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**A Comparison of Children's Books:  
Picture books versus physically and intellectually  
adaptive interactive children's books**

A thesis  
submitted in partial fulfilment  
of the requirements for the degree  
of  
**Master of Media and Creative Technologies**  
at  
**The University of Waikato**  
by  
**KRISTY WRIGHT**



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## **Abstract**

Children's book design has a great impact on shared reading practices, interaction and engagement. This study aimed to analyse a comparison of children's picture books versus children's interactive, adaptive picture books, in order to discover how physical and intellectual enhancements change the level and types of interaction within a shared reading environment. In turn, the study aimed to provide design solutions for designing effective children's books in the future.

The study was undertaken by designing a picture book with an age appropriate narrative and illustrations. The same storyline and design assets were then teamed with physical and intellectual enhancements to create the interactive, adaptive version of the book. The books were designed using a combination of currently accepted frameworks of a 'successful children's book', as well as educational practices that align with the New Zealand Curriculum. Seven families with children aged 4-6 were observed utilising these books in three shared reading sessions over a number of weeks, and their interactions were analysed and compared.

The results were compared to findings from numerous other researchers whose work centers around effective children's books, shared reading, and adaption of children's books. In addition, by comparing the findings to a background study, many comparisons and common themes could be found between the interactive, adaptive book designed for the study, and interactive books currently on the market.

Conclusions drawn from the study show that the basic principles of an effective children's book need to be implemented by all designers in order to ensure engagement and interaction. These include standards of illustration, appropriate text and storyline, moral of story and relation to the child and the real world. In turn, the inclusion of physical and intellectual enhancements within the book promote a greater level of interaction and engagement from the parent and child. However, this is only the case if

the enhancements provide meaningful interaction, and have a relevance to the story. The inclusion of adaptive features within a children's book - particularly the addition of a 'goal' - provides the highest level of interaction from children, prompting higher engagement levels and hence allowing the shared reading session to be more successful and educationally beneficial.

This thesis provides designers with frameworks to enable the successful design of interactive, adaptive children's books.

*Keywords: Children's Books, Interactivity, Shared Reading, Adaptive Books*

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# 1 Introduction

Shared reading between parent and child is an important learning tool for young minds. Children's books enable a wide range of learning opportunities, including literacy, aspects of problem solving, socialisation, hand eye coordination, creativity and an understanding of the world (Freedman-DeVito, 2004). However, the level of interaction and engagement that occurs within these shared reading sessions has the potential to vary greatly according to parent, child, and the design features within the book itself. Many previous studies have been conducted regarding the design features of a successful children's picture book, and many conclusions have been drawn about the use of appropriate imagery, language, story content and moral of the story. In turn, there has been a broad range of home and school educational techniques developed to encourage successful shared reading practices. These include the use of *Child-Oriented, interaction-promoting, and language modeling behaviors* (Ezell & Justice, 2005) to encourage interaction between the parent, child and book. Whilst interactive books currently available do tend to provide an added layer or possibility of interaction, often this is limited to only one action or learning objective, meaning that the interaction is not meaningful and does not add to the learning experience. The purpose of this study was to compare a children's picture book with an adaptive, interactive children's book designed specifically to provide meaningful interactions. By combining proven effective children's book design frameworks with educational practices, the aim was to create a children's book that provided a broad range of learning opportunities that could be adapted as a child developed. Seven families participated in the study, each with children aged between four and six. Each family was observed undertaking three shared reading sessions – the first with the control picture book, the second with the interactive book, and the third with the interactive book with a 'goal based' adaptive reading technique.

The research was formed around three key research questions:

- How do children and parents interact with books during shared reading sessions?
- Do interactive features of books affect how parents and children use books?
- How do adaptive features within books change the way that parents and children interact during shared reading sessions?

By utilising the same story and general illustrations within both of the books, the focus of the observations could be placed on evaluating the different levels of interaction and how the design features of the book promoted further interaction from both parent and child. In turn, by asking all participants to undertake the same 'goal based' adaptive activity of finding the hidden cupcake on each page, conclusions could be drawn about common interactions and ways in which to support shared readers through the design features of the book itself. The resulting findings provide design solutions and frameworks for the successful design of children's interactive books in the future.

This research is relevant for designers, child educators and parents. This research will lead to wiser design choices being made in the production of children's picture books, resulting in interactive children's books that allow learning outcomes to grow and evolve with the child. In turn, teachers, librarians and parents will be able to make informed decisions about shared reading material based on the level of interactivity and engagement that different books provide. This research will not be discussing the educational benefits of such a book, but will instead provide evidence of increased engagement and interaction from both readers and children. This is due to the fact that the research is based on the use of design features, rather than education and learning outcomes.

Chapter one of this thesis discusses the current research of children's picture books, shared reading practices and adaptive educational techniques that are currently used in the classroom and home environment. This literature review provided evidence for forming

research questions, and allowed an insight into which direction to focus the study to ensure the further advancement of the topic of effective children's books.

Chapter three discusses the results of a previous study conducted, entitled Shared Reading of Interactive Children's Books. Whilst the research was conducted in 2012, the study was written up for the purpose of this thesis and publication at ICADL 2015 (Timpany et.,al, 2014). This study prompted the further research into interactive children's books. The results of this study showed that interactive books provide a high level of engagement for young learners. However, comments from the parents proved that books that could be read differently or adapted over time would be more successful and beneficial for the home reading environment. This conclusion led to the creation of the interactive, adaptive version of *Hannah's Favourite Place*, allowing continuation of this topic and further testing of the benefits of adaptive children's books.

Chapter four introduces the main study – children's picture books versus interactive, adaptive children's books. This chapter discusses the results of the study conducted with the two versions of *Hannah's Favourite Place*. This section provides in-depth justification for the design choices undertaken and materials utilised. The results of the observation sessions are broken down according to family, allowing direct comparisons to be made between the shared reading practices and interaction levels when using the different versions of *Hannah's Favourite Place*. These results proved that the level of interaction and engagement increases drastically when introducing physical and intellectual enhancements to the design of the book. In turn, these results demonstrated the increased level of interaction from children when given a 'goal' to undertake throughout the shared reading session.

Chapter five is the discussion of the study. This section discusses comparisons found between the different families observed, and gives justification for the actions of shared readers according to previous

research undertaken both personally and by other academics. This section describes how the different design enhancements help to direct *Child-Oriented, Interaction-Promoting, and Language Modeling Behaviors*. In turn, this chapter discusses the motivations behind different actions according to the shared reading partners, proving that enjoyment and fun are two of the main factors that drive interaction.

Chapter 6 concludes the study, and provides design solutions for creating effective children's picture books in the future. These include continued development of the basic principles of successful children's book design, such as appropriate imagery, language, story content and theme. In addition, these solutions discuss the need to support shared reading partners. This support includes the design of adaptive physical and intellectual enhancements and instructions for readers. Shared reading partners need to be given the tools to become effective learners, and designers have the power to create these tools.



## **2 Literature Review**

### **2.1 Children's Books and their Significance**

Children's books are an important learning device for young readers. These devices are not simply limited to learning literacy, but instead include aspects of problem solving, socialisation, hand eye coordination, creativity and an understanding of the world (Freedman-DeVito, 2004). The term 'Children's books' covers a wide range of literature, from basic picture books for young children to more complex books for advanced learners. It is important to understand that children's books have important features and functions, and that their use is designed to aid learning in both the home and classroom environment.

#### **2.1.1 Relation to the real world**

Children are still discovering the world in which they live, and picture books help to encourage this further. For this reason, the themes and narratives of children's picture books often aim to be "closely related to children's needs and what they understand" (Norton, 2011, p.176). By replicating common emotions and situations, the story feels familiar and credible for the child (Norton, 2011). Therefore when children find it easy to relate to the story being told, they are able to learn how to cope with different social and emotional situations. It is important within picture books that the child can "identify and emotionally engage" (Goodwin, 2008, p.29) with the story quickly, allowing them to become involved in the narrative and have an active desire to discover the outcome (Norton, 2011). Zeece (2009) discusses the impact of children's books that nurture the development of kindness in young children, concluding that texts of this theme serve to "build foundations of trust whereby prosocial behaviors such as sharing, helping, comforting, and caring are acknowledged and valued" (Zeece, 2009, p. 447). This demonstrates how young learners take cues from books, and apply the actions depicted to their own lives.

Therefore it is clear that children's books have a much greater impact on children than simply a tool for learning how to read. When designing or choosing a children's book it is important to consider the theme, narrative and actions portrayed, as the book has a greater social and behavioral impact on the young learner than simply literary understanding.

### **2.1.2 Rhythm of Reading**

Reading is not simply about understanding the written word, but instead a tool for growth of vocabulary, the understanding of sentence structure and the organisation of thought. Rhythm and repetition of words promotes understanding and learning, as "the repeating text with the strong rhythm of the story forces very young readers to become involved and to share in the experiences of the story" (Goodwin, 2008, p.25). In the article *Why Reading Is So Important For Children*, Barbara Freedman-De Vito states that reading is an "important skill that needs to be developed in children. Not only is it necessary for survival in the world of schools and (later on) universities, but in adult life as well" (Freedman-DeVito, 2004, p.1). Consequently, by engaging with books from a young age, children have the potential to grow into adults who are confident communicators. The language within children's books needs to build excitement, create images, and have "an internal rhythm and melody" (Galda, 2014, p.107). This rhythm and melody helps children to understand phonemics and vocabulary, as well as developing reading comprehension, fine motor skills, rapid automatized naming and fluency (Vanderschantz & Timpany, 2013).

### **2.1.3 Importance of Pictures**

Picture books are more than simply images on a page, they are an educational tool for young minds. Bloom (2002) discusses how children think in both the written and the visual language. Therefore, by including pictures and imagery within a children's book, it enables the "cross over

and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128). Pictures are a representation of the story, allowing children to grasp meaning even when the literature itself is above their reading ability. Consequently, children are able to transition between looking at the imagery and reading the literature when given the visual cues in which to do so. Within picture books, “art contributes so much to the emotional and cognitive impact of a story” (Hall & Hall, 1990, p.xiii). The images help to convey emotions, reactions, and body language to children. These are important social and behavioral skills to learn from a young age. An important point to note is that this only occurs “when illustrations support and illustrate the writing rather than creating an untrue or misrepresented artistic interpretation of it” (Vanderschantz & Timpany, 2013, p.30). Consequently, the appropriate design and composition of images on the page is essential to a successful, engaging children’s picture book. Hall & Hall (1990), discuss how “matching the right style of art to a story’s text can mean the difference between a book’s being a memorable success or a short-lived failure” (Hall & Hall, 1990, p.xiii). It is important to consider what is being portrayed through the images, whether it is appropriate for the audience age, and whether it successfully conveys what the author or illustrator is trying to say. The style of the images needs to match the story, as “a story’s atmosphere is often evoked from the kind of illustration it carries” (Gibbons, 1999, p.53). Therefore when considering design choices, it is important to create images that match the general tone of the story.

Picture books have the potential to “aid understanding of the text” (Gibbons, 1999, p.54) through the use of image and symbols. These images are key learning tools for young readers, enabling a wider understanding of both the story and wider concepts of their environment. When evaluating or creating images for children’s picture books it is therefore important to consider the tone of the story, the appropriateness of images, and ways in which the pictures can promote the understanding of meaning through non-verbal depictions.

#### 2.1.4 Interactive Books

At the most basic level, interactivity within books can be understood as becoming aware of “a book’s unique physical structure, [bringing attention] to the momentous moment: the turning of the page” (Selznick, 2008, p. 403). However, ‘Interactive’ is a broad term that encompasses a wide range of variables. Bongers & van der Veer (2007) discuss how “an interaction can be described in several layers, taking the user from a goal and intention, formulating a task and subtasks, carrying out these actions whilst receiving feedback on the physical level, and evaluating the result” (Bongers & van der Veer, 2007, p. 610). Consequently, when evaluating children’s books it is important to understand that ‘interaction’ is a multi-layered idea. This is seen through both the physical enhancements of the page itself, as well as the intellectual enhancements that promote interaction in the form of questions, answers, and sequence of content (C. Timpany & Vanderschantz, 2012). In addition, ‘interaction’ varies greatly between children and age groups, occurring “at different levels and in different ways” (Lander, 1999, p. 1). Timpany and Vanderschantz (2012) concluded that interactivity can be viewed as a continuum, where the medium of the book demands different types of interaction from its readers in order for the content to be consumed (Timpany & Vanderschantz, 2012). It is important to understand that an interactive book does not contain simply a linear movement from beginning to end, but rather a connection of thought and understanding throughout the book. This enables an identification of how repeated readings of the same text can prompt different interactions from the same child. The scale devised by Timpany and Vanderschantz (2012), as seen in *Table 1*, depicts the different levels of interactions that can be found commonly within children’s books. This demonstrates that with a more complex enhancement, children will be prompted to interact and engage with the book at a deeper level. Ideally, children’s books will be designed with these frameworks in mind in order to ensure that children gain the greatest enjoyment and educational possibilities from reading sessions.

Physical Enhancement	Content Sequencing
<u>Level 0</u> - Reader is required to open book and turn pages	<u>Level 0</u> - Reader's attention is guided in a linear course through page content
<u>Level 1</u> - Reader is required to open book and turn pages with some additional interaction with the book	<u>Level 1</u> - Reader's attention is intentionally guided in a non-linear course around page content
<u>Level 2</u> - Reader is required to open additional inner pages to reveal further content	<u>Level 2</u> - Reader's attention is guided in a non-linear course around page/book content and drawn back and forth between set areas of contrasting content
<u>Level 3</u> - Reader is required to lift flaps, turn wheels, pull tabs, push buttons etc.	<u>Level 3</u> - Reader is required to solve puzzles/challenges to/or determine the order in which the pages are read
<u>Level 4</u> - Reader is required to interact with multiple layers of interactive elements or create/arrange content themselves	<u>Level 4</u> - Reader is required to progress through the book by making decisions that will affect the ultimate story line
	<u>Level 5</u> - Reader is required to carry out activities or actions guided by content of the book externally

Table 1: A categorisation structure for Children's Books, Timpany and Vanderschantz, 2012

### 2.1.5 History of Interactive books

Interactive books are not a modern invention. The earliest interactive and movable 'books' were used within medieval monastery's as a form of understanding and communication (Reutzel & Cooter, 2012). Illustrated wheels were positioned and turned to calculate astrological signs, star positioning and maintain a calendar. This early example allows an understanding of how tactile, interactive elements can promote learning and understanding over a wide range of education levels. As the industrial revolution took hold and middle class Americans and Englishmen recognized the importance of childhood, publishers began to develop books for shared reading, entertainment and to teach religion, manners, arithmetic and ABC's (National Museum of American History, 2010). Understanding the importance of these factors, publishers and booksellers began to create interactive books that appeal to children and teach in interesting ways. Robert Sayer created some of the earliest children's interactive books in the 1760's (National Museum of American History, 2010). These books were called "metamorphoses," "turned-ups," or "harlequinades". They were designed to educate children on behavior and

morality, and consisted of flaps that depicted a harlequin Figure and a moral tale when lifted (National Museum of American History, 2010). This demonstrates that it has long been understood that interactive books have the potential to teach in new, interesting ways.

### **2.1.6 Uses of interactive books in education**

Depending on the level of interactivity, interactive children's books allow young readers to become more engaged in the literary experience and gain more from the book (Vanderschantz & Timpany, 2013). Throughout history, interactive books have been used to educate both children and adults alike. This has allowed for different learning techniques to be explored, as well as expanding on the idea that people learn in a range of different ways. As interaction can occur in both a physical or an intellectual environment (Vanderschantz & Timpany, 2013) interactive children's books within an educational setting draw on either or both of these forms of interaction.

At a very basic stage, the tactile form of a book helps a child to understand the sense of touch and sensation. Silverman (2006) discusses this by stating that, "learning comes through touching and physical sensation. Thinking is anchored by movement, and touch..." (Silverman, 2006, p.71) This physical interaction is one of the earliest forms of learning, and consequently is why 'touch and feel' interactive books are so effective and engaging for young readers.

The *Smithsonian Institution Library* discusses how "movable and pop-up books teach in clever ways, making the learning experience more effective, interactive, and memorable" (National Museum of American History, 2010, p.7). By promoting a hands-on approach to learning – both figuratively and literally – interactive books allow the depiction of a written concept in visual form. An investigation into the range of interactive books (National Museum of American History, 2010) found an example of this in

the form of 'opposites'. *Dean's new books of dissolving views* (1860) reveals the contrasting images of day and night when a tab is pulled. This allows a visual depiction of a concept through the inclusion of a physical interaction, promoting deeper understanding for the young reader. The interactive elements – especially when discussing physically interactive books – are said to be much like playing a game. “The amusement and delight of discovery and the ability to lift and pull mechanisms are all opportunities for the reader to participate” (National Museum of American History, 2010, p.12). It is this participation and engagement that allows interactive books to teach whilst enabling the child to simultaneously have fun.

'Search and Find' or 'Question and Answer' interactive books are often used to teach children to solve problems, make connections and follow cues. This intellectual interaction promotes a different type of understanding and learning than that of the physical interaction. *Not All Animals Are Blue : The Big Book of Little Differences* (2009) requires children to match characters with a descriptive sentence. This interaction requires “close inspection and critical comparison”(Zeece, 2009, p. 449) in order to make the correct matches. This type of interaction allows the child to ask questions, and understand the theme or character in a wider context. *A suit of armour for youth* (1824), combines these types of interactions. The book poses questions to the reader, with the answers shown when the reader lifts the flap on the page (National Museum of American History, 2010). By combining this physical and intellectual interaction, the child is required to solve problems and physically touch the book. This means that the possibilities of engagement and learning are extended beyond one interaction type.

### **2.1.7 New Types of interactive books**

The Digital Age has provided a new platform for interactive learning, with e-books being considered an alternative to the traditional book. However,

with this new technology has come a shift in the way that printed interactive books are now created or designed. Dresang (2008) discusses these new methods and possibilities, stating that interactive books now include;

“graphics in new forms and formats; words and pictures reaching new levels of synergy; nonlinear or non-sequential organisation and format; multiple layers of meaning from a variety of perspectives; cognitively, emotionally, and physically interactive formats; sophisticated presentations; abundant connections; and unresolved storylines” (Dresang, 2008, p. 2).

Consequently, whilst the e-book provides different possibilities for use within technology, it has also allowed a shift in the way that interactive books are designed and used. By promoting growth within the printed interactive book, the medium is able to evolve and still be used as an effective learning tool by young children. However, whilst the possibility of Ebooks allows for a new way to understand and teach literacy, there is a fine line between being an effective reading tool and simply a game. It is important that Ebooks maintain a meaningful interactions that “engages the reader and enhances the storyline, reading or learning experience through the interactive experience” (Itzkovitch, 2012, p.1) Activities or games that are inconsequential of ‘for the sake of it’ have the potential to add nothing to the storyline, and may in fact hinder the overall learning experience (Claire Timpany et al., 2014).

### **2.1.8 Summary**

Children’s books help to shape the way children learn and understand the world around them. Whilst children’s books are often assumed to be literacy based – centered around words and reading - the design decisions that are made when creating the book itself help to determine how children interact and engage with the story. The rhythm and drive



within the text itself encourages literacy as well as communication and social skills (Freedman-DeVito, 2004). In turn, the illustrations enable a further understanding of the story content, as well as important behavioural lessons related to body language and relationships (Hall & Hall, 1990). By relating the illustrations and story content to the real world, children are able to learn about societal norms and successful ways for dealing with social situations (Zeece, 2009). In addition, interactive features encourage further interaction as well as providing learning tools that can push the child to understand a new concept – whether physically or mentally (Timpany & Vanderschantz, 2012). Children’s books are powerful early learning tools that have the potential to impact social and educational understanding in both the classroom and at home.

## **2.2 Shared Reading**

Shared reading is the act of a child and adult reading together, and can be undertaken in the home or school environment. The practice of shared reading enables one-on-one learning, where the child can progress from not being able to read, to being able to read independently (Goodwin, 2008). Shared reading effectiveness varies according to choice of book and the participation of both parent and child. However, if shared reading practices are utilised effectively, the session can provide a wide range of learning tools (Ezell & Justice, 2005).

### **2.2.1 Shared reading and its significance**

Shared reading is recommended, to promote students’ understanding and engagement with text (Worthy et al. 2012). Adults within this situation; “act as mediator between the text and the book” (Goodwin, 2008, p.30), therefore helping in the transition between the child not being able to read, and the child reading independently. The beauty of shared reading is the ability for the practice of shared reading to evolve as the needs and ability

of the child change. Whilst initially shared reading may involve only the parent reading and the child listening, this relationship and interaction will change as the child builds ability and confidence. As the child learns to read, the adult is able to answer questions, provide context, encourage learning and help to correct mistakes. Shared reading consequently is an important learning tool, promoting discussion, questions and a fun learning environment. Ezell & Justice (2005) discuss the findings of Hart and Risley (1995), who discovered that “the number and variety of words that young children heard in their home environment influenced both the size and variety of words in children’s subsequent vocabularies” (Ezell & Justice, 2005, p. 10). Therefore, participating in shared reading furthers traditional schooling practices, teaching the child that they can interact with a text as a partner in communication (Rose, 2011). This means that shared print experiences do not only enhance literacy development, but the communication skills of the child in general.

### **2.2.2 Shared reading in practice – Appropriate books**

There are certain features and criteria that enable shared-reading to be more productive. Therefore not all books are appropriate for the shared reading environment. A book chosen for shared reading should “invite involvement” (Goodwin, 2008, p.29) from both the child and the parent. The language within the book should be age appropriate, and should support the child “in reading and understanding the book” (Goodwin, 2008, p.29). This means that the child is not required to know or understand all of the words and meanings within the book, however the book itself should support further learning. Shared reading environments allow further information to be given to the child by the reader. Consequently shared reading practices give children the opportunity to push their learning and reading skill set to new level.

Reutzel and Cooter (2012) discuss how; “shared reading books should have literary merit, engaging content, (both fiction and non-fiction) and

high interest” (Reutzel & Cooter, 2012, p. 104). Consequently books either need to be chosen according to the interests of the child, or in contrast, books with broad topics that can appeal to a wide audience base need to be used within the shared reading environment.

### **2.2.3 Shared Reading in Practice - Participating in shared reading**

The act of shared reading can be undertaken in a variety of ways, with the general consensus being that any form of shared reading is better than none at all. However, Girolametto & Weitzman (2002) discuss three key behaviors and their associated techniques designed to gain responses from young readers and promote further learning and engagement.

These three “responsiveness” behaviors are explored further by Ezell & Justice (2005), and are as follows:

1. child-oriented behaviors
2. interaction-promoting behaviors
3. language-modeling behaviors

These three responsive behaviors rely on parents reacting to situations and taking action accordingly.

*Child Oriented behaviors* “follow the child’s lead, pace and topic” (Ezell & Justice, 2005, p.12). In the shared reading environment, this means responding to the child’s engagement and encouraging them to take the lead. This is important for promoting independent questions and observations from the child. The potential interactions of the child vary greatly according to the child, ability, understanding and willingness to engage.

*Interaction-Promoting Behaviours* “are used by responsive adults to engage children in conversation” (Ezell & Justice, 2005, p.12). This behaviour is utilised to encourage interaction and engagement from children who are somewhat reserved from the reading session. By asking

the child thought-provoking questions – specifically *who, what, when, where, why* and *how* (Ezell & Justice, 2005) - the theory is that the child will become more involved in the shared reading session. It is important to note however, that “close-ended questions are not very useful for engaging children in interactions and dialogues; rather, adults need to use different forms and question types to promote children’s conversation” (Ezell & Justice, 2005, p.12). *Interaction-promoting* behaviors have the potential to encourage children to initiate interactions with books. Utilising *interaction-promoting* behaviors effectively can therefore lead to *child-oriented* behaviors as the child instigates the discussion, resulting in a wider range of shared reading techniques and therefore greater potential for learning.

*Language Modeling behaviors* are “used by responsive adults to extend children’s language and literacy involvement to provide models of more advanced forms and features of oral and written language” (Ezell & Justice, 2005, p.13). This is seen most commonly in the form of labeling – whether it is objects, characters, letters or any other occurrences within the picture book. This labeling provides clarity and understanding in the context of the picture book, as well as allowing this knowledge to be applied wider to the concept and occurrences in the child’s environment (Ezell & Justice, 2005).

The behaviors of shared reading practice help to engage both parent and child in the process. However the issue here is that unless a parent is taught or told how to engage their child in this way, these behaviors will not occur. When designing a children’s picture book it is consequently important to consider how the aspects of the book itself can promote these forms of behavior.

#### **2.2.4 Summary**

Shared reading is a practice that evolves as children learn to read. By participating in shared reading parents give their children the tools to not only become fluent readers, but successful communicators later in life (C. Timpany & Vanderschantz, 2012). By utilising books with engaging content that challenge the young reader, children will be encouraged to push themselves and strive to understand at a higher level (Goodwin, 2008). By choosing books that relate to the child – both according to age and personal interests – the potential for a high level of engagement and interaction is increased. (Reutzel & Cooter, 2012). When participating in shared reading, the three ‘responsiveness’ behaviours (Ezell & Justice, 2005) - *Child Oriented behaviors*, *Interaction-Promoting Behaviours*, and *Language Modeling behaviors* – should be utilised. These behaviours encourage participation from both parties, as well as providing wider context and relation to the real world. By encouraging children to participate and ask questions, children are given the opportunity to become confident learners (Ezell & Justice, 2005). Shared reading is an important educational tool for young readers, however in order to ensure that parents and children are benefiting from the practice, design choices and features of the book must be created to guide successful participation.

### **2.3 Adaption of Children’s Books**

‘Adaption’ implies that something is suitable for modification or change. In the case of children’s books, this adaption could relate to either physical or intellectual elements. Currently there are adaptive educational practices utilised in the classroom environments to enable the evaluation of children’s current ability. In comparison, there are adaptive activities utilised in the home environment to further learning and understanding.

### 2.3.1 Adaptive education practices

Children have varying personal and literary needs at different developmental stages and ages (Norton, 2011). Consequently, as children learn, the information and resources that they are presented with must change. Currently these adaptive education practices are utilised mainly in a classroom setting. The two main forms of adaptive education practices currently utilised are *Running Records* (Fountas, 1996) and *Patterns for Adaptive Learning Scales (PALS)* (Midgley et al., 2000).

*Patterns for Adaptive Learning Scales (PALS)* are currently utilised in high schools and higher learning. The general principal of this practice is to create goals (Midgley et al., 2000). These include:

- Mastery goals
- Personal achievement goals
- Teacher performance goals
- Classroom goals
- Academic Related Perceptions, Beliefs, and Strategies
- Perceptions of Parents, Home Life, and Neighbourhood

These goals allow the student to create a list of expectations, allowing a deeper look at what the student wishes to gain from the learning environment and consequently giving an insight into which areas require further attention. Whilst this process is complex, the general principal can be applied to young learners. By allowing young readers to make simple goals and keep track of their progress, children are able to be 'rewarded' for this success. This acts as motivation and encourages further learning (Midgley et al., 2000).

*Running Records* is a classroom literacy device used to help teachers recognize children's reading levels and assess how the child's learning can be furthered through adaptation of teaching practices or material (Fountas, 1996, p.89). Whilst this system is currently utilised to test

literacy and reading ability in the classroom, the general idea – adapting resources to meet the child’s needs – could be applied to books that are utilised independently or in a shared reading environment. In order for running records to be effective in the classroom, the teacher makes notes according to how the child performs when reading aloud. These notes include comments on:

- Accurate reading
- Attempt at word
- Word told by teacher if no attempt is made
- Appeal and correction by teacher
- Omission of word
- Insertion of a different word
- Repetition of word
- Self correction of word

In the classroom the *Running Record* scheme allows the teacher to track the progress of the child, and adapt resources accordingly (Fountas, 1996). These practices are currently effective ways of tracking progress and utilising adaptive education in the classroom, however, these general ideas can be applied to the home environment. By including adaptive education practices in the home, children will be encouraged to become lifelong learners.

### **2.3.2 Activities and hands on learning at home**

It is fair to say that all activities will not suit all children. The most impacting variable when choosing appropriate activities is the child’s ability.

Previous research conducted by Timpany and Vanderschantz (2012) concluded that currently, the style of book aimed at younger children is more often than not, encouraging them to be more physically interactive where as books that are aimed at older children tend to have a less physical and more intellectual interaction with the content of the book.

(Timpany & Vanderschantz, 2012). This follows general conventions of a development of understanding within children, and hence promotes a higher level of learning by moving from physical to intellectual based activities or features. Within education, varying activities are utilised in order to target different areas of learning. These include language and reading based activities, math based activities, and creative based activities (Knowledge Adventure, 1991). The home environment allows for learning to take place at a more independent level than in the classroom. Consequently different 'steps' or levels of activities have emerged according to age group. According to *Jumpstart Knowledge Adventure Educational Software* (Knowledge Adventure, 1991), these home-based activities are roughly as follows:

#### 4 years

- Initial learning of the alphabet
- Basic counting
- Drawing
- Identifying characters/animals/etc
- Identifying and drawing basic shapes
- Learning to write own name

#### 5 years

- Further alphabet understanding– uppercase, lowercase, letters, sounds, simple words
- Basic rhyming
- Counting – forwards and backwards
- Writing numbers
- Identifying bigger/smaller numbers
- Matching the written number to a visual representation of the amount
- Time
- Drawing and distinguishing shapes

#### 6 years



- Consonants – sounds
- Vowels
- Combinations of letters and the associated sounds
- Counting, - basic addition and subtraction
- Writing
- Problem solving

Whilst it is important to have a basic framework for learning and educational activities, it needs to be understood that these levels can vary greatly. All children may not be on the same level as their age group determines, and in turn there may be differences in ability across the steps for the same child.

It is important to review interactive educational environments and the level of involvement required by the user or learner (Timpany & Vanderschantz, 2012). In turn, it is important to review the ability of the child and adapt accordingly. Consequently an activity book that caters purely towards one age group may be ineffective if the child is performing across levels. The design of educational books needs to include features that can be adapted according to age or ability level. This will enable effective learning at the child's current age, as well as allowing further learning to take place as the child progresses through the more difficult adapted activities within the book.

### **2.3.3 Summary**

It is widely understood that children need to be given new, more advanced material in order to further their learning, and it is through *PALS* and *Running Records* that this is currently undertaken in the schooling system. These practices are currently based on goals, achievements and wider understanding, promoting the idea that learning is not limited to a singular activity, but can be undertaken wherever the child is. Current home-based activities such as *Knowledge Adventure* programmes aim to work in

'steps' – where the child participates in activities according to age level, and moves to the next 'step' when successfully completing the activity (Knowledge Adventure, 1991). Whilst these standards allow the child to progress, it is important to analyse the level of involvement required by the user, and the ability of the child across a broad range of standards (Timpany & Vanderschantz, 2012). Generally speaking, all children will not be at the same level at the same time, and similarly an individual child may not be at the same level across the school curriculum. By utilizing adaptive educational practices that can be tailored towards children's needs and abilities, it will be possible to provide a broader, more enriched learning experience.

#### **2.3.4 Conclusion**

The design of children's books needs to encompass a wide range of variables in order to successfully reach children at their level. Children's books need to relate to a child by utilising appropriate words and vocabulary as well as general themes or story content. In turn, by considering how images can be teamed with the story to provide further meaning and enhance the narrative, children's picture books have the potential to promote the cross over of visual and written language. By including both physical and intellectual interactive elements, children can enjoy the book whilst learning in various ways.

Whilst it is commonly understood that shared reading practices are important for young learners, undertaking shared reading has the potential to vary greatly according to the user. The book itself must lend itself to the practice of shared reading by including engaging images and narrative that "invite involvement" (Goodwin, 2008). In order to ensure that varying interactions and shared reading practices take place, the book itself needs to include instructions and elements that work to promote *Child-oriented, Interaction-promoting and Language-modeling behaviors*. Engaging images and features that promote child engagement must be included to

allow *child-oriented behaviors* to occur, whilst in turn the content must lend itself to questions from the parent including *who, what, when, where, why, and how*. These features will ideally lend themselves to wider concepts and labels, allowing children to gain an understanding of context and relation to the world around them.

Adaptive educational practices are currently utilised primarily in the classroom. However, as the majority of early learning takes place in the home environment, adaptive education also needs to be applied at home. Parents need to be given the tools to successfully adapt books for children, and books need to be designed to include a range of activities that can be changed to suit different age and ability types. By creating adaptive children's books, children will be able to utilise the same resources over a longer period of time, allowing growth as a young learner. In turn, by educating parents of the importance of adapting children's books, parents will be given the opportunity to become active contributors to their child's education.

A children's book needs to combine these three key areas in order to be successful on a range of levels. The book needs to maintain strong elements of narrative, images and appropriate use of words in order to reach the child at their emotional level. However, this 'standard' picture book needs to promote further engagement by including physically and intellectually interactive elements. In turn, tools or instructions need to be included for parents to promote different levels of shared reading and adaptive educational practices. If these elements are included in a children's book, the potential for engagement and learning will be taken to a new level.

## **3 Background Study - Shared reading of children's interactive picture books**

### **3.1 Introduction**

*A shared reading study conducted over a three-month period within 2012/2013. The study focused on children's books that included Interactive features and Expressive Typography.*

The purpose of the study was to observe and subsequently evaluate shared reading between children and parents. By focusing on differences between books with interactive features and books with expressive typography, the aim was to evaluate which features within a book aided interaction both between the shared reading participants and with the physical book. The data for this study was collected prior to enrolment, however the data analysis and written work was completed as supporting research for the masters thesis. The data and subsequent paper of this background study prompted my continued research within this field, and was the basis for the research questions creation of the interactive, adaptive children's book Hannah's Favourite Place. This work has been published and presented at ICADL 2015 under the title Shared Reading of Children's Interactive Picture Books (Timpany et al., 2014).

### **3.2 Method**

For this study 11 families were invited to participate in a total of three, half hour shared-reading observation sessions. These sessions were video recorded and manual field notes were taken. Each session included an observation of shared reading and a post-observation semi-structured interview. An initial interview was conducted before the first observation session. This initial interview sought demographic information and an understanding of the child and parents' reading habits. Interviews and observations were conducted with all eleven families by the same

researcher and in the homes, at times that were selected by the families. After the initial interview, the child and parent then took part in the first observation, a shared reading of the control book, *Edward the emu* by Sheena Knowles. After the parent and child had read the book they were asked questions about interactions they had engaged in while reading and what each of them liked most about the book they had just read. Information about the reading environment, duration of the session and the time of day were noted.

The second session involved the researcher observing the parent and child participating in shared reading with three interactive books. Two of these books were chosen by the child and parent from the child's current collection. The researcher asked the participants to select books that the participants believed to contain interactive elements. The third book – *Blue 2* by David Carter - was provided as a control book. Observations focused on how the interactive elements of the book affected the way the readers used the book and read the story. After each book, a short semi-structured interview was conducted to discover how the participants used the features of the book and what they liked most about the books in general.

The third observation was run in the same way as the second, but with three books that contained expressive typography. The participants selected two books from their own collection which they deemed to contain expressive typography. The books chosen by parents from their personal collections included typical examples of expressive typography: changes in font, size, colour, and placement of text. The third book was provided by the researcher – '*Beautiful Oops*' by Barney Saltzberg. The observations of the shared reading conducted using these books again focused on recording details about the interactions the parent and child had with the book as well as with each other and how the use of expressive typography within the book influenced these interactions. Again a semi-structured interview followed the observations.

### **3.3 Materials**

The study utilised three control books – *Edward the Emu* by Sheena Knowles, *Blue 2* by David Carter and *Beautiful Oops* by Barney Saltzberg. *Edward the Emu* was chosen as the control book for its impacting illustration and story. This children’s picture book provides no features that encourage interaction, meaning that interaction must be driven purely by the parent and child within the shared reading environment. *Blue 2* is an interactive children’s book that features pop ups and paper engineering, and requires the reader to search for the blue ‘2’ on each page by following the written clues. These written clues are somewhat abstract and are grouped in threes, and do not read with the same flow or story structure as a typical children’s book. The expressive typography within *Beautiful Oops* is based on a ‘hand drawn’ approach that attempts to mimic a child’s writing and drawing.

#### **3.3.1 Coding**

The data collected was analysed and coded according to whether the interactions observed were based on creating emphasis, physical interactions, asking questions, answering questions or commenting. These were further broken down according to who undertook the interaction, and the specific type of interaction that occurred. This was then further analysed according to whether it was driven by physical enhancement, intellectual enhancement or whether it was non-book driven. This analysis table is seen in *Table 2* below.

Observations	Theme Code	Classification	Code	Physical	Intellectual	Non-Book Driven
Emphasis	1	Voices - parent	1.1	1.1.1	1.1.2	1.1.3
		Exaggeration- Parent	1.2	1.2.1	1.2.2	1.2.3
		Exaggeration- Child	1.3	1.3.1	1.3.2	1.3.3
		Pointing out Feature - Parent	1.4	1.4.1	1.4.2	1.4.3
		Pointing out Feature - Child	1.5	1.5.1	1.5.2	1.5.3
		Singing - Parent	1.6	1.6.1	1.6.2	1.6.3
		Singing - Child	1.7	1.7.1	1.7.2	1.7.3
		Physical	2	Touching Book- Parent	2.1	2.1.1
Touching Book - Child	2.2			2.2.1	2.2.2	2.2.3
Actions- Child	2.3			2.3.1	2.3.2	2.3.3
Actions - Parent	2.4			2.4.1	2.4.2	2.4.3
Noises - Parent	2.5			2.5.1	2.5.2	2.5.3
Noises - Child	2.6			2.6.1	2.6.2	2.6.3
Questions	3	Reader-Child	3.1	3.1.1	3.1.2	3.1.3
		Child - Reader	3.2	3.2.1	3.2.2	3.2.3
		Book-Child	3.3	3.3.1	3.3.2	3.3.3
Answers	4	Reader-Child	4.1	4.1.1	4.1.2	4.1.3
		Child - Reader	4.2	4.2.1	4.2.2	4.2.3
		Child - Book	4.3	4.3.1	4.3.2	4.3.3
Comments	5	Reader	5.1	5.1.1	5.1.2	5.1.3
		Child	5.2	5.2.1	5.2.2	5.2.3

**Table 2: Coding for categorisation of interactions**

### 3.3.2 Participant Sample

Participants were found through personal contacts within the community or referrals. The participant sample included eleven parents and their children who were aged between 3 and 6 years old. *Table 3* details the participant sample.

ID	A	B	C	D	E	F	G	H	I	J	K
<b>AGE</b>	4	3	4	5	4	3	6	4	6	5	6
<b>CHILD</b>	F	M	M	M	F	F	F	M	F	F	M
<b>PARENT</b>	F	F	F	M	F	F	F	F	F	F	M

**Table 3: Participant Sample - Background Study**

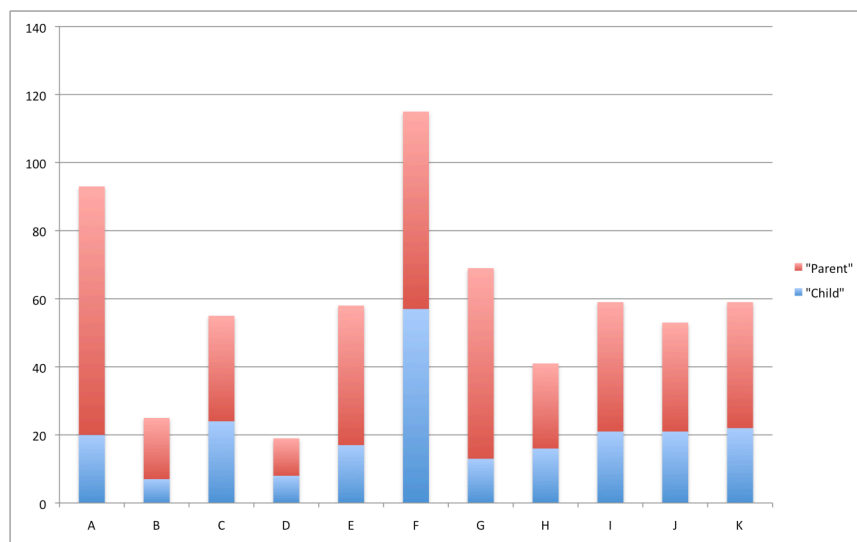
## 3.4 Results

I discuss here the results of the three observation and interview sessions.

### 3.4.1 Control Picture Book – Edward the Emu

*Edward the Emu* did not include any design features that drove further interaction. Consequently all interactions noted were non-book driven and determined by the parents and children participating in the observation

Session. *Figure 1* depicts the number of interactions that were undertaken by parents and children when reading *Edward the Emu*. All participants interacted with the book, however in general the bulk of the interactions were undertaken by the readers. The exception to this was Family F, where both reader and child interacted equally.



**Figure 1: Total Interactions, Edward the Emu**

Even though the control book did not include any design features that would drive interaction, a wide range of interaction types were noted from both the parents and the children. Ten of the parents asked questions throughout the shared reading, and in addition, eight children asked their parents questions throughout the observation session. Nine of the children interacted with the book by physically touching the pages, and seven of the children pointed out specific elements - such as illustrations and text. When asked, all of the children stated that their favourite part of the book was the illustrations, with five of the children also stating that they enjoyed the message of the book. These five children were able to easily identify the message as ‘the importance of being true to yourself’. When parents were asked the same question, they mentioned that they enjoyed the illustrations (eight parents), the rhyming and rhythm of the text (six parents), the overall message or moral of the story (four parents) and the overall level of the book and easy readability (three).



### 3.4.2 Interactive Books

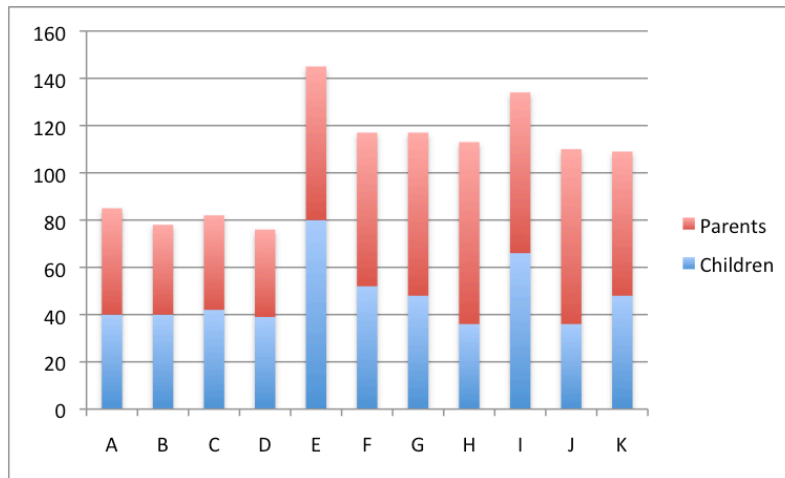


Figure 2: Blue 2 - Interactions from parents and children

The interactive design features within *Blue 2* saw a more even spread in interactions from reader and child (See Figure 2). This even spread of interactions demonstrates that the inclusion of physical enhancements prompts both parties to be actively engaged in the shared reading session. Of these interactions, the most common occurring was physical interactions, as seen in Figure 3. The second most commonly occurring interaction type was *Questions*. This occurred due to parents asking questions such as “Can you see it?” or “where is the Blue 2?”. The fact that the families participated in such a wide range of interaction types proves that interactive books promote different and higher levels of engagement.

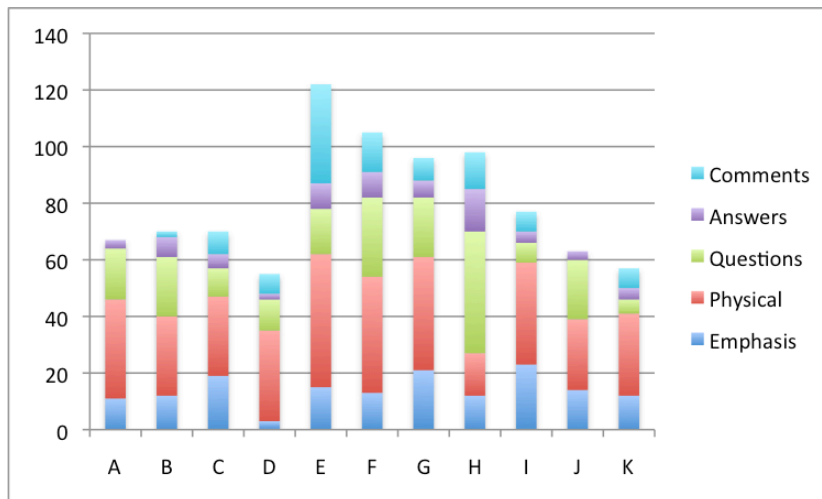


Figure 3: Breakdown of interaction types according to family, session 2

Figure 4 depicts a comparison of the total number of interactions undertaken within Edward the Emu reading sessions and Blue 2 reading sessions. The child and parent interactions noted jumped from a total of 226 (child) and 420 (parent) to 527 and 639. This significant increase in interaction, especially in the case of the children participants, again shows that the inclusion of physical enhancements drives further interaction and hence engagement in the book itself.

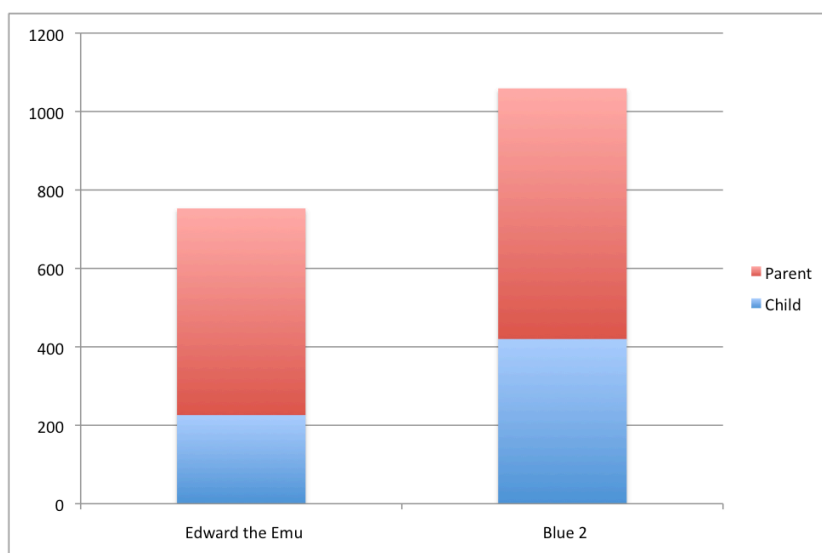


Figure 4: Total Interactions - Edward the Emu vs Blue 2

The structure and story within *Blue 2* is not typical of a children's book. The written clues are somewhat abstract and are grouped in threes, and

whilst there is an element of rhyme, often complex words are utilised. This means that the book does not read with the same flow or story structure as a typical children's book. Consequently, when reading the book, one parent did not realise that the book contained text until almost half way through. Four of the eleven parents stated that they found the story difficult to read due to vocabulary and flow of text, and consequently the physical interaction rather than the shared reading was the focus of the Session.

Five parents stated that they changed their interactions due to the delicate nature of the book. These changes of interactions included undertaking the interactions themselves, rather than letting their children touch the book, as well as encouraging the child to be careful or cautious when interacting. These participants included the parents of two three year olds, two four year olds and one five year old. Parent B stated that the book was "maybe too delicate for the age" (3years) and parent D said they were "worried about it breaking".

Two of the eleven parents stated that they enjoyed the fact that *Blue 2* could be read differently each time. Parent D stated that the book enabled you to "re-read it without getting bored", and Parent J stated that you "could read it differently every time". Two of the parents stated that the interactive books that they owned mainly included 'lift the flap' features, and were no longer read or fully utilised by the child. It was said that this may have been due to the superficial nature of those design features and the irrelevance to the story. Parent D stated about his child that "when he was younger and looking at pictures he would flip them to be involved, but now he focuses just on the story. If the flaps were more important to the story they would be more effective". It is relevant to note that Parent D commented on the ability to read *Blue 2* differently each time and the perceived importance of this within the shared reading environment. Parent G believed that 'lift the flap' features are "only good if they can't read on their own" as they often only include added illustrated content, rather than adding to the story.

When asked what their favourite part of the book was, six of the children stated that it was finding the *Blue 2*, whilst the remaining five children pointed to specific pages that they believed were the best. When asked why the pop-up features were included in the book, six of the children said that they were designed to increase the complexity or difficulty of the book. Child I stated that the pop ups “make it hard to find and makes it fun”, whilst Child D stated that the pop up features “make [the book] more exciting ... cool things to touch ... I liked it because it was hard”. When asked the same questions in relation to their personal books, six of the children stated that the illustrations were their favourite aspects. Within eleven of the 22 personal book collection observations the children stated that the interactive elements were their favourite features.

### 3.4.3 Expressive Typography Books

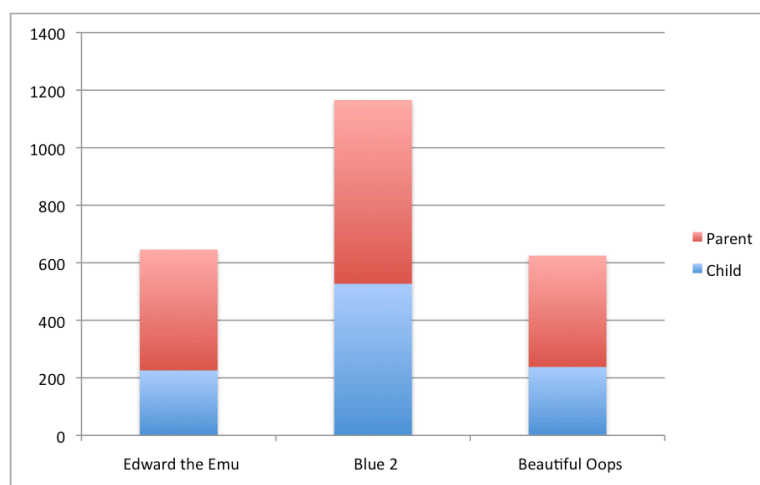


Figure 5: Comparison of parent and child interactions over the three control books

When comparing the total interactions over all three control books, *Beautiful Oops* was similar to that of *Edward the Emu*, as seen in Figure 5. This may have been due to the fact that the expressive typography and illustrations within *Beautiful Oops* are designed to look as if they have been drawn by a child. Whilst this attempts to connect with the child on their level, it could be said that this reduction in readability resulted in a

book that was perhaps not as successful at encouraging interaction as it could have been. This was made apparent by the fact that only one parent stated that the expressive typography within *Beautiful Oops* changed the type of expression used when reading, whilst all parents noted that the expressive elements present in the books from their personal collections affected the way that they read the text. For example, when observing the expressive typography books from the personal collections, Parent F stated that the expressive typography made her “[place] emphasis on those specific words” and Parent B stated that the use of different sized typography changed the voice that she used when reading, “with big writing you read it louder, more impressive. With little text you use a little voice”. This shows that expressive typography must be utilised simply in order for readers and children to apply it effectively.

Three of the parents stated that they enjoyed the fact that *Beautiful Oops* had the potential to be read differently - both in subsequent reading sessions and as the child got older. Parent E stated that the expressive typography within the book would enable her to “talk about the text as she got older”, allowing for a further explanation of the definition of words and the relationship between text and image. Only one parent (Parent B) noted the potential for this within an expressive typography book that was from their personal collection.

Six of the parents were observed asking questions when reading *Beautiful Oops*, these included “what’s that?” and “what does it look like?”. Whilst the text of the book itself did not promote questions, the parents clearly believed that the nature of the imagery and layout lent itself to a question and answer interaction. Within 14 of the 22 personal expressive typography books, the children stated that the illustrations were their favourite aspect. Two of the children stated that they liked the story content, and five children stated that they enjoyed the rhythm of text and typography. Whilst the children could not identify the feature as ‘typography’, they were able to understand the basic concept. For example, child D made a “hisssssssssss” noise and stated that she liked

how the 'sound' was "written on the page" in a shape that mimicked that of the snake illustration. *Beautiful Oops* also included aspects of physical interactivity – such as lift the flaps and other paper engineering features. Within *Beautiful Oops*, seven of the children stated that the interactive features were their favourite, and the remaining 4 stated that the illustrations were their favourite features.

When asked what they believed the purpose of expressive typography was, all eleven children understood that it was designed to help you read as well as to change the way specific words were read. These comments ranged from aspects of shape and colour to verbal cues, such as "makes you whisper and be loud" and "the letters look the same as the dog". Parent D stated that the "text [was] too cramped" within one of the personal collection expressive typography books. This was said to make it confusing to the reader. The researcher noted that the child (who was reading) was unsure which word and/or group of text was next in sequence due to the scattered nature of the text.

### **3.5 Discussion**

The study conducted has shown that the fundamental elements of the children's book continue to be successful if implemented appropriately. Illustrations remain an important aspect within children's books, as discussed by Gibbons (1999), Bloom (2002) and Piro (2002). The illustrative content is engaging and memorable, and in turn aids the child in understanding and enjoying the text. On fourteen occasions, children stated that the illustrations were the favourite aspect of the personal expressive typography books. Whilst similarly, 6 children over the 22 observations of personal interactive books made the same claim about illustrations. Four children also identified the illustrations as their favourite features within *Beautiful Oops*. All children stated that the illustrations were their favourite aspects when observing *Edward the Emu* - the control Picture Book. Consequently, when designing children's books, effective

illustrations can be applied to a wide range of books - including those with elements of expressive typography and interactivity. By including illustrations the attention is not directed away from the additional enhancements, but is instead the two have the potential to work together to promote a broader range of engagement. It would also be recommended to implement physical and intellectual enhancements within these illustrations.

The three *responsiveness behaviors* (Ezell & Justice, 2005) (*child-oriented behaviors, interaction-promoting behaviors and language-modeling behaviors*) help to engage both parent and child in the process. However the issue here is that unless a parent is taught or told how to engage their child in this way, these behaviours will not occur. When designing a children's picture book it is consequently important to consider how the aspects of the book itself can promote these forms of behaviour.

Elements within children's picture books have the potential to vary greatly. Goodwin's discussion of shared reading promotes the idea that the practice should "invite involvement" (Goodwin, 2008, p. 29) , giving the child a chance to push their level of understanding to a new level in an environment that encourages the child to take a chance. The importance of this was observed within *Blue 2*, with six of the eleven children commenting on the difficulty of the interactive task adding to the overall enjoyment of the book. Consequently the level of difficulty helps to encourage further learning from the child as well as have a direct impact on the level of engagement and enjoyment.

Interactive features within the children's picture book must have an impact on the story itself. Whilst 'lift the flap' features are effective with younger readers, the novelty wears off with older children due to the fact that the interactive features have no relevance to the story. Even though *Blue 2* is an interactive book that requires physical engagement and intellectual engagement , the story itself is not engaging. Consequently the book is more of an 'activity' book than a 'reading' book for the age group

observed. Due to the fact that the 'Blue 2' activity is fixed, there is no opportunity to change outcome or learning objective, consequently once the child has located the '2', the desire to participate in the book may be reduced. An effective children's interactive book must include an appropriate and engaging story that can be read within the shared reading environment, and in turn must include interactive features that promote further, meaningful engagement that has an impact on the outcome or reading of the story.

Expressive typography needs to be simple in order to be effective. Many of the children participants found the typography within *Beautiful Oops* hard to read, and there were further comments about the 'confusing' aspects of some books from personal collections. These included comments of using script, which was hard for young readers to read, as well as text in shapes being placed in different places on the page, meaning that young readers found it difficult to follow the flow of the story. As children are still learning about letters, the alphabet and reading, it stands to reason that if the text itself is difficult to read, the book will not provide an effective learning opportunity. This highlights the importance of readability over interactive features when designing children's books.

All parents within the study commented on the effect of expressive typography on their reading style - ranging from utilising voices as well as expression and tone. Whilst this is key within the shared reading environment, it is important to note that children's picture books tend to transition with the child as the young reader moves from listener to reader. Consequently when utilising expressive typography it is important to consider readability first and foremost. Even though the study conducted included a wide age range of children, all were able to identify the purpose of expressive typography. If it is noted that children are able to understand that this design feature is implemented for aided understanding and to imply emphasis, it is important that the typography itself is designed in such a way that the children can undertake this act. *Beautiful Oops* was perhaps the wrong choice for testing the control of expressive typography,



as the typography itself was more difficult to read than a standard typed font. However this allows a further understanding of how important it is to consider not just aesthetics, but the practicality of typography used when designing children's books.

### **3.6 Conclusion**

A successful children's picture book, needs to firstly include an engaging story that is appropriate for the age and reading level of the child. This story must have a rhythm that drives the story, and a message that relates to the real world and reaches the child at their emotional level. The illustrations must be appropriate for the text and be equally as engaging as the story itself, allowing younger children to 'read' the images and understand the combination of pictures and words. These illustrations must be designed and utilised in such a way that they support the story as well as the other features within the book.

Parents that engage in effective shared reading practices will find aspects within all children's books that can draw on a range of interactions, both physical and intellectual. All of the parents within the study participated in this way, however it is the parents that are not participating in effective shared reading practices that need to be catered for. Whilst it is understood that the asking of questions, from both parents and children, promotes wider learning and understanding, books must be designed to encourage this practice. This can be implemented by the inclusion of questions within the text of the book itself, or through the inclusion of imagery and elements that lend themselves to inquisitiveness from the child within the shared reading environment. Also, the book itself must encourage comments to be made by parents and children. Many comments noted throughout the study were centred around the interaction of characters - both in the story and the imagery - and the identification of elements. By designing a children's book that encourages the readers to 'look closer' - both figuratively and literally - shared reading practices

including comments and questions will be encouraged of shared reading partners.

As is often seen with young children's reading practices, the repetitive reading of a text lends itself to a child memorising the story and elements. Several of the parents within the observations noted the importance of being able to read the story differently each time. Consequently children's picture books need to include a level of adaptivity to allow the child and parent to interact with the book differently each time they read it. When designing children's books in the future it will be imperative to consider how one book can be adapted to provide new learning possibilities as the child grows. These adaptive qualities could relate to different storylines, different interactive activities, or different learning outcomes.

## **4 A comparison of children's books**

### **4.1 Introduction**

This project investigates children's reading, and book use, coupled with the use of interactive features and adaptive elements within children's picture books. This research sets out to determine;

- How do children and parents interact with books during shared reading sessions?
- Do interactive features of books affect how parents and children use books?
- How do adaptive features within books change the way that parents and children interact during shared reading sessions?

This project looks at children's use of two books, designed specifically to allow comparison between a book that includes no interactive or adaptive content, and one that enables adaptive learning practices and includes interactive elements. These books have the same narrative and illustrations, allowing for a direct comparison of the child's interactions. Parents and children were interviewed, interactions with the books were video recorded with audio, and photographs and notes were taken.

### **4.2 Methodology**

For this study, seven families were invited to participate in a total of three, 20 minute shared-reading observation sessions. These sessions were video recorded and manual field notes were taken. Each session included an observation of shared reading and a post-observation semi-structured interview. An initial interview was conducted before the first observation session. This initial interview sought demographic information and an

understanding of the child and parents' reading habits. Interviews and observations were conducted with all seven families in their homes, and at times that were selected by the families.

After the initial interview, the child and parent took part in the first observation, a shared reading of the control book, '*Hannah's Favourite Place*' that included no book-driven interactive features. After the parent and child had read the book they were asked questions about interactions they had engaged in while reading and what each of them liked most about the book. Information about the reading environment, duration of the session and the time of day were noted after each observation.

The second session involved observing the parent and child participating in shared reading with the interactive, adaptive version of '*Hannah's Favourite Place*'. Observations conducted using this book focused on recording details about the interactions the parent and child had with the book as well as with each other. Focus was also placed on how the inclusion of interactive features within the book influenced the interactions. After the shared reading session, a short semi-structured interview was conducted that asked how the parent and child interacted with and used the features of the book, and what they enjoyed most about the features and book in general.

The third observation was run in the same way as the second, with the interactive, adaptive version of '*Hannah's Favourite Place*' provided by the researcher once again. The families were given the 'goal' of finding the cake or cupcake on each page. The observations of the shared reading conducted using this book focused on recording details about the interactions the parent and child had with the book as well as with each other. Focus was also placed on whether or not goal-based reading session had changed the type of interactions noted in the previous observation. Again a semi-structured interview followed the observation to gain further insight into the interactions that occurred.

Observations were then coded according to a modified version of the previous table devised in the children’s books that utilise expressive typography and interactive features study (see *Table 4*). An additional category was added to this table - ‘looking closer’ – this related to the child or parent physically getting closer to the book in order to look at something specific. The encoding broke the data down according to whether the observations noted were based on; emphasis, physical interactions, asking questions, answering questions or commenting. These were further broken down according to who undertook the interaction, and the specific type of interaction that occurred. This was then analysed according to whether it was driven by physical enhancement, intellectual enhancement or whether it was non-book driven.

Observations	Theme Code	Classification	Code	Physical Enhancement	Intellectual	Non-Book Driven	
Emphasis	1	Voices - parent	1.1	1.1.1	1.1.2	1.1.3	
		Exaggeration- Parent	1.2	1.2.1	1.2.2	1.2.3	
		1	Exaggeration- Child	1.3	1.3.1	1.3.2	1.3.3
			Pointing out Feature - Parent	1.4	1.4.1	1.4.2	1.4.3
		Pointing out Feature - Child	1.5	1.5.1	1.5.2	1.5.3	
			Singing - Parent	1.6	1.6.1	1.6.2	1.6.3
			Singing - Child	1.7	1.7.1	1.7.2	1.7.3
Physical	2	Touching Book- Parent	2.1	2.1.1	2.1.2	2.1.3	
		Touching Book - Child	2.2	2.2.1	2.2.2	2.2.3	
		Actions- Child	2.3	2.3.1	2.3.2	2.3.3	
		Actions - Parent	2.4	2.4.1	2.4.2	2.4.3	
		Noises - Parent	2.5	2.5.1	2.5.2	2.5.3	
		Noises - Child	2.6	2.6.1	2.6.2	2.6.3	
		Looking Closer – Parent	2.7	2.7.1	2.7.2	2.7.3	
		Looking Closer – Child	2.8	2.8.1	2.8.2	2.8.3	
		Questions	3	Reader-Child	3.1	3.1.1	3.1.2
Child - Reader	3.2			3.2.1	3.2.2	3.2.3	
Book-Child	3.3			3.3.1	3.3.2	3.3.3	
Answers	4	Reader-Child	4.1	4.1.1	4.1.2	4.1.3	
		Child - Reader	4.2	4.2.1	4.2.2	4.2.3	
		Child - Book	4.3	4.3.1	4.3.2	4.3.3	
Comments	5	Reader	5.1	5.1.1	5.1.2	5.1.3	
		Child	5.2	5.2.1	5.2.2	5.2.3	

**Table 4: Modified coding for categorisation of interactions**

### 4.3 Materials – Hannah’s Favourite Place

The story ‘*Hannah’s Favourite Place*’ was chosen due to appropriateness of language and story content for the participant sample. Goodwin discussed how effective children’s picture books should “invite involvement” (Goodwin, 2008, p.29). This was achieved with the picture

book version of *Hannah's Favourite Place* by utilising age appropriate language that would support the child “in reading and understanding the book” (Goodwin, 2008, p.29). In turn, the text was written and laid out in such a way that it would promote rhythm and drive for the reader – encouraging literacy as well as communication and social skills (Freedman-DeVito, 2004). The illustrations were designed to enable a further understanding of the story content (Hall & Hall, 1990), and were simple in nature, with block colours and repeating elements, mimicking a style common amongst other children’s book. The illustrations and moral of the story relate to the real world in order to promote further understanding of societal norms and successful ways for dealing with social situations (Zeece, 2009).

The adaptive, interactive version of *Hannah's Favourite Place* followed the same storyline as the control book, and included the same illustrative content. This allowed observations of interaction to be purely focused on the additional interactive and adaptive features.

Features that promote physical interactions were included in order to draw upon the basic learning principal of ‘touch’, as discussed by Silverman (2006). This learning technique is not limited to simply very young children, and consequently a physically interactive book encourages this behavior to be nurtured and explored. At it’s most basic sense, this can be understood as ‘learning by doing’. These physical enhancements in turn promote *Child-Oriented and Interaction-Promoting Behaviors* (Ezell & Justice, 2005) as the shared readers ask questions, point out features and make connections between the book and the real world.

The physical enhancements that were included in the book were:

- Spinning Wheel
- Simple and complex pop up structures
- Tactile Letters
- Lift the Flaps
- Envelopes containing objects

- Pull tabs
- Windows
- Moving elements – swinging jack
- Accordion mechanisms
- Sliders
- Dry-Erase page

In addition, each page included a tactile letter of the alphabet to promote literacy, letter recognition and tactile learning. The spreads are discussed further below.

#### **4.3.1 Spread 1**

*“Hannah lived a good life in a world surrounded by wonderful things. But she had one favourite place where she loved to spend time, only one special place that was her most favourite...”*

Spread 1 utilises a spinning wheel. This wheel provides a tactile element, whilst allowing children to understand the relationship between ‘cause and effect’. As the child spins the wheel, different images are visible through the ‘thought bubble’ illustration. This provides a talking point for the book, alluding to coming themes and possible “favourite places”. This physical enhancement promotes both *Interaction-promoting* and *child-oriented behaviors* (Ezell & Justice, 2005).

#### **4.3.2 Spread 2**

*“Hannah lived in a house with her mum and her dad, and her cat and her dog, who’s a little bit mad.”*

Spread 2 includes a pop up house with cut-out windows. This pop up house provides a tactile element, as well as providing the “amusement and delight of discovery” (National Museum of American History, 2010,

p.12) as the child can look through the windows to discover what lies inside. This multi-layered addition to the book encourages children to 'look closer' and engage with the book at a deeper level. This in turn promotes further intellectual engagement as children are encourage to utilise "close inspection and critical comparison" (Zeece, 2009, p. 449).

#### **4.3.3 Spread 3**

*"She would shop at the market with her mum for hours, and come home with arms full of beautiful flowers. They'd get roses and tulips in pink blue and white; and put them in vases to show off at night."*

Spread 3 contains a pop out flower spread with cutouts. This physical enhancement encourages the child to look closer, to peer through the holes in the pages, and to talk about colours. Consequently whilst the feature itself is a physical enhancement, the interaction that it promotes encourages further *Child-Oriented* or *Interaction-Promoting Behaviors* (Ezell & Justice, 2005) as both parent and child interact with the intricate pop-up.

#### **4.3.4 Spread 4**

*"Hannah loved riding in granny's fast car; they would go on adventures – sometimes quite far; but it wasn't quite as good as her favourite place."*

Spread 4 is illustration based, allowing a "cross over and discovery of meaning in nonverbal representations" (Piro, 2002, p. 128) as the imagery mimics the storyline. This spread is the same as that found in the picture book version of *Hannah's Favourite Place*, with the additional content of the hidden cupcake and the tactile letter, in this case the letter *E*.



#### **4.3.5 Spread 5**

*“Her auntie took Hannah on trips to the zoo; they’d look at the pandas, the chimps and birds too”*

Spread 5 is also illustration based, again allowing a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128). This spread is the same as that found in the picture book version of *Hannah’s Favourite Place*, however the banana that the monkey was holding has been replaced with the ‘hidden’ cupcake, and the tactile letter *F* has been included to encourage intellectual interaction.

#### **4.3.6 Spread 6**

*“Hannah loved eating and eat well she did; she’d eat so much for dinner that her mum flipped her lid!”*

Spread 6 contains ‘lift the flap’ physical enhancements. These enhancements fit within the storyline in general – the story discusses eating dinner, and the *lift the flap* features are plates that lift up to reveal different foods. By lifting the plates to reveal what is underneath, conversation is promoted about what the foods are, what colours they are, whether the children like the foods, whether they are appropriate for dinnertime and so on. This element hence prompts *interaction-promoting* and *child-oriented* behaviors (Ezell & Justice, 2005), as both parent and child point out features, make comments and ask and answer questions. In addition, as with the previous pages, the spread contains a tactile letter – in this case, *G*.

#### **4.3.7 Spread 7**

*“She loved to go shopping and try on new clothes. She’d shop through the day till the last shop was closed”*

Spread 7 includes a paper pocket, in which sits 3 items of clothing, a cupcake and a flower. This physical enhancement adds to the story content – giving an insight into what Hannah may be shopping for. Consequently this element prompts *interaction-promoting* and *child-oriented* behaviors (Ezell & Justice, 2005), as both parent and child point out the different items, make comments and ask and answer questions. This physical enhancement also has a tactile quality – the ribbon gives a different texture and free movement, and the child has the ability to freely play with the elements within the page. This draws on Silverman’s (2006) discussion of *touch*, allowing for further learning opportunities and engagement. In addition, as with the previous pages, the spread contains a tactile letter – in this case, *H & I*.

#### **4.3.8 Spread 8**

*“Her friends were great fun to take to a show; to the circus, the theatre, or dancers on snow”*

Spread 8 utilises a ‘flip book’ mechanism. As the reader pulls down on the tab, the pages of the features flip up to show different scenes/characters. In a sense this means that the flip book can be read in conjunction with the words of the text, allowing a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128) and promoting further learning as the child makes connections between the imagery and text. This ‘flipbook’ interaction is not typically found within pop-up books, and gives the child the opportunity to learn about cause-and-effect with the physical interaction, as well as encouraging *Child-Oriented* and – *Interaction-Promoting Behaviors* (Ezell & Justice, 2005). The theory behind this design feature is that parents would encourage children to actively participate with the flipbook feature and ask questions about the mechanics of the element and the imagery.

#### **4.3.9 Spread 9**

*“Her favourite place was tucked right away, but a place she could go in the night or the day.”*

Spread 9 includes a clear window over the illustration. Within the window are stars, which move freely when the reader manipulates the book. This physical enhancement teaches children about difference in texture (Silverman, 2006), as well as shape, colour and the idea of cause-and effect.

#### **4.3.10 Spread 10**

*“She discovered this place one day with her friend, because the best thing Jack knew was playing pretend.”*

Spread 10 is illustration based, however these illustrations differ to those seen in the picture book. The clouds within this spread are formed through the silhouettes of characters and objects from throughout the book. This allows children to identify shape, and associate this with the story itself and the broad theme of ‘using your imagination’. This in turn allows children to discover “meaning in nonverbal representations” (Piro, 2002, p. 128). As “a story’s atmosphere is often evoked from the kind of illustration it carries” (Gibbons, 1999, p.53), the whimsical illustration effectively emphasises the idea of imagination and creativity. As with the other pages, spread 10 also includes the hidden cupcake and a tactile letter.

#### **4.3.11 Spread 11**

*“For Jack had not money or cars or TV, but he loved being Jack and he loved being free.”*

Spread 11 contains a swing mechanism, where Jack can swing freely from the tree. This physical enhancement allows children to understand

movement, cause and effect and tactile qualities of the different texture of the rope (Silverman, 2006). As with the other spreads, Spread 11 contains a hidden cupcake and a tactile letter.

#### **4.3.12 Spread 12**

*“This wonderful place is for bold or for shy; you can get there quite quick – in the blink of an eye.”*

Spread 12 uses an accordion physical enhancement. This means that the child can pull out the insert and look through the ‘eye’. By doing this, the child is able to see an array of scenes. This promotes the identification of objects, colours, themes and characters already seen – drawing on *Language-Modelling Behaviors* (Ezell & Justice, 2005) through the use of labeling. This in turn promotes emphasis and comment interactions, as well as prompting the child to look closer and critically engage with the physical enhancement (Zeece, 2009). As with the other spreads, Spread 12 also includes the hidden cupcake and tactile letter.

#### **4.3.13 Spread 13**

*“There are zebras with horns and fur like a bear, and wings so wide they can fly through the air.”*

Spread 13 includes a sliding and spinning mechanism. This physical enhancement allows the child to make the zebra ‘fly’ as discussed within the page of the book. This allows children to make connections between the words, images, and actions, and grasp a deeper understanding of the text as a whole. This draws upon Silverman’s (2006) discussion of touch, as well as encouraging *Responsiveness Behaviors* (Ezell & Justice, 2005) as children play with the feature, ask questions, point out elements and figure out how the enhancement works. As with the other spreads, Spread 13 contains a hidden cupcake, and tactile letters.

#### **4.3.14 Spread 14**

*“There are flowers of gold that stretch to the sky, a ladder to climb if you want to fly high.”*

Spread 14 contains a pop-up boat with sails made of giant flowers. This imagery differs quite drastically from that seen in the picture book, and hence gives children a different interpretation of the text. This in turn encourages children to think outside the square and use their imagination. This effectively promotes the moral of the story further, allowing children to emotionally engage with the story and gain greater understanding of what it means to ‘use your imagination’ (Norton, 2011). As with the other spreads, Spread 14 contains a hidden cupcake, and tactile letter.

#### **4.3.15 Spread 15**

*“There are cars shaped like snakes with no wheels or tracks – if the weather is fine you can ride on their backs!”*

Spread 15 is illustration based, allowing a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128) as the imagery mimics the storyline. This spread is the same as that found in the picture book version of *Hannah’s Favourite Place*, with the additional content of the hidden cupcake and the tactile letter.

#### **4.3.16 Spread 16**

*“There are treats stacked on tables, sometimes quite high, glubmumpkin a favourite – a sweet type of pie.”*

Spread 16 contains two pyramid mechanisms – one situated inside the other. Both pyramids are covered in the illustrations of ‘treats stacked on

tables', however the physical enhancement allows for the child to grasp an understanding of scale, as well as prompting them to look closer and critically evaluate the illustration and physical enhancement (Zeece, 2009). As with the other spreads, Spread 16 contains a hidden cupcake, and tactile letters.

#### **4.3.17 Spread 17**

*“There are gowns made of velvet that wrap you up tight, and give you a power so you shine like a light.”*

Spread 17 utilises the same illustrations as seen in the picture book, however instead of static chandeliers, they are suspended from the top of the book via ribbon. This means that the chandeliers swing freely, and can be played with by the child. This physical enhancement promotes physical interaction as well as showing the different textures of paper and ribbon (Silverman, 2006). As with the other spreads, Spread 17 contains a hidden cupcake, and tactile letter.

#### **4.3.18 Spread 18**

*“There are shows put on daily where trumpets will play, and goblins will tumble through big stacks of hay.”*

Spread 18 is illustration based, allowing a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128). The imagery is a representation of the storyline, meaning that children can point out specific features and characters that are discussed in the text. This spread is the same as that found in the picture book version of *Hannah's Favourite Place*, with the additional content of the hidden cupcake and the tactile letter.

#### **4.3.19 Spread 19**

*“There are houses of mud, of diamonds and toast, with roofs made of chocolate and candy and marshmallow roast”*

Spread 19 is illustration based, allowing a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128). The imagery is a representation of the storyline, meaning that children can point out specific house types that are discussed in the text. This spread is the same as that found in the picture book version of *Hannah’s Favourite Place*, however has the additional physical enhancement of a clear overlay that can be drawn on by the child. This physical enhancement encourages creativity, as well as reiterating the moral of the story – the importance of being able to use your imagination. This gives the child the opportunity to use the lesson that they have learnt throughout the book (Zeece, 2006). In turn, by drawing children are able to enhance motor skills and communication (Vanderschantz & Timpany, 2013). As with the other spreads, Spread 19 includes a hidden cupcake and tactile letter.

#### **4.3.20 Spread 20**

*“This was Hannah’s most favourite place, and what a wonderful place for Hannah to be; a wonderful place where she can be free. Because it was the place that only she knew... But if you just close your eyes then you’ll be there too!”*

The final spread combines imagery from the entire book, allowing the book to in a sense come full circle, and allow reflection on the story. This page allows a “cross over and discovery of meaning in nonverbal representations” (Piro, 2002, p. 128), and encourages children to point out specific characters, scenes and elements that are discussed in throughout the story. This spread gives the parent an opportunity to sum up the story, and show the child how the moral relates to them on an emotional and ‘real world’ level (Goodwin, 2008).

#### 4.3.21 Adaptive Features

Features that promote intellectual interactions were included in order to encourage “close inspection and critical comparison” (Zeece, 2009, p. 449). These features require the parent and/or child to engage intellectually with the book and make further connections between the design features, storyline and the real world. These intellectual features were in the form of adaptive goals to encourage parents to focus on different aspects of the book and adjust according to a level appropriate for their children. These goals are listed in the front of the book, along with instructions to guide the parents in the shared reading activity. These goals were created by evaluating educational activities and expected learning outcomes for children aged between 4 and 6 (Knowledge Adventure, 1991).

These goals are as follows:

- Find the cake or cupcake on each page

The inclusion of the ‘find the cupcake’ feature was an intellectual enhancement that was designed to work in partnership with the physical features of the page. By utilising both physical and intellectual features, *Hannah’s Favourite Place* effectively employs multi-layered interaction (Bongers & van der Veer, 2007). This interaction requires “close inspection” (Zeece, 2009, p. 449) of the page as well as the physical enhancements, promoting interaction in the form of questions, answers, and sequence of content (Timpany & Vanderschantz, 2012).

- Point out the letters and talk about the alphabet

The inclusion of tactile letters within the interactive, adaptive version of *Hannah’s Favourite Place* encourage both a physical and intellectual interaction. Discussion of letters and the alphabet is a crucial learning outcome for young minds. This is an early version of *Language Modeling Behaviors* (Ezell & Justice, 2005), and promotes further connections to be made between letters, sounds and words.



- Talk about words, meaning and spelling

As children progress towards being independent readers, it is important to continue to support the literacy development. Discussing words, meaning and spelling draws on *Language Modeling Behaviors* (Ezell & Justice, 2005). This in turn extends “children’s language and literacy involvement to provide models of more advanced forms and features of oral and written language” (Ezell & Justice, 2005, p.13). By discussing the text within shared reading Sessions, children have the opportunity to further their knowledge of language and communication.

- Find something to count on every page

Shared reading sessions allows children to learn in a number of ways, and these are not limited to literacy development (Timpany & Vanderschantz, 2012). Consequently, by utilising a goal that encourages numeracy development, the shared reading session has the potential to allow children to learn about numbers and math. This is a crucial stage for young minds (Knowledge Adventure, 1991), and this adaptive feature can help to encourage this learning outcome.

- Find different shapes, talk about them and draw them

This goal utilises a range of different learning techniques to encourage children to gain deeper understanding of concepts. Pointing out specific features is a form of emphasis interaction, which in turn prompts both *Child Oriented* and *Interaction Promoting Behaviors* (Ezell & Justice, 2005). Labelling said shapes also encourages *Language Modelling Behaviors* (Ezell & Justice, 2005) as children are able to make connections between words and images. Drawing these shapes further cements these connections and understanding of this concept, whilst encouraging ‘learning by doing’ (Silverman, 2006).

- Identify the colours

As with the previous goal discussed, identifying colours is a form of labeling. This encourages *Language Modelling Behavior* (Ezell & Justice, 2005) and allows children to make connections between the colours and

the word. This in turn prompts comments and questions that relate the colours within the book to those found in the real world. This consequently promotes multi-layered interactions that extend from the story (Timpany & Vanderschantz, 2012).

- Ask questions about the book and the real world

As discussed by Norton (2011), a story needs to emotionally engage with children and relate to their world in order to be successful. *Hannah's Favourite Place* successfully achieves this, however asking questions and relating the story to the real world can extend this engagement. If children are more emotionally engaged in the story, they are more likely to pay attention and gain from the reading session. In turn, by discussing the real world, children are able to make valuable connections between the moral of the story and their own life. In the case of *Hannah's Favourite Place*, the character emphasises the importance of using ones imagination and being happy. By discussing this, the lesson will be remembered by the young reader.

- Talk about your favourite places and draw them

This goal extends upon the previous goal, by asking the children to describe their favourite place. This relates the moral and theme of the story to the child on an emotional level (Norton, 2011), whilst creating a connection between the storyline and the real world (Zeece, 2009). In turn, by getting the child to draw their favourite place, the goal is encouraging 'learning by doing' (Silverman, 2006) as well as promoting creativity and motor skills.

- Imagine what your favourite place could be

By encouraging children to imagine would their favourite place could be, parents are encouraging creativity, deeper thought, and an overall understanding of the storyline at a deeper level. This allows a connection to be made between the story and the real world (Zeece, 2009) as well as promoting creativity. This is an example of how one simple activity can

promote much broader learning opportunities, moving the shared reading session from being mainly literacy-based to having a wider context.

For the purpose of this study, all families were asked to complete the first goal by finding the cake or cupcake hidden on each page. This was due to the fact that this goal was appropriate for all age and reading level types within the participant sample.

#### 4.4 Participant Sample

Participants were found through personal contacts within the community or referrals. The participant sample included seven families, each with children between the ages of four and seven. *Table 5* details the sample:

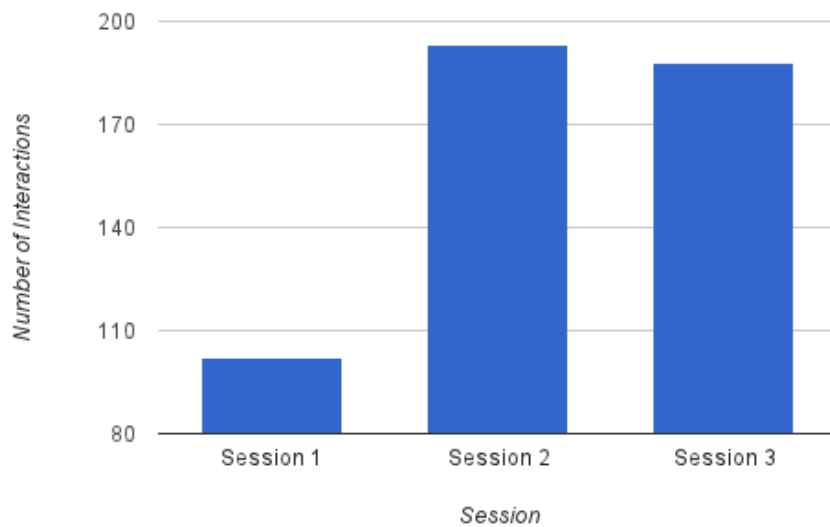
ID	1	2	3	4	5	6	7
AGE	5	4	4	6	6	4	4
CHILD	M	M	M	F	M	M	F
PARENT	F	F	F	F	F	F	F

**Table 5: Participant Sample - interactive, adaptive children's books**

## 4.5 Results

I discuss here the results of the three observation and interview sessions, broken down according to Family.

### 4.5.1 Family 1



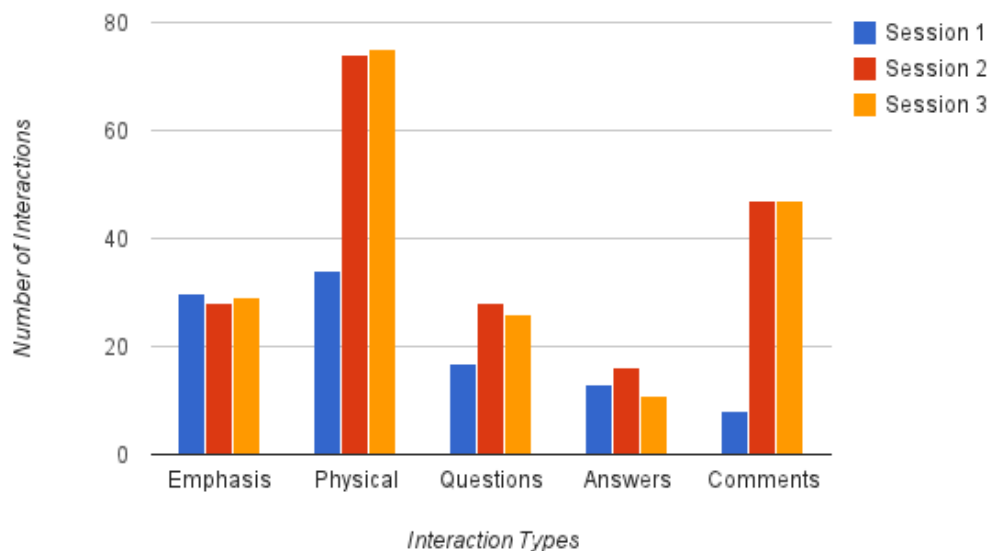
**Figure 6: Total Interactions over all three Sessions – Family 1**

During the interview process, it was found that Family 1 participates in shared reading on a daily basis, with the parent actively seeking out aspects within books to “keep him listening... keep him engaged”. This shared reading practice was demonstrated in the control book in Session 1, with 102 interactions noted in total – 45 of these driven by the parent, and 57 by the child. However, as seen in *Figure 6*, this number of interactions was significantly lower than those noted in both Session 2 and 3, which saw 193 and 188 interactions undertaken respectively.

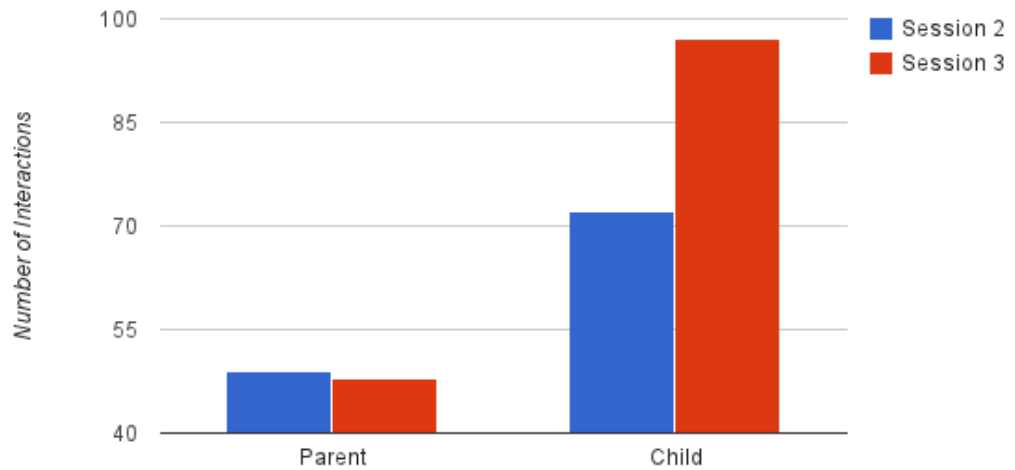
As seen in *Figure 6*, the total number of interactions in Session 2 was 193. Of these interactions, 129 were driven by the design features of the book. Furthermore, 49 of these interactions were undertaken by the parent, and

72 by the child (see Figure 8). This shows not only a significant increase in interaction, but an increase in interaction and engagement from the child. In Session 3, 188 interactions were noted (Figure 6). 145 of the interactions in Session 3 were driven by features of the book. 48 of these interactions were completed by the parent, whilst 97 were completed by the child (see Figure 8). Whilst the child participated in a greater number of book-driven interactions over both Session 2 and 3, the difference between the number of interactions that the child and parent undertook was far greater in Session 3.

As seen in *Figure 7*, the interactions that took place in all three Sessions were spread over all five categories. The most significant increase in interaction type was seen within both physical interactions and comments. These interactions jumped from 34 physical interactions and 8 comments in the first session, to 74 and 75 physical interactions in the second and third sessions, and 47 comments in both the second and third sessions.

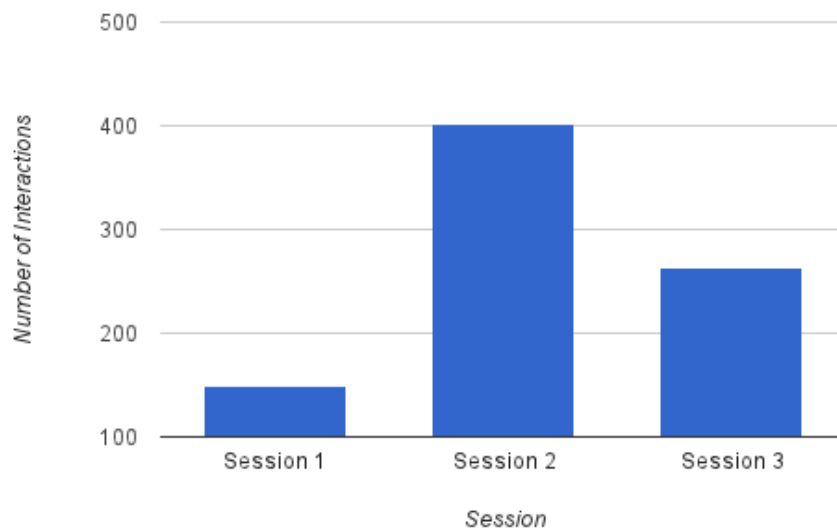


**Figure 7: Family 1 – breakdown over all three observation sessions**



**Figure 8: Family 1 - A comparison of book driven interactions, session 2 and 3.**

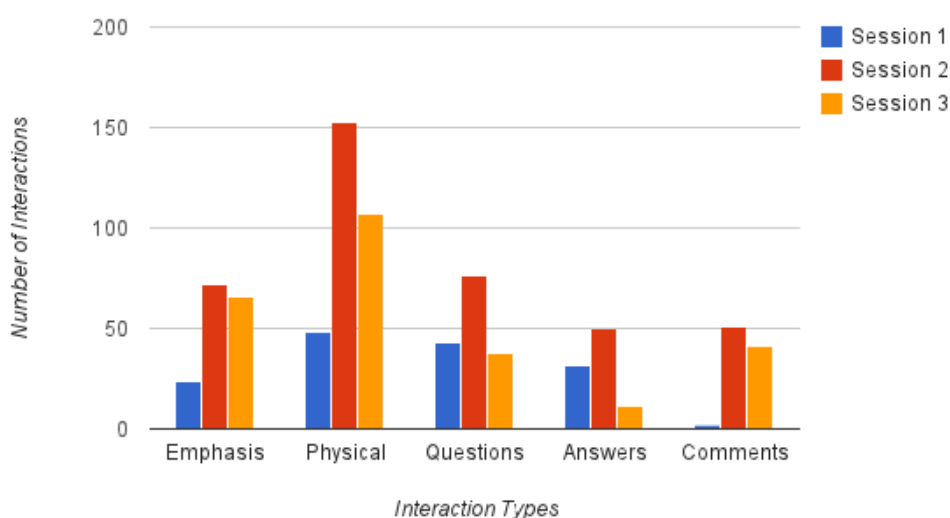
#### 4.5.2 Family 2



**Figure 9: Family 2 - Total Interactions over all three sessions**

The parent of Family 2 was the only parent to dislike the picture book in Session 1. When questioned as to why she did not like the book, she said it was due to the structure of the text and the made up word (glubmupkin). This demonstrates that it is impossible to create a book that is universally loved by all, and that personal preference and opinion will always dictate

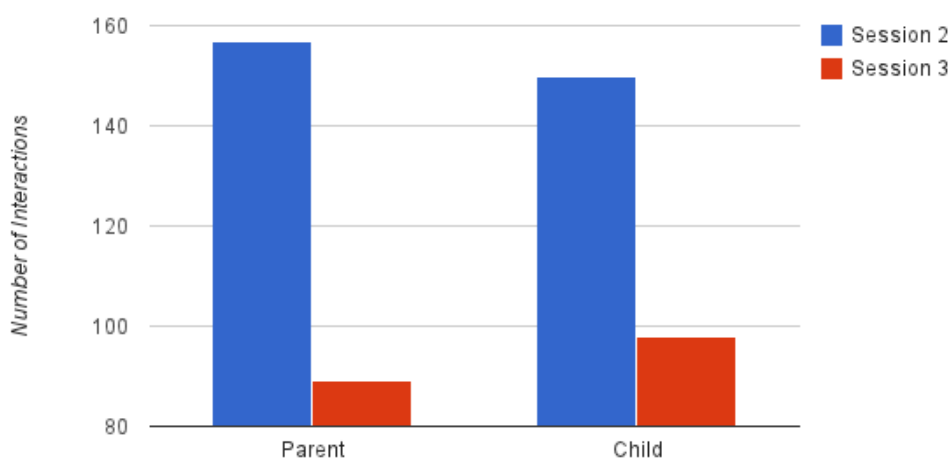
how parents react towards picture books. Even though the parent admitted to not enjoying the book, a total of 149 interactions still took place – with 82 being driven by the parent and 67 by the child. However, as seen in *Figure 9*, this total number of interactions was significantly less than the number of interactions seen in both Session 2 and Session 3, which saw 402 interactions and 263 interactions take place.



**Figure 10: Family 2 - breakdown of interactions over all three sessions**

Of the 402 total interactions observed in Session 2, 307 of these were driven by the features of the book. Session 2 saw more interactions take place in all 5 categories than both the other Sessions (see Figure 10), with 194 of the interactions driven by the child, and 208 by the parent. It was interesting to note that the parent drew on the additional feature of the tactile alphabet to create a learning opportunity. When asked why this was, the parent stated it was because they “love the alphabet”. Due to this, 111 of the total interactions were classified as intellectual interactions according to the observation table as seen in the methodology (see Table 4). The parent actively sort out a learning opportunity, again demonstrating that parents who participate in engaging shared reading practices will always find elements to draw upon and emphasise within picture books (refer to Background Study, Chapter 3).

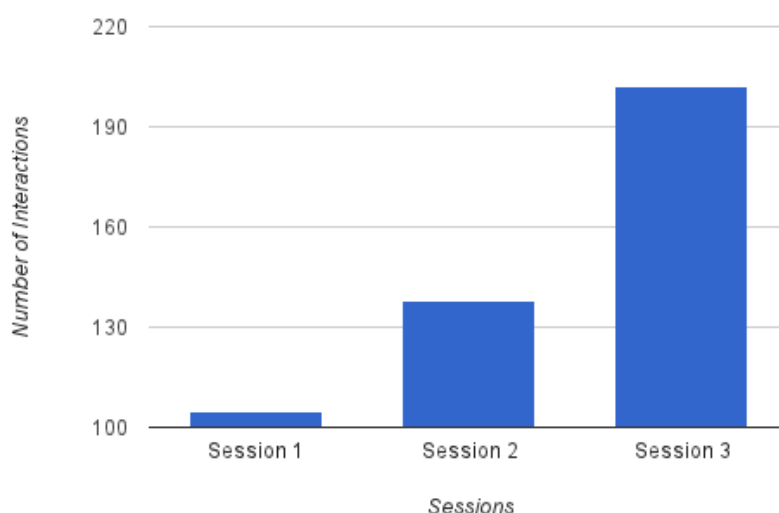
Session 3 noted 263 interactions in total, 187 of which were driven by the features of the book itself. When asked of her opinion of the goal-based reading session, the parent stated that it allowed you to keep “on track with story, [you’re] not getting distracted by everything”. This enables an understanding of why Session 2 had such a significant difference in number of interactions for Family 2. This shows that all families participate in shared reading differently, and that for Family 2, having ‘goals’ throughout the reading Session helps to keep both parent and child more actively engaged in the storyline, rather than being overwhelmed by all elements within the book. This is seen in *Figure 11*, where the number of book driven interactions that the child undertakes was higher than that of the parent – 98 interactions undertaken by the child, and 89 interactions undertaken by the parent. Consequently, even though the total number of interactions in Session 3 is less than that of Session 2, for the first time over all three sessions, the child was more actively engaged in the shared reading session. It is this higher level of engagement and interaction from the child that promotes further learning opportunities, and allows a transition between *interaction-promoting behaviors* and *child-oriented behaviors* (Ezell & Justice, 2005).



**Figure 11: Family 2 - A comparison of book driven interactions, session 2 and 3**



### 4.5.3 Family 3

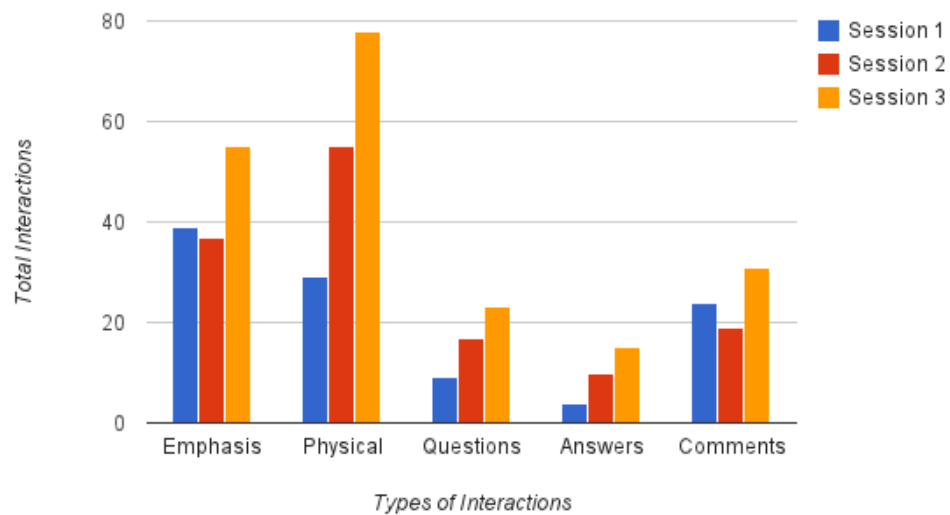


**Figure 12: Family 3 – Total interactions over all three observation sessions**

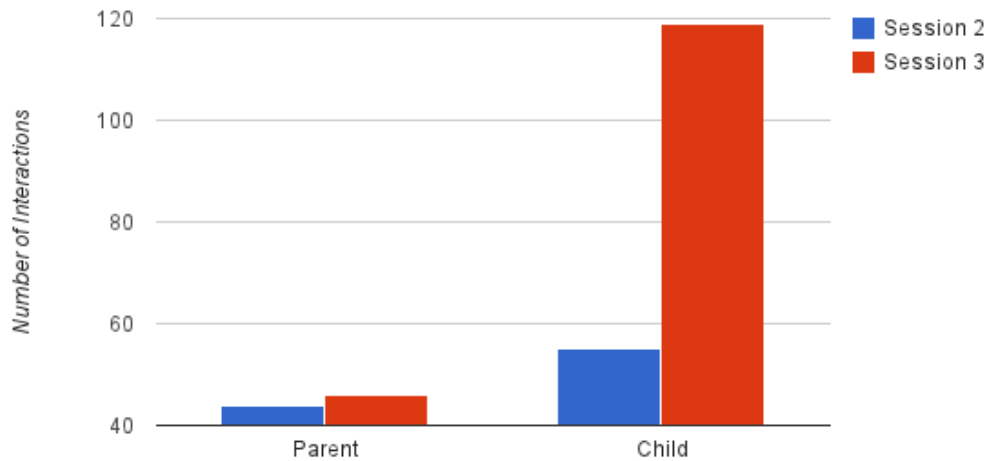
The total number of interactions observed over the reading Sessions increased steadily for Family 3, as seen in Figure 12. Session 1 noted 105 total observations, with 58 undertaken by the parent and 47 undertaken by the child. Session 2 noted 138 total interactions, whilst Session 3 noted 202 total interactions.

Out of the 138 total interactions noted in Session 2, 99 of these were driven by design features of the book. Of this 99, 44 interactions were conducted by the parent, and 55 by the child (see Figure 14). Instances of physical interaction increased significantly between Session 1 and 2 (see Figure 13). This increase moved from 55 total interactions, to 78 interactions. When asked why the parent encouraged the child to touch and turn the pages, they stated that the practice “stimulates the brain and encourages him to explore”. This demonstrates the Parent 3’s understanding of the importance of touch in the learning process (Silverman, 2006). By encouraging such interactions, the child became more engaged in the shared reading activity.

Session 3 saw a total of 202 interactions take place (see Figure 12), with 165 of these interactions driven by the design features of the book. Of these 165 book driven interactions, 46 were conducted by the parent, and 119 were conducted by the child. As seen in Figure 12, Session 3 noted the highest number of interactions over all five categories. This consistently higher interaction level demonstrates that having a specific focus or goal within a shared readings session promotes further engagement from both parent and child in the case of Family 3.



**Figure 13: Family 3 - breakdown of interactions over all three sessions**

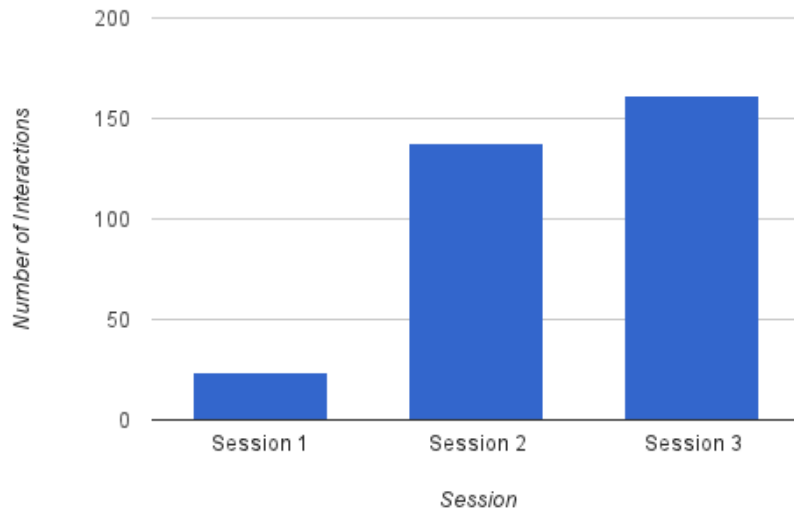


**Figure 14: Family 3 - A comparison of book driven interactions, session 2 and 3**

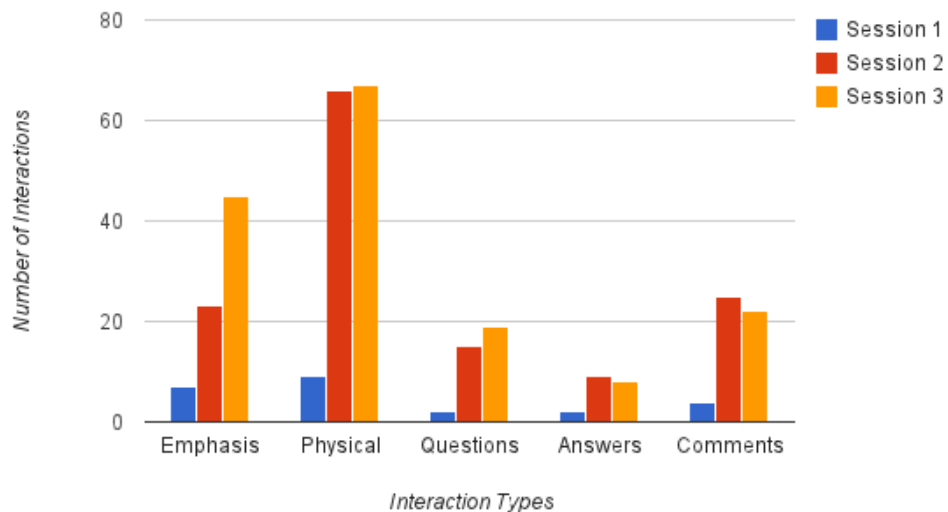
Whilst the child of Family 3 participated in more book driven activities than the parent in both Session 2 and 3, there was a significant increase in child interaction in Session 3 (see Figure 14). This increased from 55 total book driven interactions to 119 total book driven interactions. This shows that, for Family 3, having a goal based reading Session promotes a significant increase in further engagement from the child, and encourages child-oriented behaviors (Ezell & Justice, 2005).

#### **4.5.4 Family 4**

Family four included one of the oldest children in the study – 6 years. During the initial interview, the mother stated that shared reading only occurs between the pair twice a week, however the child undertakes independent reading on a daily basis. Throughout all three reading sessions, both mother and daughter took turns to read through the text.



**Figure 15: Family 4 – Total interactions over all three observation sessions**



**Figure 16: Family 4 - breakdown of interactions over all three sessions**

In Session 1, there were 24 interactions in total, with 15 of these undertaken by the parent, and nine by the child. Both Session 2 and 3 saw a large increase in interaction, from both parent and child (see Figure 15). This is significant due to the fact that the pair rarely participates in shared reading in the home setting. This demonstrates that effective shared reading practices continue to be beneficial for children through their higher levels of reading and development. Within Session 2, 138 interactions

were observed, 101 of these which were driven by the features of the book itself. Session three saw a further increase in interactions, with 161 interactions occurring in total . 127 of the interactions observed in Session 3 were driven purely by the design features of the book.

Of the 101 book driven interactions observed in Session 2, 29 interactions were conducted by the parent and 72 by the child (see *Figure 17*). Whilst all categories of interaction increased, the most notable would be that of the physical interaction, which jumped from 9 total interactions to 66 (see *Figure 16*). A large majority of these physical interactions were conducted by the parent, who wanted to “point things out if they [were] wrong”. These ‘wrong’ aspects related to literacy issues, as the child read through the majority of the book herself.

Of the 127 book driven interactions observed in Session three, 35 of these were undertaken by the parent, and 92 by the child (see *Figure 17*). Whilst the majority of the interaction types observed remained relatively consistent compared to the second session, ‘emphasis’ interactions increased significantly from 23 to 45 (see *Figure 16*). This was due to the parent of Family 4 turning the goal-based reading session into a game – giving hints, and promoting competition between the two. The emphasis interactions included “I’ve found it” and “look over there!” as both parent and child strove to ‘win’ and find the cupcake first. When asked for her opinion on this adaptive feature, the parent stated that “it’s good as it teaches children to set goals. It’s not too high pressured, so [the child gains] the satisfaction of achieving the goal”. This demonstrates that an adaptive, interactive book such as *Hannah’s Favourite Place* has the ability to teach ‘real-life lessons’, as described by Zeece (2009).

Figure 17 demonstrates a shift in level of interaction between parent and child. Whilst in Session two the parent conducted more book-driven activities – 101 versus the child’s 72 – Session three saw the shared reading Session driven in majority by the child – 92 interactions from the child, versus 35 from the parent. This shows a change within the shared

reading practice from *interaction-promoting behaviors* to *child-oriented behaviors* (Ezell & Justice, 2005).

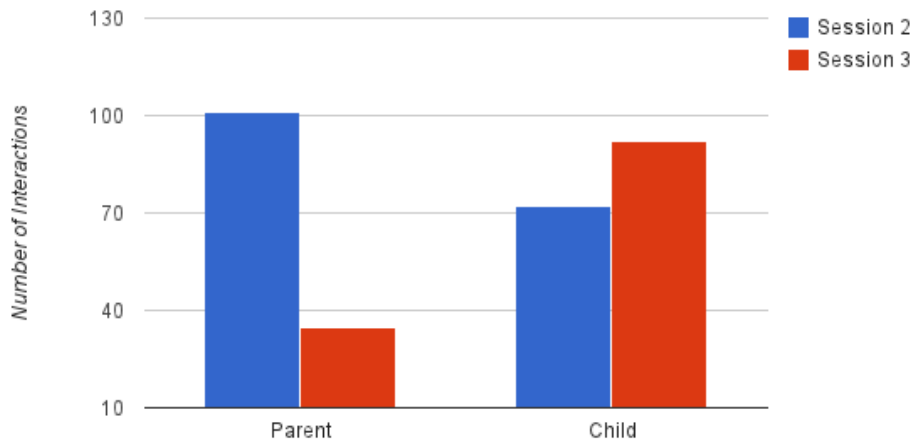


Figure 17: Family 4 - A comparison of book driven interactions, session 2 and 3

#### 4.5.5 Family 5

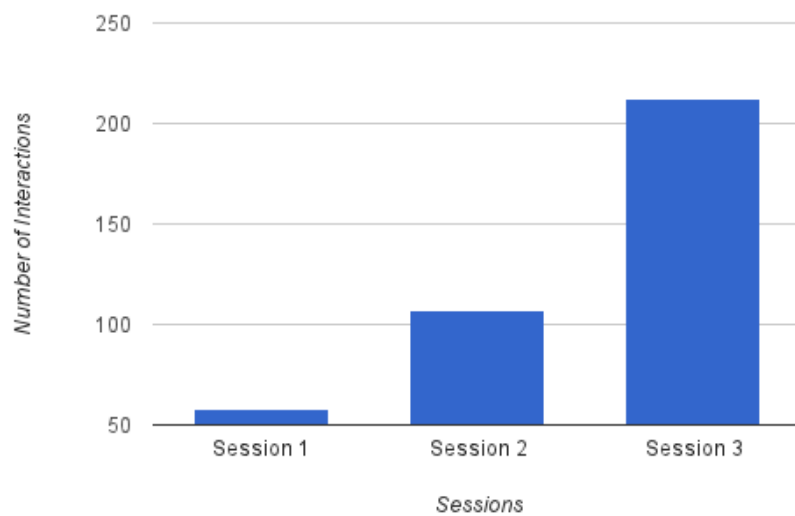
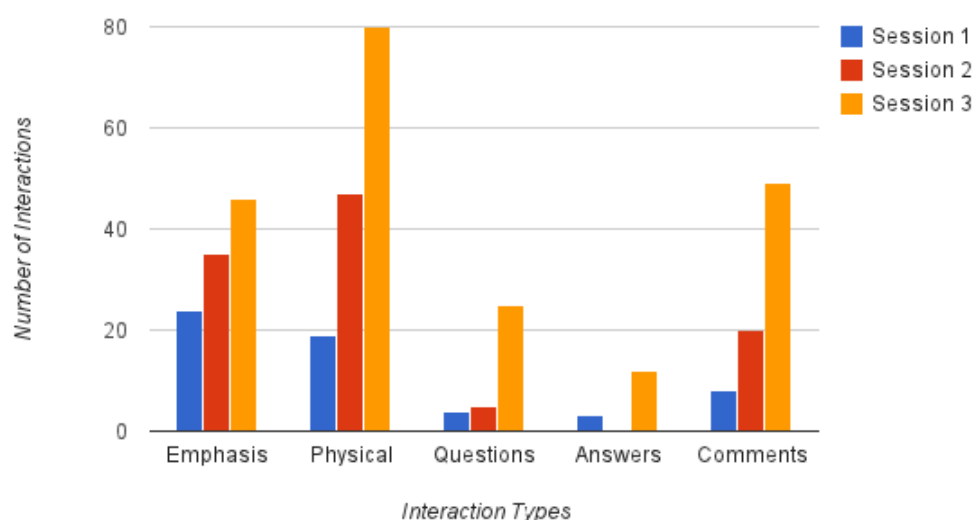


Figure 18: Family 5 – Total interactions over all three observation sessions

During the interview process, it was found that Family 5 treats shared reading as a “social interaction as well as an interaction with the book.” Consequently, both parent and child are used to participating equally in shared reading, and each interacted 29 times to add to a total of 58 interactions throughout Session 1. Session 2 saw this total almost double to 107, and Session 3 saw a total of 212 interactions (see Figure 18). Consequently, even though the parent already utilizes a range of shared reading practices, (such as those described by Ezell and Justice), this demonstrates that the features of the book itself can enable these behaviours to be taken to a new level, allowing further learning opportunities.



**Figure 19: Family 5 - breakdown of interactions over all three sessions**

Session 2 saw a total of 107 interactions take place, 80 of which were driven by features of the book. Of these 80 interactions, 48 were undertaken by the parent, and 32 by the child (see Figure 20). When looking at the breakdown of these interactions, all categories increased apart from answers – which dropped to zero (see Figure 19). A reason for this simply could have been the quality of questions that the parent asked,

and the child's unwillingness to answer questions that he felt either did not require an answer or did not deserve one.

Session 3 saw a total of 212 interactions take place, 177 of which were driven by the design features of the book. Of these 177, 68 interactions were conducted by the parent, and 109 by the child (see Figure 20). Whilst Session 3 saw a higher number of interactions over all 5 categories, the most significant increases were that of physical interactions, questions and comments (see Figure 19).

53 of the 80 physical interactions and 22 of the 24 questions noted were directly related to the intellectual adaptive feature – the searching for the cupcake. This shows the increased level of interaction that can be promoted by including a 'goal based' practice within a shared reading Session. Whilst 17 of the 49 comments were based on the cupcake feature, the remainder of the comments included general banter between parent and child. This shows that effective children's books can promote social interaction, and hence lead to a broad range of learning opportunities, as discussed by Freedman-DeVito (2004).

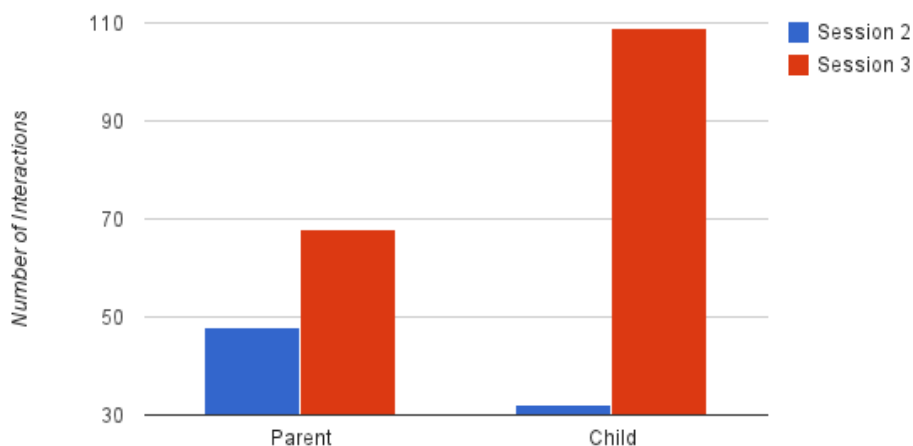
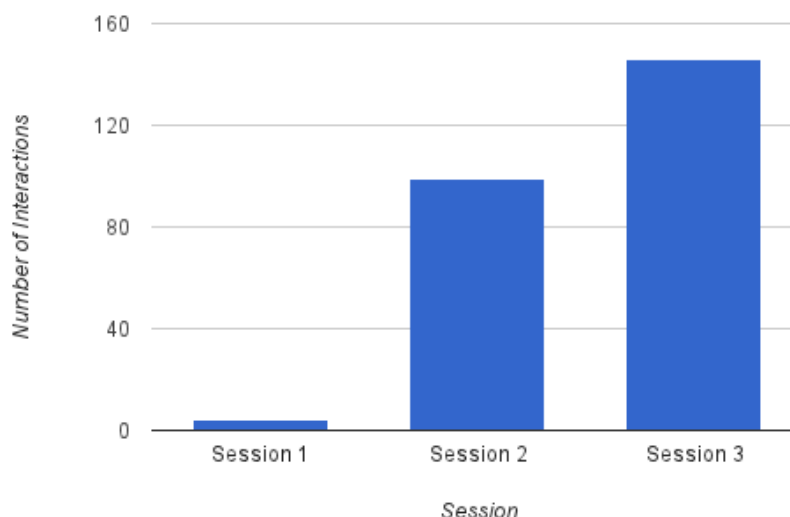


Figure 20 : Family 5 - A comparison of book driven interactions, session 2 and 3



Whilst Session 3 demonstrated a large increase in total interactions, it is interesting to note the drastic increase in the child's total book-driven interactions. As seen in Figure 20, this number increases from 32 to 109 total book-driven interactions. This number is also significantly higher than that of the parent – who participated in book driven interactions 68 times within Session 3.

#### 4.5.6 Family 6



**Figure 21: Family 6 – Total interactions over all three observation sessions**

The observations of Family 6 saw one of the most drastic increases in interaction between the three Sessions, with numbers increasing from 4 interactions to 99 and 146 respectively (see Figure 21).

Session 1 saw a total of 4 interactions take place, all of which were driven by the parent. All 4 interactions were noted as the use of emphasis of one word (see Figure 22). When asked why it was read in such a way, the parent stated that she “[didn’t] want him to lose interest”.

Both Session 2 and 3 saw an increase in total number of interactions as well as interaction type used. In Session 2, all interaction types were utilised (see Figure 22), with 99 interactions in total. Of this, 83 of these were driven by the features of the book, with 52 of these interactions undertaken by the child and 31 undertaken by the parent. It is interesting to note that previously the child had not initiated any interactions with the book or the reader, and the interactive version of *Hannah's Favourite Place* saw the child engaged at a high level. When asked of her opinion of the interactive version of *Hannah's Favourite Place*, the parent stated that "the interactive elements sometimes got in the way, [but] he liked it better." Consequently, even though the level of engagement was increased, and she admitted to the book being preferred by her child, she did not see the interactive elements as a positive addition.

As seen in Figure 22, in Session 3, all interaction types were utilised, with 146 interactions noted in total. Of these, 131 were book driven interactions, with 76 undertaken by the child and 55 undertaken by the parent (see Figure 23). Session 3 demonstrated the highest number of interactions over all categories, barring answers. In the case of Family 6, questions such as, "where's the cupcake?" were used by the parent as a prompt for further interaction. Consequently, the answers section is smaller than that of the questions, as the child responded by searching for the cupcake and undertaking the intellectual activity rather than answering the parent directly.

When asked of her opinion of the book after Session 3, the parent again had a generally negative reaction, stating that the 'goal based' reading session "takes away from the general reading of the book. Children won't be able to remember what happens. Felt pointless reading as he knows he has to find the cupcake." Even though both the parent and the child were more engaged with the book, the parent's differing views on shared reading practices means that the 'effectiveness' in which she gauges the reading session is based on how quickly the book is read, rather than the overall engagement or interaction. Figure 23 shows the extent of the

engagement – for both parent and child. Both parties increase their total number of book driven interactions by 24 interactions. It could be argued that, whilst the parent may not have enjoyed the book or understood the benefits of such an activity, both parent and child benefited from the shared reading session.

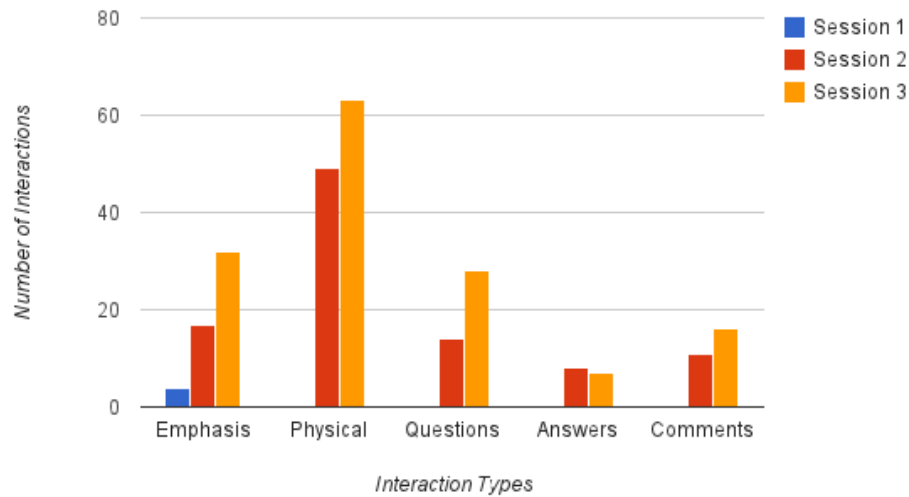


Figure 22: Family 6 - breakdown of interactions over all three sessions

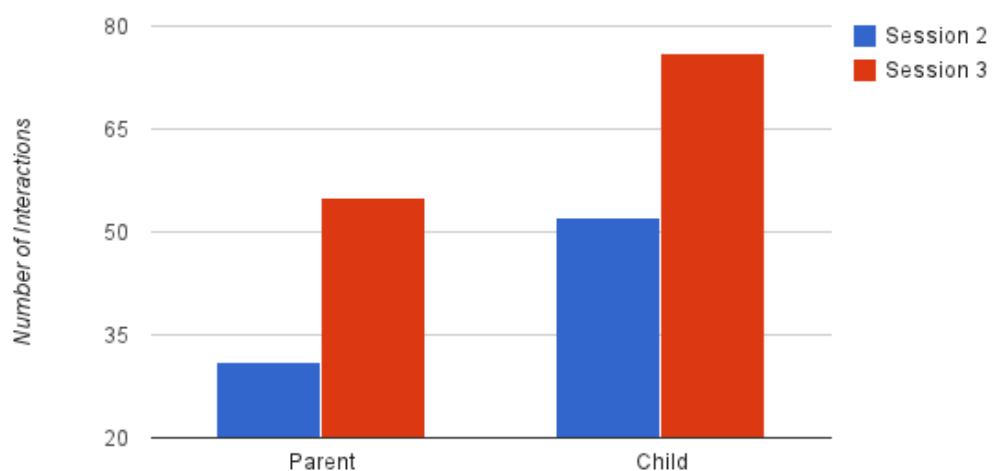
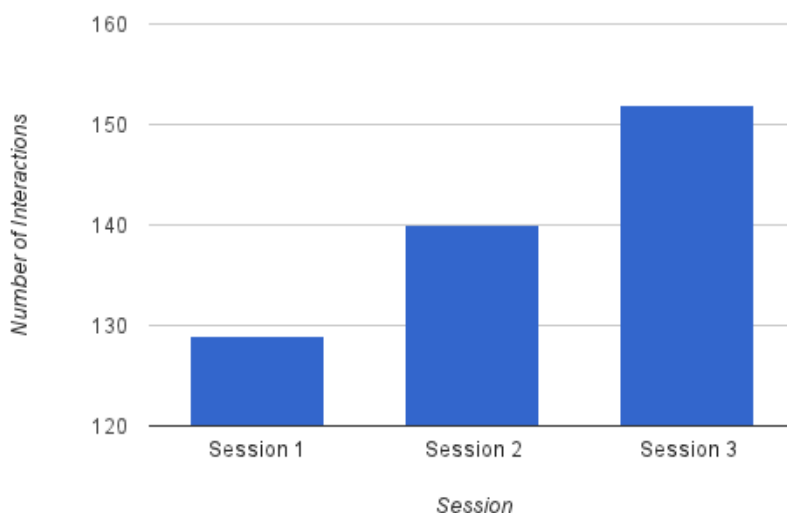


Figure 23: Family 6 - A comparison of book driven interactions, session 2 and 3

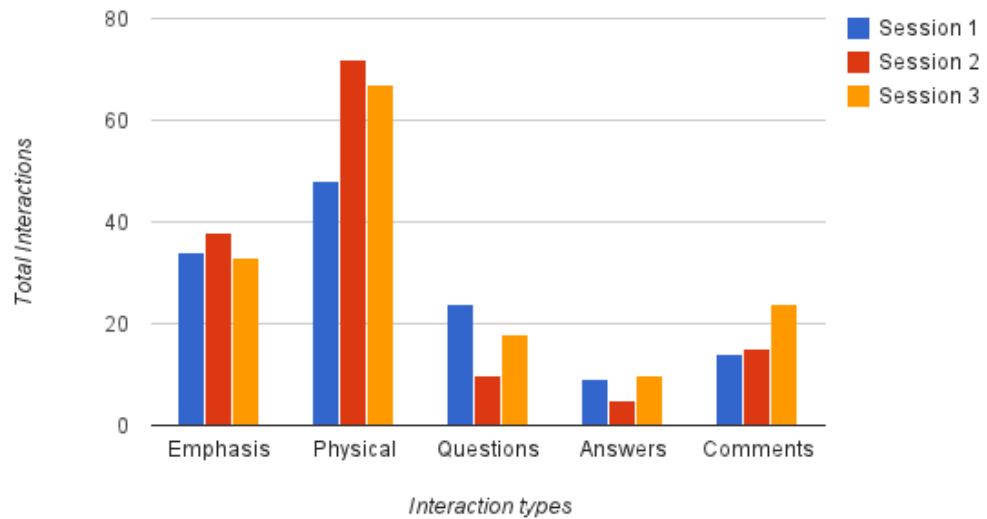
### 4.5.7 Family 7



**Figure 24: Family 7 – Total interactions over all three observation sessions**

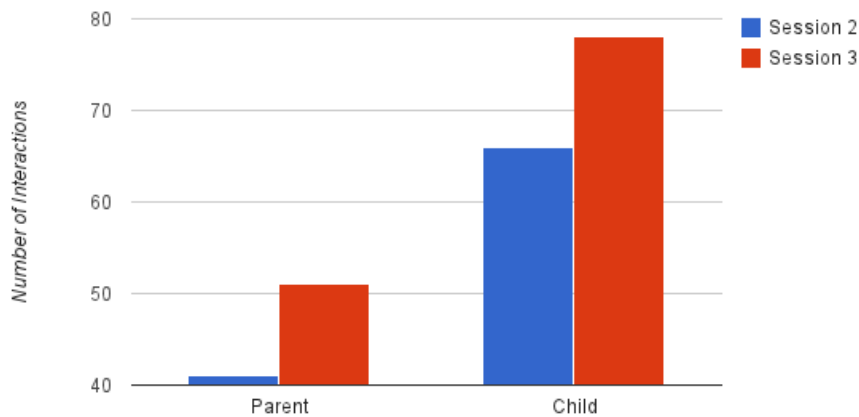
The three observation sessions for Family 7 saw a steady increase in total number of interactions - from 129 interactions in the first session to 140 in the second, then 152 in the third (see Figure 24). The first session saw the parent undertake 92 interactions, and the child undertake 37 interactions. As seen in Figure 33, the number of question and answer interactions was higher in Session 1 than in any other session. When asked why so many questions were asked, the parent stated that she “wanted to make sure she’s paying attention, being aware [and] learning”.

Session 2 saw a total of 140 interactions (see Figure 24), 107 of which were driven by design features of the book. Of these 107 interactions, the parent undertook 41 interactions, and the child undertook 66 interactions. The most significant increase in interaction type was seen in the form of physical interactions, which jumped from 42 total interactions to 72 interactions (see Figure 25). 51 of these 72 interactions were undertaken by the child, demonstrating how the addition of physical interactive features promotes tactile, ‘hands on’ learning (Silverman, 2006).



**Figure 25: Family 7 - breakdown of interactions over all three sessions**

Session 3 saw a total of 152 interactions take place, of which 129 were driven by design features of the book itself. The parent was observed undertaking 51 of these interactions, whilst the child undertook 78 (see Figure 26). When asked the opinion of the adaptive, goal based feature, the parent stated that the cupcake “makes the words less relevant, but keeps them engaged. You could read through the book and then do the activity”. Consequently, whilst the parent acknowledges that additional features in a picture book could prove to be distracting, they also understood that it is up to the parent to direct the behavior of the child, and keep the reading session on track. It is this understanding of the importance and benefits of shared reading that allow Family 7 to participate in effective shared reading sessions.



**Figure 26: Family 7 - A comparison of book driven interactions, Session 2 and 3**

Figure 26 shows that both parent and child increased their total number of book-driven interactions undertaken in Session 3. The fact that both parties increased their total interactions by a significant number – 10 interactions for the parent, and 12 for the child – demonstrates that shared reading sessions need to work as a partnership. As Goodwin discusses, the parent acts as mediator (Goodwin, 2008), and hence the more effort they are willing to put into the session, the more beneficial it is for the child.

## **4.6 Summary of Section**

Whilst the demographic of the participants was varied, many comparisons can be seen within the different observation sessions. Five of the seven families that participated in the study increased their total number of interactions with each session. This meant that a steady progression was seen from the first session to the last. This was seen with families 3,4,5,6, and 7. This shows that the physical and intellectual enhancements of the book promote more interaction from both parent and child, and allow young readers to become more engaged in the literary experience and gain more from the book (Vanderschantz & Timpany, 2013).

As discussed by Silverman (2006), children have a tendency to 'learn through doing'. Consequently physical interaction and 'touch' is important within the shared reading and learning environment. An interactive book that encourages this practice leads to further engagement from the child and a significant increase in interaction. The increase in comments demonstrates the need for a child to relate the story to the 'real world' as a form of emotional growth and attachment, as discussed earlier (Goodwin, 2008 and Norton, 2011). Comments such as "I have my favourite place now", from the child of Family 1, demonstrate how physically and intellectually interactive books can provide further engagement in the story, and hence the possibility for emotional understanding and growth (Zeece, 2009).

As children grow and develop their reading skills it is important to encourage further learning opportunities. Family 4 demonstrated how shared reading with older children can promote *language-modeling behaviors* (Ezell & Justice, 2005), and encourage continued learning of reading and literacy in the home environment. Whilst this Family stated that they did not often participate in shared reading in the home environment, the interactions noted, as well as the increase of interactions during the second and third sessions, prove that shared reading is a practice that evolves according to the age and stage of the child. Consequently it is important that independent readers continue to be supported through books such as the interactive, adaptive version of *Hannah's Favourite Place*.

Five of the families of the study utilised all five interaction types over all three sessions. This shows that parents who regularly engage in effective shared reading practices will find aspects of all books to engage their children in. Family 7 was a prime example of this. The parent asked a wide range of questions in order to ensure that the child was actively involved. Consequently Parent 7 effectively utilised *Interaction Promoting Behaviors* (Ezell & Justice, 2005) in order to keep the child engaged with the picture book.

As seen in the background study (see Chapter 3), it is the parents who do not engage in these practices that must be further catered for. Parents need to be encouraged to take part in 'responsive behaviors' to promote interaction, literacy development, and child driven interactions (Ezell & Justice, 2005). In turn, it is important to understand that the three 'responsiveness' behaviors need to be used correctly in order to encourage interaction and engagement within the shared reading environment. Consequently, asking "is that cool?" was not enough to provide stimulation for further thought and interaction in the case of Session 2 with Family 5. All parents need to be provided with a form of support in order to ensure that shared reading is being undertaken effectively in the home environment.

Perhaps the most interesting and impacting observation noted was the increase in book-driven interactions undertaken by the children in Session 3. This occurred across the board, with all children of the study displaying a higher number of book driven interactions in Session 3 versus Session 2. This demonstrates that the inclusion of a goal within the shared reading session allows for a transition between *interaction-promoting behaviors* and *child-oriented behaviors* (Ezell & Justice, 2005). Consequently it is the addition of both physical and intellectual enhancements within the book that promote the highest level of engagement and interactions.

The comparison of the families over all observation sessions allowed the successes and downfalls of the both versions of *Hannah's Favourite Place* to be analysed closely. From this comparison, conclusions can be drawn about future designs for effective children's books that support shared reading practices.



## 5 Discussion

This section compares the results of all seven families and draws conclusions related to shared reading, and the use of interactive, adaptive children's books.

### 5.1.1 Comparison of all three Sessions

General conclusions can be drawn from the comparison of all seven families over the three observation Sessions.

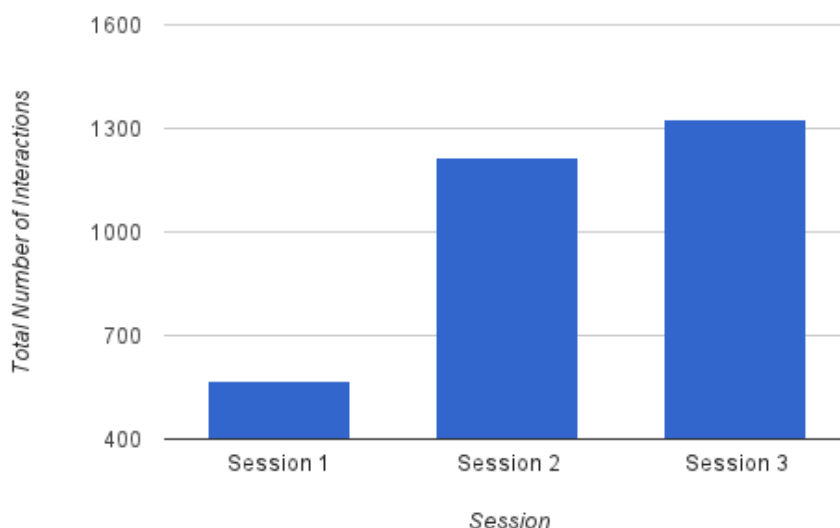
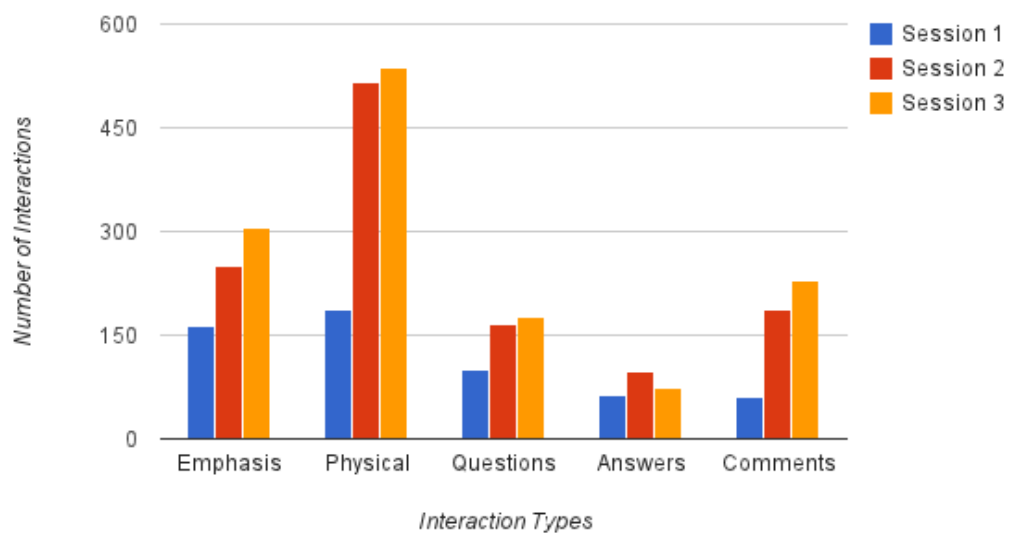


Figure 27: Total number of interactions per session – all families combined.

The total number of interactions noted per observation increased with each Session. Session 1 noted 571 total interactions, Session 2 noted 1217 interactions, and Session 3 noted 1324 interactions (see Figure 27). The increase between Session 1 and 2 was the most significant, and can directly be attributed to the physical and intellectual enhancements of the adaptive, interactive version of *Hannah's Favourite Place*. The picture book version was designed to include elements that are considered to be essential to an effective children's picture book. These include an

appropriate storyline and language (Goodwin, 2008), rhythm and drive within the text (Freedman-DeVito, 2004) and imagery that supports the story (Hall & Hall, 1990), whilst relating to the real world (Zeece, 2009). The interactive, adaptive version of *Hannah's Favourite Place* utilises these same design features as it contains the same storyline and illustrations. However, the physical and intellectual enhancements allow for additional interaction to take place. These physical and intellectual enhancements promote further *responsive behaviors* (Ezell & Justice, 2005) from the parents and the children.



**Figure 28: Total Interactions that occurred over all three observation Sessions**

Whilst there was an overall increase in total number of interactions over the three sessions, it is interesting to note where these increases were most significant, and which interactions were lacking (see Figure 28).

The occurrence of physical interactions was the most significant increase, jumping from 187 total physical interactions in the first Session to 516 in the second and 537 in the third (see Figure 28). This increase in physical interactions can be attributed to Silverman's (2006) discussion of the importance of 'touch' within the learning environment. The tactile and 3D qualities of the physical enhancements within *Hannah's Favourite Place*

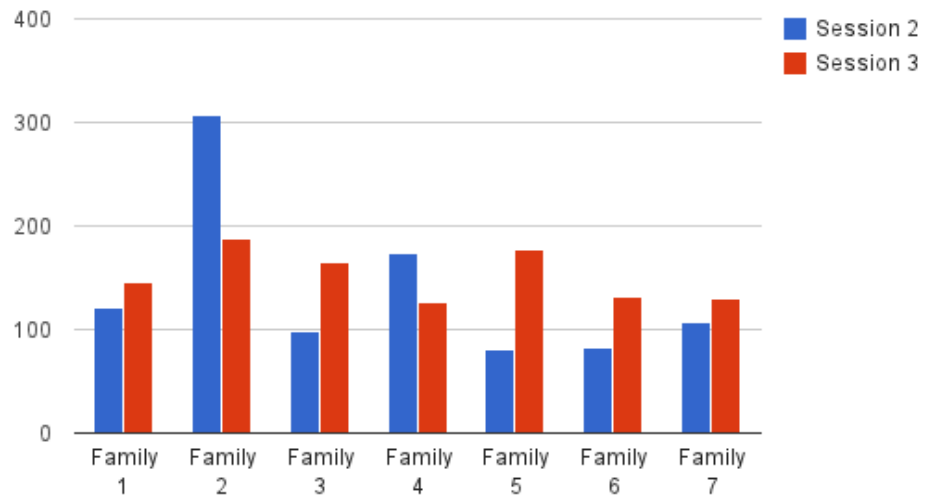
encourage children to physically interact with the page. This in turn teaches them about textures, cause and effect, and encourages them to look closer and critically engage with the story and mechanics of the enhancement itself (Zeece, 2009).

Whilst the occurrence of comments was not particularly high when compared to physical interactions, the increase in comments between sessions is significant. It was noted that there was an increase of 128 interactions between the first and second observations – from 60 comments noted to 188 – then a further increase within the third session to 230 comments in total (see Figure 28). This increase in comments demonstrates how the inclusion of physical and intellectual enhancements can allow the book to become more relevant to the child and the ‘real world’. This was seen with all families when discussing the ‘hidden cupcake’. The families used this feature to discuss food, taste, nutrition and appropriate times to eat cupcakes. This feature allows children “identify and emotionally engage” (Goodwin, 2008, p.29) with the story as well as the shared reader, in turn allowing them to become involved in the narrative and have an active desire to discover the outcome (Norton, 2011). Consequently the inclusion of such features encourages the reading partners to make connections between the book and the real world, in turn enriching the learning experience.

Emphasis interactions were observed steadily increasing over the three observation sessions, with 162 emphasis interactions noted in the first session, then 250 and 306 in the second and third sessions (see Figure 28). This increase in emphasis interaction demonstrates a dramatic increase in *Child-Oriented* and *Interaction-Promoting Behaviors* (Ezell & Justice, 2005). The physical and intellectual enhancements within the interactive, adaptive version of *Hannah’s Favourite Place* encouraged both parents and children to point out features, ask questions, and to make further connections between the storyline, illustrations and enhancements on the page. Consequently, the families were more engaged in the literary

experience, meaning that the child could gain more from the shared reading session (Vanderschantz & Timpany, 2013).

*Questions and Answers* were the interaction types that occurred least often, with the total number of *Answers* even decreasing in Session 3 (see Figure 28). Over both Session 2 and 3 it was noted that there was a tendency for parents to either repeat questions or re-word a question previously asked. This meant that if the child did answer, they were essentially answering multiple questions with the one response. In addition, the *goal based* reading session in Session 3, saw many parents asking questions such as “can you see the cupcake?” or “where’s the cupcake?”. This often resulted in the child either not responding to the parent - as they continued to search for the cupcake - or responding physically by pointing to the cupcake. Whilst these observations give an understanding of why there are fluctuations in the total number of *Question* and *Answer* interactions, these interaction types are still significantly less than the other interaction types observed. Consequently, it would be interesting to see how families responded to the book in a fourth reading session or when focusing on the ‘question based’ goal. In order to encourage *Question and Answer* interactions, the book must provide a range of suitable questions or topics. This could include focusing on broad ideas such as, colours, shapes or numbers, and encouraging parents to ask a new question on each page based on these topics. Whilst a simple solution would be to include questions typed on the page, this would not provide room for further growth or adaptability. Consequently, it is important to balance the inclusion of interactive and adaptive features in order to ensure that the book is able to provide a high level of engagement and educational possibilities over a long period of time.



**Figure 29: Comparison of book driven interactions per Family – Session 2 and 3.**

When comparing the book-driven interactions of Session 2 and 3, five of the seven families showed an increase of interaction in Session 3 (see Figure 29). The inclusion of the ‘search and find’ cupcake feature prompted the parents and children to focus on one specific task within the session. Rather than limit the number of interactions, this *goal-based* reading session prompted higher total book driven interactions, as the children and parents interacted with each other and the book in order to reach the common goal. It is important to note that all children of the study displayed a higher number of book driven interactions in Session 3 versus Session 2. This demonstrates that the inclusion of a goal within the shared reading session allows for a transition between *interaction-promoting behaviors* and *child-oriented behaviors* (Ezell & Justice, 2005). Consequently it is the addition of both physical and intellectual enhancements within the book that promote the highest level of engagement and interactions.

Of the two families that showed a decrease in book driven interactions, the reasons for the decrease were justified by the parents within the interview Sessions. For Family 2, the difference in total number of interactions was driven by the fact that there were simply too many options and features for the parent to comprehend. The parent was utilising *interaction-promoting*

behaviors to a high degree, however this was at such a high level that the story was lost within the interactions. When asked of the opinion of the goal-based reading session, Parent 2 stated that the feature allowed you to keep “on track with story, [you’re] not getting distracted by everything”. Consequently, even though the overall number of book-driven interactions for Session 3 was less than Session 2 for Family 2, the shared reading practice undertaken is deemed more successful. This shows that all families participate in shared reading differently, and that for Family 2, having ‘goals’ throughout the reading session helps to keep both parent and child more actively engaged in the storyline, rather than being overwhelmed by all elements within the book.

The child of Family 4 was a proficient reader, and consequently a large proportion of the shared reading was undertaken by her. The second Session noted a higher number of interactions than that of Session 3, however this was due to the parent wanting the child to “slow down and appreciate” the book as a whole, rather than rush through the text. As often happens with young readers, the excitement of being able to read the text themselves encourages ‘speed reading’. The increased number of book driven interactions in Session 2 simply shows the parent utilising a range of *interaction promoting* and *language modelling behaviors* (Ezell & Justice, 2005) in order to ensure that the child gained more from the reading session in general. Consequently this demonstrates effective shared reading practice, rather than a decrease in book driven interactions driven by the design features of the book.

### **5.1.2 First Observation**

Session 1 was the first time that the families had seen and read *Hannah’s Favourite Place*. Consequently, their first impressions of the text and illustrations could be taken into account to evaluate the effectiveness of the picture book as a whole.

Goodwin discussed how effective children's picture books should "invite involvement" (Goodwin, 2008, p.29). This was achieved with the picture book version of *Hannah's Favourite Place* by utilising age appropriate language that would support the child "in reading and understanding the book" (Goodwin, 2008, p.29). In turn, the text was written and laid out in such a way that it would promote rhythm and drive for the reader – encouraging literacy as well as communication and social skills (Freedman-DeVito, 2004). The illustrations were designed to enable a further understanding of the story content (Hall & Hall, 1990), with the illustrations and moral of the story relating to the real world in order to promote further understanding of societal norms and successful ways for dealing with social situations (Zeece, 2009). Session 1 noted how this book – which was designed to fit into the constraints of a 'successful children's picture book' - prompted a wide variation of interactions and reactions.

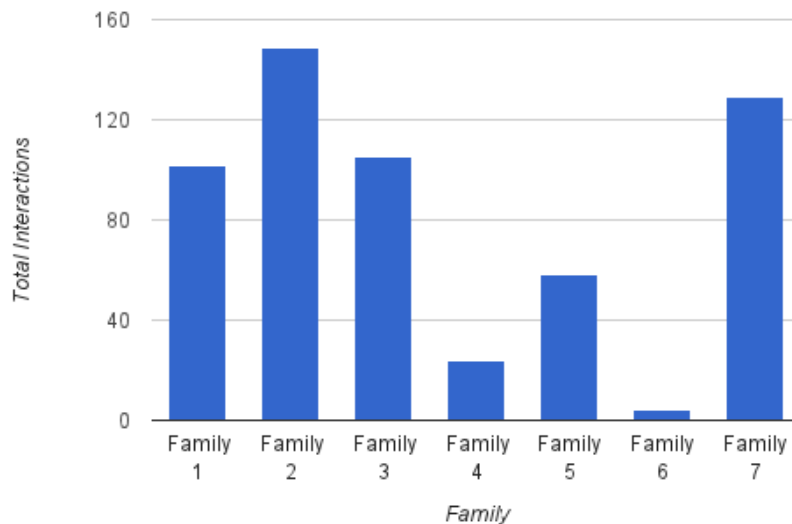
All children within Session 1 stated that their favourite part of the book was the pictures, whilst five of the seven parents also stated that they enjoyed the pictures. This proves once again that the basic principals of a children's book need to be implemented effectively in order for it to be a success. As Hall discussed, "matching the right style of art to a story's text can mean the difference between a book's being a memorable success or a short-lived failure" (Hall & Hall, 1990, p.xiii). As "a story's atmosphere is often evoked from the kind of illustration it carries" (Gibbons, 1999, p.53), the positive reaction from both the children and the parents shows that the style choice was successful and appropriate.

Four parents within Session 1 commented on their enjoyment of the text itself. As Goodwin discussed (2008), repeating text and a strong rhythm forces young readers to become involved and to share in the experiences of the story. *Hannah's Favourite Place* effectively utilised this idea, with Parent 4 even describing the rhythm of the story itself as "Dr Seuss-y". Parent 2 commented that they did not like the story due to the "made up word" (Glubmumpkin). This demonstrates that an effective children's

picture book needs to appeal to both child and reader, as if both parties are actively interested and involved, the child will benefit more from the Session in general. This also shows that the effectiveness of children's picture books is heavily influenced by personal preference and opinion, and consequently it is impossible to create a picture book that will appeal to all readers.

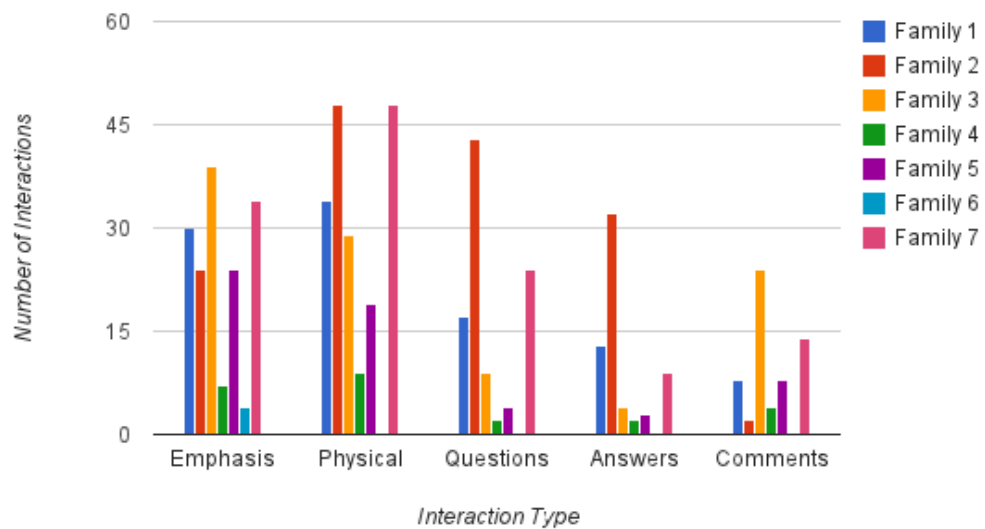
When observed in the first session, there was a wide range of behavior and interactions noted on the part of the parents. This ranged from pointing out features to asking questions and making comments. It is interesting to note that all parents stated that their actions were intended to keep their child interested in the shared reading session. This shows an understanding of the importance of keeping children engaged in the shared reading practice, whilst demonstrating that the understanding and undertaking of effective shared reading practices varies greatly from family to family. Six parents believed engagement was accomplished by involving the child in the reading activity, and one parent (parent 6) believed that, to keep the child attentive, the most effective reading session involved getting through the book as fast as possible. Consequently, six parents utilised varying degrees of the *responsive behaviors* (Ezell & Justice, 2005), by asking questions, pointing out features, following the child's lead and enthusiasm and discussing words and language. The fact that the total interactions varied so greatly however proves the need for educating parents about effective shared reading practices, and demonstrates that books themselves must give parents the tools for participating in such a way.





**Figure 30: Session 1 – Total number of interactions from all 7 families.**

Session 1 saw a large variation in total number of interactions, as seen in Figure 30. The highest number of total interactions was seen from Family 2, who undertook 149 total interactions. In contrast, the lowest number of interactions was seen from Family 6, who undertook only four interactions. This huge variation proves that there is a need for shared reading practices to be taught to parents. Whilst the three ‘responsiveness’ behaviors (Ezell & Justice, 2005) (*child-oriented behaviors, interaction-promoting behaviors and language-modeling behaviors*) were undertaken by parents that participate in effective shared reading, it is the parents who either do not know how to undertake effective shared reading practices, or simply choose not to, that need to be catered for. This observation backs up the conclusions drawn from the background study (see Chapter 3), and demonstrates that even a book that is appropriate for shared reading purposes is not going to be effective without further guidance for the parent.



**Figure 31: Session1 – Total interactions from all families according to interaction type.**

Figure 31 demonstrates the wide variation of interaction types noted in Session one. The drastic difference in numbers demonstrates that there is currently no consistency for shared-reading practices, and consequently parents may be unsure how to effectively participate in these sessions. The fact that physical interactions are noted as the highest is a reflection on the tactile learning of young children (Silverman, 2006). Children naturally want to touch the pages and point to features, meaning that this is somewhat an instinctive reaction type. The interaction types noted within Session 1 demonstrate that parents do attempt to engage their children in different ways, however the great variation in total interactions noted proves that parents need to be given help or instruction in order to effectively participate in shared reading.

### 5.1.3 Second Observation

The second observation session saw the initial introduction of the interactive, adaptive book. Consequently, their first impressions of the physical and intellectual features could be taken into account to evaluate the effectiveness of interactive book as a whole.

Physical enhancements that promote physical interactions were included in order to draw upon the basic learning principal of 'touch', as discussed by Silverman (2006). At it's most basic sense, this can be understood as 'learning by doing'. These physical enhancements in turn promote *Child-Oriented and Interaction-Promoting Behaviors* (Ezell & Justice, 2005) as the shared readers ask questions, point out features and make connections between the book and the real world. The intellectual enhancements within the book were included in order to give further learning oppourtunities, and encourage both children and parents to engage with the book at a higher level.

Within Session 2, all parents commented that their actions were led by the desire for their child to learn and explore the book. All parents in this case utilised *interaction promoting behaviors* (Ezell & Justice, 2005) which included pointing out features and illustrations, asking questions, and encouraging the child to look closer and interact with the physical enhancements. This shows that simply the inclusion of physical enhancements prompts parents to participate in *interaction promoting behavior*.

The total number of interactions increased drastically between Session 1 and 2 - from 571 to 1217 (see Figure 29). However, four parents discussed the fact that the interactive elements may be somewhat distracting, and stated that they had the potential to take away from the story content itself. Parent 1 addressed this concern, and the consequent solution, by stating that her child was "more engaged in the book, but [I] don't know if he followed the story... but maybe he learnt more by doing [because] on the drawing page he wanted to draw a unicorn and toast". This idea was observed by the other three parents who were concerned about the distracting nature of the interactive elements. Consequently it could be said that parents understand interactive books differently to children - where children seamlessly jump between the elements and the story, parents seem to separate the two. All seven children stated that

their favourite part of the interactive version of *Hannah's Favourite Place* were the interactive elements themselves. As “movable and pop-up books teach in clever ways, making the learning experience more effective, interactive, and memorable,” (National Museum of American History, 2010, p.7) it is important to remember that the way in which parents and children view the world differs greatly. Consequently, parents need to be open to the use of interactive books to promote shared reading and learning in the home as the benefits include not only literacy, but motor skills (Timpany & Vanderschantz, 2012), communication and social skills (Freedman-DeVito, 2004), and behavioural lessons related to body language and relationships (Hall & Hall, 1990).

All parents within Session 2 noted that they enjoyed the interactive, adaptive version of *Hannah's Favourite Place* due to the fact that their children were having fun. Parent 4 stated that she “enjoyed that she enjoyed it. She was obviously having fun.” This shows that the parents level of enthusiasm and consequent engagement is directly linked to that of the child. Therefore, in order for a children’s book to be successful, it must engage children at their level and promote fun, play and enjoyment.

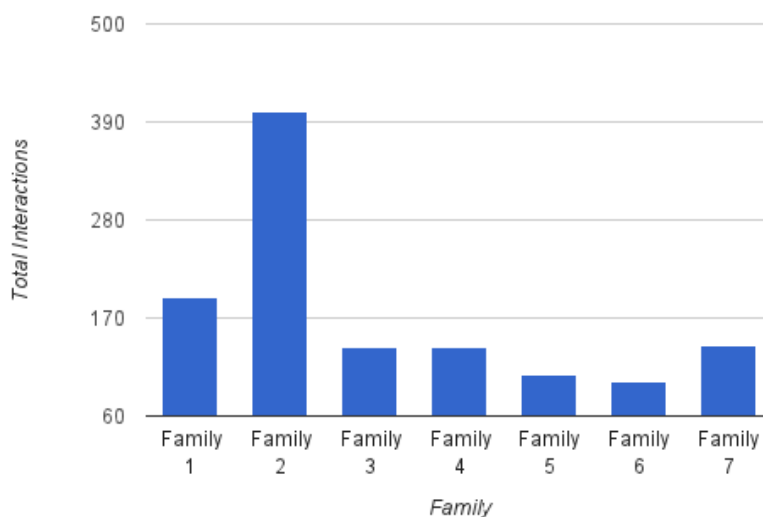
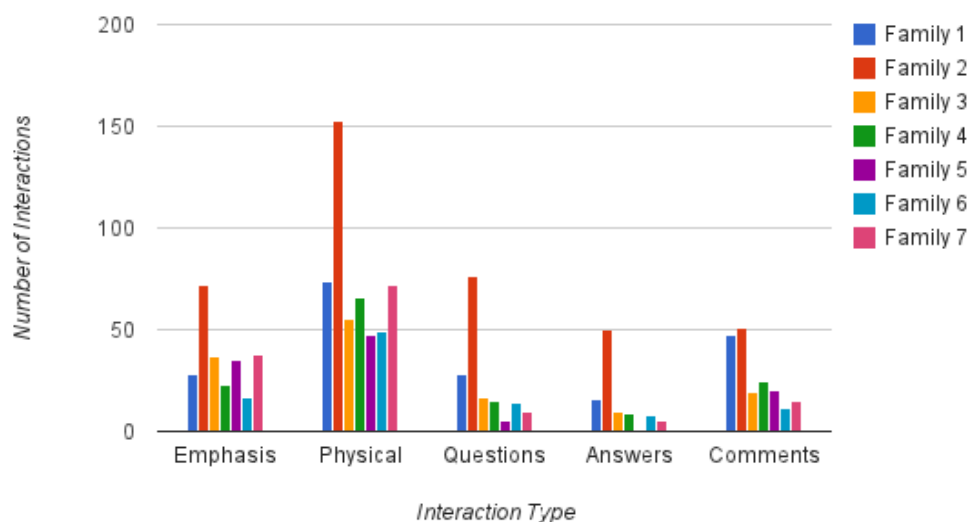


Figure 32: Total interactions broken down according to Family – Session 2.

Session 2 saw a more consistent spread of total interactions than Session 1, excluding Family 2 (see Figure 32). The anomaly of Family 2 was discussed earlier (see section 5.1.1) and can be attributed to the parent becoming “overwhelmed” by the large number of interactive and engaging possibilities within the interactive, adaptive version of *Hannah’s Favourite Place*. This demonstrates that the addition of physical and intellectual enhancements gives all shared readers the opportunity – and perhaps the confidence – to actively engage their children in different ways. In turn, the addition of such features encourages the child to interact with the book, promoting a transition from the parent-led *Interaction-Promoting Behavior* to the child-led *Child-Oriented Behavior* (Ezell & Justice, 2005). It can be assumed that personal techniques and relationships have a high impact on shared reading and the total number of interactions. However, Session 2 demonstrates how the inclusion of enhancements gives a range of parents and readers the opportunity needed to further their engagement level and hence the effectiveness of the session itself.



**Figure 33: Total interactions broken down by Family and type of interaction – Session 2**

As seen in Figure 33, Session 2 proved to have a much more consistent grouping of total interactions (excluding Family 2, as discussed earlier). Physical interactions were noted as the most frequently occurring

interaction type, proving that tactile learning is a natural and effective way of engaging children (Silverman, 2006). The physical enhancements were included in order to encourage 'learning by doing'. Consequently the high occurrence of physical interactions demonstrates that this was achieved as children were encouraged to explore, discover, understand textures, and understand cause and effect. These physical enhancements in turn promoted *Child-Oriented* and *Interaction-Promoting Behaviors* (Ezell & Justice, 2005), which are observed as Emphasis interactions - the second highest occurring interaction type noted. These emphasis interactions were observed as shared readers pointing out features and making connections between the book and the real world. This encouraged discussion, as well as teaching the child how to interact with a text as a partner in communication (Timpany & Vanderschantz, 2012). This discussion consequently is seen as comment, question and answer interactions, as the parent and child actively engaged with the story, the illustrations and the physical enhancements. This demonstrates that the inclusion of physical enhancements within a children's book allow a range of interactions to take place. These design features act as a bridging device – promoting an initial physical interaction that leads to different interaction types and learning opportunities. This reveals the need for effective children's interactive books to utilise design features that promote meaningful interaction (Timpany et al., 2014).

#### 5.1.4 Third Observation

Whilst the third observation utilised the same book as was used in the second, the introduction of the task – finding the cupcake – meant that the shared reading session changed and became goal-driven. Whilst all families had shared their opinions on the interactive, adaptive book earlier, it is interesting to note how these changed when given one specific action to undertake within the session.

The inclusion of the ‘find the cupcake’ feature was an intellectual enhancement that was designed to work in partnership with the physical features of the page. By utilising both physical and intellectual features, *Hannah’s Favourite Place* effectively employs multi-layered interaction (Bongers & van der Veer, 2007). This interaction requires “close inspection” (Zeece, 2009, p. 449) of the page as well as the physical enhancements, promoting interaction in the form of questions, answers, and sequence of content (Timpany & Vanderschantz, 2012). All participants were asked to take part in this activity, as it is appropriate for all age and reading levels.

All parents within Session 3 discussed the use of hints as a form of encouragement and reassurance. Parent 3 stated that she provided hints to “get him to do it rather than relying on mum”, whilst Parent 4 stated that she used hints because “it was just more fun.” Parent 4 also stated that she encouraged competition as she believes “that someone should stand out, [and that] not everyone should win.” This shows how children’s books are not limited to teaching literacy, but instead include aspects of problem solving, socialization, hand eye coordination, creativity and an understanding of the world (Freedman-DeVito, 2004). All children in the study stated that finding the cupcake was their favourite part of the book. This shows that the intellectual feature provided not only further engagement – as seen by the increase in total engagement from 1217 to 1324 (see Figure 29) – but increased enjoyment for the child. This is similar to the results seen in Session 2, where the overall enjoyment of the

child directly effects the enjoyment – and consequently level of enthusiasm and engagement – of the parent. Children are spurred on by their parents reactions, and consequently if both parties are excited by the book, the shared reading session will be more successful as a whole.

Within Session 3, two parents discussed how the inclusion of the cupcake goal could distract from the reading of the story. In relation to this, Parent 6 stated that the cupcake feature “takes away from the general reading of the book..... It felt pointless reading as he knows he has to find the cupcake.” Whilst Parent 7 had similar concerns, Parent 7 posed the solution for this issue themselves, stating that the “ cupcake makes words less relevant, but [it] keeps them engaged. [You] could read through the book and then do the activity”. This shows an acknowledgement of the need to direct the child’s behaviour and activity within the shared reading Session. As Goodwin discusses, the parent acts as mediator (Goodwin, 2008), within the shared reading session, and hence the more effort and attention that the parent is willing to put into the session, the more beneficial it is for the child. Consequently, whilst an effective children’s book can provide the tools for successful shared reading, it is still ultimately driven by the partnership and parent and child.

One parent commented on the potential for distraction within the final observation due to physical enhancements – unlike Session 2, where four parents noted this concern. Parent 6 stated that “children won’t be able to remember what happens”, due to including the ‘search and find’ feature of the cupcake. It could be argued however that this issue was previously addressed within the analysis of Session 2, and that children are able to view the enhancements and the story as one, rather than separate the elements into ‘story and pop ups’ (see section 5.1.3). Consequently, it is important to understand that children and parents view interactive books differently – with parents separating the elements and story, and children considering the story and activities as one. These intellectual and physical enhancements consequently do not take away from the story itself, but add additional tools for engagement and interaction.

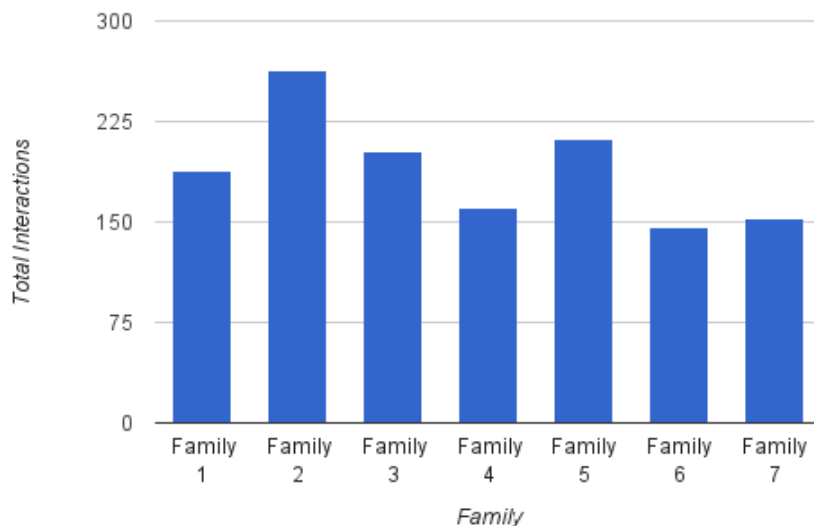


After reading the 'goal page' (see materials, section 4.3), parents were asked their opinion of the adaptive properties of such a book. Six of the seven parents had positive reactions to the idea of a 'goal based' reading session. Parent 3 stated that the adaptive features are "really good because it's a book that will keep the child engaged for a long time. Great mileage". This demonstrates that a book such as the adaptive interactive version of *Hannah's Favourite Place* has the potential to keep children engaged and learning over a wide age range, effectively helping them transition from passive listener to active learner. Parent 1 also commented on the benefit and appeal of such a book, noting that it has the potential to be both educational as well as fun. Parent one stated that the interactive, adaptive version of *Hannah's Favourite Place* is "not boring for the parent either, it's stimulating. [The book] can grow with the child - as they are going to school they can recognize the letters. It makes it educational, which is a huge bonus." Consequently, by teaming the design features of an effective children's book with both physical and intellectual enhancements, the parent and child are given more tools for taking part in effective shared reading. As the book itself provides room for personal and educational growth, it will remain relevant and provide further learning opportunities over a longer period of time.

Five of the parents commented on the appeal and importance of being able to read the story differently each time. Parent 5 stated that one of the benefits of such a book was the fact that it "could be read three times in a row as three different books." This draws the same conclusion as seen in the previous study (see Chapter 3), and demonstrates the attraction for parents as well as the educational benefits of a book that can be adapted according to age and reading level.

The one parent who had a negative reaction (Parent 6) was the parent who believed that reading straight through a book would encourage her child to "not lose interest". Whilst the number of total interactions for both parent and child did increase significantly in both Session 2 and 3, this

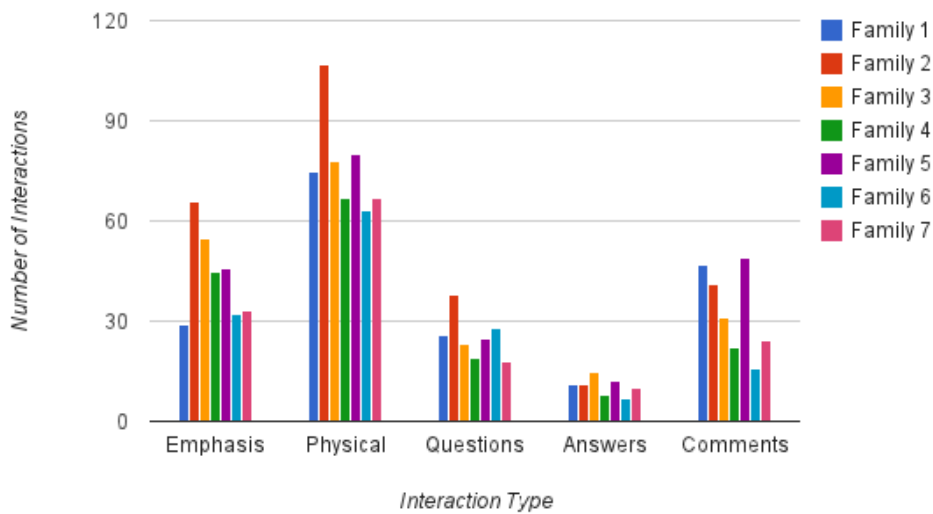
parent believed that the 'goals' were pointless, and would not add to the story in general. Consequently this shows that, even when given the tools, and when an increased level of interaction and engagement is noted, the attitude of the parent towards shared reading will dictate whether the practice is undertaken effectively in the future.



**Figure 34: Total interactions according to Family – Session 3**

Session 3 again saw a much more consistent spread of total number of interactions per family, as seen in Figure 34. Whilst again Family 2 was noted as having a significantly higher number of total interactions (263 in total) the spread of total interactions demonstrates that a goal-based reading session effectively promotes higher interaction and engagement levels. As participants were required to complete one activity, rather than given 'free reign', the session could be considered more 'focused'.

The high number of total interactions noted proves that this encouraged interaction, rather than limiting the total interactions as one could assume would occur with 'rules' set in place. It could be said that goal-based reading sessions help to keep children focused and more emotionally engaged in the story (Goodwin, 2008). Consequently children become more engaged in the literary experience, and are able to gain more from the shared reading experience.



**Figure 35: Interaction type, broken down by Family – Session 3**

Figure 35 demonstrates the range of interactions that took place according to Family throughout Session 3. The largest number of interactions was seen in the form of physical interactions. This interaction type was the highest across all seven families, demonstrating that the physical enhancements of *Hannah’s Favourite Place* encourage the child to touch and interact with the page. As Silverman (2006) discusses, “learning comes through touching and physical sensation. Thinking is anchored by movement, and touch...” (Silverman, 2006, p.71). Consequently, by encouraging ‘learning by doing’ children are able to explore, discover, understand textures, and understand cause and effect.

Comments and Emphasis were noted as the next highest occurring interaction types. This is significant due to the *responsiveness behaviors* associated with them. The high level of emphasis interactions demonstrates a high occurrence of *child-oriented behaviors*, which “follow the child’s lead, pace and topic” (Ezell & Justice, 2005, p.12). This shows that children are pointing out features and interacting with the book without prompting from the parent. In turn, parents have reacted to this behavior through utilizing further emphasis interactions. In the case of Session 3, this shows that the parents are acting as mediators within the shared

reading Session (Goodwin, 2008), enabling the child to interact independently and learn how to interact with a text as a partner in communication (Rose, 2011).

The high number of comments noted within Session 3 demonstrates a high occurrence of *child-oriented behaviors* (Ezell & Justice, 2005), as well as an increased level of emotional engagement (Goodwin, 2008). This higher level of emotional engagement occurs due to the fact that the story content and the physical and intellectual enhancements “closely relates to children’s needs and what they understand” (Norton, 2011, p.176). If the child feels that they can relate to the character and moral of the story, they are more likely to actively engage in the shared reading practice (Norton, 2011). In turn, the physical and intellectual enhancements allow young readers to become more engaged in the literary experience (Vanderschantz & Timpany, 2013). By pairing these features, the child has the opportunity to gain more from the book.

## **5.2 Summary of Section**

The three observation sessions demonstrated the importance of engaging in effective shared reading, and how designers of children’s books can help to encourage this behavior.

The picture book version of *Hannah’s Favourite Place* saw great variation in total interactions over the seven families. Whilst all parents stated that their actions were intended to keep their child interested in the shared reading session, their total number of interactions and attempts at engaging the children were drastically different, varying from 4 – 149 total interactions. Six parents believed engagement was accomplished by involving the child in the reading activity, and one parent (Parent 6) believed that the most effective reading session involved getting through the book as fast as possible. Consequently whilst these six parents utilised

*responsive behaviors* (Ezell & Justice, 2005), the variation in total interactions demonstrates that even effective shared readers would benefit from guidance in order to further the learning experience. Additionally, as seen in the previous study (See Chapter 3), parents who do not know how to undertake effective shared reading practices, or simply choose not to, need to be catered for. This shows that there is a need for educating parents about effective shared reading practices, and demonstrates that books themselves must give parents the tools for participating in such a way.

The total number of interactions noted per session increased over the three sessions, demonstrating that the addition of physical and intellectual enhancements promotes further engagement within shared reading sessions. The physical and intellectual enhancements within the interactive, adaptive version of *Hannah's Favourite Place* promote further *responsive behaviors* (Ezell & Justice, 2005) from the parents and the children. As features are touched and pointed out, questions are asked, and comments are made, the parent and child actively engage with each other and the book. This therefore is not only teaching the child literacy, but forms of communication, motor skills (Timpany & Vanderschantz, 2012), social skills (Zeece, 2009) and furthering emotional development (Norton, 2011). Shared reading sessions are important forms of communication and development, and if a book has the design features to further these learning opportunities, the child and parent will benefit more from the activity.

Whilst a number of parents voiced their concern over the distracting nature of the physical enhancements, it is important to understand that children and adults view the world different. Children seamlessly jump between the physical enhancements and the story, whilst parents seem to separate the two. As “movable and pop-up books teach in clever ways, making the learning experience more effective, interactive, and memorable,” (National Museum of American History, 2010, p.7) it is important that parents embrace the learning possibilities of interactive books in the shared

reading environment. As Goodwin (2008) discusses, the parent acts as a mediator within the shared reading session. Consequently the parent can help to guide the session if they believe that the child is getting too distracted by the design enhancements. An effective interactive children's book can provide the tools for successful shared reading, so parents need to embrace such books and be open to broader learning opportunities within the shared reading environment.

Meaningful physical enhancements act as a bridging device to promote a range of interaction types. As children are encouraged to explore, discover, and understand cause and effect, they are also prompted to participate in *Child-Oriented and Interaction-Promoting Behaviors* (Ezell & Justice, 2005). These behaviors are observed as shared readers pointing out features, asking questions and making connections between the book and the real world. Therefore it is important that effective interactive children's books include enhancements that add to the story and engage children on a number of emotional and intellectual levels.

The inclusion of a goal within the reading session promotes further interaction and engagement. This goal-based reading session prompted higher total book driven interactions, as the children and parents interacted with each other and the book in order to reach the common goal. It was noted that all children of the study displayed a higher number of book driven interactions in Session 3 versus Session 2. This was observed as a transition from parent-led interaction techniques (*interaction-promoting behaviors*) to child-led interaction (*child-oriented behaviors*) (Ezel & Justice, 2005) as children began to take the lead and actively engage with the text on their own accord. Therefore it could be said that goal-based reading sessions help to keep children focused and more emotionally engaged in the story (Goodwin, 2008). Consequently children become more engaged in the shared reading experience, and are able to gain more from the session. It is the addition of both physical and intellectual enhancements that prompt this change in interaction and overall increased level of engagement. It is important that an effective

interactive children's book include meaningful interactions that are going to mentally and emotionally engage children throughout different stages of their development.

The Interactive, adaptive version of *Hannah's Favourite Place* effectively engages parents and children within a shared reading session. The physical and intellectual enhancements promote interaction that is meaningful and engaging for both parent and child. In turn, the elements that draw upon the principals of an effective children's picture book continue to engage the child at their emotional level and in terms of relating to the real world. The use of adaptive goals furthers this emotional engagement by giving children a specific task that they must focus on throughout. This means that the child is less likely to get distracted, and will in turn gain more from the reading session. When designing effective children's interactive books, it is important to support both the child and the parent. If the parent is given the tools to actively participate in shared reading and utilise *responsiveness behaviors*, they are more likely to be enthusiastic and hence engage their child further in the shared reading session. Consequently, well designed children's books have the potential to increase enjoyment and interaction from both parents and children, and hence provide greater learning opportunities in the home environment.

## 6 Conclusion

This study aimed to analyse a comparison of children's picture books versus children's interactive, adaptive picture books in order to discover how physical and intellectual enhancements change the level and types of interaction within a shared reading environment. In turn, the study aimed to provide design solutions for designing effective children's books in the future.

*Hannah's Favourite Place* was an effective prototype for testing the design enhancements, and gained a generally positive reaction from participants. The findings of the study demonstrated the importance of basic principles when designing effective children's books, including appropriate story, illustration, theme and the creation of an emotional relevance or connection with the child. In addition, the physical and intellectual enhancements prompted children and parents to interact and engage with the book at a much higher level, demonstrating the broad learning possibilities of such a book. The adaptive properties of the book highlighted how goal-based reading sessions can promote further engagement and interaction possibilities, spurring a change from *Interaction Promoting to Child-Oriented Behaviors* (Ezell & Justice, 2005). The study also resulted in suggested design improvements and solutions for future children's books.

### 6.1 Further Work

Continued refinement of the prototype as well as further testing would provide a wider set of results and enable designers to find additional enhancements to promote further interaction and engagement.



### **6.1.1 Limitations**

It is important to acknowledge the limitations of conducting such a study. The participant sample was relatively small, and the genders and ages were not balanced. It would consequently be interesting to run the same test with a larger sample number, and with a more consistent spread of genders and ages over both readers and children. In addition, the reading levels of the children participants were not noted or considered during the testing process. Consequently it would be interesting to test the prototype over a broad range of reading levels in order to compare how young readers at different stages react to the interactive, adaptive features.

### **6.1.2 Further Testing**

It is important to acknowledge that the interactive, adaptive version of *Hannah's Favourite Place* was only tested twice – once as is, and once as a goal based session. It would be interesting to test the book with children over a longer period of time in order to see how the interactions noted changed. These changes could be influenced due to adapting the goals according to the child's age or stage, as well as the investment of the child in the story itself. In addition, it would be interesting to compare the interaction and engagement levels of regular readers versus non-regular readers. This would provide insight into how an interactive, adaptive book could be used by a broad range of audiences, and how it could potentially encourage reading in the home environment.

It would also be interesting to analyse which goals are used frequently or not at all, and consequently evaluate how a well-rounded reading session can be implemented. For example, if the families mainly focus on the 'cupcake finding' goal, the other learning outcomes would not be supported. Whilst the *goal page* encourages parents to choose a different goal according to age and stage, this cannot be enforced. It would consequently be interesting to see which goals were used repeatedly, and how this changes the interactions noted from both readers and children.

As children grow and learn, shared reading practices evolve and change. Behaviors transition from parent-led interactions to child-led interactions. Further testing would enable a look at how literacy and personal development has an effect on shared reading practices, and how skills and lessons taught within the sessions are continued and built upon as the child grows.

Continued testing of a refined prototype of *Hannah's Favourite Place* would further cement the findings of both the background study and the main study conducted. Further testing would also give an insight as to how designers can engage and educate young learners over a number of years through creating effective interactive, adaptive books.

### **6.1.3 Refinement of Goals**

Whilst the goals were chosen due to national educational standards of NZ and recommended activities, it would be interesting and beneficial to get the opinion of children's librarians, and early childhood and primary school teachers. These groups of people are experts in the field of young learners, and would perhaps enable further insight into how an interactive, adaptive book could further enhance shared reading. The goals could be further refined, and perhaps give parents more detail in order to allow this learning resource to be used to the highest potential.

## **6.2 Recommended Improvements to this Interactive Book**

*Hannah's Favourite Place* combined the principles of an effective children's picture book with physical and intellectual enhancements, and adaptive features, to result in a successful prototype. Whilst the prototype of *Hannah's Favourite Place* was an effective way to test adaptive, interactive features, there are a number of areas which could be improved

upon. Consequently, further refinement is needed to ensure that the children's book is as effective as it could possibly be. Throughout the testing process there has been a wide range of feedback, which has resulted in suggested improvements.

### **6.2.1 Question and Answer Interactions**

*Question and Answer* interactions were noted as the least frequently occurring interaction throughout the observation sessions. These interactions are important for literacy, personal growth and understanding of problem solving, socialization, creativity and the world (Freedman-DeVito, 2004). Question and Answer interactions also promote communication skills between parent and child, and consequently should be supported by the book itself in order to ensure that communication takes place. For future prototypes or refinements of the book, it would be interesting to give parents a list of basic questions such as:

- What colour?
- How many?
- What is?
- Where is?
- Who is?
- Why is?

These questions could be adapted to suit each spread. Whilst this would require extra work and persistence from the reader, it would ultimately lead to greater communication between the pair. Designers need to give shared readers the tools to communicate effectively, and providing further instructions for *Question and Answer* interactions would enable this.

### **6.2.2 Additional Interactive Features**

A number of parents within the study stated that they thought the book was somewhat inconsistent due to physical enhancements not being

present on every page. Whilst there were tactile letters on all spreads, clearly these parents did not consider these on the same level as the paper engineered features. Consequently, the addition of paper-engineered features on each page would give the book consistency. In addition, the inclusion of tactile numbers as well as letters would give parents and children the opportunity to focus on basic numeracy, giving a physical and intellectual enhancement that allows children to transition through the stages of identifying numbers to counting, addition and subtraction.

### **6.3 General Reaction from Participants**

It is fair to say that the interactive, adaptive version of *Hannah's Favourite Place* - which was tested in section 4.5 - had a generally positive reaction from participants, with Child 4 even describing the enhancements as "fabulous and wonderful". Whilst it was the interactions that were focused on for the purpose of the study, when working with children one of the driving factors of success is simply whether they like the book or not. All parents in the study had a generally positive reaction to the interactive, adaptive version of the book, even if they had a negative reaction to the picture book version (such as Parent 2) or if they disagreed with the inclusion of 'goals' (as seen with Parent 6). All children had a positive reaction to the book, with every child stating that their favourite part of the third session was completing the goal and finding the cupcakes (see section 5.1.3). A book such as this is a key learning tool for young readers, enabling a wider understanding of both the story and wider concepts of their environment. Whilst it is understood that the book has a high educational value, it is important that children enjoy the book, and consequently want to participate and learn. Children learn through play (Silverman, 2006) and it is important that designers take this into account when creating children's books. The fact that all parents stated that they enjoyed the interactive, adaptive version of *Hannah's Favourite Place* due

to the fact that their children were having fun proves that this ‘fun factor’ is imperative when designing effective children’s books.

## **6.4 Findings**

The findings of the study demonstrate that a wide range of variables need to be taken into account when designing effective children’s books.

### **6.4.1 Illustration, language and story are keys to success**

The results of the study show that the fundamental principles of a children’s book need to be addressed in order to be successful. As found with both the previous study conducted (see Chapter 3), and the testing of the picture book version of *Hannah’s Favourite Place* (see section 5.1.2), the design of children’s books needs to encompass a wide range of variables in order to successfully reach children at their level. This includes focusing on the written story, the illustrations, and the moral of the story and the way in which the entire book relates to the child on their level. Children’s books need to relate to a child by utilising appropriate words, vocabulary, general themes and story content. This promotes further emotional engagement and teaches important behavioral and social skills. Additionally, the illustrations within children’s picture books need to promote the cross over of visual and written language by being meaningful and relevant to the storyline. As children’s books are almost always utilised within the shared reading environment, the book must lend itself to the practice of shared reading by including engaging images and narrative that “invite involvement” (Goodwin, 2008). These basic elements of a successful picture book need to be applied to interactive, adaptive children’s books in order to ensure that the book promotes the highest possible number of learning opportunities.

#### 6.4.2 Shared readers need to be supported

As seen in the previous study conducted (see Chapter 3) parents who engage in effective shared reading will do so whether the book itself provides interactive features or not. Five of the families of the study - who regularly participate in shared reading practices - utilised all five interaction types over the three sessions. This shows that a parent who regularly engages in effective shared reading practices will find aspects within any book to engage their child. However, the drastically fluctuating numbers of total interactions, even with parents who effectively practice shared reading, demonstrates a need for extra support and guidance (see section 5.1.2).

It is clear that parents who do not engage in effective shared reading practices must be catered for when designing effective children's books. Parents need to be encouraged to take part in 'responsive behaviors' to promote interaction, literacy development, and child driven interactions. (Ezel & Justice, 2005) As seen with Parent 6 (see section 4.5.6), even when given goals, parents will not necessarily consider the practice effective, and hence may not participate. Perhaps a way to encourage this further would be to introduce this type of interactive, adaptive education practice in the classroom, and give parents an opportunity to learn of the effectiveness of such a tool from a wide range of sources.

In order to ensure that varying interactions and shared reading practices take place, the book itself needs to include instructions and elements that work to promote *Child-oriented, Interaction-promoting and Language-modeling behaviors*. Engaging images and features that promote child engagement must be included to allow *Child-Oriented behaviors* to occur. In turn the content must lend itself to questions from the parent and consequently *interaction-promoting behaviors*. These questions need to include *who, what, when, where, why, and how*, and need to engage children in the imagery, storyline and relevance of the theme to the real world. These features will ideally lend themselves to wider concepts and

labels, allowing children to gain an understanding of context and relation to the world around them. All shared readers would benefit from further support, which can be offered through the design features of an effective children's picture book.

#### **6.4.3 Interactive books provide higher levels of engagement**

The study showed that interactive books promote higher levels of engagement. All of the families increased their total number of interactions between Session 1 and 2. In turn, five of the seven families that participated in the study increased their total number of interactions between Session 2 and 3 (see section 5.1.1). This demonstrates the power of physical and intellectual enhancements to promote further interaction. Meaningful physical and intellectual enhancements act as a bridging device to promote a range of interaction types. As children are encouraged to explore, discover, and understand cause and effect, they are also prompted to participate in *Child-Oriented and Interaction-Promoting Behaviors* (Ezell & Justice, 2005). These behaviors are observed as shared readers pointing out features, asking questions and making connections between the book and the real world. Therefore it is important that effective interactive children's books include enhancements that add to the story and engage children on a number of emotional and intellectual levels. These design choices are important to ensure that children are not distracted by other factors throughout the shared reading session. The enhancements within interactive, adaptive books must consequently have relevance within the context of the story, rather than being simply a game or an added feature.

It is important to note that interactive features were considered 'distracting' by a number of parents within the user study group, as discussed in section 5.1.3. Parent 7 acknowledged that additional features in a picture book could prove to be distracting, however they also understood that it is up to the parent to direct the behavior of the child, and keep the reading

session on track. When participating in shared reading sessions it is important to note that children learn differently to adults, and that they are able to view the story and elements as one in order to gain deeper understanding from the book as a whole. Parents must be open to using interactive books as a tool for shared reading sessions as their benefits stretch far greater than literacy, including motor skills, emotional development, communication and life skills. Books that relate to the child and provide meaningful interactions have the potential to heighten the level of engagement and interaction (Reutzel & Cooter, 2012). Consequently interactive, adaptive books need to be designed with meaningful interactions in mind, whilst parents need to embrace the wide range of educational possibilities from such a book.

#### **6.4.4 Adaptive shared reading sessions are successful**

The adaptive, goal based reading session drew from concepts within reading standards and educational activities. PALS (Midgley et al., 2000) is a systems that works on a goal structure, allowing children to move to the next stage when they have successfully completed a task (see section 2.3.1). The observation process proved that this practice within the shared reading environment engages children and promotes a high level of interactivity. All children displayed an increase in book-driven activities in Session 3 versus Session 2 (see section 5.1.1). This demonstrates that the inclusion of a goal within the shared reading session allows for a transition between *interaction-promoting* behaviors and *child-oriented behaviors* (Ezell & Justice, 2005). This is observed as a change from parent-led interactions to child-led interactions, where the child has the opportunity to steer the shared reading session in the direction of their choosing. This change in interaction type shows that, if children are given a task, they are more likely to get actively involved in the shared reading session. Consequently if they are more engaged, the potential for learning is increased and the session is more successful.



Six of the seven parents had positive reactions to the idea of a 'goal based' reading session (see section 5.1.4). Parent 3 stated that the adaptive features are "really good because it's a book that will keep the child engaged for a long time. Great mileage". This demonstrates that a book such as the adaptive interactive version of *Hannah's Favourite Place* has the potential to keep children engaged and learning over a wide age range and over a long period of time, effectively helping them transition from passive listener to active learner. Parent 1 commented on the benefit and appeal of such a book, noting that it has the potential to be both educational as well as fun. Parent 1 stated that the interactive, adaptive version of *Hannah's Favourite Place* "can grow with the child - as they are going to school they can recognize the letters. It makes it educational, which is a huge bonus." Consequently, by teaming the design features of an effective children's book with both physical and intellectual enhancements, the parent and child are given more tools for taking part in effective shared reading. As the book itself provides room for personal and educational growth, it will remain relevant and provide further learning opportunities over a longer period of time. Designers need to take this ability to 'adapt' into account when designing effective children's books. Children respond well to goals and tasks, and therefore it is important that all enhancements are meaningful, and provide room for further engagement as the child develops further literacy, communication and life skills.

#### **6.4.5 Personal Preference dictates the success of the interactive, adaptive children's book**

It is fair to say that personal preference and opinion dictate how parents and children will react to a children's book. It is impossible to create a children's book that is universally loved by all, and the testing process proved that the reasons for parents not liking a feature were not necessarily logical or clear. Parent 2 was unhappy with the inclusion of interactive features due to their distracting nature, however wished for

each page to have a physical enhancement (see section 4.5.2). In turn Parent 6 believed that her child would not benefit from the inclusion of physical enhancements, as reading through the book as fast as possible was, in her opinion, the only way to keep him on track (see section 4.5.6). It is fair to say that parents need to be taught of the benefits of interactive features and how to effectively undertake shared reading practices. In turn, readers need to become open to the ways in which children view the world and learn in different ways.

## **6.5 Recommendations**

To design an effective children's book, four basic steps must be taken. The book needs to include the fundamental principles of a successful children's picture book, including appropriate story, illustration, theme and the creation of an emotional relevance or connection with the child. In turn, the book must provide support to shared readers through instruction or a guide in order to ensure that both parties benefit from the session. The book must include physical and intellectual enhancements that provide meaningful interactions, and have a relevance to the story outcome or storyline itself. Finally, the book must be adaptive in some form, allowing the book to remain relevant and educational as children grow and learn. These aspects combined will enable both the shared reader and the child to gain more from the shared reading session, and promote fun, enjoyment and education in the home environment.

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