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Emotions at play: gaining emotional knowledge using a video game

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I certify that all material in this thesis, which is not my own work, has been identified and that no material is included for which a degree has already been conferred upon me.

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Abstract

The use of video games for teaching children different subjects is commonly believed to be a good approach. In general has learning theme for these games focused on traditionally subject, such as math or biology. Important as they can be for education, other softer aspects can also be considered important for the children and education. One such aspect is emotions and the role it has on a social level. However, it is not much research showing how to use emotions in a learning game. In this thesis, I examine how children perceive and use emotions as they play a game specially designed for teaching emotions. The game utilises emotions in a new design that let the player interact with cartoon animals in different scenarios. I report findings based on a sample of thirty-three (33) preschool children, and six (6) parents who took part in the study. Data was collected using a qualitative method in a two step procedure with observation of play and follow up interviews in the first step, followed by video recordings of play and demonstrations using cuddly pets in the second step. Using an ecological framework for analysis and theory from the field of emotional intelligence, I show that children playing this game can perceive emotions expressed in the game. I also show that it is possible to play this particular game without the need to involve emotions. Children do not learn emotions from playing the game. These results carries important implication for the design of learning games as it illuminates that learning can come from possible sources other than the gameplay.

Keywords: affordance, video games, learning, emotions, emotional intelligence, Peppy Pals, ecological framework, preschool children.

Summering

Det finns en spridd uppfattning att videospel kan fungera som lärandespel för barn. Generellt sätt har denna uppfattning stöd i skolan och det finns därför även en önskan att producera spel som kan användas till att undervisa traditionella kärnämnen, exempelvis matematik eller biologi. Dessa ämnen är betydelsefulla att bemästra, dock finns även andra mer mjuka aspekter som kan ha en avgörande betydelse för barnets lärande. En sådan aspekt gäller den viktiga betydelse som känslor har i ett socialt sammanhang. I denna uppsats undersöker jag hur barn uppfattar och använder känslor då barnen spelar ett spel som är designat enkom för detta syfte. Spelet utnyttjar en design som låter spelaren interagera med tecknade djur i skilda scenarion. Jag redovisar resultat som baseras på ett urval av trettiotre (33) förskolebarn och sex (6) föräldrar. De material som samlades in bygger på en kvalitativ datainsamlingsmetod som är uppbyggd i två steg. I steg ett samlades data in genom observationer samt uppföljande intervjuer. I steg två genomfördes sedan observationer följt av demonstrationer då barnen använde gosedjur. Jag visar, genom att applicera ett ekologiskt ramverk samt teori kring emotionell intelligens, att barnen kan uppfatta känslor som manifesteras i ett videospel. Jag visar också att spelet kan spelas genom en slumpmässig interaktion där barnen inte behöver använda känslor för att föra spelet framåt, och jag konkluderar därför att det är möjligt att barnen inte lär sig känslor som en följd av själva spelandet.

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1. Introduction

Video games are becoming a big part of many peoples life today; adults and even young children spend time playing various games. The introduction of touch screens and applications (apps) has also certainly contributed to making games much more available. The use of mobile devices and touchscreen technology is not only something that takes place at home or work places, but also at school. There is a growing interest from the educational administration to use this technology as a pedagogical instrument. Modern teaching instruments shall, according to the Swedish National Agency for Education (Skolverket, 2013), be applied in such a way that every pupil can access and use it in their education. For example, Stockholm distributed 2285 tablet PCs among pupils from preschool to high school, in a one-year project in 2013.

Many have thought of using video games for learning purposes, but typically focused on traditional subjects taught in school. Annetta (2008) gives several examples of games specially developed for learning children biology, as the game Immune Attack or social engagement via Food Force, where pupils learn to solve problems related to famine. A further example is DOGeometry developed by Wallner and Kriglstein (2011) where the child should solve geometrical problems.

Another example is the game Minecraft, a game not developed for the purpose of education but nevertheless, according to Short (2011), can be used as a pedagogical tool for teaching children for example biology or physics.

Mastering these subjects is essential to be able to take part in the society and work life. However, the child must also learn social skills in order to cooperate and work with others on a level that is becoming increasingly complex in the modern society. A recognized important factor in this respect is how social abilities are dependent on emotions Layder (2004) and the impact emotions have on for example social-relation aspects and regulating social life Van Kleef (2009).

While there is a growing understanding of the significance of emotions for human cognition and social life, not many games are targeting emotions as a primary path to education and learning. When research has been conducted, the focus has often been on aspects of aggressiveness related to violent content (Barlett et al., 2009, Engelhardt et al., 2011). However, as of today, there is little research on the use of games designed to promote emotions, specifically targeting younger children.

The focus of this study is therefore to address this gap by exploring an educational game based on different emotional contexts, as a means to arise emotional awareness in young children.

1.2. Domain of study: eQidz and the game Peppy Pals

Peppy Pals is a video game specially designed with an ambition to function as a tool to teach children about emotions. The game was developed by the Swedish company eQidz [1], and it is the

[1] http://eqidz.com

brainchild of the entrepreneur and CEO Rosie Linder who founded the company together with Jesper Engström from Talawa Games.

The game idea has its root in a wish to reduce bullying as both Linder and Engström have a strong belief that bullying amongst children can be prevented if children can learn about different social aspects related to emotions and empathy. The overall view is, therefore, to teach emotions, using a video game specially designed for children at the age between three and six. The company eQidz presents the game Peppy Pals, as a way to cultivate emotional growth using elements of emotional intelligence (EI), role-playing and humour.

In the year 2014, Rosie Linder and Jesper Engström was one of five winning teams (amongst 700 other competitors) in a competition arranged by Reach for Change a Swedish non-profit organization. Reach for Change's [2] mission is to invest in: "exceptional individuals with unique ideas for social change" The prize, named "Change Leaders - people with breakthrough ideas that make life better for children" gave access to founding's from Reach for Change. They joined a three-year, specially designed incubator program, receiving salary funding and support from partners to Reach for Change in the business sector and their global network. The company also joined the so-called Sting fast-forward program by Sting Stockholm Innovation & Growth [3], which provides support and a network of already established companies.

It can, therefore, be said that there is a strong support in the business and game community for their idea about using a video game as a way of teaching children emotions and the benefits it could bring.

2. Problem description

As described in the introduction, there are examples of specially designed video games as well as other games that can be used in education. Research also shows that video games are believed to be attractive for educational purposes. However, it is not clear that a video game can be used to teach young children emotions or even get a higher emotional intelligence. In an attempt to address the gap between emotions as recognized being an important part of human thinking and social life, and the believed beneficiary aspects of using video games for learning emotions, this study is important as it can help clarify how a video game might be utilised to teach emotions.

2.1 Aim

The aspects mentioned previously indicate that it is not obvious how emotions can be used in a videogame, neither as a way to increase emotional intelligence or to prove such an effect. The aim is, therefore, to study how children take use of emotions as they play a game that is designed for emotions.

[2] http://reachforchange.org/sweden/
[3] http://www.stockholminnovation.com

2.2 Problem statement
The central research question for this thesis is:

- *How do children at preschool age perceive and make use of emotional expressions in a learning game that is specially designed for teaching emotions, such as Peppy Pals?*

2.3 Scope and delimitations
This study is an effort to examine how children perceive and make use of emotional expressions while playing the game. It is not an attempt to determine if the child gets higher emotional intelligence compared with other children not playing the game. Nor is it an attempt to determine if any other long-term effects such as preventing bullying can occur, from playing the game.

The target group for the study is preschool children between the ages of three to six and correlates with the intended design of the game.

2.4 Disposition
Chapter 3 introduces current research regarding games and emotion intelligence. The chapter put together key aspect of emotional intelligence and gameplay in order to illuminate the theoretical framework later used as analytic tool.

Chapter 4 explain the methods, having two different parts a pre-study and main-study, where the main-study allowed for an opportunity to use an innovative methodological approach to game studies. The chapter ends with a view of considerations taken and ethical reasoning.

Chapter 5 outlines the design of the game Peppy Pals focusing on the two most central scenarios for this study. The chapter also illuminates the implementation of the research process.

Chapter 6 introduces the pre-study and presents empirical data from observations and interviews. The chapter give a tentative analyse based on the findings and the pattern that emerged as well as the implications some of the data had on the main-study.

Chapter 7 presents the findings from the observations and demonstrations of the main study. The chapter then presents the analyses based on the theory and the empirical data.

Chapter 8 concludes this study and starts by discussing the study in relation to the research question and validity and reliability. The chapter ends with a reflection of insights gained and propose future research.

3. Background
The game Peppy Pals presents an interesting opportunity to study how children interact while playing a game with emotional content. Firstly the game design was heavily influenced by the idea of emotional intelligence (EI), or emotional quotient (EQ), and although the study does not measure EQ, the concept of emotional intelligence is important in order to understand some of the key design decisions for the game. Secondly, previous research on games has influenced the approach of this study of Peppy Pals, especially the ecological framework presented by Linderoth (2012).

3. 1 Emotional Intelligence

Peppy Pals was designed with the idea that it would be possible to prevent children from bullying if they were taught about emotions. This idea of preventing bullying implies that different abilities can be enhanced through a social learning process. Reed et al. (2010) for instance defines social learning as social interaction and deliberation where a subject for example prove a change in attitude as a result of new understanding as well as the change in practise in larger social units. This ambition of preventing bullying also suggests that emotions can play an important role for humans as well as in the sociocultural dimension of life and that individual awareness of emotions can lead to a different pattern of social behaviour.

Emotional intelligence is formulated as the ability to reason about emotions and the ability to use emotions and emotional knowledge to enhance thought and can, according to Mayer and Salovey (1997), be defined as: "the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth." (Salovey and Grewal, 2005) is further expanding this definition by adding that it consists of four different parts; perceiving, using, understanding and managing emotions. The first part is the ability to detect and identify emotions in cultural artefacts faces, voices, also in other humans. The second part is related to cognitive functions like the ability to use emotions in order to support, for example, problem-solving. The third part is the ability to realise complicated relationships among emotions and to understand the language of emotions and the fourth part relates to the ability to regulate own emotions, as well as emotions in others.

3.3 Games and Learning

The beneficiary aspect of using video games for learning is very much propagated by James Paul Gee. He is arguing for the use of a game like approach to learning as video games, in his opinion, can function as a platform for problem solving. He describes a video game as: "action-goal preparations for and simulations of embodied experience." Gee (2007 citing Barsalou 1999a) is thereby highlighting the situated cognition view that humans are using perceptual simulations as a way to prepare for a situated action. According to this view, simulators serve as a type that can be used to create a simulation for a given moment.

Gee (2007) claims that video games are perfect as metaphors for this view and says: "humans think and understand best when they can imagine (simulate) and experience in such a way that the simulation prepares them for actions they need and want to take in order to accomplish their goals" Gee (2007 cited Barsalou 1999b, Clarc 1997; Glenberg and Robertson 1999).

While Gee (2007) claims that video games that have good design are good learning environments, others as Linderoth (2012) propose that games not necessarily have to provide for good learning. Certain games can according to Linderoth (2012), be played in a successful manner without any learning process, and consequently without the need for or developing of skills and knowledge.

Linderoth (2012) suggest that theories from ecological psychology can be applied as a framework for understanding learning processes in gameplay. A key concept in ecological psychology and the ecological framework is affordance, which can be defined as what the environment offers the individual for utilising actions (Gibson, 1986). In the context of the ecological framework, affordance

is examined using exploratory actions to figure out what kind of performatory action can be used (Linderoth, 2012). As such, it is based on the idea that affordances are not merely offered by a presentation but as interplay between seeing and acting on affordances.

Linderoth (2012) argues that while it is the perception of affordances and the possible actions upon it that drive the gameplay, it is not the same as saying that skills and knowledge will follow. On the contrary, Linderoth (2012) claims that the progression in games can be designed in such a way that it is even unsuitable for learning. Affordance can be shown to the player in such a manner that the gameplay has less need for exploratory activity suitable for the knowledge and the performatory actions can be supported so that the player can gain skills without practice.

Learning can be explained as an incremental process with the purpose of gaining new affordances and new ways to interact with the environment (Linderoth 2012). As Linderoth and Bennerstedt (2007) say it: "To become a skilled player is, therefore, a process where the gamer develops a more and more fine-tuned understanding and in one sense is more and more distanced from seeing the screen as a depiction of something else."

3.5 Summary

The theory presented implies that there exist different opinions regarding how a learning process can be supported by the use of video games. Linderoth questions the general idea that a player's performance must be the outcome of learning. A video game can provide for good learning, but it can also be a learning game in disguise. The design of Peppy Pals is based on the idea of emotional intelligence and has a clear ambition to function as a learning tool. Peppy Pals is also a game developed for young children, who probably set constraints to the design and how skills and knowledge can be utilized. The ecological framework with its critical approach and its possibility to break down a gameplay in exploratory and performatory actions is, therefore, thought to be a useful tool for the analytical process as to find out how children perceive and make use of emotional expressions.

4. Methodology

4. 1 Study approach

This study design consists of two distinct stages, the pre-study and the main study (see figure 1 below). The pre-study was explorative and produced preliminary findings, which then could be analysed and used for decisions concerning how to conduct the main study. The main study used a more elaborate and controlled setup and went deep into specific details of the game, which then could be analysed and interpreted according to a theoretical framework.

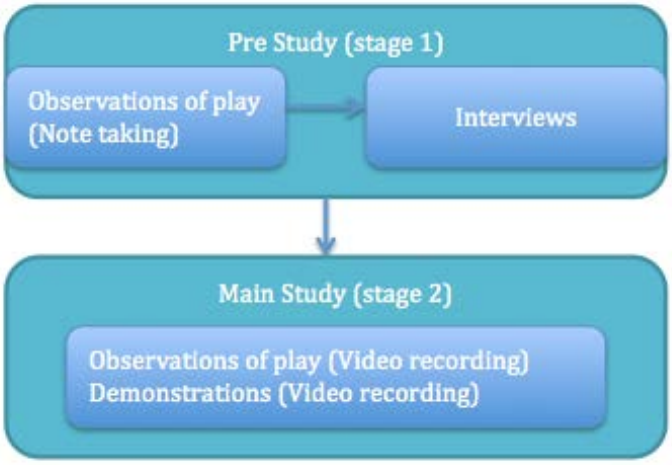


Figure 1: Study layout

4.1.1 Pre-study Observation

The pre-study used open observations and note taking of how the participants freely played the game. It also included interview sessions to give the children a way to express thoughts and feelings that could not be expressed during play. This approach is qualitative and strives to generate a description of the interaction with the game as it unfolds the children's natural environment. The results from the pre-study observations were analysed in order to construct questions that could further probe interesting findings.

4.1.2 Pre-study Interview

While observations in general are good choices for producing data about external events, they are not best suited for matters where the participant's own subjective view is sought-after (Langemar, 2008); for this reason interviews were considered a good choice. A qualitative interview with semi-structured questions was proposed for this stage of the study. It was possible to construct a questionnaire partly based on data from the first observations, having a flexible structure allowing it to be used as open-ended questions in a follow up fashion.

4.1.3 Main study observation

In the main study, video equipment was used for data collection. In order to understand how the child perceived emotions, questions were also introduced during the play. (It was not considered possible to establish a think aloud protocol for children at preschool age.) At the end of every play session a demonstration session took place where different game scenarios can be played with cuddly toys.

Patton (2002) describes naturalistic inquiry as being the opposite from an experimental setting, where it has a predetermined course. Instead, observations and open-ended interviews are conducted in the real word. The environment should also be familiar and comfortable for the person in the study (Patton, 2002). The structured method, on the other hand, follows a procedure that can be repeated with more accuracy. The idea was that this should allow for observations that could be done with a minimum of disturbance so that the focus was on the actual game play.

This mix of different methods can be considered as a pure, qualitative strategy. Even though there are some constraints in the second stage with structured observations, it is still not an experiment in a strict sense. There was no use of a control group, or statistical analyses of the data, nor were participants randomly assigned to a condition (Graziano et al., 2010). Overall, this approach allowed for a study that covered the situations as they develop naturally, but it also allowed for a controlled setting, which made it possible to compare multiple game sessions.

This stage had several equally conducted observations that were repeated depending on the number of participants. What differed between each observation was the number of persons participating; there was either one child together with one parent, two children playing, or one child playing alone.

As subjects in this study were preschool children, there were no simple ways of asking questions that did not lead the subject to respond in a certain way. It was, therefore, essential that observations were to be conducted without having to interfere too much in the normal game play. This was a reasonable approach because emotions can be difficult to express in an interview setting. Therefore, in order understand the child's own interpretation and conception of the game and the situation, an experiment was implemented in a way that allowed for an interaction with the child that resembled the child's own perspective. Samuelson et al. (2010) defines a child's perspective as a representation of the child's own views, understandings and experiences of the world and life; in contrast to a child-perspective, where an adult makes a reconstruction of a child's view, experiences and making (Samuelson et al. (2010).

The experiment was based on a method that could help reconstruct how a child interprets a situation (Samuelsson et al., 2010, p 155). This was a slightly reduced implementation of their method, adapted to this study and the conditions at preschools.

Figure 2: Reconstruction phase

The experiment took place in a room at the preschool where the child felt safe and comfortable. A table with a tablet PC was prepared together with the game to play. Somewhere in the room, storage was prepared for cuddly toys that resembled the same characters used in the game; these cuddly toys were later used in the recondition phase and demonstration. The whole game session and the

recondition phase were recorded using a video camera.

1. Playing the game: A preschool pedagogue, together with the supervisor of the experiment, introduced the child to the room where the game session was to be recorded. This started the first part (see Figure 2: Reconstruction phase). The initial experiment and observation was about playing the game, so the child was asked to start with the prepared scenario. After playing a while and finishing the different scenarios, the child was thanked for participating.

The next part of the experiment took place after the first initial observation was finished; this is the reconstruction phase and consists of the demonstration. The setup was as follows: when the child was about to leave the room (believing that the session was over), the child was told to come back and receive a gift (bookmarks) for taking part in the study. This started the reconstruction phase:

2. Demonstration: While the child was back in the room again, and was choosing amongst bookmarks, the cuddly toys were taken out from the box. The child was invited to play different scenarios so to explain what happened in the game by using these pets. This was very important as it gave the child a way to communicate by acting instead of talking.

In combination, these methods gave valuable data regarding the understandings of emotional expressions in the game.

4.2 Overall considerations for study design and data collection

The game of this study: "Peppy Pals", utilizes emotions as an important aspect for understanding the game. The idea was to get a deep understanding of emotions in this context rather than to give a statistically significant result of aspects concerning emotions in play. This should give a thick or rich description; data that can give a detailed and concrete description of people (Geertz 1973 cited in Patton 2002, p. 438) and places which accordingly: "provides the foundation for qualitative analyses and reporting" Patton (2002). However, since the target group was preschool children between four and six years of age, one can expect that children of that age have a limited capacity to express their feelings verbally, compared to adults. Verbal information is though very important and was collected together with bodily expressions to further enhance the result using triangulation (Patton, 2002, p. 247).

This design strategy is well in line with how Langemar (2008) define qualitative research. Qualitative studies are appropriate to use when to we want to interpret findings and understand their meaning, describe qualitative attributes and variations, theory generation or to conduct qualitative exploration (Langemar (2008, p. 21). The latter is usually done in an area where little research has been conducted and where we want to find relevant questions. This was surely the case for this study, but this study can also be considered as being inductive (Langemar (2008, p. 200). Several cases or organised observations (se chapter 5.3.2) will be conducted, and it might be possible to do inductive reasoning based on regularities (Nigel, 2008) (or irregularities for that matter).

The data that are required for this study is qualitative, and for this a number of different methods can be used. However the choice of data must be see in the light of the purpose of the study and how informative the data is (Langemar, 2008). The aim was to study how children play a game that is designed for emotions.

The study had to produce data that were both subjective and objective to its nature. The participants and their own perception of for instance emotions was important to capture as well as the interaction and how they played the game. Inner data concerning thoughts believes, interpretations and experiences can be collected using interviews and questionnaires (Langemar, 2008). Data of this kind was useful for getting an understanding of how children understood the game. Equally important was to capture data that show non-verbal processes or processes that the participant was unaware of.

4.3 Framework for analysis

The analysis strategies were both based on an inductive and deductive approach. The inductive analysis was used in the pre-study because it allowed for a way to discover patterns, themes and categories in the collected data. For this purpose a colour-coding scheme was used as a way of fleshing out emerging patterns using different colours for different verbal occurrences. As the first part of the study was to study how children played the game without interference, this analysis gave a first indication of possible themes. The deductive approach (Patton (2002, p. 453), was used in the main study where the arrangement of empirical data extracted from video recordings, was partly built on the interactions analysis described by Jordan and Henderson (1995). This interactions analysis allowed for a systematic walk trough of data and made it possible to flesh out talk as well as the activities in the room and on the screen. Further analyses in the same manner were made in the main study part as it contained video recordings of the demonstrations using cuddle pets. For the final analysis, an ecological approach was used as a theoretical standpoint. The ecological approach (Linderoth, 2012) describes gameplay as *perceiving* suitable actions and/or *performing* suitable actions and was therefore considered appropriate in order to analyse how children did *perceive and made use of emotional expressions in the game.*

4.4 Ethics

The study conforms to the ethical principles by Vetenskapsrådet (2002). For example, all data were collected for research only and all written and recorded data was anonymized in order to prevent any recognition of individuals participating in the study. The company eQidz had an interest in using some of the findings, for example when seeking more funding, but any such request, if it meant a possible identification of the child, was first to be approved in writing by the child's parents. Such aspects also included to inform everyone involved about the purpose of the study, that everyone were participating on a voluntary basis and the right for everyone to end their participation in the study at any time and without any explanation. In this case where the subjects were children, an agreement from their parents before the study begin was required and consequently obtained before the start of the study

An ethical concern was that the whole picture could not be communicated to the children involved. Even though children, parents and teachers were informed, it was not possible to uncover, for example that the study was about emotions as this could have influenced the child. One other ethical concern was that the child was very much in the hands of decisions taken by adults, for instance parents' consent, which in effect meant that some children could not participate at all or participate in the main part of the study (recorded by video equipment). An important ethical decision was therefore to view the child as more than a passive object and a means to enable this study. Christensen and Prout (2002) refers to UN Convention on the Rights of the Child (CRC) when they say

that: “all activities (including research) that affect children’s lives have to build on seeing children as fellow human beings and as active citizens. It promotes the idea that the child is involved, informed, consulted and heard.”

In order to implement this requirement every child was informed as much possible about the study before taking part. They could also ask questions and make comments along the way. It also meant that every child knew that they could play the game if the wanted, but also that not everyone could participate in the study as this was a decision taken by their parent. Extra care was taken to present the study so that the child knew that it was a test of the game and not themselves.

5. Implementation of Peppy Pals and the study

The following subchapter 5.1 describes the video game Peppy Pals and the parts of the game that are central for this study. Subchapter 5.2 presents the practical considerations for the study.

5.1 Peppy Pals: Interaction model

Peppy Pals is a video game specially designed for younger children. The game is constructed around a set of independent scenarios having animals as the main interaction objects. In general, there are two types of scenarios, with or without a storyline. For example, painting or trying different items in order to find out how, for instance, a horse react to a ball or fish are scenarios where the user can play around without having to follow a specific route. The other set of scenarios is based on individual stories where the user should realize what to do next according to emotions expressed by animals (5.1.2 ff.). The central idea, in the gameplay, is that the child should figure out how to help a character to fulfil a particular task. The way the character announces the need for support is by expressing emotion, for example, fear or sadness. The intention is that the child should use emotions as a way to guess which action should follow.

The games as a whole were explored in the pre-study, but only two of the scenarios with a storyline were chosen for the main study. These scenarios; the ‘pie’ and the ‘slide’ scenario are particularly interesting as they differ in how the player perceived the story.

The interaction model is based on a predetermined goal that should be accomplished in a (storyline) scenario, for example, to ride a slide and to help another animal to do the same thing, or comforting each other as a way of solving the scenario with the tipped pie. The child should click on different animals or items in order to move on to the next sequence in the scenario. The interaction suggests that an animal for instance moves in some direction and for example uses the slide, but the child cannot control the direction of the movement as the game in effect moves on to the next part of the scene. Feedback is given in the form of sound and animal-expressions indicating the need for further interaction. For example, the dog regularly whimpers, anxiously looking towards the child, as well as a periodical change in brightness of the dog accompanied by a clear sound.

There is also a progress bar that informs the child of the current progress in the scenario as a whole, and in some cases a small temporary progress bar that helps the child to accomplish the finishing task (5.1.3, figure 9) of sliding down. This progress bar only fills up as a child holds a finger on the animal for a short while. The animal is responding as the progress bar fills up, by showing with the body language that he is inducing more courage before proceeding to slide down. This feeling

is expressed by even more worried sounds from the dog, which change as the child interacts by holding down a finger making the dog taking a big breath before ultimately sliding down. If a child is clicking somewhere else, there is again a sound and the dog changes its brightness for a second in order to indicate an unsuccessful interaction. Other ways of indicating an incorrect action is by repeating the same event once again.

The children are supposed to detect emotions expressed by different animals in order to understand that it is time to click on some animal in order to progress. Some of the animals need to be comforted, and the child is prompted for interaction by the expression of the animal. The rabbit express sadness by bending the ears and doing a sobbing sound, which indicates a need for comfort; and the interaction from the child should be to click on the rabbit. In the slide scenario (5.1.3) there is a need for extra courage as the dog hesitates to use the slide. Other sounds and visual clues are jumping and making angry sounds, shaking the head or sobbing or just the appearance of an animal when first entering the scene.

5.1.1 Start menu

The start menu image (figure 3) gives an overview of the different scenarios available in the game. There are four types of scenarios in the game, one category is a playable story (the pie, apple, carrot, slide and water scenarios) and one category are black and white stills for painting and colouring (heart and palette). The two final scenarios are about pairing emotional expressions (in the form of smilies) with emotions and the final scenario lets the player choose various items to see the how the animal respond. Focus in this study, as mention earlier, is on the story-based scenarios.

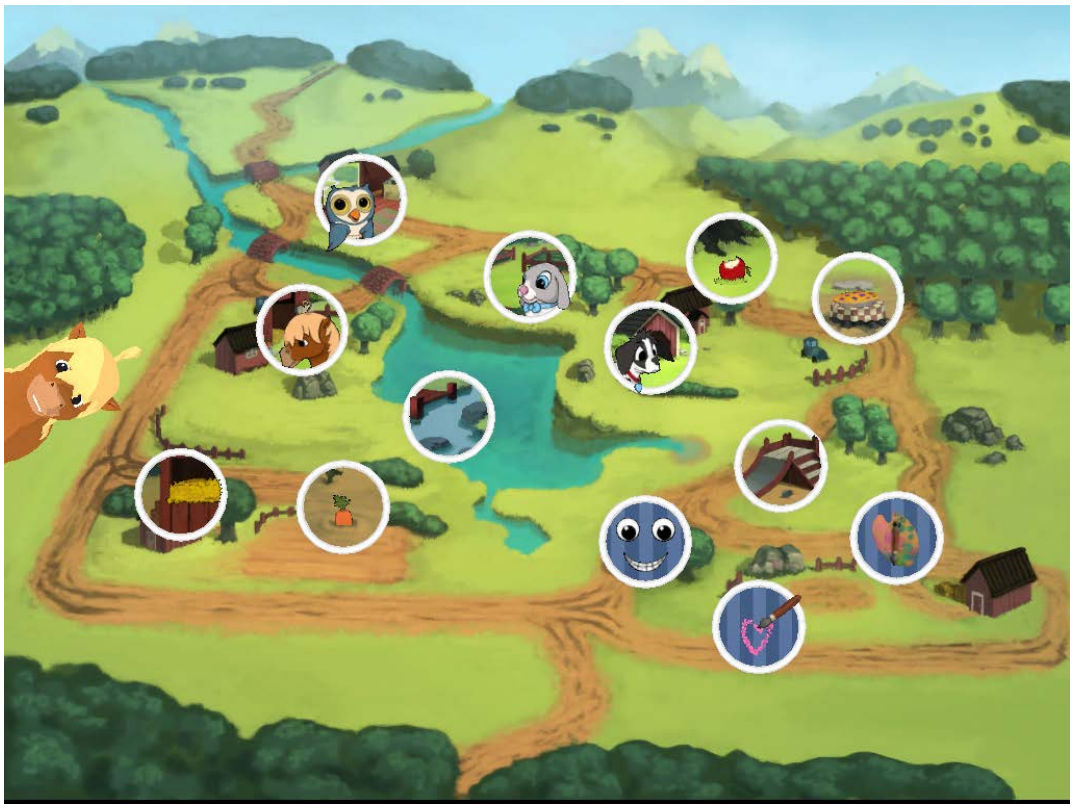


Figure 3: Start menu of Peppy Pals

5.1.2 Pie scenario

In the pie scenario, every animal gathers around the table one by one, but when the dog approaches the table he topples the pie by accident (figure 4). This causes an emotional reaction amongst the other animals (figure 5). The rabbit gets sad and cries out load with tears falling down to the ground while the dog is ashamed, and the horse is concerned and the owl angry. The story evolves as the animals feel a need for being empathic (figure 6). This lead to a change in their behaviour (figure 7) so that they end the story by a comforting group hug.

The pie scenario has a somewhat intricate story as it does not give a clear and direct understanding of what to do just by taking a first look. Even though there is not much more to do than first gather around the table, this does not provide support for how to proceed with the gameplay in the same manner as the slide scenario, so there is no automatic merge into the emotional goal of comforting.

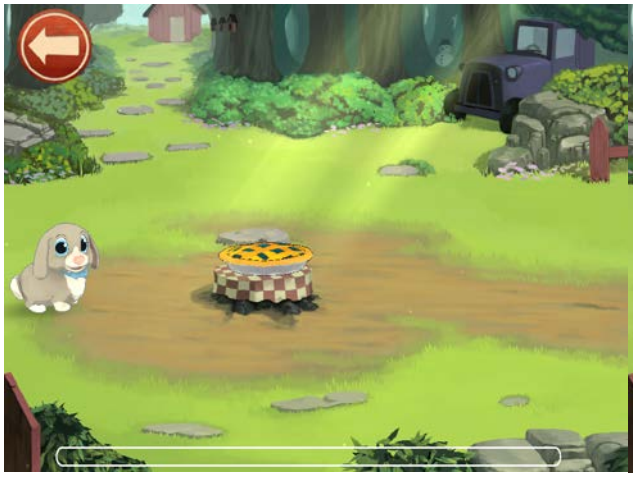


Figure 4: Approaching the pie

Figure 5: The dog has rolled the pie

Figure 6: The rabbit is bending the ears

Figure 7: A comforting ending

5.1.3 Slide scenario

The slide scenario is a story where the dog is about to try the slide (figure 8), but because he is a bit afraid he has to assemble some courage (figure 9, a slider just above the head of the dog).

Most the same then happens as the owl enters the scene, but this time it is the owl that is afraid. The dog recognizes this emotion and helps the owl by standing close and together they mobilize the strength necessary for sliding down (figure 10 and 11).

The slide scenario has a very straightforward goal that everyone can understand. It is obvious that this goal can be viewed as riding the slide. This goal will then converge into the emotional goal; which is to support and to encourage.

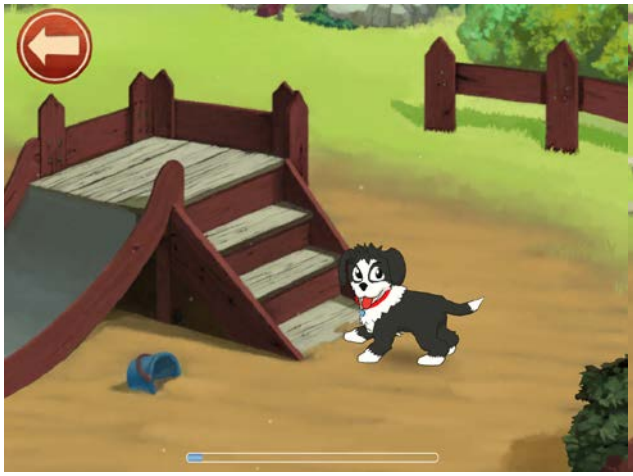


Figure 8: Approaching the slider

Figure 9: Half gaining confidence

Figure 10: Helping the owl

Figure 11: Sliding down together

5.2 Implementation if the study

5.2.1 Choice of appropriate places for the study

It was essential to find an environment that was comfortable for the child and where the children's playing could be observed. It was also important to have a place that allowed for a controlled setting to some extent, as the design of the study depended on the opportunity to do observations of selected participants.

The use of video camera did also put constraint on where and how the observation could be conducted. The camera had for instance to be set up so that it only filmed participants who had provided consent to be filmed. Other considerations were that the equipment was not run over by children running and playing or just safe from prying eyes with might have disturbed the observation. It would also be practical to have contact persons that were familiar with the children who could help with the initial communication with parents as well as the practical and pedagogical aspects that could appear.

The obvious choice was to select preschools as the study location. Preschools allowed access to large groups of children that allowed for both successive game sessions with different participants as well as the chance to address the group as a whole. Two preschools where selected, Matteus and Pysslingen. Both preschools are located in Stockholm. Since the team behind Peppy Pals considers families as their primary customer group, the preschool studies were complemented by studies in a home environment. Two families were selected in Stockholm, one that is the author's own family and the other a neighbour. This is very clearly a convenience sample, but this was considered acceptable, as the study would be in-depth and qualitative.

5.2.2 Study participants and location

The participants of the study were children between four and six years of age and in some cases, their parents. In total, a sample of thirty-three (33) children and six (6) parents were part of the study. They were distributed among two preschools and two families, as eleven children and two parents from Matteus preschool, twenty children and two parents from Pysslingen. Furthermore, two families participated with one parent and one child each. All in all, twenty-five (25) children and four (4) parents participated in both observation one and observation two.

At Matteus preschool, the first observation took place at the group for children of ages five to six. A small desk in the main room was used, and this was where children usually sat and play with various toys. The interview, with the group-as-a-whole, took place in the main area on a small platform. This observation setup allowed for observations in the children's natural play area. For the second observation stage, a setup in the lunchroom area was prepared. One camera was placed at one corner overlooking a small table (see appendix Matteus for a sketch showing the preschool floor plan). This way the second, more controlled observation could be done more privately, without being disrupted by children playing.

At Pysslingen preschool, the first stage observations took place in a dedicated small room, usually used be the children for drawings etcetera. A teacher was present at all observations sessions. For the second observations, using video recording, both the previous small room was used as well as a small office room. The office room was probably not a room that children had access to under normal conditions, but it was used because of lack of space the day of observation. Some of the participants at the age of four came from the side building at the preschool compound, but they were familiar with the building even though they did not use it on a daily basis.

The observations made at the two families in the study were conducted in the living room and in a dedicated playroom.

5.2.3 Preparations

In order the get an initial approval, appropriate personnel at the two preschools was contacted and the idea with the study and how it would be undertaken was communicated via mail and telephone. At Matteus and Pysslingen a meeting was setup where the purpose of the study was explained in detail and where the head and teachers had the opportunity to ask questions. Next, teachers at each preschool distributed the necessary consent form to the parents (see appendix A). A preliminary time schedule was then established.

For the two families, consent was given orally both to the first observation as well as the second part. Information was given in person, so there was no need for a written consent form to be handed out in advance.

Before any observation could start the consent forms had to be collected and the answers checked. The form allowed for a parent to decide if the child could participate in the first observation (without video recording) and the following interview, or the first and second observation. The parent had also the option to mark whether to participate together with the child in the second observation. The procedure was the same for Matteus and Pysslingen.

6. Pre-study

This chapter is presenting the empirical data and analyses from the pre-study. In order to describe how the data was collected, the chapter first begin with a description of the observations and interview phase. The empirical data and analyse is then presented in chapter 6.2, followed be the tentative conclusions drawn in chapter 6.3. Lastly in chapter 6.4 the implications for the coming main-study are presented.

6.1 Data collection

The data collection started at a family home because this was convenient as it also functioned as a pre-test. The child and parent took place together in a sofa in the living room and the child and parent where given a short explanation of what would happen and that it was voluntarily and that the child could stop play if she wanted, without having to explain anything. The interaction during the game session was documented using pen and paper and lasted for twenty-eight minutes.

Before the first observation took place at Matteus preschool everyone, teachers and children gathered around their stage for a short information session. A short introduction of the study was given explaining the tablet PC and the game, and also that they should test the game in pairs. The focus on emotions was not mentioned; as this could have influenced the way the children would play the game. At this occasion, the tablet PC and the game Peppy Pals was presented and the children were informed about how to use the device. It was explicitly articulated that each and every one only did participate if they wanted that themselves and that they could abort at any time if the wanted so. All the children had a chance to comment and look at the game before it was decided which two children that should start playing.

6.1.1 Observation

Two children at a time sat down at the table (see 6.2), beside each other. Every session lasted about ten minutes and the total time was one hour and 30 minutes for all twelve children. Note taking was made using paper and pen.

The observation at Pysslingen followed the same pattern as Matteus. Here, one session was with a single child, and one session with four children using two tablet PC's. The rest of the sessions were done with children in pairs. A laptop was used for note taking. Seventeen children in total were observed over a timespan of two hours and thirty minutes.

Finally, the second family was observed following the same procedure as family one. Note taking was made using paper and pen.

6.1.2 Interview

The data from the first observations was partly used to assemble the questions that could further illuminate how the child perceived the game. The tablets were left with the families and preschools, and a follow-up interview session was done approximately one week later. First out was Matteus preschool, where all children were gathered on their small stage in the corner of the open space. They were told that this time it was important to hear more about their own experience from playing the game. Again, emotions were not mentioned. It was a lively, sometimes a bit turbulent interview as the children were very much involved and did talk all at the same time. The interview at Pysslingen preschool was arranged in the same fashion as Matteus and using the same question as at Matteus preschool. When it comes to the two families, only one family (child) took part in the interview due to time constraints.

6.2 Results and analyses

The children taking part in the first observations had all the opportunity to explore the game as to their own pleasing. This free play was a good way for a child to learn how to play the game, and it was not the intention to study specific elements or parts of the game. Some of the notes, regarding for example drawing or filling colours, or testing the reaction made by an animal if presented with a spider or whoopee cushion, are not discussed in this thesis.

Through inductive analysis of the data, several patterns were recognized. These could be organized into five different themes summarized below.

6.2.1 Observations

Joy

One emerging pattern was that the children really had fun playing the game. A lot of laughing and smiling happened while they were playing and in general, they seemed amused. Most of the spontaneous laughs came when they were interacting with objects such as a virtual whoopee cushion. Commentaries accompanying the different scenarios were clearly expressed the feeling of joy: "*this was fun!"* or *"the owl was fun"* The children would sometimes react with physical actions to game events, such as by putting a hand over the mouth.

Affordance
A common behaviour amongst the children was that they tried to click repeatedly on the same area, or tried to drag an object in some direction. They did this regardless of what system feedback was provided or not provided. Several of the scenarios were identified as difficult but particularly difficult was the pie and the apple scenario. One child gave up on the apple scenario, and several other children expressed confusion about the apple as well as the pie scenario.

Ending state
Most of the time, the children would play a scenario through to the end. However, some of the children had difficulties in identifying when a scenario was finished. This was seen several times and it was not limited to only the youngest even though this was most common with them. Sometimes, the scenario had finished but the child did not understand that it had; the child did not wait long enough to get applauds that signified that the scenario had been completed, but moved on to something else by using the exit arrow. On other occasions, the child gave up before playing the whole scenario till the end. Some tracks, especially the one with pie and the one with apples were left unfinished on several occasions, but also the slide and water stream was abandoned occasionally.

Acting
Many of the sessions revealed that that the child was involved in a decision process based on instrumental rules in the game. For example when two children played together a conversation went as:

- "*Does this game work?"*

Child 2 is then showing how and says to child 1*:*

- *"You has to press now…"*
- "*Now you should press the dog*"

And later…

- "*You should press the horse once more*"

In another session a conversation followed as:

- "W*hat should we do?*"
- "Click on the mouth!"

What does the animal want?
A common question amongst the children was reflections about the state of the animal.
One example from the carrot scenario:

- "*Why is he crying?"*
- "*Poor him!"*
- "He is sad!"

And an example from plying the slide:

- "*Doesn't he want to do it*? (The dog hesitates)

Or from the same scenario with another child:

- "*It doesn't dare*"

6.2.2 Interview

The follow-up interview sessions was an attempt to further illuminate the themes identified and why for instance many children aborted scenarios or why they used a trial-and-error behaviour that seemed to be detached from an emotional understanding.

When asked about how they should move an animal, most argued for pressing but some argued for the possibility of both dragging and pressing. The understanding of what was correct or incorrect originated primarily in whether a key press generated a movement, for example:

- *"You press and they do something"*

Or:

- *"The animals walk when you press"*

The children brought up reflections about emotion spontaneously when discussing the different scenarios. An example is the scenario with the apple where a child expressed that the owl became angry:

- *"The owl went angry because the horse ate the food belonging to the owl"*

And in the scenario with the slide, comments showed that they fully understood:

- *"The dog helped the owl"*

Or:

- *"The dog was a little afraid, then the owl"*

Most children had not understood how the game communicates when a scenario has finished. Only one child was able to give a direct answer. She mentioned the progress bar and gave a nice description of a tube and that when being at the end you should wait a short moment before taking a picture:

- *"A small tube at the end, then you are finished, you take a photograph, you have to wait a while"* "

Others comments was that the end was when you came back to the menu again or simply:

- *"I don't know!"*

How to move on and to play the game the answers were given as for example:

- "*When no one moves*"

Or:

- "*When it moves then it is right*"

The answers show that the children know how to relate to emotions as they the spontaneously talk as about emotions in a correct way describing what happened. They do however not talk about the play as something related to emotions.

6.3 Tentative conclusions from the pre-study

One emerging pattern from the observations and the follow-up questions was that the children did understand the emotional expressions. Emotions were clearly articulated by most children in, for example, talking about an angry owl or a sad dog. They also understood, in the context of the scenario, why the owl was angry or the dog was sad. They could, for example, mention that the food belonged to the owl (from the apple scenario) or that the dog was sad because he bumped into the pie. However, the dialogues around 'what to do next' did not seem to focus on the emotional

aspects of the game; rather it indicates that the child was trying to repeat behaviour based on rules that were picked up from past experiences of the game.

The tentative conclusion is, therefore, that the children understand the emotions expressed by the animals, but the children do not use emotions in order to play the game. The finding indicates that emotions are past tense reflections on "what just happened", and that a more instrumental perspective drives the play.

6.4 Implications for the main study

The result concerning the children's interaction with the game suggested that the children had trouble understanding how to move forward in the scenario, and that the user involvement primarily affected the movement of the character rather than its emotions.

The mixed results show that both an instrumental interaction and an emotional thematic understanding of the game are at play. Finally, it was possible to distinguish between some scenarios that were easier or harder to play. For example, the slide scenario was a bit simpler compared to the scenario with the pie.

The results motivated a further focus on two scenarios, the scenario containing the pie and the scenario with the slide. This does not mean that the other scenarios were completely ignored, but it was important to include these two scenarios, as they seemed to highlight different problems. Furthermore, the pre-study showed that it was not possible to solely rely on the child's own telling in every moment, it was therefore necessary to ask questions now and then in the coming play sessions in the main study. This latter also indicated the need for an analytic method that could give the child an opportunity to demonstrate rather than talk.

The pre-study suggests that the children understand the emotions, but it was not obvious if this meant that the child used emotions in order to understand how to play the game.

7. Main study

The chapter start with subchapter 7.1 describing how data was collected before describing the result and preliminary analyses in subchapter 7.2. Because the findings were part of two different settings, the play and the demonstrations, subchapter 7.2 is listing various excerpts first from the play and then the demonstrations. The last chapter, 7.3 present the main analyses based on the ecological framework and emotion intelligence.

7.1 Data collection

Prior to the second observation, a time schedule hade to be worked out. Parents that wished to take part needed to be contacted beforehand. Therefore, a letter with suggested time slots was sent by email to a selection of parents. Answers from this correspondence made it clear that the data collection had to be stretched over several days.

The data collection of the second stage observation began with children from the families. It also functioned as a trial session. For this first observation, the two children from each family were playing together. Because of the successful data collection from this session, it was decided to not

change the setup. It was recorded in the family home and in the child's play room, a familiar place for both children.

The second stage observation was recorded using video camera equipment. At Matteus preschool, the lunchroom was prepared for the observation. This room allowed for a quite space where it was possible to set the video camera at the corner of the room overlooking the table. The video camera was put on a tripod and equipped with a wide-angle lens. It gave a view that captured the whole session from the side and from above. At Pysslingen, a small room was prepared as well as the administrator's room. The camera was set on a tripod allowing the camera to overlook the table. The recordings at families were made in the living room, also using a tripod and a wide-angle lens.

The data collection at the preschools started at Matteus, where the room was prepared with the camera, the game and also those animal pets that should be part of the session, as well as stickers gifts. These pets and gifts were hidden beside the table so that no one could see what it was. A plan for which child to begin, based on the response from parents and earlier given consensus forms had been prepared in advance.

Two sessions with parents and one child plus a child playing alone were recorded day one. On the following day, two sessions where two children played together (as a pair) were recorded. Every session started with a short briefing telling the participants that the game session this time was to play only some of the scenarios and that those scenarios were decided beforehand. Because this strategy was to avoid having the child choose for example, drawing or other parts of the game that did not have any link to emotions as of the study. It was also a decision made for the possible outcome that a child could get bored or tired and, therefore, wanted to quit the session. If so, some of the scenarios should at least be played by most children in the study.

During the play, the child got occasional questions just to improve the verbal responses of what was going on in the game. After playing the scenarios the child/children (and parents) were thanked for their excellent play and the session was ended, but as they were about to leave the room they were immediately asked to come back as they had not received any award. A box with stickers was presented and the child was offered to choose a couple of stickers. In the meantime, as the child was focusing on the stickers, the pets were brought to the table. The animals that were used were a horse, a dog, an owl and a bunny. The excuse for bringing the pets to the table was that they had been forgotten, but now when they were there the child could play what happened in the game. Instead of relying on verbal retelling only, this procedure allowed for interaction with these "real" pets. It gave the opportunity to record how the child played the scenario, as the child now was free to act and show what happened using both body and language. Again was the child thanked for the participation and this ended the data collection for the observation.

The observation procedure was then repeated for every session and also for Pysslingen and families.

7.2 Results and analyses

The result from the main study is based on a selection of the data available. The reason for this was that the pre-study indicated a difference between the scenario with the slide and the rest of the scenarios, for example the pie scenario. It seemed as the child found it a bit easier to finish the slide

scenario before the others. The pre-study also indicated that the interpretation of different events in the game could be seen as either an emotional statement of an animal, for instance an angry owl but it could also sometimes be a more direct instrumental instruction for how to play the game.

7.2.1 Observations

The game can be played in a trial and error way. The story in this case has none or little importance to the choice of interaction. Another way is to take use of the emotional signals expressed by the animals. However since there were sessions that showed that the children sometimes did not know how to continue, this is also illustrated by examples.

The excerpts below illustrate how children are expressing emotional statements that the animals have. The child also talks about the story line, but at the same time often without knowing what to click on or what to do next.

Excerpts 1 from playing the slide scenario

In this sequence the two children is playing the slide scenario. The task is to get the dog up on to the slide, and then boost his confidence so he dares ride to the slide. They have already got the dog up to the stairs and are about to figure out how to continue. Questions from the interviewer are marked with a Q in the table.

Name	Talk	Activity in the room	Activity on the screen
Le	What is going on here?	They are clicking a lot on the dog	The dog is on top of the slide
Le	Go!	More clicking 	The dog is still there
No	But drag it drag it, until it is becoming completely full!	No is interrupting Le	The progress bar is half full as the dog breathe
Le	And then comes the owl	More clicking	The progress bar fills up
Le	Mm he tries to slide down	Clicking and dragging	The dog slides down
Q	How does the owl look?	Mimicking to owl	The dog and owl is on the top of the slide

No	He dare not!		Still at the top waiting to slide
Q	What is the dog doing then?	A lot of clicing	Progress bar half full
Le	He is helping the owl	Even more clicking repeatedly	Progress bar fills up. A lot of audio response (short sounds) to every click.
Le	They are sliding together	They are watching without any interaction	The dog and owl slides down together

Le says: - *What is going on here?*
The children seems to be at first a bit puzzled about how to proceed and then they tries to solve it by clicking a lot on the animal. Their task at this moment is to encourage the dog to slide down but he is a little afraid. In order to help the dog they have to press and hold a finger on to the dog while a progress bar fills up indicating that he is ready to go (also see 5.1.3). "No" is then interrupting Le saying: - *But drag it drag it, until it is becoming completely full!* Then when specifically asked about emotions (a moment of silent play) "No" puts her hands to the face and says*:* - *He dare not!*

Excerpts 2 from playing the slide scenario
In this sequence there are the two children playing the slide scenario.

Name	Talk	Activity in the room	Activity on the screen
Ra	And then comes the owl, the owl becomes afraid but the owl gets help from the dog.	No is clicking on the dog	The dog is moving up the ladder of the slide

No	And then he should breathe.	Both boys take a big breath with the dog 	The dog is sliding down
Ra	And then comes the owl	No is clicking on the dog	The dog moves up the ladder
Ra	The owl is a scared little coward, but later he will not be a coward any-more	No continues the click on the dog	The dog is go-ing up on the slide, the owl is waiting
Q	How can you tell he is a coward?	No continues the click on the dog, and then on the owl	The dog and the owl are up on the slider. The owl is giv-ing a scared expression and sound.
Ra	Because he doesn't dare to go by him selves.	No continues to click on the dog and owl	The owl is in front of the dog
Q	What does he do then?	Taking a big breath as the dog did!	The progress begins to fill up and the dog and owl breathe
Ra	Breath like the dog did.	Ra is watching and No hold his finger on the owl	The progress fills up com-pletely

Ra	They are going together now.	Both Ra and No waits and look	The dog and owl slides down

Excerpts 1 from playing the pie scenario

In this sequence the children are playing the pie scenario and one of the children starts by saying that this is a difficult track to play. They are a bit quiet so question has to be asked in order to get them to talk. They can identify emotions and they can retell the story.

Name	**Talk**	**Activity in the room**	**Activity on the screen**
Q	Tell me what is going on.		A rabbit is visual
A	First comes the rabbit	Clicking on the rabbit	The rabbit is visual at the right side of the screen. The rabbit moves towards the centre of the screen
A	… then comes the owl	Clicking on the owl	The owl is visual at the right side of the screen. The owl is moving towards the pie
B	And then comes the horse I suppose	Clicking on the horse	The horse is visual and then approaching the pie
Q	And what happens with the dog?	Clicking on the dog	The dog appears and is approaching the pie
A	He tilted the pie.	Waiting and looking	The dog is tipping the pie
Q	How does the dog look!	Waiting and looking	The pies is laying up-side down on the ground
A	Sad!	A is showing the tablet	All animals are to-gether
A	Yes because **she… he** does not like it.	A is clicking on the pie as well as pointing	No response but a small “boink” or a “fling” sound indicat-ing an incorrect inter-action
Q	What is the rabbit doing?	A is clicking on the rab-bit	The rabbit is crying and the other animals look sad

A and B	She is crying, because he broke the pie.	A is clicking on the rabbit again, and the dog and the horse	There is no response except a "boink" sound
Q	And what do the other then?	They are pointing at every animal at a time as well as the pie.	No interaction because they didn't touch the screen
A and B	That one is angry, that one is sad, that one is sad, that one is sad.	A are pointing at every animal at a time and clicking on the owl	The animals are together being sad except from the owl that is angry
Q	Which one is angry?	A is about to click on the owl	The owl is angry waiting
A	That one!	 Pointing and clicking	The owl is jumping; angrily
B	But then everyone come and give comfort to the dog	They start to compete on the clicking	The owl is making angry sounds
A and B	But then everyone come and give comfort to the dog	The are both clicking fast	They accidentally left the scenario
B	No click on the rabbit!	A accidentally left the scenario	Back to the menu

Excerpts 2 from playing the pie scenario
This sequence in the pie scenario show how the child stops and clearly signal both with body (scratching the back of his head) and by saying the he cannot understand how to proceed. He can identify emotions expressed by the animals.

Name	Talk	Activity in the room	Activity on the screen

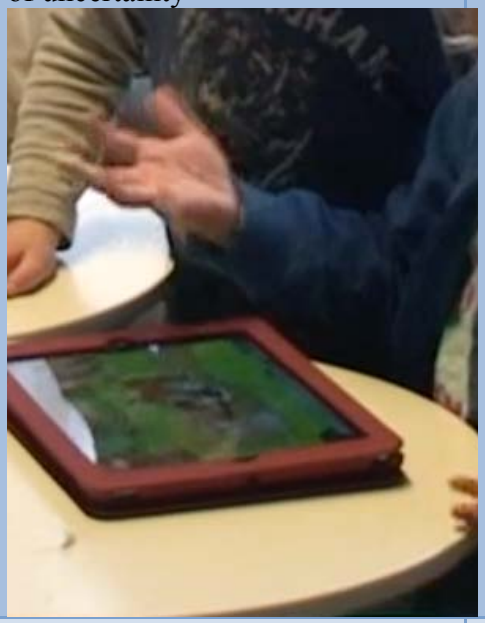
Q	What is the dog doing?	Clicking on the dog	The dog is approaching the pie
A	Tipping the pie!	Watching	The pie is rolling over
Q	And what does the rabbit do?	Watching and explaining the scenario	All animals are together
A	It becomes sad... and the dog becomes sad, and the horse a little sad, and the owl become angry.	Clicking on the dog a couple of times	Sounds as "fling"
Q	How can vi fix this?	Scratching the back of his neck	The animals are centred around the pie
A	This is a little tricky to figure out!		The animals are centred around the pie
A	I can't really understand how to do it.	Clicking a couple of times on the rabbit, the owl and horse	"Fling and boink" Animal sounds as expressing "sadness"
Q	What is the horse doing then?	He starts mimicking the horse saying "mmmmm" as he looks upwards	The horse is shaking his head
Q	Just go on and try something	Must intervene, as he does not know what to do next. Clicking together and on the owl.	The owl is jumping

Q	How does he look?	Clicking on the owl	Referring to the owl making an angry sound
A	I don't know!	Clicking on the owl again	The owl is flying and sits beside the dog
Q	But what about the sound?	Clicking on the horse	The owl is comforting the dog
Q	What is the owl doing now?	Clicking on the dog	The owl is comforting the dog
A	Hugging the dog!	Clicking on the horse	The rabbit is "blink-ing" and there is a "fling" sound
Q	What is the horse doing?	Clinging on the rabbit	The rabbit moves to-wards the dog
A	Looking at each other	Watching	All animals are to-gether and hugging each other

Excerpts 3 from playing the pie scenario

This excerpt starts when all the animals are gathered around the dog and the task is to get the owl to comfort the dog. The emotion of the rabbit is identified as A is saying that the rabbit is sorry. A is saying not only as "sorry" but "sorry with" indicating that she was able to understand the context. A is also not certain how to proceed and there is a lot of random clicking.

Name	**Talk**	**Activity in the room**	**Activity on the screen**
Q	How does the other look then?	Clicking little in random on each animal	The pie has been tipped by the dog

A	They are sorry **with** it	A is pointing to the dog	The animals are centred around the pie
Q	They are sorry with it…mm	A is watching	No change in scene
A	Silent	Looks at me and reaches for the exit button	No change in scene
Q	Let us continue, there are some more to do	A is looking at the scene	No change in scene
A	Silent	Clicking on animals and all around	The animals are gathered together
A	Silent	Repeatedly clicking on different animals and the horse in particular	The game makes a clear "boink" for every error
Q	Ops what is happening?	Clicking on the owl	The owl is flying towards the dog
A	What is the owl doing?	A is holding up hands in a gesture of uncertainty 	The owl is comforting the dog
A	Comforting the dog!!	A lot of random clicking	They all come together
Q	So what did they become?	A waits	Now all animals hug each other
A	Friends!	Has to intervene to show how to end the scenario	Picture of scene is taken

7.2.2 Demonstration

The demonstration part of the study let the children express experiences from the gameplay using natural play as the children could show what happened instead of just relying solely on verbal means. The purpose with the demonstration was to investigate how the children had perceived emotions during the gameplay and how they put emotions into use in order to illuminate how they understood and related to the emotions in the game. Examples as these below show how the children can describe a full story including the emotions put in the correct context while they were playing.

Example of how the children are organizing all animals together in the beginning of the pie scenario.

This is how they start telling the story with the pie. Figure 12 shows how the children set up the scenario with all the animals as they gradually come together.

Figure 12: The beginning if the pie scenario played with cuddle pets

Example of storytelling using emotions

Two children are retelling the pie story using cuddle pets. They take different animals and explain what is going on.

T: The dog got sad
Q: Why sad?
C: Because it happened to end up with his chin on the pie
T: Because it fell down

Q: What happens to the dog now?
T: Sad
C: Wait ... start with those who came... first
T: The rabbit
C: Then come the owl
C: Then the horse
C: And then that (brings out the dog)

This excerpts from the demonstration show that they are retelling what happened and also can tell what emotional state the animal is in. They have a good understanding of the story.

Example of how the child illustrates the tipping of the pie

Figure 13 and 14 show how the children, in this sequence are recreating the moment when the dog is tipping the pie. It is the box with the bookmarks that functions as the pie.

Figure 13: The pie (box) is rolling over

Figure 14: Again but with other children

Example of how the child is illustrating emotions when the rabbit is sad because of the ruined pie.

Figure 15 and 16 show how the child mimics the sound of a sad rabbit, and at the same time covers the rabbit eyes using the rabbit ears. This was exactly as in the sequence in the game and the children commonly repeated the movements.

Figure 15: Bending the ears of the sad rabbit

Figure 16: Again but with other children

Example of how the child is illustrating emotions when the owl is angry (pie scenario).

How child mimics the owls and sound and let it fly in the same manner as it did in the game is shown in figure 17.

Figure 17: Mimicking the angry owl

Example of comforting at the end of the pie scenario
Figure 18 and 19 show how the children gather the animals and how the owl comforts the dog at the end of the scenario.


Figure 18: Comforting the dog


Figure 19: Again but with other children

Example of how the child taking a big breath in the slide scenario

Figure 20 and 21 is an example from the slide scenario where the child illustrates emotions as the owl feels a bit scared. The child mimics the owl taking a big breath to overcome the emotion of fear just before going down the slide. He also holds the two pets together as they slide down together.

Figure 20: Mimicking the dog taking a big breath

Figure 21: Sliding down together

7.3 Analyse of main study

7.3.1 Emotions in play

Two of the aspects of emotional intelligence (Salovey and Greval, 2005) that are recognizable in the observations are *perceiving*, and *understanding* (chapter 3.1).

Perceiving: The children are able to detect and identify emotions expressed by the animals and the child can express the same emotion. For example when the rabbit is sad because of the ruined pie, the child is bending the ears and is also doing the same sobbing sound. Both excerpts 1 and 2 from playing the pie scenario show how emotions are identified. It is also possible to see how emotions come in when replaying the scenarios, see for example how the angry owl is mimicked in the example of how the child is illustrating emotions when the owl is angry (pie scenario) or how the need for courage is illustrated in the example of how the child takes a big breath in the slide scenario.

Understanding: Besides being able to perceive emotions, there are also indications of an understanding of how emotions might change over time. For example excerpt 3 from playing the pie scenario can be interpreted as an understanding by the child that the animals are a bit cross with the dog, which show the awareness of the nuance of the emotion; the owl is not just angry. It is also possible to see in the demonstrations, for instance the example of comforting at the end of the pie scenario, that they understand the transition from, for example, an angry owl to a comforting owl.

What can be interpreted, as a general pattern, is that emotions are understood but also expressed in past tense. When the child talks about an emotion it is usually a statement of something that has already happened. It is not something that is expressed as way of analysing what to do next because of an emotion. When the play breaks down as in excerpts 2 and 3 from playing the pie scenario, the child is left without clues and cannot continue without getting help from the experiment observer.

7.3.2 Ecological analysis

The interaction analysis in this study is based on the ecological view that: “players perceive affordances through exploratory actions and act on affordances with performatory actions” (Linderoth, 2012). This view then implies that video games should offer two important properties; affordance that can be explored in some sense, and in connection to this get explorative knowledge that can be used in some meaningful purpose in order to continue and reach a goal.

To be able to see how this can come in play, it is illuminative to look at each scenario separately. The slide scenario is simpler to analyse than the pie scenario. The scenario has an understandable goal (try the slide), which the children seem to grasp. This operational goal differs from the emotional goal, which is first to help the dog and then the owl (by the help of the dog) to overcome his fear of the slide. Furthermore, there is at first only one animal and the following sequence with the owl is a repetition of the same idea; go up and breathe in order to boost some courage. At the beginning of the scenario, the child moves the animal by clicking on it. At each click, the dog

moves a couple of steps closer to the slide; the dog then stops and look towards the player waiting for further interaction.

From an ecological viewpoint this is an example of how the room for explorative interaction is reduced, as there is only one thing that the player can do. The game communicates subtly what to click, but the children often overlook these signals. Instead, they will do numerous clicks to explore the options, or attempt to drag the animal in some direction. The interpretation is, therefore, that there is weak support for a performatory action and that the child tries to use exploratory actions in order to see what the animal can do. Furthermore, a successful click does not lead to any new knowledge about some affordance, as what needs to be clicked varies in the different scenarios, and from time to time also within the same scenario.

The children recognise that the dog is scared, when the dog hesitates to slide down as has been shown both in play and demonstrations. Temporary power-up (the dog on the slide is becoming braver by filling the progress bar) is an example of a built-in support for affordance, and it is repeated twice in the slide scenario. The dog is at first on his own and the next time together with the owl. It can be seen as an example of how a player can learn what kind of performatory action is possible, without having to differentiate between available information in the game. The owl may be afraid, and the dog is aware of how the owl feels (the children illustrate their understanding by taking a deep breath), but the player cannot use the information to explore further – once the progress bar is full the animals will go down the slide together when the player click on one of the animals.

The pie scenario has a more complex setup as there are four animals, and there is no clear goal from the start. The emotional goal however, is to realise that the dog is sad and that the dog need comfort.

This scenario progresses by clicking on the right animal, and sometimes the pie. Sometimes this has to be done in the correct order while sometimes the order is left a bit open. There is no repetition as in the slide scenario. The tipping of the pie then triggers a sequence of similar performatory actions that lead to the ending sequence where the animals come together in a group hug.

The ecological view is supported for the same reason as in the pie scenario; performatory actions are supported, as highlighting and sound amplifies the affordance. Again the children often miss this signal. However, there is no way to interact in order to gain further information from an animal. The possibilities to fine-tune the understanding using exploratory actions are reduced to figuring out the audio-visual feedback for correct and incorrect clicks (clicking on the wrong animal makes a ‘beep’ sound and the animal stays still), as can be seen in the gameplay, such as in excerpt 2, when the child has no clue of how to proceed. What is particularly interesting is that the child does not seem to be able to make a try; as a consequence of the lack of exploratory options that could have opened up for other performatory actions.

From an ecological standpoint the clicking, (or dragging) and occasional breakdowns can be interpreted as a lack of explorative options that hinders exploration of affordance. Instead, the child is dependent on performatory actions with little explanation and that have little connection with the perceived emotion. The observations suggest that the child is trying out, for example, which animal

to interact with through a random explorative interaction, as a way to get to the next moment in the scenario.

7.3.3 Summary

Both verbal and bodily expressed data support the view that the children understand the emotions used in the gameplay. Furthermore, data from the demonstrations also show that emotions are understood. The use of different data collection technics strengthens the findings as the result can be triangulated (Angrosino, 2007). Put in the context of emotional intelligence; the analysis indicates that some of the emotional aspects related to that field can be applied. However, the ecological study of the gameplay shows that the game can be played very much without applying a knowledge related to the fact that the player understands emotions.

8. Discussion and conclusion

8.1 Result

The research question this thesis set out to determine was: how do children at preschool age perceive and make use of emotional expressions in a learning game that is specially designed for teaching emotions, such as Peppy Pals?

Peppy Pals is designed for preschool children and it can be argued that the interaction has to be adapted to prerequisites that fit children of that age and is therefore intentionally simplified. However, the result illuminates that Peppy Pals utilise an interaction, which viewed by the ecological framework can be interpreted as less efficient for knowledge and that learning aspects therefore cannot be taken for granted.

The method applied in the study made it possible to investigate how the child perceived emotions, both from playing the video game and from playing with cuddly toys. The key results show that the children:
- Understand and differentiate between emotional expressions in the game.
- Do not have to use emotions in order to play the game.

Emotions can be seen as the child mimicking different behaviours. The children use their body when they act on different situations, and they have no problem to show this in the demonstration. They have in general no problem of understanding the meaning of a particular emotion as they can accurately explain how emotions fit in the story. It is, therefore, reasonable to conclude the children perceive emotions. On the other hand, the result implies that the children often play the game in a trial and error style, indicating that the use of emotions may not be important. Put in another way, Peppy Pals can be played as an interactive book where the interaction is there to advance to the next frame in the story.

A possible explanation for these results may be that the game is played in rather slow phase and ‘Slowness’ might be important in order to perceive what is going on in the scenarios

8.2 Validity

Validity in qualitative research is about getting result that is reliable and has empirical ground in relation to analysis, data and sample. It is also important that the result have significance, is useful and coherent (Langemar, 2008). This means according to (Langemar, 2008) that any interpretations must have solid support in data, without far-fetched conclusions. Furthermore, it should be possible to generalise the data to the domain of study. Significance is how well the result meets the purpose of the study and what new knowledge it brings, where usefulness is how the result can be used in order to understand similar appearances.

The conclusions that are made in this study can be considered having a solid ground based on the data. For example, both observations using video equipment and demonstrations produced data after careful analysis showed that it was possible to conclude that the children understood emotions in the gameplay. Other data as, for example, not being able to continue or clicking and dragging in a random fashion was something that could be seen in many observations, and this could also be examined using interview question. The conclusions drawn using the ecological framework is made with care and based on empirical data seen throughout the study.

The generalization to the game domain might be restricted to the age of the participants, and particular aspects of emotions in learning as the sample was selected amongst preschool children. These children had the age that matched the intended game design, and they were capable of playing the video game. Being together with children and interacting with them during the observations without interfering was not possible. This could have introduced situations where more subtle signals as, for instance, a concerned eye or maybe a smile could give away expressions that could be picked up by the child. It is very difficult to judge what kind of impact this had on the study.

What also must be discussed however is the fact that it can be challenging to observe and in particular interview children. Some of the questions asked during the play and the demonstration can probably be considered slightly leading. Being neutral and still being able to get verbal data was something that had to be balanced against the risk of getting little or no verbal data at all. It may have been possible to ask some questions, in a way, that did not explicitly focus on the emotional state of on animal but more on the interaction. Maybe could the question have been phrased indirect as: “Why do you click on the owl”, instead of asking for example: ”How does the owl look?” Asking about an emotion in this direct fashion can perhaps bias the children to notice or reflect on emotions, making it more difficult to know if they otherwise, for example, would have missed it completely. However, data from other sessions (and the same scenario) show that the children could accurately describe emotions without being asked in this manner. It can be argued that the many sessions, both play and the following demonstrations could have produced enough verbal empirical data, but this was not obvious at the beginning of the study.

The observer effect is also something that probably must be considered. Overlooking the children and also as in the main study, using a video camera could maybe induce a change in behaviour. However, using video equipment in the main study was necessary in order to do later analysis, and it proved to be very valuable as it provided data that could easily have been missed otherwise; question is how this affected the data? It is sure that some of the children asked about and showed an interest in the camera, but the general experience was that they forgot about it after a while. In

addition, the observation took place in an environment the children were used to and every person that participated was known to the children.

The overall understanding is that the children maybe played a little harder or longer than they otherwise would have if they played on their own. It is, therefore, reasonable to assert that the methods used gave relevant aspects concerning the understanding of the use of emotions in video games. It is therefore possible to apply the result to the domain of study

8.3 Conclusion

It can be said that the result from this study satisfies the research question as it does answer how children perceive and use emotions in the game Peppy Pals. It is clear however that it was not possible to make a single interpretation out of the result. Children understand emotions in the game and it's likely that the game yet somehow helps with learning emotions, if nothing else by strengthening children's understanding. However, the ecological framework shows that children are NOT using their understanding of emotions in playing the game and it is therefore possible to conclude that *children do not learn the emotions from 'playing the game'.*

8.4 Further studies

Based on the result further studies are recommended. It might be possible to empirically test the suggested hypothesis of ‘slowness’, for example by making a comparison between the game and a book with the same content. Further studies could also focus on bodily aspect as findings suggest that the children used their body in the interaction and it would therefore be interesting to go deeper into this subject and examine if, for example, situated and embodied cognition could offer an approach that would bring an explanation to this seemingly contradictory result.

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Appendix A

Hej

Jag heter Gunnar Bohné och studerar människa-datorinteraktion på Uppsala Universitet. Under våren skriver jag min masteruppsats, som handlar om appen ’Peppy Pals’ Som utvecklas av företaget eQidz [4].

Peppy Pals är ett enkelt spel som riktar sig till barn som syftar till att hjälpa barn lära sig känna igen känslor, hos sig själva och hos andra. Så här skriver eQidz själva: ”*EQidz and Talawa Games are developing a lighthearted visual adventure that cultivates emotional growth. A game children want to play and parents want to buy. In the game you can help your friends in situations ranging from comedic to exciting, all while understanding the others’ emotions and learning what consequences your actions can have.”*.

Syftet med min uppsats är att försöka ta reda på om spelet fungerar som tänkt. För det behöver jag dig och ditt barns hjälp.

Min avsikt är att besöka ditt barns förskola och genomföra två studier där. Den första studien går helt enkelt ut på att barnen på förskolan får prova spelet. Jag kommer att låna ut en pekplatta med spelet till förskolan, och stanna en stund för att se hur barnen tillgodogör sig spelet. Sedan får förskolan disponera spelet i en vecka. Sedan kommer jag tillbaka för att observera hur barnen, ensamma eller i grupp, använder pekplattan och spelet. Jag tar anteckningar men kommer vare sig att fotografera eller filma. Jag kommer också att ställa en del frågor om spelet till barnen.

Ett mindre antal barn deltar sedan i en andra studie. Där är avsikten att jag vill observera hur barnet spelar spelet med andra barn eller med dig som förälder. Denna studie kommer att dokumenteras med videofilmning, och består av två delar: först får man spela spelet och sedan genomför jag en intervju när barnet får återberätta händelser ur spelet med hjälp av dockor som ser lite ut som figurerna i spelet. (Det är viktigt att du som förälder vet hur studien är upplagd, men berätta inte i förväg för ditt barn.)

Jag vill poängtera att det inte är du eller barnet som studeras, utan interaktionen med spelet. Ingen information om er som individer kommer att sparas eller redovisas, inte för eQidz eller för någon annan.

Den första fasen med observationer och intervjuer är planerade till vecka 10 och nästa fas till vecka 12-13.

Var snäll och fyll i nedan om ditt barn eller du själv kan medverka i studien. Om du har frågor

[4] http://eqidz.com

om studien, kan du kontakta mig på telefon 0733458716 eller per e-post på Gunnar.Bohne.1998@student.uu.se

Med vänlig hälsning Gunnar Bohné

☐ Jag godkänner att mitt barn får vara med i den första studien. Det innebär att barnet observeras medan det använder spelet på förskolan tillsammans med andra barn och personalen. Jag godkänner också att barnet får intervjuas om sin spelupplevelse.

☐ Jag godkänner att mitt barn får vara med i den andra studien. Det innebär att barnet får filmas medan det använder spelet, och intervjuas om sin spelupplevelse. Barnet kommer att spela spelet tillsammans med andra barn eller andra vuxna.

☐ Jag kan själv delta i spelstudien. Kontakta mig via telefon eller epost nedan.

Namnunderskrift Namnförtydligande Mamma/Pappa till

Epost Telefon (Endast om du själv kan delta i studien)

Appendix B

Öppna frågor att diskutera kring vid intervjutillfälle

- En del barn verkar inte se att en viss bana är klar (ex den med kaninen, hunden och moroten, har flera sådana observationer)? De går ur innan de hinner få applåden.

- Banan med äpplen körs inte alltid klar? (detta för barn även i 5 års ålder)

- Scenariot med pajen, några barn kunde inte göra klar den?

- En del barn försöker att dra istället för att klicka, en del klickar massor fast det inte ger något resultat?

- Barn under 5 år verkar ha svårigheter att gör klart scenarierna, däremot så kan de identifiera känslorna hos djuren utan svårigheter? (stackarn, han ser ledsen ut…)

- En del barn verkar inte snappa upp de ljud som ges och ser inte djurens kroppsspråk?

Följande frågor utgör inledande frågor i syftet att få igång en diskussion och få svar på ovan frågeställningar.

Frågor: (samla barnen och låt de räcka upp handen)

- Vilka djur fanns det i spelet?
- Hur vet man att banan är klar?
- Banan med äpplet vad tycker ni om den?
- Banan med moroten?
- Banan med rutschkanan?
- Banan med vattnet?
- Banan med pajen?
- Banan med en paj, vet alla vad det är? Visa den och fråga!
- Vilken bana tycker ni bäst om?
- Var det någon bana som var lätt? Som var svår?
- Hur känns det att klicka när det verkar som att de vill dra något: hur fråga?
  Om man vill att något ska hända i spelet hur ska man göra då?

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