, is that they often don't feel like they're working. And I think because they find enjoyment, that helps relax them and also makes them more open to learning. Anytime I've used these types of creative methods, you see the stress reduce. And I also believe, that that helps them in retaining more of what they're learning.

The students experience less stress when they use creative methods, methods they enjoy. Doing something enjoyable with words or letters helps them retain what they learned.

> I also use Crayola Model Magic®. It is a material that feels foamy. You can roll it and you can stretch it. And they love using this to make letters, numbers, imaginary things that they're playing. So anytime I can incorporate something like that, I find that's very beneficial for them on multiple levels. I think that 3-D is magic and I also think they really engage with anything sensory, anything tactile.

A significant amount of learning happens for students when something is presented as part of a creative activity, part of something they enjoy doing. Depending on the student, there may be different ways of doing so.

How many students learn to read by being exposed to the methods described? I asked every teacher quoted here, and the answer was always: they all learn to read eventually, some by Christmas of kindergarten (Tera), some whenever they figure it out (Caroline and Dorothy). Anne said, "All of the kids learn to read by fourth grade, unless there's a huge hindrance, like for this one little boy in my class right now." Elizabeth remembers a lad who came to see her five years after she worked with him, having written a whole story and gotten a very good grade for it.

All of the methods described here have one thing in common: they include tangible, often pleasurable element. "I hear and I forget. I see and remember. I do and I understand."

This quotation, attributed to Confucius, underlines that learning by doing, embodied learning, creates understanding and augments the retention of the knowledge gained.

4.5 Reflections on teaching, thinking and learning

In Chapter 2, we reviewed concepts that may facilitate learning or make it more difficult. We looked at visual, auditory and kinesthetic thinking and learning styles. Here, we consider them again, in light of the interviews.

The teacher's knowledge is an important component of students' learning. The method used to present the knowledge may be a deciding factor for students to learn successfully.

> Teachers … do their own teaching, i.e., a mix of what they have learned at university and what they have experienced during their professional development. This mix is shaped by restrictions due to time table, to compulsory learning materials like text books, and to other administrative factors that may differ from school to school type. … At the end, despite all efforts, students still learn the way their parents have done, by reading and listening. (Macedonia, 2019, p. 1)

Reading and listening are good ways of learning. Teachers and students who learn and communicate easily with words have an auditory thinking and learning style. What they hear becomes *personal*. They recall subject presented verbally and may excel at writing

However, not every student learns and thinks this way. Students who fail to learn adequately by reading and listening to instruction may assimilate information more easily if visuals like pictures, graphs, charts or models are added to teaching methods. We find them in classrooms, used to illustrate material presented verbally. As Rosenberg indicates, "Visually oriented people learn by seeing. They like to get handouts and need to take notes that they look at after a lecture" (Rosenberg, 2001, p.156). They may also appreciate methods such as painting or photographing things to remember them.

Caroline shares working with students who learn and retain information they see, whose strength is a visual thinking and learning style. "I found that I can get them to recall something that's a picture much easier than if they're just thinking of something like a flat word on a page." She also shares what she does for visual learners to support reading. "I've used different things, even using like Play-Doh ® and making the vowels a different color than the consonants when we're reading." Here Caroline describes a multi-sensory learning

strategy. The student has made the letters in 3-D, kinesthetically learning their shapes. The added color enhances the experience visually.

> Caroline adds, she's one of those students that needed to see things just so many times before it would really stick. I think the clay sped that process up. And I believe it is because she's very visual. She draws beautifully. She's very artistic.

Something *personable* is pleasant to look at, easy to study and remember.

The third learning and thinking style identified in this thesis is kinesthetic. As Rosenberg points out, "kinesthetically oriented people learn by doing and feeling. They need to try things out for themselves and remember what an object feels like. These people tend to use gestures and movements while speaking…" (Rosenberg, 2001, pp. 156-157). Students who think and learn kinesthetically remember best if they create something real, something *tangible*. Caroline adds, "You know, our students here with dyslexia, oftentimes their working memory and their recall needs to be strengthened. So I think bringing in the 3-D. is a huge benefit because they were already very visual." Thinking about something and pursuing it by creating it in 3-D is a talent students like Caroline's share with inventors like Thomas Edison, who famously claimed, "Great ideas originate in the muscles" (*AZQuotes - Citation*, n.d.). Great ideas are realized by doing.

Anne has been working with elementary students for more than 20 years. She attributes her students' successful learning to multi-sensory teaching.

> If they have this dyslexic tendency through second grade, with reversals, because we're moving things through their bodies and they're hearing things orally and they're seeing it and practicing it three-dimensionally, often those little quirks don't manifest as syndromes. I've seen that really happen in a beautiful way for most children.

Identifying individual thinking and learning styles proves to be an important component of successful teaching, leading to successful learning. Using auditory, visual and kinesthetic teaching strategies together is crucial if the goal is for all students to become competent learners. Tera suggested it: Make it "tangible, personable and personal." Moreover, Gazibara reminds us, "Johann Heinrich Pestalozzi, a Swiss pedagogue and education reformer … already emphasized that teaching should be a unity of the head, heart and hands" (Gazibara, 2020, p.71). Is this the way teachers are working in schools today? Are they teaching the whole student, hands, heart and head? Might the methods

most often used be focused simply on the head? “Contrary to the latest insights about the functioning of the human brain and learning styles, practical teaching still takes the high road and focuses on the cognitive development of the student, as such skills are easier to be tested and evaluated” (Gazibara, 2020, p.71, 72). If getting good grades on tests were the main goal, memorization would be the best method. If gaining new insights, real understanding and retention is the goal, memorization does not serve the purpose.

> It is precisely active and integrated learning, or learning with the head, heart and hands, that is one of the key elements for increasing the quality and efficiency of modern schools. For all those reasons, it is important to consider a new organization of learning, as well as the role of school and community, in order to ensure the full development of students and harmonize it with their capacities and potentials. (Gazibara, 2020, p. 72)

Integrated learning, active learning, was described to me in all of the interviews. Each of the teachers pointed to such learning as the key to really understanding, and therefore retaining, what was taught. The schools where they work foster such teaching, and all the students learn, enjoying the process.

The majority of public schools in the United States do something else: they have struggling students tested and the students are then given an Individualized Educational Plan, IEP.

> The number of students in special education in the United States has doubled over the past four decades, with schools responsible for providing special services to a growing segment of their student bodies. … Almost 7.3 million students, or 14.7 percent of all public school students nationwide, needed special education services in the 2021-22 school year. …compared to the data from 1975, when students in special education made up 8 percent of the overall student population. … The increasing share of students who need special education can mean that a larger share of students aren’t getting their needs met through regular education … If a child has an IEP for a learning disability, it can mean they have any condition affecting their ability to read (dyslexia), write (dysgraphia), or do math (dyscalculia). … Learning disabilities account for almost a third of all students with IEPs, or 2.3 million students in 2021-22. (Pendharkar, 2023)

Fundamentally, this is good. Many students are being helped. However, we are left with the question of whether there could not be a better solution for some of the problems these students with dyslexia, dysgraphia and dyscalculia face. Might it be possible to reach them by using embodied learning and teaching and accommodate all three thinking and learning styles: auditory, visual and kinesthetic, instead of teaching only for the auditory learners?

4.6 The way forward

When we consider that there are currently more than 3 million schoolteachers in the United States alone (National Center for Education Statistics, accessed 24-04-24), it becomes quite clear that interviews with five teachers, as was done for this thesis, cannot possibly be representative of anything in teaching as a whole. However, even in such a small group, we clearly see that students profit when teachers are creative in their methods, having been given the freedom to do so. As Hyytinen points out, "normative elements (how things ought to be) and descriptive elements (how things are) are fundamentally intertwined in the educational research" (Hyytinen, 2015, p. 3). That characterizes the research done for this thesis. We looked at how things are. We saw how they might be, if the way they are were amended to allow new ideas to take hold. Vygotsky reminds us that creative activity supports changing the present and facilitating a new future. (2004, p.9)

> All human activity … that results not in the reproduction of previously experienced impressions or actions but in the creation of new images or actions is …a type of creative or combinatorial behavior. … It is precisely human creative activity that makes the human being a creature oriented toward the future, creating the future and thus altering his own present. (Vygotsky, 2004, p.9)

May an ever-increasing number of studies point to simple changes that could easily be implemented, so schools and especially teachers feel supported in finding manageable ways to add creative methods to their teaching, enabling all students to learn together and retain such learning. Moving forward, this is my vision of schooling. I believe Thomas Jefferson would agree.

For pertinent statistics, see Appendix 8

Chapter 5: Discussion

5.1 Introduction

In this chapter, I discuss the research questions in relationship to the interviews done with the teachers. Specifically, I will point out the links between the overarching theme of the transcripts and the narratives of the individual teachers, linking both to the research questions. I will discuss the findings in light of the conceptual framework and the literature review of the study.

The following research questions guided this study:
RQ 1. Do creative processes, like clay work, drawing, and painting, building models or other 3-D activities support the learning of the alphabet, reading, writing or basic arithmetic?
RQ 2. Do such processes support the retention of these skills?
These two questions will inform the discussion, leading to answers in line with the findings.

5.2 Pathways toward a new perspective on learning and teaching

Many years ago, a mother and son came to see me because the son, I will call him John, was having a hard time in school. John came with a diagnosis of dyslexia and dyscalculia. For him, math was hard, reading was hard, writing was hard, and listening to verbal instruction was hard. Everything in school was hard for him. He was in 6th grade at the time. The lad really believed he was much less intelligent than the other students, He also believed he would never catch up with them.

We worked together. We made the letters of the alphabet with clay, made the numerals 1-10 in clay, looked at frequently made spelling mistakes and made those words with clay letters. Little by little, he improved, eventually becoming a good student. We had done the kind of work together that Anne and the others all spoke about in our interviews, and he had learned what he needed to learn, albeit not in school. John went on to finish high school and then college.
This was not a miracle. It was the result of working in 3-D, the result of making content he needed to understand *tangible, personable* and *personal*. Had John been taught with 3-D methods from first grade on, he might well have experienced successful learning from the beginning of school, never having to go through the sorrow and frustration that had been part

of his daily life for those first 6 years of school. What is discussed in this chapter is recounted for John and all the students like him who struggle with learning. The overarching theme of the analysis, ‘make it tangible, personable and personal’ will again guide us through the chapter.

5.2.1 Make it capable of being precisely identified: tangible

Something simply written on a piece of paper is hard for a kinesthetic or visual learner to grasp. Anne was talking about teaching fractions. She said to a student, “You've been doing fractions forever. Will you cut this apple in half for me?” Looking at the two halves of the apple, having cut them himself, enabled the student to *identify precisely* what ‘half’ means. It was an immediate, *tangible* and very clear 3-D experience, creating instant understanding. Probably the other students, having watched it happen, had an immediate understanding of what ‘half’ means as well.

Tera explained teaching addition and subtraction. Using clay balls made themselves, students could actually see what that means.

> For addition, we can make three little balls, and then two little balls, and how many clay balls do we have all together? We can see that.
> And then, when it comes to subtraction, they'll make five clay balls. What we would say is, “we're going to take away three, so we'll squish three. How many are left?”

Joining up clay balls and counting them helps *identify precisely* what addition means. It is *tangible* addition. Squishing some of them, so one can see what was there before and see what is left helps *identify precisely* what subtraction means. It is *tangible* subtraction. As Tera said, “I've watched students, they learn best by being a part of it and creating.”

Caroline reflected on the advantage of learning with clay: “I think that also just using their hands and being tactile is a huge benefit, connects that mind and hands and all those pathways that we have.” Connecting mind and hands is a *tangible* experience that helps *identify* something *precisely.*

Perhaps not every student needs this. Some may find it easy to use the strategies the teacher usually suggests. For others, this may not be the case. As we saw previously, Gutierrez had a similar view. She remarks here that teachers can prepare their lessons more effectively if they integrate knowledge of their students’ learning styles into the preparation. (Gutierrez, 2018)

> The diagnosis of learning styles of the students helps teachers plan more adequately their teaching activity and to justify to the student group and share with them the because of the activities and exercises … which are more in line with one or more Learning Styles. (Gutierrez, 2018, p.27680)

In other words, the goal of teaching is achieved more effectively by respecting students' learning styles.

5.2.2 Make it attractive: personable

Dorothy remembers a student who resisted working on the alphabet. She discussed it with him, and agreed to his choice of medium. "If how you're willing to write the alphabet is with watercolors, then absolutely, be my guest."

> What is an assignment, what is learning, and what does it have to look like? It doesn't have to look like a worksheet. It can look like they drew me a watercolor. We labeled it together. So just being a little bit more flexible in terms of what success might look like for the student.

Using watercolors and a brush, painting the letters, the student made something that was *pleasing to look at*, something that was *attractive*. The experience created a *personable* result. If you have created something you like, looking at it will be pleasurable, facilitating recall. This is also true if students *do* something they enjoy. Having fun while doing something is attractive, it pleases the person and generates the desire to do it again, creating learning.

> …fun and hard work do not have to be mutually exclusive; rather, fun may actually encourage higher levels of engagement and effort. Participants associated fun not only with being entertained, but also with gaining information and revealed that both aspects of fun motivated them to want to expend the effort necessary to read and write. Mathers, 2008, p.81)

Having fun is an appealing way to learn. Students who experience learning as enjoyable will seek to repeat the process.

5.2.3 Make sure it is relating to the person who makes it: personal

Perhaps not all students in a class need to be doing the same thing at the same time. Caroline recounts situations where a student in the class might simply be stuck.

> This young lady is now in the fifth grade. She's reading at probably about a first grade level. If I see that she's getting stuck on something, I will say, 'OK, how

> about we do that in clay and see if we can move through whatever you have that's caused you to hit a block.' She's worked with me enough that she will do a good job on her own if I tell her that I want her to go make this word in clay.

Because the student knows it is fine to use her own *personal* way of learning, she can work through something that is difficult for her and figure it out by herself. Words are full of letters, and they are the same for everyone. If you actually make the letters yourself, however, and eventually combine them to make words, those become your *personal* letters, your *personal* words. As such, you will remember them.

Incorporating a drama production into learning allows each student to inhabit a role, making that role *personal*. The person a student represents in the production speaks words, words that the student playing the role may never use in daily life. This promotes learning vocabulary in quite a pleasurable way. "Results suggest a direct causal link between drama-based instruction and improved reading comprehension" (Rose et al., 2000, p.55). New vocabulary acquired this way will become part of you, because you are, however temporarily, a person who uses such vocabulary. It becomes part of your *personal* vocabulary.

Words made with a student's own letters become *personal*, they *relate to the person* who made the letters. The letters are *tangible*; you can *identify them precisely*. They are *personable*, because the person making them worked with the clay until they were *pleasing* for her *to look at*. Such letters and such words will be remembered. We have here the same trilogy as is practiced in Waldorf education.

> Waldorf education cultivates three principal faculties in children: thinking, feeling and willing. As such, it is often described as education for the "head, heart and hands." "Head" refers to the ability to think clearly and independently. "Heart" refers to the capacity for feeling emotionally connected to one's work and the world at large. "Hands" refers to the willingness to take action to achieve one's goals and to contribute to the world. (Bds, 2015)

The hands make something *tangible*, the heart recognizes it as being *personable*, and the head as it being *personal*. Comprehension and subsequently retention is the result.

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Chapter 6: Conclusions

6.1 Conclusion of the research

In this chapter, I return once again to the research questions. They were what fueled my searching, my conversations with interview partners and hours of reviewing their answers. As it is said, "Ponder the path of thy feet, and let all thy ways be established" (*Bible*, 1611). Paying attention to the path of my feet, to where I was led by my questions, led to establishing ways of answering them. Here I recount what I found.

I will start by addressing my first research question: Do creative processes, like clay work, drawing, painting, building models or other 3-D activities support the acquisition of the alphabet, reading, writing and basic arithmetic?

The answer is 'yes.' Each of my interview partners affirmed that they clearly saw changes in students' comprehension once one or more of the creative methods described in the analysis was implemented. Tera went so far as to say she did not originally think it was going to be helpful to work with the clay, because the students would only be playing. However, once she saw the results, she was convinced this was a good method to use for learning the alphabet, individual phonemes and sight words.

> The term sight word has two distinct meanings with very different instructional implications. Most commonly, the term denotes high-frequency irregularly spelled words, presumed to be impervious to decoding. Reading teachers historically have assumed that sight words are acquired by memorizing word spellings. (Murray et al., 2018, p. 124)

Many schools in English-speaking countries teach sight words to beginning readers by having them memorized. Using clay is faster and more fun.

Addressing the second question is perhaps less straightforward: "Do such processes support the retention of these skills?" The simple answer is 'yes, they support retention.' The answer Caroline gave me was the same. She spoke about two older students who had not been at their school for a long time yet, who needed to start out by learning the alphabet: "tracing the letter and looking how a letter is formed with the clay and touching it, I think all those things really add to the multisensory approach. By the time we were done, both of those students solidly

knew their alphabet." So yes, working with the clay, making the letters in 3-D, supports retention, even for older students who had previously struggled with the alphabet.

Tera related, "Over the last three years, which is when we've been using the Davis program [meaning clay] I've probably had maybe three students going into first grade struggling." Having only three struggling students in three years demonstrates that making letters in clay promotes retention. We did not explicitly speak about the length of such retention. The fact that Tera mentions learning with clay has been her teaching method for three years might allow inferring that such retention is long-term. The method she described includes multiple repetitions for each learned letter. Karpicke and Roediger submit, "Repeated retrieval of information is the key to long-term retention" Karpicke & Roediger 2007, p.151). In practical terms, this would mean, studying something repeatedly. In the same article, they admit that "multitrial learning is rarely investigated in current memory research, even though it may reflect how students master new information in school, such as multiplication facts or foreign language vocabulary" (Karpicke & Roediger, 2007, p.151). We are therefore left with a somewhat ambiguous answer to the question of long-term retention of alphabet letters and numerals learned with creative, 3-D methods. Yes, repetition supports retention, perhaps even long-term, but we are not sure of the latter. A new study, regarding long-term retention of alphabet letters and numerals learned with creative methods, might elicit a more definitive answer to this question.

6.2 Study evaluation: quality and limitations

6.2.1 Quality

The interviews for this study were done via Zoom. Heath indicates that such interview settings have certain advantages. Although her remarks are about Skype, the experience created by Zoom is comparable.

> This mode of interview … felt very boundaried with both physical and personal limits. The participant and I sat focused at our respective desks, each with a window to the other. It felt as though we were on equal terms. In these interviews, I felt very much like the equal other; a professional interested and willing to learn about the experience of another in order to affect positive change. (Clift, et al Eds., 2018, p. 77)

What particularly resonates with me is the perception of being equals. My interview conversations with teachers elicited the same feeling of equality. While that might be perceived as a bias, I posit it as a factor that contributed to the quality of our conversations. Regarding ourselves as equals allowed for generous, unfiltered, sharing of ideas. Considering this perspective, I deem my method of interviewing enhanced the quality of the gathered data.

Analyzing the data requires decisions regarding what to report and what to ignore. For this process, my positionality as an insider might be viewed as an obstacle to objective decisions. However, the ability to recognize suitable methods that contribute to learning was supported by my insider knowledge of working with many different students for many years. It equipped me with a nuanced understanding of the vocabulary used. I consider my positionality augmented my ability to choose themes and report results.

6.2.2 Limitations

In this study, the actions and observations of the teachers that were interviewed are presented and discussed. This is interesting and valuable. What students thought or felt about various teaching and learning strategies however is derived solely from the observations of their teachers, whom I did not observe teaching. While this elicited interesting ideas and points of view regarding teaching and learning with creative methods, there is the possibility that some students might view some of these methods differently from their teachers. They might prefer yet other methods of learning, which were not touched upon here.

Other limitations are the small number of participants, and the choice of schools. Five teachers, teaching in three types of schools in the United States, were interviewed for this qualitative study. All of the schools are private. Interviewing teachers or students from public schools could point to different teaching or learning strategies with similar or different results. Nevertheless, I consider this study to be a valid reporting of strategies that support learning.

6.3 Possible contributions

The insights and results from this study contribute to the knowledge of practical methods of teaching basic literacy and numeracy. The findings draw attention to the value of using 3-D methods in support of the acquisition of the alphabet, reading and arithmetic. Conceivably,

they could be used together with other teaching strategies in elementary education, leading to successful learning for a greater number of students.

6.4 Implications and directions for future research

6.4.1 Size of study

This study is small. Therefore, it cannot be considered as being representative of teaching methods as a whole. A quantitative research study regarding different teaching strategies for basic literacy and numeracy, conducted through interviews with teachers from public elementary schools, as well as participatory observations in classrooms, could augment the finding of the present study. Such research done with students who attend public elementary schools might also add valuable insights.

6.4.2 Teaching methods

The teachers who were interviewed for this study are potentially freer to choose individual methods of supporting individual students than teachers in public schools. This is at least partially due to smaller classes and to the fact that teachers in these schools do not answer to school boards, superintendents, or overarching rules and regulations regarding students' performance. In light of this, researching the efficacy of the methods presented in this study in the context of public elementary education has the potential of being a valuable addition to elementary education as a whole.

6.5 Researcher reflections

The overarching theme of the analysis in this study is: make it tangible, personable and personal. It is the quotation of a comment made by Tera, one of my interview partners. She pointed out that it is easy to learn and remember something if these three components are part of the learning process. Considering them, I discovered similarities between this theme and two others. As Waldorf teachers, we speak about thinking, feeling and willing, or action. Pestalozzi speaks about teaching for head, heart and hands

Reflecting on these, I will call them qualities of education, it becomes apparent that they are all related, and all important for teaching and learning.

Steiner: Waldorf Education 1919	**Pestalozzi**: the qualities needed for healthy development 1820	**Ellis**; real learning has the following three elements 2024
Thinking: high school The world is a good place	**Head**: academic skills, using reasoning(head) to direct the hands	**Personal**: something relating to the person, reflecting
Feeling: elementary school The world is beautiful	**Heart**: the first instruction is of the heart, feeling	**Personable** something pleasant or pleasing to the eye
Willing, action, doing, being active, The world is good kindergarten	**Hands**: vocational skills and the practical skills needed in everyday life	**Tangible**: created by actions, doing something

Of course all of these various qualities are found in conjunction together with the others.

Three very different people, three very different times, three seemingly different approaches to learning (very much abbreviated here), and yet, they are related. Studying them, looking for examples, comparing and contrasting them, finding teaching approaches in line with them, this could be the basis for a new thesis.

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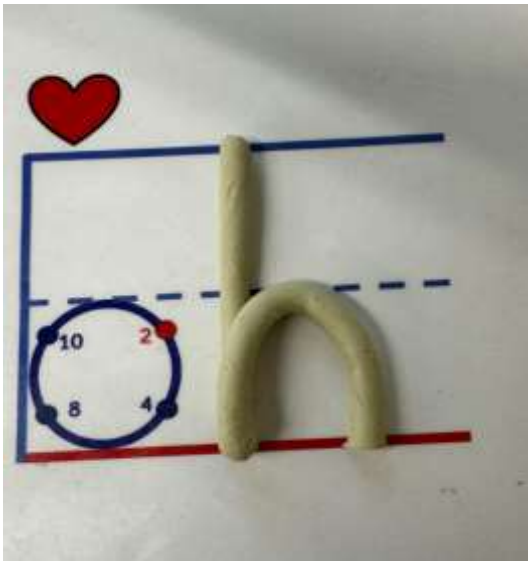
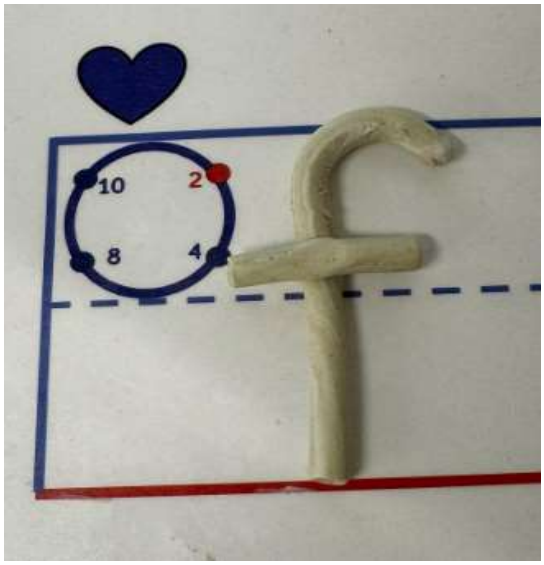
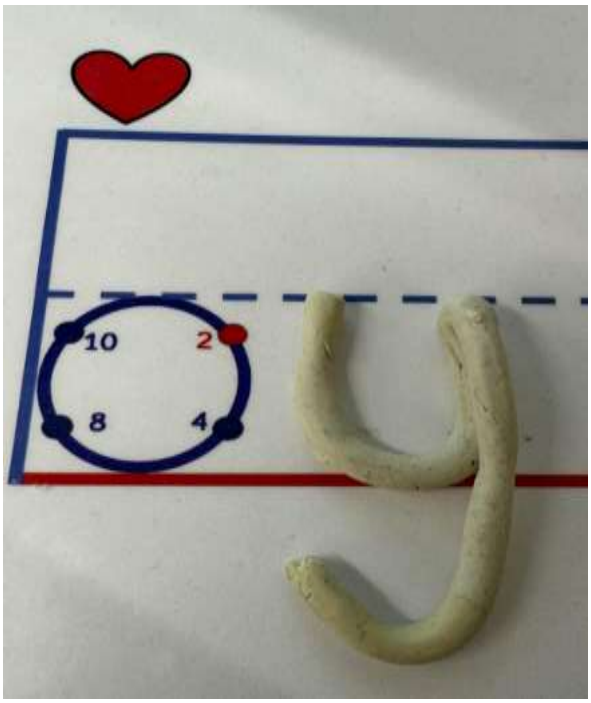
Appendices

Appendix 1: Clay letters

These photos are additional illustrations of using clay for learning letters.





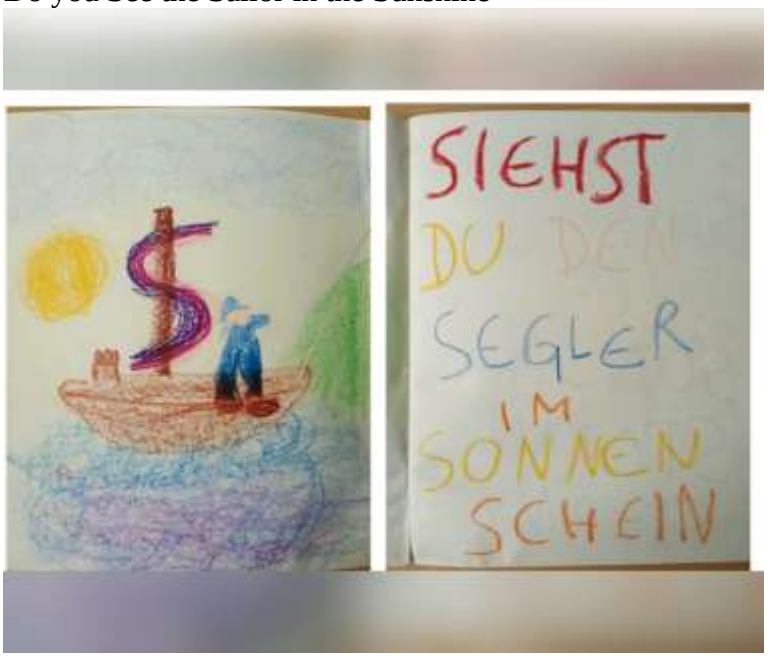


Photos © Tera Ellis, used by permission

Appendix 2: Pictures for G and S

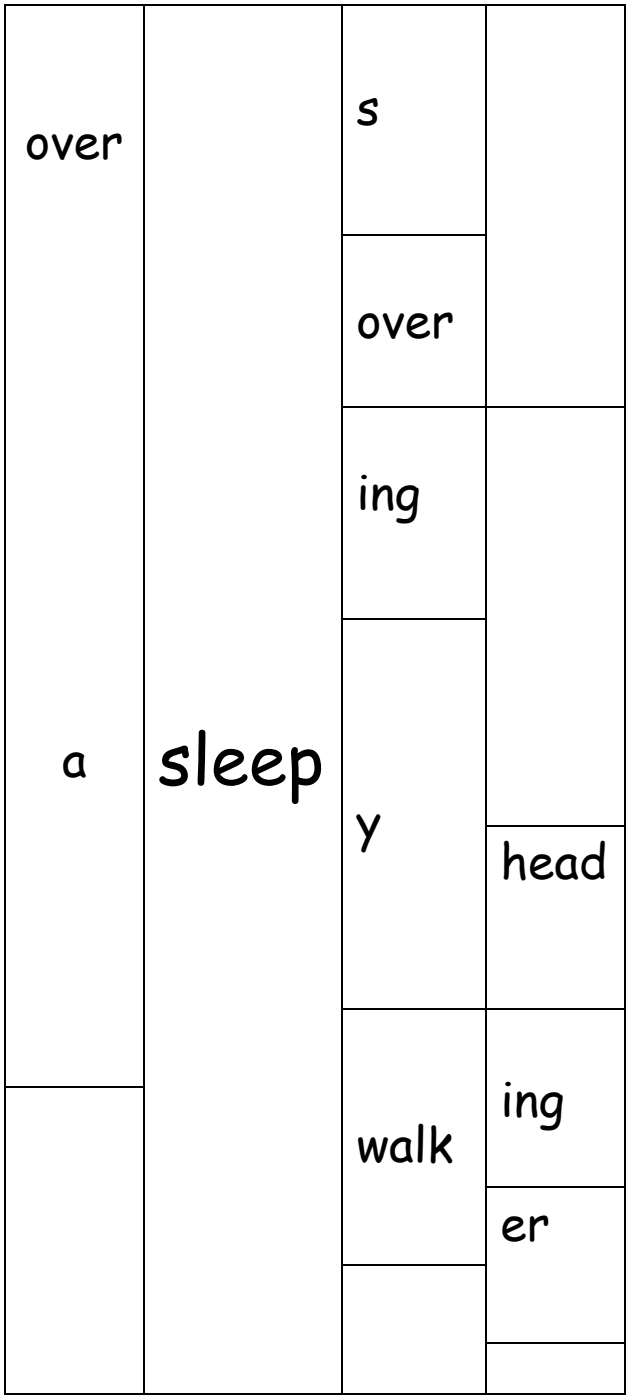
Goose for **G**

Sail for **S**
Do you **S**ee the **S**ailor in the **S**un**s**hine



(Photos © Franziska Scholter, used by permission)

Appendix 3: Example of a Matrix



Appendix 4: Coding

Subjects	Difficulties	Learning strategies	Important	Successful learning	Make it tangible, personable personal
	remedial	primary exposure	flexibility	love the process	multisensory
reading	alphabet in 4th grade, clay	alphabet with stories including letters (J, F), clay	Stories make pictures, pleasurable	3 months; early 4th grade; when it happens	tangible personable personal
strategies	flexibility multisensory	creative processes Focusing	pleasurable	creative processes flexibility	tangible personable personal
writing	build models add words	according to ability level	create meaning		personable personal
		multisensory	flexibility	multisensory	personable
arithmetic		eating fractions, clay, food	pleasurable		tangible personable personal

The following themes were elicited:

1. Focusing 2. Abstract elements made tangible 3.Using tangible elements to create meaning

4. Love what you do and you remember it 5. Stories make pictures

6. Creative processes facilitate learning

Appendix 5: Letter of consent

This letter gives information regarding the qualitative research in education, for the purpose of a master study at Steinerhøyskolen in Oslo, Norway. The theme of the research is the use of creative methods for learning the alphabet, learning to read and learning basic arithmetic.

You have the right to withdraw at any time during the process of the study, before or after the interview. If you withdraw after the interview, material gathered from you during the interview will be discarded.

The recorded material will be kept safely and be treated as private and confidential. The recorded material will be discarded after the successful passing of the assignment, projected to be the end of June 2024. The interviewee will be given a pseudonym. The name and address of the school the interviewee works at are omitted from the transcript and not used in the thesis.

Only a copy of this consent form will be made available to Steinerhøyskolen and/or the public, not the original with the signature of the interviewee.

The interviewee will keep the signed original.

Appendix 6: Proposed interview guide

1. I am interested in hearing about how you teach students who are starting to learn the alphabet and to read, or learning to do arithmetic. Do you use any creative, hands-on activities or methods to support their learning these skills? If yes, could you share with me some of what you do with students?
2. In your experience, do such creative activities contribute to students' learning? If so, what have you observed about such learning?
3. How do such creative activities contribute to the overall success of your students' retention of what they are taught?

Appendix 7: Request for participation

Before a participant was asked to interview, I was in touch with the person, either in person or by email. We discussed my field of study and the individual's possible participation. The following was my guide for these discussions:

7.1 Description of proposed field of study

I am interested in hearing about how you teach students who are starting to learn the alphabet and to read, or learning to do arithmetic. Do you use any creative activities or methods to support their learning these skills? If yes, could you share with me some of what you do with them? In your experience, what do such creative activities contribute to students' learning? How do such creative activities contribute to the overall success of your students' retention of what they are taught about learning to read or do arithmetic? Would you be interested in being interviewed for such a study? If you have questions about any of this, please just ask!

7.2 Purpose of the project

This master's thesis project seeks to explore the possible role of creativity in the teaching of basic literacy and numeracy. The methods used by participating teachers might be substantially different from the way elementary school students are usually taught in many other schools. The question being explored is whether such divergent didactic methods could be suitable for teaching all students together, with all of them learning successfully.

7.3 The institution responsible for the research project

Steinerhøyskolen is the institution responsible for the project. It is a state-accredited and state-funded private university college in Oslo, Norway

7.4 Why you are being asked to participate

I am contacting you, because you have indicated a willingness to participate, either directly to myself or through a person known to both of us.

Participation in the project is voluntary. If you choose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be removed from my files. There will be no negative consequences for you if you choose not to participate or later decide to withdraw.

Appendix 8: Statistics

Dyslexia
Around 1 out of 10 people have dyslexia.

780 million people in the entire world are dyslexic.

More than 40 million US adults have dyslexia, with only 2 million of them receiving a diagnosis.

Between 70% and 80% of people harboring limited reading proficiency suffer from dyslexia.

Around 60% of people with dyslexia are men.

5% of all adults in the US are functionally illiterate.

About 25% of adults read at an elementary school level.

The high school dropout rate for kids with reading problems is 62%.

Kids with ADHD account for 30% of those that are also dyslexic. (Elias, 2023).

Dyslexia in the United States: "Dyslexia affects 20 percent of the population and represents 80–90 percent of all those with learning disabilities. It is the most common of all neuro-cognitive disorders" (Adadasd, 2022).

Dyscalculia in the United States: "Dyscalculia, a severe, persistent learning disability in mathematics, affects about 5 percent to 8 percent of school-age children nationwide" (Sparks, 2023).

ADHD in the United States: "During 2020–2022, 11.3% of children ages 5–17 years had ever been diagnosed with ADHD Among both boys and girls, the prevalence of ADHD was lower in children ages 5–11 years (8.6%) than in those ages 12–17 years (14.3%)" (Reuben, 2024).