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SUPPORTING EMOTIONAL INTELLIGENCE IN CHILDREN WITH ASD

Evaluating the feasibility of an AI-based technological
solution to address communication deficits

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ABSTRACT

Mika Pelvola: Supporting Emotional Intelligence in children with ASD: Evaluating the feasibility of an AI-based technological solution to address communication deficits

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Emotional intelligence (EI) plays a critical role in individual well-being, yet children with autism spectrum disorder (ASD) often face challenges in developing it due to communication difficulties and a less nuanced understanding of emotions. By improving the communication skills of these children, it is possible to support their emotional intelligence and, in turn, their general well-being.

This thesis explores the feasibility of an early-stage technological concept designed to support the communication skills and thereby the emotional intelligence of children with ASD. The solution uses AI-generated images—created based on users' emotional experiences—to support educational or therapeutic efforts aimed at enhancing emotional intelligence. The primary focus of the study is to understand how professionals working in emotional therapy for children with ASD perceive the solution's feasibility and potential value in practice.

The study is conducted within an exploratory research approach, collecting qualitative interview data from EI therapy professionals. The collected data is analysed and synthesised with existing literature to evaluate the solution's feasibility and provide insights for its further development and future research.

The findings indicate a genuine interest and need among therapists for technological tools similar to the one explored in this thesis. The evaluated solution is grounded in a solid theoretical background, and its suitability for practical therapy work appears promising. Key observations include the important connection between inclusive user experience design and therapeutic goals. However, as the evaluated tool is still in an early phase of development, further technological work is needed to better define its usability and assess its practical value.

Overall, this thesis provides early but meaningful contributions to the development of assistive technologies for interventions that support emotional intelligence. By combining theoretical foundations with expert insight, the study lays a conceptual and empirical basis for the continued development of the evaluated solution. While exploratory in nature and centred on a solution in its early developmental phase, the work offers valuable direction for future research and design.

Keywords: AI-generated images, Emotional Intelligence, Autism Spectrum Disorder, Emotional Intelligence therapy

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USE OF AI IN THESIS

The AI tools utilised in my thesis and their purposes are described below:

Names and versions of AI tools: ChatGPT, models 3.5 and 4o

Purpose of using AI tools: During the writing process, ChatGPT was used to improve language and enhance the readability of the text. The tool was also utilised in the final stages of writing to standardise terminology, correct typographical errors, and improve the overall flow of the text. Importantly, ChatGPT served solely as a text improvement tool, and all concepts and ideas presented in this thesis are the original work of the author.

I acknowledge that I am fully responsible for the entire content of my thesis, including the parts generated by AI, and accept accountability for any violations of ethical standards in publications.

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1 INTRODUCTION

Emotional intelligence (EI) is a form of social intelligence that correlates with many aspects of our lives. Individuals with higher levels of EI are reported to experience better social relationships (Lopes et al., 2004), perform better in work life (Rapisarda, 2002), and enjoy better mental and physical health (Gohm et al., 2005; Schutte et al., 2007). Given these benefits, there has been significant academic and non-academic interest in the past two decades towards deeper understanding of EI (Mancini et al., 2022). This rapidly growing attention has sparked different theoretical interpretations of the term, and even the scientific definitions are not unanimous; EI can be seen as a human-ability-based construct, personality-trait-based construct or as a combination of both (Mancini et al., 2022; O'Connor et al., 2019). Even though specific theoretical interpretations of Emotional Intelligence vary, they all share the same core idea: emotions are a central and developable factor in our social lives.

Autism Spectrum Disorder (ASD) is a biological and lifelong condition (Lord et al., 2018) that affects an individual's neurodevelopment, with symptoms varying significantly in severity (Geschwind, 2008). Although global ASD prevalence is estimated to be 1% (range 0.01–4.36%) (Zeidan et al., 2022) it is considered a major public health concern due to increasing diagnostic rates, and association with significant difficulties in social, psychological, and educational contexts (Brentani et al., 2013; Suomalainen Lääkärisseura Duodecim, 2024).

It is typical for individuals with ASD to experience difficulties in social interaction and communication settings, because of their less-nuanced understanding of basic and complex emotions (Trevisan et al., 2021). Challenges with language development and restrictive behaviours are also a common part of the general clinical picture (Geschwind, 2008). Importantly, ASD should be interpreted as a spectrum, rather than a binary condition, with a significant variety in the severity of the symptoms (Campisi et al., 2018; National Institute of Mental Health, 2022).

Even though it is not possible to experience a full recovery from ASD, individuals can greatly benefit from early diagnosis, and appropriate therapy and treatment methods (Brentani et al., 2013). Behavioural, psychological and educational interventions can support the individual in many ways; learn skills required in social settings, reduce restrictive behaviour, and generally learn important life skills (National Institute of

Mental Health, 2022). Children who experience communication-related challenges may especially benefit from assistive technologies and other supportive means for communication (Vienonen, 2022). These supportive means of communication can be images, graphical signs, sign language, technological applications, or other aids that support self-expression in communicative situations (Vienonen, 2022). Despite the increasing role of assistive tools in therapy and education, little research has explored how modern AI-based technological solutions could support emotional development in children with ASD.

Being able to understand, express and then communicate one's own emotions is a fundamental part of developing Emotional Intelligence (Nelis et al., 2009). People with ASD commonly have difficulties with communication, and therefore tend to have lower baseline levels of EI (Brady et al., 2014). To enhance the well-being of individuals with ASD, it is crucial to find personalised ways to support their communication skills. This, in turn, may strengthen their emotional intelligence, leading to benefits in multiple aspects of life. Considering all the previous, the foundational problem facilitating this whole research project is as follows:

- Children with ASD often struggle with communication skills, which affects their Emotional Intelligence. This can negatively impact their social relationships, performance in work life, and overall health.

This study explores the feasibility of an early-stage technological solution, designed to support the development of emotional intelligence in children with ASD through the use of AI-generated images. The idea of the solution centres on using these images as personalised visual representations of emotions, which could be used in therapeutic or educational contexts to support EI development. In this thesis, the term 'conceptual mockup' is used to refer to this solution — specifically, as a non-functional, early-stage concept demonstration presented in the form of a video. It does not refer to a working prototype or an interactive interface, but rather to a visualised idea of a potential solution, used to communicate the idea and support expert interviews and feasibility evaluation. The conceptual mockup is presented in more detail in Chapter 3.

The second objective of the study is to open-mindedly gather various types of preliminary information and draw conclusions that help guide the solutions' future endeavours. The gained knowledge is intended to guide the future development of the conceptual mockup and to also inspire future research. Given the novelty of this topic and the limited existing scientific literature, the study adopts an exploratory research design to generate baseline knowledge and evaluate early-stage hypotheses.

Identifying the underlying research problem—that communication difficulties in children with ASD affect their emotional development and emotional intelligence—this study aims to answer the following research questions:

- **Primary Research Question:** What is the feasibility and potential of the conceptual mockup as a tool in emotional intelligence therapy for individuals with autism spectrum disorder?
- **Secondary Research Question:** What additional insights could support the development of the conceptual mockup and guide its integration into future emotional intelligence therapy and research?

To answer the research questions, qualitative data from the experts working with ASD children and their emotional development were collected and then analysed. Additionally, the knowledge gained from the theoretical framework presented in this thesis was utilised to bolster the answering of the research questions.

This thesis consists of a total of seven chapters: The second chapter presents the theoretical background, introducing the key concepts and perspectives that support the aims of this research. Chapter 3 introduces the development and design of the conceptual mockup. Chapter 4 outlines the research process and methodology. The fifth chapter presents the results. The sixth chapter analyses the results in relation to the research questions, discusses possible implications, addresses the study's limitations, and outlines avenues for future research. The seventh chapter sets the closing marks and general summary for the project.

2 BACKGROUND

Background chapter creates a gradually evolving conceptual understanding of the underlying theory behind this research project. First, an overview of the terms *Emotional Intelligence (EI)* and *Autism Spectrum Disorder (ASD)* is introduced. Then the role of communication and supportive means of communication as a bridge to the emotional development of children with ASD is discussed. To conclude the chapter, the concept of AI-generated images is introduced, along with their relevance to emotional development and assistive therapy tools.

The aim of this chapter is to provide sufficient theoretical understanding of the key topics of the thesis, highlight research gaps, and lay the foundation for the overall objectives of the study. The content presented here will be reflected against the empirical findings in the Discussion chapter, where conclusions are drawn and the research questions are addressed.

2.1 Emotional Intelligence

In this section I will explain the meaning of the term emotional intelligence (EI), introducing the different interpretations in the scientific literature. The goal is to critically investigate the term and therefore build a proper theoretical and practical knowledge to assist this study. I will also display the EI effects and correlations to the life of individuals', later in this theoretical framework connecting the gained knowledge to other central concepts around this thesis.

In the past two decades emotional intelligence has gained a lot of scientific and non-scientific interest because of its positive impact on personal and professional success (Gohm et al., 2005; Lopes et al., 2004; Rapisarda, 2002; Schutte et al., 2007). The term emotional intelligence was coined by Salovey & Mayer in 1990, but research on the non-cognitive aspects of intelligence dates back further (Cherniss, 2000; Dhani & Sharma, 2016). Although Salovey & Mayer coined the term, Dr. Daniel Goleman popularised it in his bestseller book "Emotional Intelligence, Why It Can Matter More Than IQ" (1995). Goleman's work gained a huge interest especially in the corporate world, because of the arguments towards correlations between EI and work performance (Cherniss, 2000). There are conceptual differences between the definitions of Mayer & Salovey, Goleman and other theorists, but despite the disagreements, the general benefits of EI are widely acknowledged in the scientific community.

There is no clear consensus about the exact definition of the term emotional intelligence. Some theories define EI as a human-ability-based construct, some as personality-trait-based construct—and some interpret it as a combination of the both (O'Connor et al., 2019). Scientific literature on emotional intelligence does not follow a single cohesive path; therefore, each definition of the term should be seen as one interpretation rather than the definitive answer (O'Connor et al., 2019). These different definitions of EI are introduced in Section 2.1.1 and its subsections. At a high-level EI can be interpreted as being a form of social intelligence, which consists of various abilities and/or traits. It is important for researchers and practitioners to recognise and understand the different theoretical frameworks to be able to utilise suitable techniques and measurements for their projects (O'Connor et al., 2019).

Without differentiating the various theoretical conceptualisations behind the term; higher levels of emotional intelligence positively correlates to many aspects of life like: better social relationships (Lopes et al., 2004), performance in work life (Rapisarda, 2002), psychological well-being (Gohm et al., 2005) and health in general (Schutte et al., 2007). Children and adolescents with higher levels of EI are proven to have more positive social relationships reported by themselves and their close circle (Lopes et al., 2004; Mayer et al., 2008). Additionally, people with high EI are perceived more positively by other individuals (Mayer et al., 2008). Given these findings, emotional intelligence should be seen as a highly important skill or an attribute that contributes to multiple domains of our life.

The baseline level of EI can strongly vary between individuals, but it is possible to increase the EI levels with different types of training (Nelis et al., 2009). Both short- and long-term emotion-related training are proven to have positive effects on the EI levels. The concrete training methods and tools might vary widely, but they are tied to dealing with our own emotions and the emotions of other individuals. Emotion-related diaries, identifying facial expressions, gaining emotion-related knowledge and generally working with multiple aspects of emotions are possible ways to increase the EI levels. Even though there might be a significant difference between the EI levels of individuals, with proper training it is possible to increase the EI levels and therefore gain the positives related to higher levels of emotional intelligence.

Understanding how emotional intelligence can be supported and strengthened through different methods has been an important part of the theoretical background of this thesis and also served as a central piece of knowledge when developing the conceptual mockup, whose feasibility is explored in the following chapters.

2.1.1 Emotional Intelligence theories & models

The not unanimous definition of EI has created different models to explain and measure emotional intelligence without conflicting with other theoretical explanations of the term (O'Connor et al., 2019): EI can be viewed via three main models: Ability EI, Trait EI and Mixed EI. All these three models declare and measure EI a bit differently, and for researchers and practitioners it is important to understand the differences between the models to incorporate suitable EI measurements and theories to their project. Classifying different EI constructs under these three models is not ideal due to their overlapping similarities but the categorisation makes it easier to understand the disagreements in the scientific literature.

The technological solution whose therapeutic feasibility is evaluated in this thesis was not developed based on any single EI model. Reviewing different models and theories of emotional intelligence was considered important background work, but the development of the solution was ultimately guided more by practice-oriented thinking and insights gained during the empirical part of the study. The relevance of the different models, and how they might relate to the conceptual mockup, is discussed further in Chapter 6.

In the following sections I'll introduce the three main models, emotional intelligence theory behind the models, and model-related ways to measure the level of one's emotional intelligence. The aim is to highlight the contradictions in scientific literature, uncovering the main differences, therefore building foundational knowledge for this research project.

Ability EI

In the ability model, emotional intelligence can be seen as a form of social intelligence, including a set of abilities to understand one's and others' emotions to guide our thinking and actions (Salovey & Mayer, 1990). The framework for emotional intelligence presented by Mayer & Salovey in their (1990) and (1997) articles, and then revised in (2016) by Mayer, Salovey & Caruso, revolves around how emotional intelligence serves as a unique but supportive type of intelligence next to regular cognitive skills. Because of the contradictory definitions of the term EI; Mayer & Salovey wanted to distinguish their work from others by relabelling their work as ability EI or four-branch model (Mayer & Salovey, 1997). Ability EI emphasises the focus on mental ability to reason about emotion and emotional meanings (Mayer, 2004), conceptualising the model around measuring maximum performance as in IQ tests (O'Connor et al., 2019; Petrides, 2011).

The four-branch / ability model of emotional intelligence identifies four core skills to define EI; (1) managing emotions, (2) understanding emotions, (3) perceiving emotions, and (4) emotions as facilitators of thought process (Mayer et al., 2016). The four-branch model with information per core skill is presented in Table 1. To understand the model and its role in the broader sense of EI, it is essential to know that the skills in ability EI are performance-centric, and measurable; the emotional intelligence levels can be quantified, and with performance-centric measurements, a numeric score of total EI can be formed (Mayer, 2004). The measurement of the level of emotional intelligence of a person is done by using standardised tests like Mayer-Salovey-Caruso Emotional Intelligence Tests (MSCEIT), which are to some extent comparable to IQ tests (O'Connor et al., 2019).

Table 1. *The Four-Branch Model of emotional intelligence, with a summary of key skills for each branch. Applied from (Mayer et al., 2016)*

<p>1. Managing Emotions</p>	<p>Managing emotions involves the ability to regulate both one's own emotional responses and those of others to achieve desired outcomes. This includes evaluating and applying strategies to maintain, reduce, or intensify emotions as appropriate, monitoring emotional reactions for their appropriateness, and deciding whether to engage with or step back from certain emotions. It also requires staying open to both pleasant and unpleasant feelings and recognising the value of the information they convey.</p>
<p>2. Understanding Emotions</p>	<p>Understanding emotions involves the ability to interpret emotional experiences in nuanced ways, including recognising cultural differences in emotional expression and evaluation. It encompasses the capacity to anticipate how emotions might unfold in the future, identify transitions between emotional states, and distinguish between complex, mixed feelings and broader mood states. This also includes labelling emotions accurately, understanding their causes and consequences, and evaluating the situations likely to trigger them.</p>
<p>3. Perceiving Emotions</p>	<p>Perceiving emotion involves recognising emotional cues in oneself, others, and the environment. This includes identifying emotions through facial expressions, vocal tone, language, and behaviour, as well as distinguishing between genuine and deceptive emotional displays. It also entails understanding how emotions are expressed across different cultural and situational contexts, accurately expressing one's own emotions when appropriate, and perceiving emotional meaning in areas like art and music.</p>
<p>4. Facilitating Thought Using Emotion</p>	<p>Using emotion to facilitate thought refers to the ability to harness emotional states to support cognitive processes. This includes selecting tasks that align with one's current mood, using emotional fluctuations to gain different perspectives, and directing attention based on emotional relevance. It also involves generating emotions to better understand others' experiences and to enhance judgment and memory.</p>

Trait EI

Petrides and Furham (2000) proposed a distinction between the ability-based (ability EI) and the personality trait-based interpretations of EI. The main difference between the two revolves around the way to measure emotional intelligence: while the ability EI

measures the maximal performance, the trait EI measures common reactions in situations involving emotions (O'Connor et al., 2019; Petrides, 2011). In the trait EI, all the measurements are based on self-reporting, whereas in ability EI the measurement is done by answering questions which are deemed to be correct or incorrect (O'Connor et al., 2019). Petrides (2011) criticises the ability EI and the measurement of the maximal performance in emotional experience, because of the highly subjective nature of the emotional experience. It is generally accepted in the scientific literature that the trait EI and the ability EI are two different constructs (Petrides, 2011).

Trait EI doesn't take a strict or detailed stance about what is emotional intelligence, or what should be part of the construct (Petrides, 2011). Petrides, Pita and Kokkinaki described trait EI as self-perceptions related to emotions, located at the lower levels of personality hierarchy (Petrides et al., 2007). Trait EI argues that individuals' traits and emotional self-perception makes it impossible to define the term emotional intelligence objectively (Petrides, 2011). Although a strict, universally accepted definition of trait EI remains difficult to make, Table 2 presents a set of key facets commonly used to conceptualise and operationalise the construct. These facets reflect typical patterns of self-perception in emotional contexts and serve as a foundation for self-report trait EI measures, such as the Trait Emotional Intelligence Questionnaire (TEIQue) (Petrides & Furnham, 2001).

Table 2. Facets of trait EI. Applied from (Petrides & Furnham, 2001)

Self-Related Facets	Emotion-Related Facets	Social and Interpersonal Facets
Self-esteem	Emotion regulation	Social competence
Trait happiness	Emotion appraisal (self & others)	Relationship skills
Trait optimism	Emotion expression	Assertiveness
Self-motivation	Emotion management (others)	Trait empathy
Adaptability	Stress management	
Impulsiveness (low)		

Trait Emotional Intelligence Questionnaire (TEIQue) is one way to measure the level of one's (trait) emotional intelligence (Pérez et al., 2005). The basic version of TEIQue

consists of 153 Likert scale questions (Pérez et al., 2005). And as a result, the person completing the questionnaire will receive their general and facet-specific EI scores (Pérez et al., 2005). There are many alterations of the basic TEIQue; for example a shorter 30-question version and a version recommended for children (Petrides, 2009). While TEIQue is not the only practical way of measuring the trait EI (Pérez et al., 2005), it is repeatedly recommended and academically approved (Freudenthaler et al., 2008; Gardner & Qualter, 2010; O'Connor et al., 2019).

Mixed model EI

Mixed model EI can be seen as a category for emotional intelligence models and theories, which combine the ability EI and trait EI (O'Connor et al., 2019).

Measurement of the level of one's emotional intelligence—in a mixed model—is done by using self-reporting methods as in trait EI with the support of other tools and methods appropriate for the situation (Dhani & Sharma, 2016; O'Connor et al., 2019).

Even though there is not a clear consensus about the categorisation of the different models and theories (Zeidner et al., 2008), literature suggests that Daniel Goleman's (1995) and Reuven Bar-On's (2006) theories can be interpreted as being part of the mixed model (Dhani & Sharma, 2016; Mayer et al., 2000; O'Connor et al., 2019). Both of these theories view emotional intelligence as a collection of abilities (as in ability EI) and non-ability traits (as in trait EI) (Mayer et al., 2000). Mixed model theories can be seen as the broadest definitions of emotional intelligence; they combine aspects of both ability- and trait-based models of emotional intelligence (O'Connor et al., 2019).

2.1.2 Summary of the EI models & theories

Reflecting on the three models outlined earlier, we can see that defining what emotional intelligence is, isn't straightforward and unambiguous. But with shifting the focus from detailed conceptual definitions to a more general interpretation of the term EI, a significant overlap can be seen between the models. All the models seem to share a common general-level definition: EI is how we recognise and regulate emotions both in ourselves and in others. Also following four features can be found from every model, even though the terms used by theorists might differ: *self-awareness*, *emotional management*, *social awareness* and *relationship management*. With understanding the distinctions in theories, it is possible to construct better research projects (O'Connor et al., 2019), but the differences in theories can also be seen as more complementary to each other, rather than contradictory. All the models acknowledge the central role of emotions and how well we deal with them as a highly important aspect of life and well-being.

Although the conceptual mockup introduced in Chapter 3 was not originally developed with a specific EI model in mind, these models offer useful perspectives for understanding the mockup's potential benefits, limitations, and alignment with emotional development goals. The connection and relevance of the different models to the development of the mockup are discussed in Chapter 6.

2.1.3 Finnish translation of EI within this study

One noteworthy point regarding the concept of emotional intelligence is how the term is interpreted in the Finnish language, which is the native language of the author of this thesis. The interviews conducted in the empirical part of the study were carried out in Finnish language, and therefore, the terminological differences between English and Finnish should be noted. In the Finnish language, the term emotional intelligence is most commonly translated as *tunneäly* or *tunnetaidot*. Some Finnish studies make a distinction between the two Finnish terms, using *tunneäly* to refer to a broader definition of emotional intelligence, and *tunnetaidot* as a construct within the Ability model (Finnish: *kykymalli*) of emotional intelligence (Virtanen, 2013). However, it can be said, and as suggested by the empirical findings of this study, that these two terms are often used interchangeably in everyday language. During the interviews of this study, the two Finnish terms *tunneäly* or *tunnetaidot* were used interchangeably without differentiating the theoretical interpretations behind the two terms.

2.2 Overview of Autism Spectrum Disorder

In this section I provide a brief introduction to autism spectrum disorder; what it is, the causes behind the disorder, how it develops and how it affects individuals' behaviour. The chapter establishes a theoretical foundation for understanding the characteristics of ASD and for the use of various technological or non-technological applications as one form of support. The purpose of this section is to build understanding of the characteristics of ASD that help in evaluating the feasibility of the conceptual mockup within this specific user context.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder, affecting individuals' communicational skills and behavioural habits (Campisi et al., 2018; National Institute of Mental Health, 2022). People diagnosed with ASD face difficulties in social interaction settings and have challenges with restricted, repetitive sensory–motor behaviours (Lord et al., 2018). These difficulties and challenges can be for example: deficits in emotional response, poor verbal and non-verbal communication skills, repetitive movements and abnormal interest towards objects or sensory aspects

of the environment (Lord et al., 2018). The severity level of the symptoms can vary significantly, and therefore ASD should be seen as a spectrum rather than a binary condition (Geschwind, 2008).

ASD strongly correlates with genetic factors (Kumar & Christian, 2009; Waye & Cheng, 2018). Children of parents with neurological disorders are associated with increased odds of developing neurological disorders like ASD (Xie et al., 2019). The heritability of autism spectrum disorder ranges from 64 % to 91 % (Leppä & Tammimies, 2020). If an older sibling is diagnosed within the broad spectrum of autism, the risk for a younger sibling to develop the disorder is 8.4 times higher than average (Leppä & Tammimies, 2020). Environmental factors like complications during pregnancy and air pollution have also been linked to the spectrum of symptoms (Mandy & Lai, 2016). With decades of research, we understand that ASD is strongly connected to genes, but the exact causes behind the ASD and the complex diversity of the spectrum still remains unclear (Geschwind, 2008).

Autism Spectrum Disorder can be diagnosed at any age, with typical symptoms starting before the age of 3 (National Institute of Mental Health, 2022). Early diagnosis of ASD can be done by professionals like paediatricians, psychiatrists, or psychologists with the help of diagnostic instruments like standardised observation tools and methods (Lord et al., 2018). Due to the heterogeneity of the condition and diversity of the symptoms, the diagnosis of ASD is often difficult (Havdahl et al., 2016), but diagnosis can be reliably made by trained professionals (Regier et al., 2013). Despite the possible difficulties, the evidence says that early diagnosis is important, and suitable treatment can significantly improve the quality of life of individuals with ASD and their close circle (Elder et al., 2017).

2.3 ASD & Emotional Intelligence

This section introduces the relationship between ASD and EI by examining the communication characteristics of ASD children, highlighting the central role of communication as a bridge to developing emotional intelligence. It also discusses the possibilities of using visual material as a treatment method to support the communication deficits in ASD children.

Children with ASD typically have lower levels of emotional intelligence due to their social and emotional challenges, as is typical to the general picture of the symptoms (Boily et al., 2017; Brady et al., 2014). One major reason behind the lower levels of EI in children with ASD are their communication-related difficulties and their less nuanced understanding of both basic and complex emotions in social interactions (Trevisan et

al., 2021). This less nuanced understanding of emotions makes it more challenging for ASD children to naturally develop relationships and their capability dealing with emotional problems (Trevisan et al., 2021). The typically lower levels of EI negatively affect the everyday social situations like vocational, educational and personal contexts (Brady et al., 2014). EI skills are highly important to every human being, and – because of the lower baseline level of EI – ASD children can significantly benefit from improving their emotional intelligence capabilities (Chaidi & Drigas, 2022).

2.3.1 Characteristics of communication in children with ASD

The severity of symptoms in children with ASD varies widely, affecting their communication skills differently (Vienonen, 2022). Some children diagnosed with ASD have no abnormality in communication skills, while some other ASD children do not verbally communicate at all. Some might have limited verbal skills while some others might experience difficulties in understanding abstract verbal expressions and figures of speech. Repetitive speech and generally slow processing and acting in a communication environment are typical symptoms. Although communication difficulties vary greatly, it is fairly common for children with ASD to experience challenges interpreting both non-verbal and verbal cues, often leading to atypical behaviour in communicative settings.

Children experiencing communication difficulties might benefit from alternative means of communication to support their verbal and non-verbal interactions (Suomalainen Lääkäriseura Duodecim, 2023). Augmentative and Alternative Communication (AAC) generally refers to techniques or methods which could support the child in communication settings. These AAC methods are used when a person does not have spoken language or when they need additional means of expression to support their communication needs. Some of the possible AAC methods are: using images, action and body messages, and technical aids such as speech devices. The suitable AAC method or a combination of methods is always chosen individually, and should be selected based on the child's language developmental level. The child's immediate circle plays a central role in the practical utilisation of the chosen AAC methods; they can provide help with practicalities related to working with the method, while also motivating to use it. The use of AAC methods opens non-traditional communication possibilities, which could help the child develop their skills and communicate in a format they understand.

2.3.2 Using images to support communication

Images, or more generally visual materials, can serve as AAC methods to support communication development in children with ASD (Vienonen, 2022). Image-based methods like PECS (Picture Exchange Communication System), are practical solutions that support ASD children's communication skills (Pereira et al., 2020). In the PECS method, children are taught the basic principles of social interaction using image cards as communication tools (Suomalainen Lääkäriseura Duodecim, 2023). In the first phase of using the PECS method, the children communicate their basic needs, by for example saying they are thirsty by picking an image card representing thirstiness (National Autism Resources, n.d.). The method then gradually expands to include expressing emotions, using a broader communication vocabulary, and forming full sentences (National Autism Resources, n.d.; Suomalainen Lääkäriseura Duodecim, 2023). Art therapy is another scientifically proven example of a method, where one goal is to support the communication skills of ASD children via visual expression (Schweizer et al., 2020). Regardless of the specific method using visuals, the high-level goal is to let the children communicate in ways other than speaking (Suomalainen Lääkäriseura Duodecim, 2023). Visual materials serve as accessible means to address the communication challenges faced by ASD children, thereby supporting their emotional intelligence skills.

Combining the earlier, it can be said that children with ASD typically have lower levels of emotional intelligence, largely due to their communication-related challenges. Supporting children with their communication is therefore a central pathway to improving emotional intelligence, and visual materials have been shown to be particularly effective in this regard. Image-based AAC methods such as PECS offer children alternative ways to express themselves beyond spoken language, and allow for more accessible and personalised interaction, helping with their communication deficits.

The next section builds on the previously established understanding by shifting the focus to the technological perspective. It examines the role of technology and its applications in supporting communication in children with ASD, building on earlier insights into the recognized role of images as supportive means for communication.

2.4 Technological approaches to support EI

A growing body of research suggests that digital tools such as virtual reality environments, social robots, emotion-centred games, and music therapy applications can effectively support the emotional development of children with ASD (García-García et al., 2025). These technologies have shown particular promise in helping children identify and interpret emotional cues, which are foundational skills for developing emotional intelligence (García-García et al., 2025). Rather than replacing traditional non-digital support methods, these tools are increasingly viewed as complementary (García-García et al., 2025). However, in some cases they have even been reported to outperform more traditional interventions such as music therapy (Lahiri et al., 2015). A key strength of modern digital solutions is their ability to offer personalised, repeatable, and structured training in controlled environments that reduce the social pressures often associated with interpersonal interaction (Lahiri et al., 2015).

This section presents technological approaches designed especially to address the communication and emotional challenges faced by children with ASD. The aim is to describe existing tools and explain how they function as support mechanisms, while drawing attention to the unique aspects of digital solutions that distinguish them from more traditional methods. The focus is on how digital interventions can strengthen communication and emotional skills, and why these features may be particularly beneficial in comparison to non-digital alternatives.

2.4.1 Technological AAC methods

As noted earlier, emotional intelligence challenges in children with ASD often arise from difficulties in communication and emotional understanding. A number of digital augmentative and alternative communication (AAC) tools have been developed specifically to support the identification and expression of emotions (Lima Antão et al., 2018). These tools have been shown to improve emotional and communicational skills in individuals with ASD, particularly when used in personalised ways as part of broader intervention plan (Lima Antão et al., 2018).

Digital AAC tools follow similar therapeutic principles to those seen in traditional methods such as the PECS approach described in Section 2.3.2. At a broad level, they aim to create structured environments where children can practice things like naming emotions and simulating social interactions and thereby improving their emotional and communicational skills (García-García et al., 2025). On a practical level, this might involve for example identifying different emotional states from images presented by the application (García-García et al., 2025). Although the underlying goals of these tools

are similar to those of more traditional methods, digital solutions often offer greater opportunities—for example, in terms of personalisation (García-García et al., 2025). From a therapeutic perspective, tailoring the experience to the individual is considered highly beneficial (García-García et al., 2025; Lima Antão et al., 2018). Compared to non-digital methods, digital applications are typically more adaptable and easier to customise for the diverse needs of children with ASD (García-García et al., 2025).

Because ASD is a highly heterogeneous condition, with wide variation in the severity of the symptoms, tailoring support to individual needs is essential (García-García et al., 2025). In this regard, digital solutions offer a practical advantage. However, for these tools to be effective in practice, they must be integrated into structured and comprehensive intervention plans (Lima Antão et al., 2018). This may involve formal therapy, planned use of selected support methods, and the active involvement of caregivers in the implementation process (Lima Antão et al., 2018).

2.4.2 The motivational role of technology

Given the complexity and variability of ASD, broad claims about individual preferences must be made with caution. However, studies have shown that children with ASD often favour technological applications over other leisure activities (Papoutsis et al., 2018; Shane & Albert, 2008). This preference is particularly evident when the applications are designed with their specific needs and sensitivities in mind (Cañete & Peralta, 2022). These findings highlight the importance of applying inclusive and user-centred design principles in the development of assistive technologies (Cañete & Peralta, 2022).

Children's positive response and motivation when interacting with technology-based tools can support their integration into therapeutic interventions (Papoutsis et al., 2018). This general tendency toward utilising technology may encourage the incorporation of technological applications as part of treatment approaches. It also provides one perspective of justification for the development of the conceptual mockup. In Chapter 6 I will discuss the motivation and design-related aspects to improve and make the user experience of the conceptual mockup better meet the needs of ASD individuals.

2.4.3 Bridging technology and communication

Digital tools designed to support the communication skills of children with ASD have shown to be effective (García-García et al., 2025; Lima Antão et al., 2018), and in some cases, even more so than traditional non-digital methods (Lahiri et al., 2015). When these tools are used in ways that take individual needs into account and are placed within a broader support system, such as therapy or structured intervention

plans, they can meaningfully contribute to both communication and emotional development (García-García et al., 2025; Lima Antão et al., 2018). One common feature across both digital and non-digital approaches is the use of visual materials like images, which have been shown to help with tasks such as naming emotions and developing interaction skills (García-García et al., 2025).

The conceptual understanding developed so far suggests that communication difficulties are closely linked to emotional challenges in children with ASD, and that visual materials can be one central way to support both. These visual materials can be used in both modern digital solutions and more traditional non-digital applications. However, digital tools offer greater opportunities for personalised user experiences, which are known to better support the therapeutic goals of such interventions. This understanding forms the basis for the next section, which introduces the concept of AI-generated images. First, the term is defined, and then it is connected to the earlier discussion by exploring how these AI-generated images could potentially be used as part of communication and emotional support for children with ASD.

2.5 AI-generated images

This section introduces the term AI-generated images and integrates it into the already established theoretical context, providing a foundation for their potential use in supporting the emotional development of children with ASD.

AI-generated images can be interpreted as an umbrella term for the creation of visual content using techniques associated with artificial intelligence generated content (AIGC) and more specifically generative artificial intelligence (GAI) (Cao et al., 2023). Regardless of the specific technology or combination of different technologies behind the creation of the content, the primary goal of AI image generation is to create unique visuals that respond dynamically to user needs and actions. Typically, a user can interact with an AI image generation service (e.g. DALL-E, Midjourney, Stable Diffusion) by providing a textual description in natural language, and the service will create a visual image based on this description. While the technologies behind these services may vary, the user experience remains mostly the same: the user inserts an input or so-called 'prompt' as natural text, and the service creates an image based on this input. The term 'AI-generated images' is not tied to any specific technology or service; it broadly refers to the creation of images based on user input using GAI techniques.

Even though the amount of prior research is extremely limited, AI-generated images have shown promising implications supporting children's emotional development by

empowering their creativity and self-expression (Lee et al., 2023; Wang & Xinnuo, 2023). AI-generated images have also shown potential in interpreting the human emotions described in the textual inputs provided to the image generation service (Lee et al., 2023). Lee et al. (2023) encourage future research to build upon their discoveries about the potential of using AI-generated images in interventions such as mental health education, therapy, and counselling.

Intuitively, there are numerous technological and instrumental possibilities to use AI-image generation as a tool to help ASD children with their emotional development. As discussed in Section 2.4, digital AAC tools commonly aim to enhance communication by helping children name and recognize emotions, often through the use of visual materials. While the specific application of AI-generated images within these tools remains largely unexplored in current research, it is logical to assume that both AI-generated visuals and artificial intelligence more broadly could offer novel and personalised solutions to communication challenges in ASD contexts. These tools may help children express emotional content in more accessible and engaging ways, particularly when tailored to individual needs. This assumption is one of the premises of the present study, which explores the potential feasibility of an AI-image-based application as part of therapeutic and other supportive interventions for children with ASD.

As a technology, artificial intelligence offers a framework that can inherently support the specific needs of children with ASD, particularly in relation to individualised requirements and personalised user experiences. For example, the text-to-image conversion can be done using multiple modalities (e.g., speech, text, gestures), and in personalising the overall experience to serve different individual needs (Wang & Xinnuo, 2023). Presenting emotions as AI-images is still fairly new and unexplored territory. Hence, the implications suggest positive possibilities for the use of AI-generated images in emotional development.

While assistive visual tools, such as non-digital PECS and its digital counterparts, are widely used in ASD therapy settings, they typically rely on predefined visual materials. Research on dynamically generated and personalised emotion-based visual content, such as AI-generated images, is extremely limited. The potential of AI-generated images to reflect emotional states in a personalised way has not yet been systematically explored in therapeutic or educational contexts. This represents a meaningful gap in the current literature. This thesis takes an exploratory step toward addressing that gap by investigating the feasibility of the conceptual mockup and the

use of AI-generated images within the solution. The implications are further discussed in Chapter 6.

2.6 Summary of Chapter 2

This chapter introduced the key theoretical terms and concepts relevant to this thesis, providing a foundation for evaluating the technological solution explored in this study. The aim was to first define the terms and concepts, and then link them together to form a gradually evolving conceptual understanding of how to improve emotional intelligence, and how it can support children with ASD. Also, the chapter provided a theoretical foundation for the idea that using images is beneficial for developing communication skills, and therefore EI of children with ASD. In addition, the chapter built understanding and laid the groundwork for exploring the potential of AI-generated images as part of therapeutic interventions and communication support for children with ASD.

The contents of this chapter are linked to the practical context and objectives of this study in the Discussion chapter, where theoretical and empirical knowledge are synthesised to examine the findings in the light of the research questions.

The next chapter introduces the technological solution, referred to as the conceptual mockup, and describes its origins, functionality, and role in this thesis.

3 DEVELOPMENT OF THE CONCEPTUAL MOCKUP

A technological solution, referred to as a 'conceptual mockup' throughout this thesis, is a central part of the study and its underlying motivation. In this context, the term refers to a non-functional, early-stage representation of a potential solution, presented in the form of a video. It is not a working prototype or an interactive system, but a visualised concept designed to communicate the idea and support expert interviews conducted during the feasibility evaluation.

The conceptual mockup was created prior to this thesis as a course project, which sparked the idea for this master's thesis project. This chapter introduces the solution by explaining the development process and the reasoning behind the creation, while also outlining all the technological and non-technological aspects considered necessary knowledge for understanding this thesis. The goal is to provide a clear overview of the stage at which the solution and the entire project were before the start of this thesis.

3.1 Beginning of the project

The conceptual mockup was created as part of a Human-Technology Interaction Research and Innovation Project course at Tampere University in 2023 as a group work by Mika Pelvola (author of this thesis) and Tuire Viita-aho. The course was supervised by the main supervisor of this master's thesis, Markku Turunen, professor from Tampere University Faculty of Information Technology and Communication Sciences. Broad idea of the course was to create some form of an innovation or a project in the field of human-technology interaction, based on the topics given by the course supervisor. One of the topics was "Generative AI and Art", inside which the conceptual mockup was created.

Second-year Human-Technology interaction master's students, Mika Pelvola and Tuire Viita-aho shared similar ideas about the type of innovation they would like to develop; both were interested in innovating and then developing something to help kids and their parents. After various different ideas, the group chose to continue with the vision of using AI image generation to capture the feelings of individuals, and then use the generated images as some sort of a help with their emotional intelligence. The seed idea for the whole innovation did arise from our own perceptions and hypotheses about autism spectrum disorder and emotional intelligence. The innovation and the development process were then further aligned by a small-scale literature review

conducted by the project group. Based on our initial understanding and a brief literature review, we identified the central problem facilitating the conceptual mockup development: children with ASD commonly have difficulties with emotional intelligence, and these children might benefit from visual guidance in recognising, naming, expressing and processing their feelings and emotions. This initial seed idea, together with our early hypotheses, eventually formed the main research problem for this master's thesis.

The course didn't set strict requirements about the actual concrete end-result of the project. The group decided to deliver the project and communicate the idea of the solution in the form of a concept-video, which would give an overview of the whole idea. This created video is central part of this whole study, because it is used within the conducted interviews communicating the idea of the solution to the interview participants. Link to the video is provided in the next section with more detailed introduction.

In late 2023, when groups had introduced their innovations, course supervisor Markku Turunen told us that our innovation had sparked some interest in Professor of Child Psychiatry, Kaija Puura. Markku suggested contacting Kaija about the possible future development of the innovation. In early 2024 Kaija, Markku, Mika and Tuire had a meeting where we agreed that the innovation deserves more studying. After the meeting we agreed that I (Mika) will continue the project as my master's thesis, and the thesis would be supervised by Kaija and Markku. The angle from which the innovation would be researched within the thesis was not specified at this point. We agreed that testing the feasibility of the conceptual mockup and creating more knowledge of the novel idea should be the broad goals of the thesis. From these initial goals, the idea naturally developed throughout this thesis project.

3.2 Idea of the conceptual mockup

The broad idea of the conceptual mockup is to let the user create an AI-image of their emotional experiences and then use this image as an aid for developing emotional intelligence. On a high level, this is done by using a smartwatch to communicate with an AI image generation service, and then using the generated images as support for discussion, for example in therapy settings.

To get the best possible perspective on the idea of the conceptual mockup, the following video should be watched:

<https://vimeo.com/1070418690/d8021b2318?ts=0&share=copy>. The workflow of the mockup is also introduced in Section 3.2.1. For the purposes of better understanding

this thesis project, the video and the illustrations in Section 3.2.1 should be considered as communicating a larger idea, rather than precise and polished technical details.

It is important to note that the whole idea of the solution, including the conceptual mockup video, was created prior to the beginning of this thesis project. A small amount of scientific backbone had been identified, but the need for further investigation was evident. The need for further research serves as a motivation and justification for this thesis.

3.2.1 Workflow of the conceptual mockup

Detailed explanations of the conceptual mockup's functionality and technological development are not essential for understanding this study. However, a basic understanding of the technologies used and how the mockup works can help with digesting the contents of this thesis.

In brief, the process of using the solution consists of the steps presented in Figure 1. The steps give a high-level understanding about how the conceptual mockup works from the technical point of view. Additional and more specific information regarding the different steps is presented below the figure.

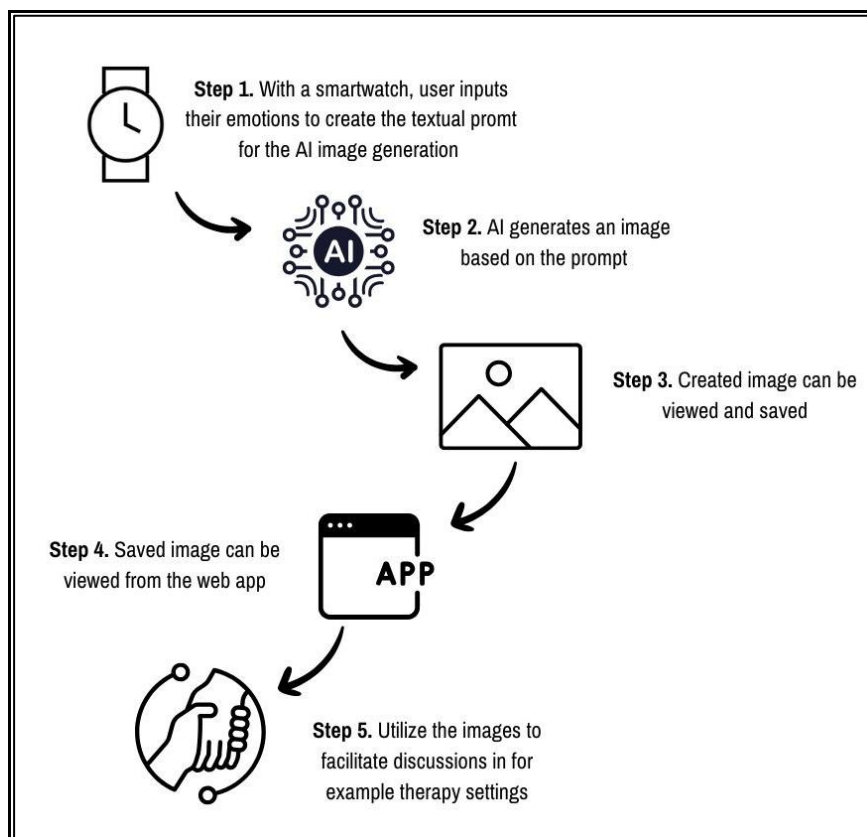


Figure 1. Overview of the conceptual mockup's workflow, illustrating how user input is transformed into AI-generated images and later used in therapy or educational contexts.

Step 1. Users can input their emotions or emotional experiences with their preferred modality. Input can be given as text, speech, or with premade questionnaires. The application processes and stylises the input data provided by the user so that it can be used as a prompt for an AI image generation application. An example of the process of inputting emotional experiences using the premade questionnaires is presented in Figure 2.

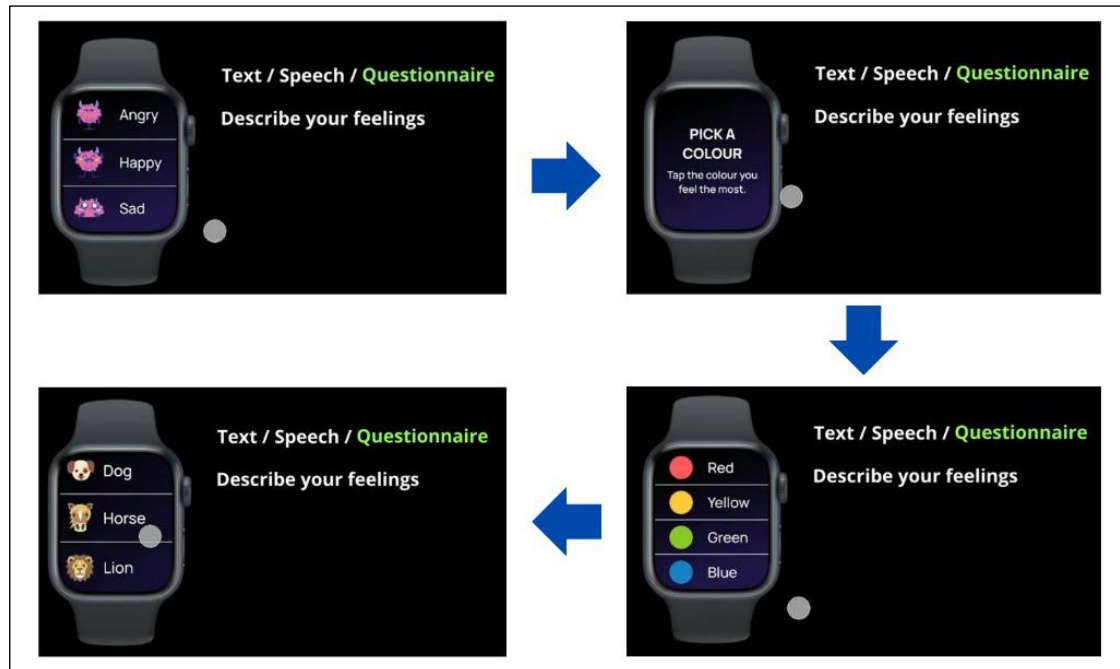


Figure 2. Screen captures from the conceptual mockup video, introducing emotional input using premade questionnaires as the input modality.

Step 2. AI-image generator processes the prompt and creates an image based on the given prompt. The prompt depends on the input provided by the user, as well as any technical processing the application may apply to that input. Referring to Figure 2, an example of input sent to the AI image generator could be: **'an angry red lion'**. Of course, in a real situation, the input would not be this simplified; it would need to include information such as the desired image size and other details. However, a detailed breakdown of these elements is not essential for understanding the high-level functioning of the conceptual mockup. What matters most is understanding that the user provides information about their emotional experiences using their chosen input method, and that this information is used in the image generation prompt.

Step 3. Users can see the created image with their smartwatch and decide whether they want to save the image or not. Figure 3 demonstrates image created with the prompt of 'angry red lion'.



Figure 3. Screen capture from the conceptual mockup video, showing the step in the workflow where the AI image is generated.

Step 4. If the user decides to save the image, it is now accessible via the solutions web application, for example by using a computer's web browser and logging into their account. The web application can be used by, for instance, the children themselves, a therapist, guardians, or anyone who has been granted access in the application's settings. Illustrative images of mobile and desktop devices, and how the generated image might appear on them, are presented in Figure 4.

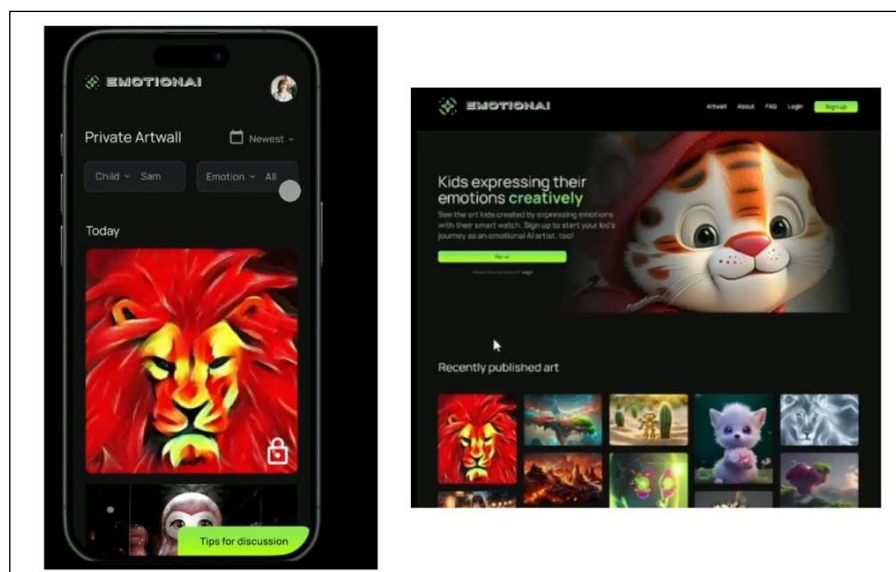


Figure 4. Screen captures from the conceptual mockup video, demonstrating the possibility of accessing the created images using both mobile and desktop technologies.

Step 5. Now that an image or images have been generated by the child and shared, for example with the child's therapist, they can be used as part of emotional intelligence therapy to support discussions about emotional experiences.

The extent to which this application, or the images it generates, can be used as part of EI therapy forms the central research motivation of this study – Chapter 4 introduces the specific research questions, which aim to examine this potential.

3.3 Role of conceptual mockup in this thesis

In this thesis, the conceptual mockup video was explicitly used as part of the expert interviews. It helped participants better understand the solution idea and then estimate its feasibility and to provide insight into the project's future endeavours. In other words, it served as a practical tool to facilitate informed feedback and guidance during the interviews, rather than being a fully thought-through or finalised solution. The interviews, and how the conceptual mockup was integrated into them is introduced in more detail in the Chapter 4 (Research Process and Methodology). Chapter 6 (Discussion) addresses the limitations of using an early-stage solution, such as the conceptual mockup, as a research method in this study.

This chapter has provided the necessary background and functional overview of the conceptual mockup, forming the basis for evaluating its feasibility and development potential. As the solution is both the foundation and the motivation for this thesis project, it is closely integrated into the research process. The following chapter introduces the research process and methodology, outlining the framework and methods through which the conceptual mockup was explored and assessed.

4 RESEARCH PROCESS AND METHODOLOGY

This chapter introduces and justifies the research process and the chosen methods. The process and the methods used were designed and selected to align with the exploratory nature of the study, the identified research problem, and the research questions.

The identified research problem guiding this whole research project is as follows:

- **Research problem:** Children with ASD often struggle with communication skills, which affects their emotional intelligence. This can negatively impact their social relationships, performance in work life, and overall health.

Identifying the underlying research problem, the following research questions were developed:

- **Primary Research Question:** What is the feasibility and potential of the conceptual mockup as a tool in emotional intelligence therapy for individuals with autism spectrum disorder?
- **Secondary Research Question:** What additional insights could support the development of the conceptual mockup and guide its integration into future emotional intelligence therapy and research?

The research questions were designed to serve different but complementary purposes. The primary question focuses on evaluating the feasibility of the concept in its current state, specifically in relation to the features and implementation choices already included in the original idea. The secondary research question addresses aspects of the conceptual mockup and its related research that go beyond the original idea but remain important for its further development.

The methodological approach for gathering empirical data to answer the research questions is qualitative research using semi-structured interviews. Data from the experts working with children with ASD and their emotional development was collected and then analysed to uncover feasibility and the future of the conceptual mockup. The insights gained with the chosen methods will be synthesised with the theory in the later chapters.

In the following sections of this chapter, the holistic research design, participant recruitment, and the methods used to collect and analyse data are introduced and justified to serve the purposes of this study.

4.1 Research Design

This research project is conducted within the exploratory research design. Exploratory research is a type of research, which aims to gain information about a little-known subject (Drew, 2023; Swedberg, 2020). It is a useful way to conduct a study if the goal is to open-mindedly gather information about a certain topic (Drew, 2023). With exploratory research it is possible to gain a broader perspective, general sight, and understanding towards a fairly unexplored area (Drew, 2023). Exploratory research should be seen as a type of research used in the early stages of a research project for theorising empirical material, and facilitating the possible future research (Swedberg, 2020).

More specifically, exploratory research seeks to produce descriptive baseline data to improve understanding of the subject, support and guide future studies that may use more conclusive methods and generate new ideas or hypotheses for further investigation (Drew, 2023). It also serves to test the overall feasibility of all kinds of research projects (Drew, 2023).

Exploratory research is not limited to certain research methods. Hence, it is common to use small-scale qualitative research approaches like expert interviews and case-studies to meet the objectives (Drew, 2023). Because of the nature of exploratory research and small-scale qualitative research projects in general; the results are usually not generalisable and to make persuasive claims, follow-up studies are usually needed (Drew, 2023). In conclusion, exploratory research is an approach used to investigate a fairly unexplored subject aiming to gain insights, support future work, and develop hypotheses. Considering the objectives of this thesis, namely, to gather preliminary insights and inform the future direction of the research, an exploratory research approach is well justified.

Despite its limitations, exploratory research is appropriate for the aims of this study. Given the relatively unexamined nature of the topic, the insights gained are expected to support the future development of the conceptual mockup and inform further research. While the results are not generalisable and strong conclusions cannot be drawn, the approach is well suited to creating preliminary understanding. The specific limitations of this research design are discussed in more detail in the Discussion chapter.

4.2 Participant Recruitment

Two individuals working with ASD children and their emotional intelligence development were interviewed. The participants were recruited via email using the

professional connections of the second supervisor of this thesis, Professor of Child Psychiatry, Kaija Puura. Participation was fully voluntary. The selection of the participants was based on professional background in the emotional development of children with ASD, their current involvement in work closely related to this field, and their practical experience in emotional therapy with ASD children.

Both participants received a brief information package via email about the thesis to help them better understand the research project and decide whether to participate. Participants were given an option to choose if the interview was conducted in their chosen physical-environment or by using internet-meeting platforms like Microsoft Teams. Participants were also instructed that the interview would last a maximum of one hour in length and attending the interview requires no preparation from them.

Two workdays prior to the scheduled interview, the participants received an email where data and privacy related information and the general structure of the interview were introduced. Participants were also informed that although the collected data will be pseudonymised, there remains a possibility that they could be identified based on their responses, given their specialised roles and expertise. Guidelines of Good scientific practice of Tampere University (Tampere University, 2025) were followed in every phase of participant recruitment. The two participants who took the interview are listed in Table 3.

Table 3. *List of participants and their background information.*

Participant ID	Occupation	Experience in years	How many years of experience working with ASD-children
P1	Child psychiatrist	15	10
P2	Nurse (Terveystenhoitaja) / Psychiatric nurse	19	19

While significant variations in sample sizes are common across qualitative research projects (Mason, 2010), the small sample size of this thesis is acknowledged as a limitation. This limitation is further elaborated in Section 6.4.

4.3 Data Collection

Both interviews were conducted remotely between August and September 2024 using Microsoft Teams. The whole interview session consisted of the following components:

1. Short presentation explaining the idea of the research project and the structure of the interview - 10-15 minutes
2. Collecting background information and informed consent using Microsoft Forms - 5 minutes
3. Showing the participant a video of the conceptual mockup, necessary for being able to answer the interview questions - 5 minutes
4. Conducting the actual interview - 30 minutes. This part was audio-recorded.

The interviews followed a semi-structured interview plan with the idea of getting answers to the key topics but also letting the participant and their expertise guide the interview towards a more open-ended discussion. Considering the exploratory research design of this thesis, guiding the interview to a more open-ended discussion was considered a better approach compared to a strict interview plan. Both of the interviews were conducted in Finnish. The materials for the interview session, including presentation and the semi-structured interview template can be found in Appendix A.

4.4 Data Analysis

The data analysis began with the establishment of two deductive categories aligned with the research questions. The first category was dedicated to addressing findings relevant to the primary research question, while the second category focused on findings related to the secondary research question. These categories were established before any analysis of the interview data was conducted. The idea behind this deductive categorisation was to create a framework for addressing both research questions, while also providing structure for the subsequent results and discussion chapters and improving the overall readability of the thesis.

Next, all interview observations relevant to the thesis objectives were listed without yet categorising them further. After the listing, the observations were sorted into the previously defined deductive categories based on whether they were considered relevant to the primary or the secondary research question.

Finally, thematic entities were constructed under the main categories derived from the research questions, bringing together observations related to similar topics. These thematic entities are initially presented in the Results chapter and are subsequently

examined in more detail in the Discussion chapter. Within the Results chapter, the thematic entities can be identified through the use of bolded text. The data analysis process is also visualised in Figure 5.

Due to the open-ended nature of the exploratory research projects, the goal of data analysis was to allow themes and insights to emerge naturally from the data without imposing strict analytical frameworks. Even though the two categories were established before processing the data, the overall analysis was still largely driven by the observations. This inductive approach to creating themes and structuring data was considered to best serve the purposes of this exploratory research project.

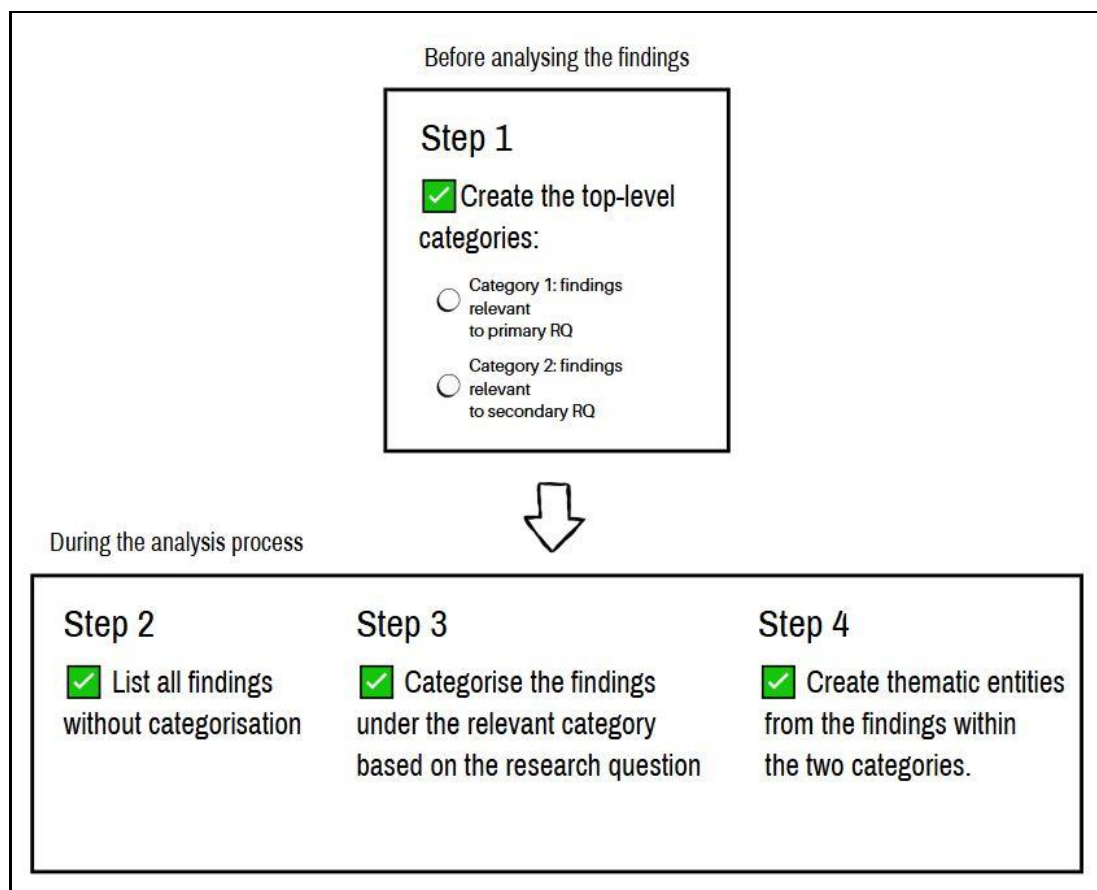


Figure 5. Steps of data analysis process

To conclude this chapter, the exploratory and open-minded nature of the project was taken into account in the research design and methodological choices. The aim was to create favourable conditions for collecting and analysing a broad range of preliminary data that could enhance understanding around the study's core objectives and provide direction for future research. While the selected methods support the exploratory, insight-driven aims of this thesis, they also entail certain limitations. These limitations

and challenges of the used data analysis methods, and the exploratory research framework in general, are debated further in the Limitations section within the Chapter 6. In the next chapter, the empirical results are organised and presented through the thematic entities developed during the data analysis process.

5 RESULTS

This chapter presents the key findings from both interviews conducted as part of this thesis project. The findings are organised under two main sections: 5.1 Feasibility of the technological concept and 5.2 Insights for the future development process. These sections reflect the two deductive categories established during the data analysis phase, aligned with the primary and secondary research questions.

Within each of the two main sections, the findings are presented as thematic entities derived from the data analysis. These entities, identifiable by bolded text, represent the core analytical insights created through the interview material. For clarity, thematically related entities are grouped together under descriptive subheadings.

The results in Section 5.1 address the primary research question by offering insights into the feasibility of the conceptual mockup and providing direct feedback on its current state. Section 5.2 responds to the secondary research question by presenting development-oriented insights that extend beyond the mockup's current scope. These findings, along with their interpretations, will be further examined in the following Discussion chapter. All results are summarised in Table 4 in Section 5.3.

Some overlap in results exists between sections 5.1 and 5.2, as certain findings could be interpreted as relevant to both research questions. For example, some insights help evaluate the feasibility of the current concept, but at the same time align with the aims of the secondary research question. To improve readability and to keep the thesis structure consistent, this overlap is acknowledged and considered acceptable.

Results are not arranged based on their significance; their order corresponds to the thematic discussion presented in the next chapter. The quotes in this section were first translated from Finnish to English and then rephrased to improve clarity while preserving their original meaning. In the quotations, participants are referred to as P1 and P2, as indicated in Table 3 in Chapter 4.

5.1 Primary RQ: Feasibility of the technological concept

This section presents the results which can be considered to unveil the feasibility of the conceptual mockup in its current state. All the results in this section can be regarded as direct feedback on the mockup.

5.1.1 Therapeutic needs

Has potential in therapy settings. Both of the participants saw benefits of using the conceptual mockup as part of therapy. Each participant felt the application could be part of their daily practical work, as one potential tool.

- “I would perceive this as a conversation tool meant to help emotional skills. I could easily imagine using it in my own work.” (P1)
- “The idea that the child provides information about their own feelings, which is then utilised, is a functional concept”. (P1)
- “I could absolutely use it as a part of therapy.” (P2)

These responses suggest that there exists a practical need and a clear fundamental use case for the conceptual mockup within therapeutic environments. This should be interpreted as important feedback indicating that there is a genuine need for the mockup, and that it is not being designed without a real field-level demand.

Improvement compared to current tools. Therapists currently use several common assistive tools in therapy. Participants gave insight on how the conceptual mockup compares to the current tooling. They noted that the conceptual mockup could provide stronger links to emotional experiences compared to current tools used in therapy. The modernity of the conceptual mockup was also seen as an aspect that offers new opportunities.

- Participant P1 told that some therapists use image cards, plays and board games to make connections to social interaction settings and emotional experiences. Comparing the conceptual mockup to the tools currently in use, the participant underlined the possibly stronger relationship to the actual emotional experiences: “A pathway to a person's own, genuine experience that has already occurred. Something that can then be processed.” (P1).
- Participant P2 sees that the current tools are working and usable in many cases but they might be lacking some versatility and agility that a modern technology could provide: “We are a bit behind when it comes to the technology side; the current tools aren't bad, but physical pictures on the wall aren't as agile or easily adjustable as with this type of technology.” (P2)

It appears that there is demand for modern and agile tools like the conceptual mockup within therapeutic environments. While current tools may not be particularly modern or

flexible, they seem to function reasonably well in practice and could certainly offer inspiration for the further development of the mockup.

5.1.2 Inclusive and adaptive design

The user experience should match the perspective of the actual user. Participant P1 noted the importance of being able to personalise the user experience: the created images and overall user experience should be customisable to ensure that emotional experiences are presented in a way that aligns with their developmental stage and cognitive skills.

- Participant P1 suggested that personalising the user experience could make the mockup suitable for a wider range of groups, not just children with ASD: “AI could expand the potential user group beyond just (ASD) children”, “The solution could be suitable for primary school-aged children or teenagers, especially if the generated image isn’t too childish.” (P1)

This result shows how important personalisation options are, underlining their key role in both the technical implementation and the overall development of the concept. The original idea of the concept included, for example, the possibility of personalisation in terms of input modalities, but not a user experience that adapts to the user’s developmental level.

Could be a link to actual personal emotional experiences. Both participants saw the benefit of having a visual link to the real emotional experience. Each of the participants underlined the importance of having a memorable and personal link or a pathway to the situation where an emotional experience occurred: It is difficult to start the discussion about emotions if a discussion is too superficial and not linked to an actual personal and memorable experience.

- “It could be useful to save emotional experiences in everyday life and revisit them in therapy. Children commonly have difficulties remembering the emotions they experienced throughout the week. Also, the visual aspect of recording emotions is a positive thing.” (P2)
- “In order to process emotions, there must be some kind of link to the emotional experience. If the connection to emotional experience feels too detached, revisiting past emotional states can be challenging. Through an image formed

based on a past situation, it is possible to better revisit the emotional experience.” (P1)

This highlights the importance of personalisation in the image generation process. If the produced images feel too generic from the child's actual experience, the link to the emotional experience might feel too detached. In contrast, a well-personalised image—created from the child's real-life emotional experiences—can act as a link between the past experience and present reflection. This finding also underlines the idea that personalisation is not merely a technical feature, it is also a core design requirement for therapeutic effectiveness.

5.1.3 Emotional support

Could help with verbalising emotions. Difficulties with verbalising emotions and emotional experiences is one common challenge for the ASD children. Participant P1 saw possibilities in helping with this common challenge by using images as a bridge to verbalising emotion.

- “For many children on the autism spectrum, the problem is that they cannot verbalise the contents of their mind, but images could provide a way to discuss them. Through images, they could learn to verbalise emotions and then develop a habit of talking about feelings.” (P1)

The communication difficulties faced by children with ASD introduced in Section 2.3.1 mentioned AAC's as non-traditional communication possibilities, which could help the child develop their skills and communicate in a format they understand (Suomalainen Lääkäriseura Duodecim, 2023). The above result should be interpreted to show alignment with previous literature and the potential in the conceptual mockup to serve as some form of AAC. The solution could serve as a bridge to discussions and therefore support the ASD individual with their challenges.

Could help kids handle their emotions better by taking a moment to stop.

Participant P2 brought up several times during the interview how important it is to let kids pause. By this, they referred to reacting to upcoming negative emotions early enough so that, for example, possible aggressive behaviour could be managed better by addressing it in time.

- “A major benefit is that the application could help individuals on the autism spectrum pause; it could provide a socially acceptable way to stop and reflect.

We always try to teach children not to act immediately on their emotions but to think before taking action. Acting without consideration can lead to overreactions or even violent situations.” (P2)

This observation appears to reinforce an aspect also highlighted in underlying theoretical models of emotional intelligence. As discussed in Chapter 2, emotion management is a common feature across EI theories and is considered a central component of emotional skills and their theoretical definition.

5.1.4 Therapeutic role of AI

No categorical issues with AI, but further investigation is needed. When participants were asked about the use of AI within the solution and its suitability to their daily work, the matter was approached cautiously, without a decisive view. Neither of the participants saw a premise-level problem with using AI-assisted tools within therapy settings, but at the same time they acknowledged the fact that AI is still heavily unexplored in healthcare, and possible problems might arise later.

- Even though neither of the participants considered AI as a fundamentally bad idea to implement to a therapy setting, participant P1 pointed out that bringing new technologies like AI into practical fieldwork might face some natural resistance: “I believe that some people might initially feel it’s unfamiliar.” (P1)

The results suggest that the applicability of AI to therapy settings requires considerably more research in the future.

Similarities with art therapy. Both of the participants saw similarities between art therapy and the conceptual mockup. They highlighted that transforming emotions or emotional experiences into images or art is a common feature of both approaches. Additionally, the unique value of creating the art by hand, rather than letting AI generate the images was emphasised.

- Participant P1 considered that the conceptual mockup shares some similarities to art therapy. At its core, both involve creating an image or piece of art to represent an emotional experience. A key distinction between conceptual mockup and art therapy is the time when the image is created: the memory trace to the emotional experience might be stronger if the image is being created in the moment when the emotional experience occurs. “In art therapy, a similar link to one's own emotional experiences can be created. If that link can

be made at the moment when the person is, for example, nervous or anxious, it leaves a memory trace and a connection to the created image.” (P1)

- Participant P2 saw obvious similarities between the conceptual mockup and art therapy, underlining the importance of creating the image by a human-being rather than creating it with AI: “What is similar is the effort to turn the emotion into an image, which is basically the same, but now AI does it. In art therapy, the aim is for the person to create the image on their own.” (P2)

Since therapists saw similarities between the conceptual mockup and an established form of therapy, art therapy, it makes sense to consider whether art therapy could offer useful ideas for further development. That said, because the mockup is still at an early conceptual stage and the discussion about these similarities stayed quite high-level during the interviews, it's important not to draw overly simple conclusions. Still, the similarities between the idea behind art therapy and the conceptual mockup are worth acknowledging and could be helpful in future development.

5.2 Secondary RQ: Insights for the future development

This section presents results regarded as knowledge which is outside the scope of primary research question that informs the integration of the conceptual mockup into EI therapy, offering guidance for its future development and future research in the field. As previously acknowledged, some overlap exists between the results and themes discussed in Sections 5.1 and 5.2.

5.2.1 Target group

Could be used by children over the age of six. Both participants shared similar ideas on the earliest age when the solution should be used. Participants didn't see that there exists an upper limit for age if the solution could be personalised for the needs of different age groups.

- Participant P1 pointed out that the solution might be suitable for children starting from six years old: “It would be suitable for primary school-aged children, but just as well, a teenager could use it, especially if the images aren't too childish. Kids under six might not have the abstract thinking and cognitive skills developed enough to make the best use of this kind of solution.” (P1)

- Participant P2 noted that children under the age of 7 should not be encouraged to have additional screen time, and therefore the earliest suitable age for using this kind of solution would be around 7: “I don’t think kids under school age need to be guided to additional screen time. It might work better for children who already have some ability to understand and conceptualise things like emotions, so from around 7–8 years old and up.” (P2)

These results help to define the potential user context of the application more precisely. The fact that the users would be six years old or older helps with, for example, decisions related to user experience and interface design. The findings also highlight the importance of personalisation options and support earlier observations suggesting that a user experience aligned with the user’s mindset is crucial for the application’s effectiveness.

Has potential outside the context of ASD children. If the user experience of the solution is personalised well enough, there is no need to think that the solution is only beneficial for the children with ASD. For instance, teenagers or children without an ASD diagnosis who experience challenges in language development may also benefit from the solution.

- “It’s not a consistent idea to think that the application would only suit ASD children. Plenty of other kids also have room to grow their emotional skills.” (P1)

This result should be interpreted as an indication that, in the future development of the solution, it is worth considering whether to limit the target audience to children with ASD or to broaden it to a wider user base. If the application is deliberately limited to children with ASD, it may exclude other user groups who could benefit from it in similar ways.

5.2.2 Extensibility

Measuring the emotions is beneficial. Both participants mentioned the role of measuring emotions. It is a common convention to let the children evaluate and measure their own emotions. Implementing measurement-related features to the technological solution could be beneficial for the user’s emotional development.

- Participant P2 said that they use emotion meters as part of the therapy. Emotion meters can be for example paper sheets with a numbered or labelled

scale (e.g., 1–10, calm to angry) by which the children can point and then evaluate their feelings. “A child is surprisingly capable of measuring emotions and their changes. In therapy sessions, I try to make sure emotional states are measured.” (P2)

- Participant P1 emphasised the importance of measurements, especially if the user context goes outside the ASD children: “Especially if it included the ability to measure emotions, the application would be an excellent tool for learning, regardless of the child's age.” (P1)

These results suggest that self-evaluation of emotions is a feature, which should be added to the user experience of the solution. When it comes to measuring emotions, the key issue is not whether the measurement is objectively accurate. A more important observation is that a child's self-assessment of their emotional state or experience provides valuable information for therapeutic goals. If measurement features are incorporated into the application's user experience, it is important that they are not confused with the standardised, model-specific EI measurements introduced in Section 2.1.1.

Sensory data could be beneficial. Wearable sensory data could support children in managing and reacting to rising emotions. Participant P2 thought adding sensory features to the mockup could be a feasible idea.

- “If we go a step further, it might work for the device to recognise an emerging emotional state based on changes in the body. ASD kids often have a hard time noticing emotional changes in their body early enough. They could be supported in stopping and reacting to their emotions in time if things like skin temperature or heart rate could be used to identify these changes.” (P2)

This and the following two results support the conclusion that there is a demand for technological development and new tools in the fieldwork of EI therapy. It can be argued that in the future development of the conceptual mockup, these additional features and their potential integration to the solution should be evaluated. The technological environment of the application offers a framework for various additional features that could be therapeutically beneficial, making their integration into the application's functionality worth considering. The original idea of the conceptual mockup included the idea that, for example, a heart rate sensor could be used to help detect emotional states. This finding supports the original hypothesis about the potential usefulness of sensors.

Possibilities as an activity regulation system. Participant P2 had noted the possibilities of expanding the conceptual mockup idea to serve as some form of an activity regulation system. Currently, therapists often rely on various non-digital tools to support ASD children with their daily activities; these tools are seen as somewhat outdated and not very flexible.

- “We often create daily and weekly schedules for ASD children, and these are usually tangible notes. It would be great to have these in an app that the child could carry with them. We’re a bit behind when it comes to technology. Paper notes aren’t bad, but they’re not very flexible.” (P2)

Storing information about the situation where the emotional experience happened could help with designing daily activities. Participant P2 pointed out that it would be useful to not only store the emotional experience, but also information about the concrete situation where the emotional experience occurred. Understanding the concrete situations, locations and time of the event where for example negative emotions arise, would help the therapists, parents and the children themselves guide their daily routines.

- With an application like that, it would be handy to pinpoint stress points during, for example, a school day or other daily routines. Then, you could collaborate with the school or, for instance, family members to find ways to help the child avoid unnecessary stress. (P2)

Data has to be accessible by the therapist. Participant P2 noted that the therapist needs to have access to the data created by the children. The technology should allow the therapist to be able to see the information created by the children so that the discussions during the therapy sessions can be facilitated by the concrete memories.

- “I’m not sure how this would fit into our framework in practice, but the employee should have access to the data. Seeing the data is important. I feel that starting a conversation with the child would be easier if the events weren’t just based on memory but supported by something concrete.” (P2)

From a technological perspective, sharing the mentioned data is not particularly challenging. The more complex issues related to data sharing concern privacy and ethics. These should be seen as key considerations for the future of the solution and deserve more research going forward.

5.2.3 User context

It is difficult to motivate the users. Participant P2 emphasised the critical role of motivation in effectively utilising tools like the conceptual mockup, particularly in the context of ASD children: motivating ASD children to adopt new tools or devices can be challenging. However, technological tools and gadgets might interest ASD children more than non-technological solutions.

- “It’s always a challenge to get ASD children to figure out why they should do something. It’s also usually hard to get a child to stop and think about their emotions. Using a technological device as a tool for evaluating emotions might be more interesting to ASD kids than just someone asking about their feelings.” (P2)

As the result shows—and as noted in the theoretical part of this thesis—technological applications can support the motivation of children with ASD. In the future development of the application, the central role of user motivation should be taken into account, and recognising motivational factors characteristic of children with ASD is essential.

All emotions are important information. Participant P1 noted that when developing this kind of a solution, it is important to understand that all emotions should be considered as information, and the goal is not just to survive out of the emotional experience. By this they referred to a feature introduced in conceptual mockup which was aimed to help the user calm down. In psychotherapy emotions are considered as something which are normal and natural part of life, guiding our actions. Even the negative emotions are something, which we should acknowledge as important information, rather than something that we should always try to hide and get rid of.

- “In psychotherapy, the goal is not to prevent children from experiencing emotions. The aim isn’t to simply 'survive' emotions. Emotions are important sources of information. It’s essential to be able to examine emotions without always trying to get rid of them.” (P1)

This result highlights that emotions are a highly complex subject. From a practical development standpoint, this insight should reflect that the solution and the features within it should not automatically prompt the user to immediately try to eliminate negative feelings. Negative emotions are a natural part of life, and it is not appropriate to encourage users to escape them right away. This should be considered in the design of the application's user experience.

5.3 Summary of results

Table 4 provides a list of the thematic entities or findings presented in this chapter, each accompanied by a brief insight that captures its essential implication.

Table 4. Summary of findings presented in this chapter, with corresponding key insights

Thematic entity / Finding	Key insight
Has potential in therapy settings.	The mockup was seen as a practical and useful tool in real-world therapy sessions.
Improvement compared to current tools.	Compared to traditional tools, the solution offers more agility and emotional relevance.
The user experience should match the perspective of the actual user.	Personalisation and inclusive design are essential to ensure suitability across age groups and developmental levels.
Could be a link to actual personal emotional experiences.	Personalised images can help children revisit meaningful emotional moments more effectively.
Could help with verbalising emotions.	Images can act as bridges for children who struggle to put emotions into words.
Could help kids handle their emotions better by taking a moment to stop.	The mockup may support emotion regulation by prompting children to pause and reflect.
No categorical issues with AI, but further investigation is needed.	AI is not fundamentally rejected in therapy, but its role remains under-researched.
Similarities with art therapy.	The concept shares similarities with art therapy, but the hands-on creation of images plays a central role that distinguishes it from AI generation.
Could be used by children over the age of six.	The solution is seen as suitable for children aged six and up, depending on personalisation.
Has potential outside the context of ASD children.	The tool could benefit a broader audience beyond ASD, such as children with language delays.
Measuring the emotions is beneficial.	Self-assessment of emotional states is a valuable therapeutic and learning practice.

Sensory data could be beneficial.	Wearable sensors could help detect rising emotions and support timely intervention.
Possibilities as an activity regulation system.	The concept could be extended to help structure and visualise daily routines.
Storing information about the situation where the emotional experience happened could help with designing daily activities.	Capturing situational context of emotions can support behavioural planning.
Data has to be accessible by the therapist.	Therapists should have access to user data to facilitate meaningful discussions.
It is difficult to motivate the users.	Motivation is a known challenge, but technology may increase engagement for ASD children.
All emotions are important information.	Emotional tools should support recognition, not suppression, of all emotional states.

The next chapter builds on the findings presented above by discussing them through the lens of the research questions and linking them to the theoretical and practical contexts introduced earlier. The aim is to address the study's main objectives by evaluating the feasibility of the conceptual mockup and offering guidance for its future development.

6 DISCUSSION

In this chapter, the results and their corresponding thematic entities are discussed in relation to the theoretical concepts introduced in Chapter 2. The empirical findings and theoretical information gained through this thesis are synthesised to generate knowledge about the feasibility of the conceptual mockup, inform its future development, and guide future research in the field. This synthesis aims to provide answers to the two research questions and address the underlying research problem that has guided this entire thesis project.

As was done in the previous chapter, this chapter is also structured by the research questions of this thesis: Section 6.1 analyses the feasibility of the conceptual mockup (RQ1). Section 6.2 discusses the future development of the conceptual mockup, by providing insights, which might influence the future of the solution (RQ2). Section 6.3 translates the analysis and insights into more concrete and practical design guidelines to support future development.

Each subsection under Sections 6.1 and 6.2 concludes with a summarising statement derived from the analysis, labelled as “Insight [number]”. These statements also serve as reference points in the design guidelines table presented in Section 6.3.

Limitations and opportunities for future research are also discussed in this chapter.

6.1 Primary RQ: Analysis of the feasibility of the conceptual mockup

The primary goal of this thesis was to evaluate the feasibility and potential of the conceptual mockup as a tool in emotional intelligence related therapy for individuals with autism spectrum disorder. To best understand the following feasibility insights, it is important to clarify the perspective from which feasibility was assessed: it was assessed based on empirical input from therapists working with the EI skills of children with ASD, combined with the theoretical knowledge gained during this thesis project.

Multiple different angles can be examined when determining the feasibility of a product or solution (Bowen et al., 2009). And claims about the feasibility of a solution can be made from different perspectives and at different stages of the development process (Bowen et al., 2009). In the case of this conceptual mockup, the perspectives could include, for example, sociocultural, technological, clinical, or ethical dimensions. With this in mind, the following insights should be interpreted within the framework and

scope of this study, while also acknowledging that a more comprehensive evaluation of the feasibility would require evaluations from additional perspectives to support more conclusive claims.

6.1.1 Considerations of therapeutic needs

One focus of this thesis was to better understand the actual need for the conceptual mockup: what kind of value it could offer and whether a genuine role or use case exists for it within the context of EI therapy. The results of the interviews signal that the current assistive tooling used in therapy is lacking some modernity and agility, and therapists expressed a need for technological solutions like the conceptual mockup. Or from a more cautious perspective at least, there does not appear to be any major barrier that would fundamentally prevent the conceptual mockup from being used as part of EI therapy. This insight is of primary importance, because without a genuine need, there wouldn't be much justification for the conceptual mockup in the first place.

As discussed in Section 2.4, previous studies have highlighted the benefits of incorporating technological solutions into interventions for children with ASD. Digital AAC tools aimed at addressing communication deficits have been shown to support both emotional and communicative development, thereby contributing to therapeutic goals (García-García et al., 2025). In addition, there is evidence that children with ASD often show a preference for technological applications (Papoutsi et al., 2018; Shane & Albert, 2008). The empirical findings of this study align with existing literature, suggesting that the conceptual mockup and its underlying idea were viewed as both suitable and potentially motivating tools for children with ASD from a therapeutic perspective.

Although there are similarities with previous literature, it is important to acknowledge that comparing technological applications at a high level of abstraction is not particularly meaningful. Instead, the usefulness of such applications should be examined and compared in more detail. Nevertheless, it can still be argued that there is support for the use of technological applications in therapeutic settings in general, and for the conceptual mockup in particular.

The practical field-level need for the conceptual mockup and similar solutions provides a solid foundation for its further development. Simply getting positive signals from the interviewees about the possibilities and utilisation of the conceptual mockup can be considered as valuable feasibility insight at this early stage of the development process.

Insight 1: There is real need for technological solutions like the conceptual mockup within therapy settings.

6.1.2 Therapeutic implications of inclusive and adaptive design

The results suggest that a key factor in determining the feasibility of the conceptual mockup is whether the solution and its user experience can adapt to different individuals and their mental landscapes. The core idea of the mockup is to generate images based on users' emotional experiences, which can then be used to support therapeutic or educational interventions. If the created images and the overall user experience can adapt to varying cognitive levels, age groups, and types of emotional experiences, the feasibility of the concept appears promising. On the other hand, if the user experience and the generated images remain too external or detached from the individual, the potential of the conceptual mockup becomes significantly more limited.

As discussed in Section 2.4, previous literature supports the importance of inclusive design approaches when creating assistive solutions for children with ASD (Cañete & Peralta, 2022; García-García et al., 2025). Such approaches help tailor the user experience to individual needs, thereby enhancing the effectiveness of the solution in supporting therapeutic goals.

Based on the empirical findings and previous literature, it can be concluded that personalising the user experience within the conceptual mockup is essential, particularly regarding the therapeutic perspective. The emphasis on personalisation stems primarily from therapeutic considerations, rather than from technological or general user experience concerns.

The importance of inclusive implementation in the design and development of the application can be considered one of the key findings of this thesis in terms of defining its feasibility. This is particularly relevant, as inclusive design and its technological implementation are seen to serve therapeutic aims, rather than being driven solely by technological user experience considerations.

Insight 2: Inclusive design and the conceptual mockup's ability to align with different mental landscapes are central to determining its feasibility.

6.1.3 Theoretical perspectives on emotional support

The broad idea of images as a support for the emotional intelligence of ASD children has a strong background: As introduced in Chapter 2, children with ASD are prone to experience communication-related difficulties affecting their emotional intelligence (Trevisan et al., 2021). And images or visuals can be used as tools to help with these

communication challenges (Vienonen, 2022) by expanding communication vocabulary, and therefore being more able to talk about emotions (Suomalainen Lääkärisseura Duodecim, 2023).

The results of this study align well with existing scientific literature: representing emotional experiences as images and then using the images to facilitate verbal discussions and then emotional intelligence appears to be an effective concept. The interviewed therapists felt that the concept could serve as a useful tool for supporting therapeutic conversations. The AI-generated images could act as links or sparks for deeper discussions within therapy sessions. The underlying idea of the conceptual mockup and its applicability as part of therapy is therefore strongly supported by both previous scientific literature and the findings of this study.

Although the therapeutic value of images in supporting emotional intelligence in children with ASD appears well supported, the empirical findings do not clearly link this to any specific EI theory or model discussed in Chapter 2. García-García et al. (2025) argue that the Ability model of EI is particularly well-suited for interventions targeting individuals with ASD, as it offers a structured and cognitively grounded framework that aligns with the typical emotional and social challenges found in ASD. However, the empirical findings of this study did not provide clear evidence to support the selection of any one EI model as the theoretical foundation for the development of the conceptual mockup. At best, the empirical results suggest that in therapeutic contexts, and to the extent relevant to the solution explored in this study, EI is often understood more broadly, combining elements from multiple models.

Considering the results of the interview, we can see that the conceptual mockup aligns well with the idea of improving EI, without taking a stance about which underlying EI theory is being followed. The differentiation or deeper understanding of different EI models seems like an important scientific objective but is not the objective for the current line of research for the conceptual mockup.

Insight 3: Concept aligns with practice and broad EI understanding, but lacks model-specific evidence.

6.1.4 The role of AI in therapeutic contexts

One key aspect in determining the feasibility was to better understand the role of AI in this whole process of improving communication skills with visual representation of emotions. The empirical results didn't provide much information about the role of AI. The participants appeared to view the role of AI primarily as a technological question

rather than something relevant to therapy. And also, the limited amount of prior scientific literature made it difficult to draw conclusions.

It seems like there exist no categorical issues from the investigated point of view in implementing AI to assistive technology used in therapy. The question about whether AI should be used in solutions like the conceptual mockup lies more on the practical aspects like how well the AI actually works from a purely technological perspective. Some promising signals of AI-generated images supporting children's emotional development have been discovered (Lee et al., 2023), but the need for further research is evident.

In the big picture, from the therapy point of view, the question of: “can AI-generated images support the teaching of emotional intelligence to children with ASD” could be revised to just “can images support the teaching of emotional intelligence to children with ASD”. Logically, given the strong support in previous scientific literature for using images as a therapeutic aid, there is no apparent reason from a therapeutic standpoint why AI-generated images could not also be beneficial.

Overall, this feasibility insight suggests that from a therapeutic perspective, there is no inherent obstacle to using AI-generated images, as they are largely perceived in the same way as traditionally produced images. The practical usefulness of AI-generated images in therapy largely depends on whether they can depict different mental landscapes with sufficient accuracy and create strong enough links to personal emotional experiences. However, these questions are primarily related to a more technological rather than a therapeutic perspective.

In the future research, the questions about the role of AI in the conceptual mockup should be investigated from other perspectives than the one investigated in this thesis. One perspective relevant to the development of the conceptual mockup could be: practical technological aspects about how well the AI can represent emotional experiences of different individuals. Also, ethical aspects of utilising AI in therapy should be further studied.

Insight 4: No barriers in using AI, but further research is needed.

6.2 Secondary RQ: Reflections on development-related insights

Throughout the thesis project, the secondary research question was considered to be heavily tied to the experimental nature of exploratory research projects. The goal of exploratory research, in the big picture, is to open-mindedly gather information about a little-known subject (Drew, 2023). In this section, knowledge that is not considered as

direct feedback on the feasibility of the conceptual mockup but is relevant to future advancements is analysed. Again, some overlap between the feasibility insights in the previous section, and the insights below exists.

6.2.1 Target group considerations

This study suggests that the conceptual mockup may be appropriate for children approximately six years of age and older. Its use involves abstract thinking and cognitive skills that typically begin to develop around the age of six. However, previous scientific literature emphasizes that symptoms of ASD typically begin to appear around the age of three (Lord et al., 2018; National Institute of Mental Health, 2022), and that selecting appropriate support measures early, ideally at the time of diagnosis, is crucial for managing the condition (Brady et al., 2014; Chaidi & Drigas, 2022; Elder et al., 2017).

As noted in the previous insights, the conceptual mockup may be beneficial in EI therapy for children with ASD. However, given that the solution is suitable for children aged six and above, it is not appropriate for the very early developmental years when ASD symptoms typically begin to emerge. Considering the high variety of symptoms of ASD (Geschwind, 2008), it is important to view age limits as rough guidelines and to make decisions about suitability on an individual basis. That said, this study suggests that the primary user group for the conceptual mockup is likely to be aged approximately six years and older.

Another interesting target group aspect to consider in the future is the user context and scope of the intended user group for the conceptual mockup. The results of this study suggest that narrowing down the user group to ASD only, might not be logical from a medical point of view. Developing emotional intelligence is beneficial for both individuals diagnosed with ASD and those without a diagnosis, suggesting that the solution could offer value to a broad range of users.

It is known that the individuals with ASD generally have lower levels of EI compared to ones without the diagnosis (Brady et al., 2014). This knowledge suggests that the demand for EI support is higher among individuals with a diagnosis, but it does not imply that EI support is unimportant for those without an ASD diagnosis. The correlations between emotional intelligence and outcomes such as general success in working life (Cherniss, 2000) also suggest that the conceptual mockup could be beneficial way beyond EI therapy for children with ASD.

The conceptual mockup appears to be a valuable tool for children with ASD, but at this stage of development, it does not yet include features specifically designed to support

their emotional development. Instead, the idea and its features are applicable to a broader context of emotional development, rather than being tailored solely to the EI skills of children with ASD.

Narrowing down the user group of the conceptual mockup to ASD only is of course possible and might be just a matter of choice after all. However, if this choice is made, it is important to understand where the justification for that choice comes from. It might not be logical from the medical point of view to narrow down the user group of the conceptual mockup to ASD individuals only.

Insight 5: The solution seems suitable for individuals from around six years of age and may also be relevant beyond the context of ASD.

6.2.2 Future extensibility of the concept

The empirical data suggest that there are multiple possibilities for the extensibility of the conceptual mockup. The lack of modern and agile assistive tooling in the therapy sparked several thoughts about how the conceptual mockup could be improved to better serve the needs of the EI therapy. The technologies used in the conceptual mockup can support the integration of additional features without requiring changes or extensions to the existing technology stack.

It seems that the therapists could benefit from additional information about the habits and feelings of the patients. Without going into too technical details here, adding possibilities for the users to measure their emotion levels with different modalities, and storing biometric sensory data could help with the overarching aims of therapy.

Implementing activity control features to conceptual mockup could also help with the daily activities of ASD children. Additionally, simply collecting data about the concrete situations or locations where for example negative feelings emerged, could make it easier for the therapists to understand the patient and therefore improve the therapy overall. It seems obvious that if sharing such information about the user would be considered, many ethics and privacy-related questions would emerge, and therefore further research would be needed.

Measurements: The results indicate that adding a possibility for the user of the solution to be able to measure their emotion levels could be beneficial. And in this context, the measurement of emotions refers specifically to a subjective assessment of emotional states. Therefore, the measurements should not be conflicted with the measurements discussed in the emotional intelligence theories & models section in Chapter 2, which aim for more conclusive or absolute EI related values. Instead, the

idea is to let the user make a personal evaluation about their emotion levels, and then use this information as reference value to detect changes in emotions.

The results suggest that children can surprisingly well measure their emotions in a way which is beneficial for the therapy. On a more practical level, this could mean incorporating mood meters into the image generation process and using the collected values as individualised reference points for future image generation.

Sensors: Utilising biometric sensor data could be used in detecting changes in emotional states, and therefore being able to react to the changes more quickly. Heart-rate sensors of smartwatches have shown promising results in controlling and reacting to stress episodes and negative emotions (Torrado et al., 2017). Being able to react to emerging negative emotions and stress episodes quickly enough was also emphasised in the results. Even though the importance of reacting to negative emotions is emphasised, biometric sensors could be used to react to positive emotions also. As the results of this study suggest, all emotions, both negative and positive, should be considered valuable information. Integrating sensors capable of detecting all kinds of changes in physiological states into the conceptual mockup could help individuals better understand their own emotions.

Activity control: The activity control tools currently used in therapy might be lacking some agility and modernity. The mockup could be developed to offer activity control features within the user experience. Individuals with ASD often encounter difficulties in managing their daily activities (Vienonen, 2022). They may struggle with predicting events, organising plans, or assessing factors such as the time needed to complete tasks (Vienonen, 2022). To help with the daily activities, many kinds of activity control systems could be beneficial (Vienonen, 2022).

The results of this study, as well as the previous literature, identify the importance of activity control tools and systems. The basic technology of the conceptual mockup could easily provide a modern technological environment for activity control features: for example, by notifying the children about doing a certain task, or by keeping them informed about the daily schedules. From a technology standpoint, the opportunities are immense.

Collecting information: The therapists commonly work together with the close circle of the children with ASD. This might be simply sharing information about the pain points in the daily lives of the children to help with the therapy sessions. The data suggests that therapists consistently seek ways to better understand the child's inner experiences. Since children with ASD often face difficulties with verbal communication (Trevisan et al., 2021), it is reasonable to assume—and as the empirical data

suggest—that therapists could benefit from additional non-verbal information. If strong negative emotions arise, it might be useful to have additional context, like where and when the situation happened. With the help of conceptual mockup, storing that kind of information could make it easier for therapists to support the child in everyday situations. As with other insights related to extensibility, further research on ethical considerations, privacy, and technological concerns is needed to better align the concept with real-world applicability.

Insight 6: Has extensibility potential beyond the original idea

6.2.3 Complementary insights

When making decisions related to the development of the conceptual mockup, the common characteristics of ASD should be noted. We know for fact that ASD is a condition with an extremely broad variety in symptoms, and the challenges faced by individuals vary greatly (Geschwind, 2008). This heterogeneity of the condition makes it difficult to make generalisations. However, as the results indicate, motivation plays a central role in most successful therapy sessions. If the children can find the intrinsic motivation to do something, then the positive results more likely follow. The tendency of children with ASD to prefer technological applications (Papoutsi et al., 2018; Shane & Albert, 2008) was noted in the theory and empirical results of this study.

There's nothing especially surprising about the essential role of motivation, but it's important to recognise how strongly it stands out in the behaviour of children with ASD. This insight could be valuable for future development and may provide strong justification for incorporating motivational elements such as gamification into the user experience.

Insight 7: Motivation plays an important role.

From a therapeutic perspective, a promising use case for the conceptual mockup is to use the AI-generated images as personal links to emotional experiences, thereby facilitating discussions between the patient and the therapist. The results suggest that the role of the AI-generated images within the solution is not to accurately depict emotions, but rather to serve as a link to the underlying emotional experience. For example, if a person feels negative emotions such as anger during the image creation process, it does not necessarily mean the image should visually express generic mental images of what anger looks like.

What matters is that the image feels personally connected to the emotional experience—if it feels too disconnected, it loses its value as a tool. While this might

sound a bit abstract or philosophical, it can guide practical development too: when choosing between different AI-image generators, it might be more useful to focus on how well they can adapt to different mental landscapes, rather than how accurately they show a specific emotion or a set of emotions.

However, this is not to suggest that the ability of AI image generators to accurately represent emotions should not be utilised. In fact, recent research has shown promising progress in AI's potential to interpret human emotions (Lee et al., 2023). Still, the core insight here is that from a therapeutic point-of-view, the value lies more in the image's ability to link to the individual's emotional experience than in its ability to provide a perfect emotional interpretation.

Insight 8. An AI image is a link to the emotion, rather than an exact expression of the emotion.

6.3 Design guidelines for future development

This section brings together the insights from the Discussion chapter, refining them into possible design guidelines for future development. These guidelines should be viewed as actionable recommendations to inform the further development of the conceptual mockup. Table 5 presents each design guideline together with a concrete recommendation or action, followed by a reference to the specific insight from the Discussion chapter that informed it.

Considering the aims of this study and the early-stage nature of the application's development, the guidelines are not intended to present finalised concrete solutions, but rather to outline high-level development themes for future work. However, these themes have been abstracted to a level that allows them to be further developed into concrete technological or other types of solutions and actions.

Table 5. Design guidelines and actionable recommendations for further development of the conceptual mockup.

Design guideline (DG)	Action	Reference insight(s)
DG 1: User preferences for personalizing the image generation and overall UX	Enable users to input information about themselves and their preferences within the UX. Use this information to tailor both the user experience and image generation to better reflect their individual mental landscapes.	Insight 2: Inclusive design and the conceptual mockup's ability to align with different mental landscapes are central to determining its feasibility.
DG 2: Evaluation of AI-image generation services	When evaluating different AI image generators for integration into the solution, prioritise their ability to adapt to diverse mental landscapes rather than their accuracy in depicting specific emotions.	Insight 4: No barriers in using AI, but further research is needed
		Insight 8: An AI image is a link to the emotion, rather than an exact expression of the emotion.
DG 3: More inclusive, rather than highlighting its suitability only for children with ASD.	Avoid emphasising the application's suitability specifically for children with ASD in its implementation or presentation to promote broader inclusivity.	Insight 5: The solution seems suitable for individuals from around six years of age and may also be relevant beyond the context of ASD.
DG 4: Motivational UI and UX development choices	Integrate UX and UI design elements that actively support user motivation and engagement.	Insight 7: Motivation plays an important role
DG 5: Extensibility of the solution	Explore the integration of extensibility features—such as emotion self-assessment tools, sensor-based inputs, activity control, and contextual data collection.	Insight 6: Has extensibility potential beyond the original idea
DG 6. Self-measurements in UI	Incorporate UI elements such as mood meters or emotion rating scales to allow users to self-assess their emotional state, supporting therapeutic reflection and progress tracking.	Insight 6: Has extensibility potential beyond the original idea
DG 7. User context: children aged six and above	Focus design, testing, and deployment primarily on children aged six and older. Ensure that UI and UX design choices reflect the age recommendation by aligning with children's cognitive and developmental capabilities.	Insight 5: The solution seems suitable for individuals from around six years of age and may also be relevant beyond the context of ASD.

Previous sections of this chapter analysed the study's findings through the lens of the research questions, combining theoretical and empirical perspectives to draw conclusions relevant to the feasibility and future development of the conceptual mockup. The presented design guidelines in Table 5 summarise the conclusions and

point towards meaningful next steps for further development. Next, the identified limitations of this study are introduced, followed by suggestions for future research.

6.4 Limitations

The limitations of the project are outlined and assessed below.

Shortcomings of exploratory research. When assessing the limitations of a study, it is essential to consider its objectives and align methodological aspects accordingly. The exploratory, and therefore inconclusive nature of this study can be viewed as a limitation to some extent. When this limitation is considered in relation to the objectives of this thesis—where the aim was to gather preliminary insights—the significance of this limitation becomes clearer. If validity of the research project is determined by factors such as conclusiveness of the findings, and replicability of the research project, then the exploratory nature of this project is an obvious limitation. However, if the chosen research design aligns with the goals of the research project, then the inconclusiveness should be viewed as an accepted characteristic rather than a major drawback.

That said, the shortcomings of exploratory research projects should be acknowledged when interpreting the findings of this thesis. Still, making a categorical decision that exploratory research is a big limitation, and a scientific liability is not reasonable, given the preliminary nature of the study.

Small sample size. The small sample size of this study is another limitation. In qualitative research the correct interview sample size for a specific research project can vary heavily; it can be anything above 1, depending on the type of study, and how it has been carried out (Mason, 2010). Saturation is commonly used as a term to define the sweet spot for the optimal n-number (Mason, 2010; Saunders et al., 2018). There are no easy-to-adopt guidelines about what should be the exact saturation point, or a n-number for a specific type of research project. Saunders et al. (2018) say that saturation should always align with the research questions, theoretical position, and the methodology adopted.

That said, saturation should not be seen as a fully relativistic concept, where no predefined limits are not applicable at all (Saunders et al., 2018). For an inductive analysis—as in this thesis—one way to find the saturation point is to conduct as many interviews as needed to find a spot where no new themes or insights emerge

(Saunders et al., 2018). While not a certainty, logically new themes and insights likely would have emerged if additional interviews had been conducted as part of this thesis. When interpreting the findings of this thesis, it is best to think that with this thesis we got n of 2 amounts of information about the conceptual mockup. Findings might not be conclusive, but they are still valuable information for the future research and endeavours of the conceptual mockup.

Subjectivity in data analysis. The analysis of the interview data in this study is inherently prone to subjectivity. It is likely that the researcher's own perspective influenced the results, potentially compromising their objectivity. While subjectivity is a recognised aspect of qualitative research, and particularly in exploratory studies, it may play an even more prominent role in this case. This is due to the fact that the researcher responsible for analysing the feasibility of the conceptual mockup was also involved in its development. This personal connection to the concept may have introduced a bias toward interpreting the findings in an overly favourable light, potentially limiting the ability to critically assess the solution from a neutral standpoint.

Early phase of the development. Another limitation of this project is the potential challenges associated with the early phase of the conceptual mockup's development. Many technological and ethical aspects would require significantly more investigation and practical development to better assess the concepts feasibility. For instance, the use of AI within the conceptual mockup is based on several assumptions that remain largely unexplored. Furthermore, the early stage of development might hide critical feasibility issues and make the potential benefits seem more promising than they actually are.

Additionally, although it was beyond the scope of this study to explore the complex ethical and technological questions in depth, it remains important to acknowledge that a deeper understanding of these aspects would likely influence the future development and evaluation of the conceptual mockup.

6.5 Future research

This section presents future research avenues identified through the analysis and conclusions of Chapter 6.

1. Addressing study limitations.

Limitations in Section 6.4 introduced questions which could be further researched. For example, further studies could examine the ethical implications of using AI within the solution and in a therapeutic context. Additionally, expanding the number of interviews would help increase the sample size and strengthen the reliability of the findings.

2. Evaluating the adaptability of AI image generators.

This thesis identified that, from a therapeutic point of view, it is essential for the solution to generate images that align with the mental landscape of the individual. Therefore, it is important to evaluate how well currently available AI tools can adapt to different expressions of emotional experience, particularly across age groups and cognitive levels.

3. Understanding ASD-specific user characteristics in technology use.

In what ways do children with ASD differ from children without the diagnosis as users of technology? Are there general patterns or distinctions that should be considered in UI/UX design to better support this user group?

4. Strengthening the link between user and emotional content.

What are the common features that should be incorporated into the AI image creation process to help users meaningfully associate the generated image with the emotional state they experienced?

7 CONCLUSIONS

As discussed in the previous chapter, this study offers preliminary yet meaningful insights into the feasibility and future development potential of the conceptual mockup. This concluding chapter summarises those insights, reflects on the research questions, and considers broader implications for practice and future research.

This thesis examined a novel technological idea—referred to throughout this thesis as a conceptual mockup—to assess its feasibility in supporting emotional intelligence (EI) therapy for children with autism spectrum disorder (ASD). The work also aimed to provide direction for the mockup's future development and for further research in the field. The foundational research problem guiding the thesis was:

- **Research problem:** Children with ASD often struggle with communication skills, which affects their emotional intelligence. This can negatively impact their social relationships, performance in work life, and overall health.

The identified research problem was addressed through two research questions:

- **Primary research question:** What is the feasibility and potential of the conceptual mockup as a tool in emotional intelligence therapy for individuals with autism spectrum disorder?
- **Secondary research question:** What additional insights could support the development of the conceptual mockup and guide its integration into future emotional intelligence therapy and research?

The main sources of knowledge used to answer the research questions were the semi-structured expert interviews conducted during this thesis. Qualitative insights from professionals working in EI-related therapy for children with ASD were analysed and then synthesised with prior scientific knowledge in the Discussion chapter. This combination of empirical and theoretical insights formed the basis for drawing conclusions about the conceptual mockup's feasibility and in answering other aspects of the research questions.

The findings suggest that the idea behind the conceptual mockup is well justified, with a clear need for such solutions within EI therapy settings. Its goal of supporting the communication skills of children with ASD, and thereby enhancing their emotional intelligence through AI-generated images, is supported by both theoretical and empirical evidence. Interviewed experts saw clear practical value in the solution, viewing it as something they could realistically integrate into their daily therapeutic

work, especially given that the current tools available for similar therapeutic goals often lack modern features and flexibility. Observations of real-world therapeutic needs are particularly important and provide strong justification for further development of the concept.

Another key finding related to the feasibility is the importance of inclusive, user-sensitive design and implementation. To effectively support therapeutic goals, both the application and its AI-generated images should align as closely as possible with the user's individual mental landscape. Therefore, users' age, cognitive abilities, and other personal capabilities must be carefully considered throughout the technological development process, ensuring a personalised user experience tailored specifically to each user's needs and capacities.

The central finding regarding the secondary research questions is the potential extensibility of the concept beyond its original scope. Features such as emotion self-assessment tools, activity tracking, or the integration of sensor-based data could enhance therapeutic outcomes without requiring fundamental changes to the planned technological stack.

There was very little existing research on utilising an idea like the conceptual mockup, which is why the study was carried out as an exploratory research project. The project followed an open and broad-minded approach, allowing this relatively unexplored area to develop inductively through the findings.

Given the exploratory nature of the study and the early-stage development of the conceptual mockup, the findings should be viewed as preliminary. To address the limitations related to these factors, further research and concrete development of the solution are essential. Further work is needed to validate the concept in practice, reinforce its theoretical foundation, and confirm its relevance in real-world therapeutic contexts.

This thesis contributes to the understanding of assistive technology in EI therapy and other supportive contexts by evaluating the feasibility of a novel solution. It reinforces existing knowledge on the connection between improved communication and emotional intelligence and highlights the potential of technological tools in supporting children with ASD. In addition, it identifies critical considerations for the design, implementation, and integration of the conceptual mockup and similar tools into therapeutic settings.

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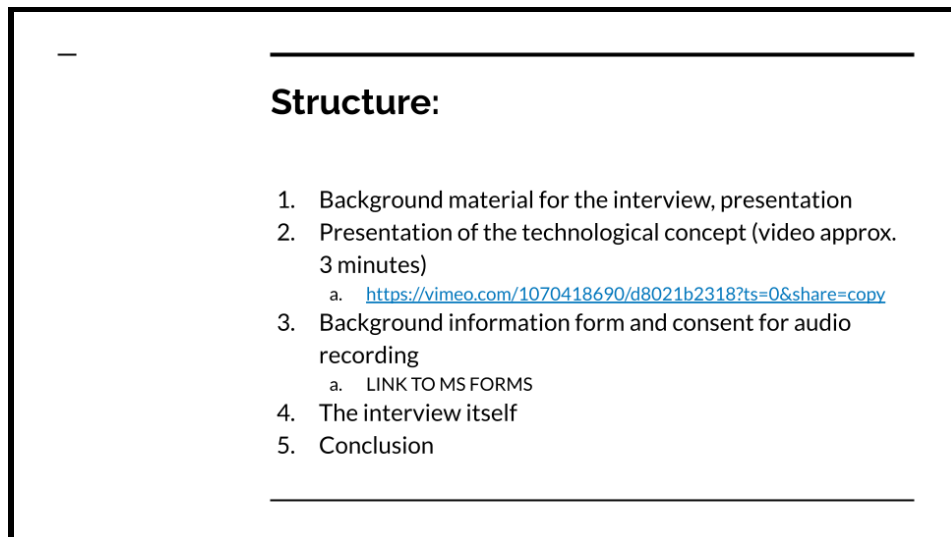
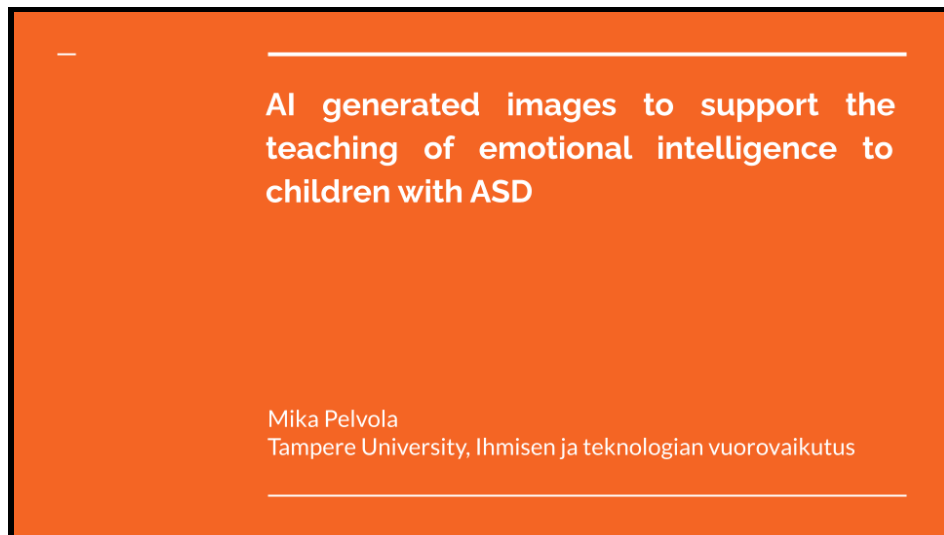
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APPENDIX

Appendix A

This appendix shows the materials used within the interviews: presentation and the semi-structured interview plan. The interview was conducted in Finnish, with most materials also written in Finnish. Appendix A materials are translated to English for the consistency of this thesis.



Background info

- Started as a course project
- Motivation: We recognized the challenges children on the autism spectrum face in expressing emotions
 - → Support from modern technology; one possible aid
- Idea:
 - A way to express emotional experiences through images
 - A way to record emotional experiences
 - A way to use recorded emotional experiences as conversation starters, e.g., as support in therapy?

Thesis Aim in a Nutshell:

The overall aim of this Master's thesis is to explore the potential and applicability of AI-generated images—based on emotional experiences—as a means of supporting and developing emotional skills in children on the autism spectrum.

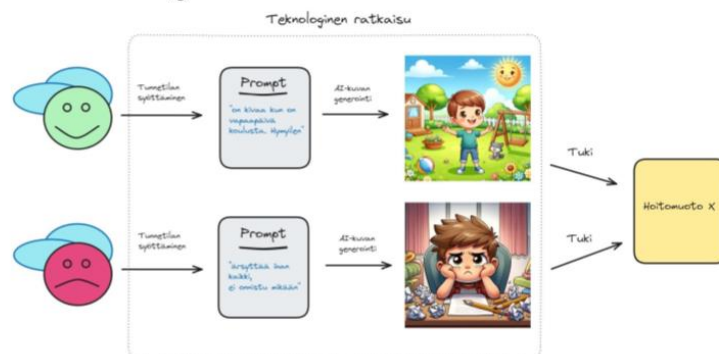
Prior to starting the thesis, a technological concept was designed, focusing on the use of artificial intelligence to visually represent emotional experiences.

This thesis incorporates that concept as part of the research, seeking to understand its potential value as a complementary tool alongside other therapeutic approaches.

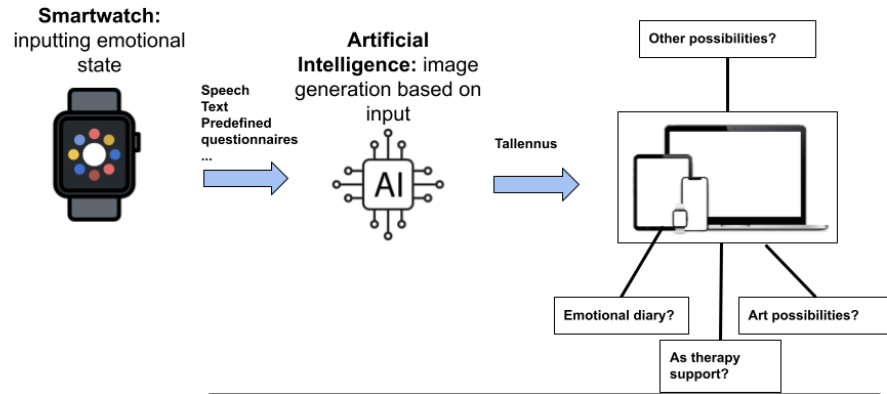
Specifically, the thesis aims to:

1. Understand how AI-generated images could serve as a useful aid in supporting emotional development in children with ASD
2. Gather feedback on the potential feasibility of the technological concept

Visual, flowchart-style description of the technological solution:



About the technology:



Summary

- The aim of this thesis is to:
 - Investigate the potential applicability of the technological concept in supporting emotional skills in children with ASD | [Technological perspective](#)
 - Understand how AI-generated images—based on emotional experiences—could support the emotional development of children with ASD | [General perspective](#)
- Would you like to ask any questions at this point?

Semi-structure interview plan

Idea for the interview:

- The idea of the interview is to allow the conversation to flow naturally, while ensuring that all thematic areas listed below are covered.
- Follow-up questions within each category should be asked only when necessary to support deeper discussion.

1. General Impressions and First Reactions

- What thoughts does this idea and concept evoke?
- What do you think about representing emotional experiences using AI-generated images?
- What were your initial reactions?

2. Professional Background and Experience

- Could you describe how you encounter children on the autism spectrum in your work?
- How are you involved with the target group?

3. Perceived Usefulness of the Concept

- Thinking about children on the autism spectrum and their emotional skills, how do you see the potential usefulness of this idea:
 - As part of therapy?
 - In everyday life (outside formal treatment contexts)?
 - In your own work related to children's emotional development?

4. Target Group Considerations

- Who might this be suitable for or beneficial to?
- Can you suggest an appropriate age range?
- Can you identify a more specific group or context?
- Do you have any additional ideas in this regard?

5. Design and Development Considerations

- From your professional perspective, is there something important we should understand when designing such an application?
 - On a general level?
 - On a practical or fieldwork level?
- Is there anything in the idea that you think should be taken into account during development?
- Did anything in the video presentation stand out to you as problematic, missing, or "off"?

- Are there specific characteristics of children on the autism spectrum that should be considered?
- Can you think of any improvements?

6. Comparison with Existing Practices

- How does this idea compare to practical tools or instruments currently used to support emotional skills in children on the autism spectrum?
- For example, non-verbal ways of discussing emotions, existing technological applications, art therapy, or the use of images as communication tools?

7. Additional Reflections (if more open discussion is needed)

- My aim is to conduct an initial exploration and increase understanding of the potential applicability of this type of technological concept. Is there anything important you'd like to add that hasn't been covered in the previous questions but that you consider important from your perspective?

8. Clarification and Final Thoughts

- To summarize: What might be the benefits of allowing a child to transform their emotional experiences into visual form?
- From a therapeutic perspective, how might this be helpful?
(*This may be one of the most important questions.*)

9. Final Question

- Would you like to add anything else that you consider important regarding this topic but that has not yet been discussed?

End of Interview

- Thank you, that was the last question.
- I will now stop the recording.