An Augmented Analog Book that Contributes in Educating Arab Children

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Abstract

This research studies designing an augmented analog storybook that in conjunction with digital devices makes children's use of digital devices more beneficial for learning to read in Arabic. Through this research a literature review, a focus group, and visual research has been conducted. The main finding of the literature review was that the use of multi-media in children's storybooks could serve as an educative and interesting teaching method that improves linguistic skills. Additionally, the main findings of the focus group was that parent-child joint reading leads to a more successful learning outcome. Furthermore, the main finding of visual research was that, a script with repetitive, simple vocabulary, along with unrealistic illustrations that show textures of different colors and materials is best suitable for making a storybook interesting for children. This research is the basis for a design outcome. Thus, the primary deliverable of this paper is the augmented features that will appear in the digital device. On the other hand, the secondary deliverable of this paper is the Arabic analog storybook, which will include special pages that can be scanned by an app that uses photo recognition technology, this will tie the book and the digital features together.

مستخلص

يدرس هذا البحث تصميم كتاب قصص يعمل جنبًا إلى جنب مع الأجهزة الرقميةل جعل استخدام الأطفال للأجهزة الرقمية أكثر فائدة من خلال هذا البحث ، تم إجراء مراجعة ل‌تعلم القراءة باللغة العربيةأدبية ومجموعة ، نقاش ، كانت النتيجة الرئيسية ل .وبحث بصري‌لمراجعة الأدبية هي أن استخدام الوسائط المتعددة في كتب قصص الأطفال يمكن أن يكون بهدف التعليم بطريقة مثيرة للاهتمام‌تعمل على تحسين المهارات اللغوية للطفل بالإضافة إلى ذلك ، كانت النتائج الرئيسية ل‌مجموعة النقاش هي أن القراءة المشتركة بين الوالدين والطفل

علاوة على ذلك ، فإن النتيجة تؤدي إلى نتائج تعليمية أكثر نجاحًا ، وهناك فجوة في سوق الترفيه التعليمي العربي الرئيسية للبحث المرئي،هي أن النص الذي يحتوي على مفردات متكررة وبسيطة ، جنبًا إلى جنب مع الرسوم التوضيحية المنسقة غير الواقعية التي تُظهر،تموجات من ألوان ومواد مختلفة ، هي الأنسب لجعل كتاب القصة ممتعاً للأطفال. هذا البحث يهدف إلى تصميم و إنتاج كتاب قصة أطفال تفاعلية.

بها ميزات معززة تظهر،على شاشة،جهاز الرقمي مثل المشاهد المتحركة المصحوبة بالصوت من ناحية .والنص أخرى ، فإن الناتج الثانوي لهذه الورقة هو كتاب،قصة مطبوع سيتضمن صفحات خاصة يمكن مسحها ضوئيًا بواسطة تطبيق يستخدم تقنية التعرف على الصور ، وهذا سيربط الكتاب والميزات الرقمية معًا.

الكلمات المفتاحية: الواقع المعزز، الواقع الافتراضي، الكتاب النظري، التكنولوجيا .

Introduction

Currently, it seems young children's use of digital tablets in Saudi Arabia has been increasing dramatically. One possible reason for that is because parents rely on digital devices to keep their children distracted and quiet. Seemingly, Saudi children usually spend many hours of their day sitting in front of a digital tablet watching foreign animation or playing silly games. As a result it is probable that their Arabic language is becoming weaker and the tablet is becoming an expected element in their day. Furthermore, it seems that children are spending less time bonding with their families.

Some topic-specific terms include augmented reality which is defined as "an enhanced vision of reality created by the use of technology to overlay digital information on an image of something being through a device (such as a smart phone camera)'' (Merriam-Webster.com, 2018). Virtual reality is another important term in this paper which is defined as "an artificial environment which is experienced through sensory stimuli (such as sight and sound) provided by a computer and in which one's action partially determine what happened in the environment."(Merriam-Webster.com, 2018). Furthermore, Analog is "something that is not digital; not computerized" (Merriam-Webster.com, 2018). Finally, technology addiction is " a term that refers to the uncontrollable urge to use technological devices such as computers, smartphones, and gaming systems'' (Study.com, para. 2, 2004).

Finding an outcome to the issue discussed is important because as (Wong, 2015) noted:

"the increased use of digital devices such as touchscreen tablets in the home

for work, communication, entertainment, and information searching

makes them naturally attractive to toddlers and preschoolers who learn to communicate by observing and interacting with parents and older siblings… the use of iPad engages children in multimodal literacy practices, motivates literacy learning and provides opportunities for independent exploration and creation" (p.12). This quote stresses that combining learning with technology encourages young children to learn how to read and write and to explore new concepts, and this is why Arab children end up learning English better than Arabic at such a young age because the technology does benefit learning but since they watch entertainment in English and not in Arabic the benefit is not as much as it could be.

The primary target audience for this research are Arab parents especially mothers (working and nonworking) that are interested in making digital devices more beneficial to their children and encouraging them to use Arabic as their primary language. They and their children will benefit directly from the outcome of this research. Accordingly, this research studies designing an augmented analog storybook that in conjunction with digital devices makes children's use of digital devices more beneficial for learning to read in Arabic.

Literature Review

The following sources support the objectives of the research by offering information regarding how to combine analog techniques with modern digital techniques; how digital augmentation of an analog book can make reading more fun and interactive for young children and to know how to teach children how to read in Arabic through storybooks.

In Phadung, Suksakulchai, Kaewprapan, and Howland (2013), an article which develops an industrial design of an interactive storybook to support early literacy skills of ethnic minority children, the author reports a quote by, Bird, & Goodman, (1991) that "storybooks can be used to support early literacy and second language skills for children" (p.12). This quote demonstrates that storybooks are effective in teaching young children early linguistic skills. The authors additionally mention that "children learn happily through interesting media and are thus more highly motivated to learn the language" (Phadung et al., 2013, p. 12). Furthermore, the authors list the steps of

designing a good interactive storybook approach which uses software to supports early literacy skills which include,

> "1) Pre-story telling activities; stimulating children's interest in the interactive storybook, 2) Story-telling activities; providing language learning in a holistic view and, 3) Post-storytelling activities; providing activities in which children show their story comprehension and literacy skills in various forms" (Phadung et al., 2013, p.14).

These quotes not only stand as evidence that an augmented analog book would be an effective tool to teach young children how to read, but also it serves as a guideline to design the book and its supporting app by offering helpful steps and explanation of the function of the storybook.

Limitations of this source are that it is only a literature review and does not actually study the use of the suggested electronic storybook design, also, all of the sources cited within the review are Western studies and nothing conducted in the Middle East much less Saudi Arabia. The source also talks about designing an electronic storybook program and not and augmented analog that is interactive with a digital device, also the source specifically targets Thai children and aims to teach them how to read their own language. However this source can be applicable to this research as it supports the objectives. Though the source is specific to teaching Thai children to use their language rather than the Malay language and this is a limitation due to it not being focused on teaching Arabic, however, that the studied multimedia approach was deemed successful and fun for the children to use to learn any language means such an approach can be adapted for any language needed. In the article it was software on a desktop computer and in a classroom with a teacher yet, a mobile device based augmented storybook would be more convenient and with the parent in the 'teaching' role while using the proposed book, the aforementioned steps considered successful would work well.

In Krcmar and Cingel (2014) a study on parents and their preschool-aged children tests the difference between reading interaction and child comprehension on two platforms which are traditional books and electronic iPad books, the authors state that "parent-child joint reading is related to a number of positive childhood outcomes

such as vocabulary acquisition and school success" (Krcmar and Cingel, 2014, p. 262). This quote points out that parent-child joint reading is not only beneficial for creating a bond between the child and the parent, but also it strengthens the child's vocabulary and comprehension skills. When comparing both media, the authors have determined various results. For example, Krcmar and Cingel (as cited in Verenikina and Kervin, 2011) report a quote by that says that "iPads are used to facilitate imaginative play among young children and their parents but employed a qualitative design that did not allow for causal conclusions" (2014, p. 263). This quote supports the result of their study as they concluded that "children scored significantly lower in comprehension in the electronic book condition than in the traditional book condition" (Krcmar and Cingel, 2014, p.272) however they "engaged in significantly more distraction talk, or comments, questions, and answers about the book format and environment, in the electronic book condition when compared to the traditional book condition" (Krcmar and Cingel,2014, p. 276). This indicates that electronic books are more attractive in terms of visual interaction which includes the interactive layout, characters, background, supporting sound effects, and animation. On the other hand the authors concluded that "parents offered significantly more evaluative comments about book content in the traditional book condition than in the electronic book condition" (Krcmar and Cingel, 2014, p. 273), and "children offered more evaluative comments, questions, and answers in the traditional book condition than in the electronic book condition"(Krcmar and Cingel, 2014, p. 276). These quotes show that traditional analog books are more successful in engaging both the parent and the child in the content and morals of the storybook, thus leaving the child with well-established newly learned information. These results clearly state the advantages and disadvantages of each reading media to young preschool-aged children. This supports my thesis by pointing out the benefits of both analog and digital books and how both the parent and the child engage in each type of book.

Limitations of this source include that it is a Western study that is not based in the Middle East on Arab parents or Arab children. Furthermore, it examines each media separately and not in conjunction with each other. However, this source can be applicable to this research as it supports the objectives, by proving that analog books,

digital books, and parent-child joint reading is beneficial in teaching children. Although the source compares traditional analog books and electronic iPad books separately, the information found can be used to create and augmented analog book that brings the best of both media into one, combining the benefits of both traditional and digital books.

In Hirashima (2018), a paper that proposes a digital storybook in the Indonesian language for children of ages 4-5 that can be accessed through multiple digital devices, the author states "Storytelling is one of the suitable approaches to deliver the right information and build the character education of young children" (Hirashima ,2018, p.211). This quote stresses that storytelling is a powerful technique in teaching young children valuable ethics and information. Through the process of designing the digital storybook the author points out that, "The story content presented by utilizing multimedia elements is able to offer more attractive and increase interest for children" (Hirashima 2018, p. 212). This quote indicates that using multimedia elements in storytelling, whether in digital storybooks or augmented analog books, would increase children's interest in the storybook and make it more appealing. The author also states that "The use of multimedia elements (texts, pictures, sounds, animation, and video) in the storybooks can produce educative and interesting contents for children. The optimum presentation of such various contents can produce more meaningful stories. It can be seen that the children were very enthusiastic and enjoy the given story". (Hirashima, 2018, p. 215) this quote suggests that using multimedia elements not only make the story more interesting and enthusiastic for children, but also increases their comprehension of the story, and produce more meaning.

Limitation of this source include that it is specific to creating a storybook for Indonesian children rather than Arab children. Also, the source discusses designing an electronic storybook rather than an augmented analog book. However, this source is applicable to this research as it supports the use of interactive material in book reading. Although it targets Indonesian children, the information about combining multimedia into storybooks to make it more interesting to children is not restricted to Indonesian children and can be applied to any nationality. Furthermore, the

information given about designing the storybook can also be beneficial when designing the augmented analog book.

Similarly, all three sources discuss digital storybooks and not augmented analog books that are interactive with a digital device, in contrast with this research that aims to produce a successful augmented analog storybook. However this limitation that is present in all three sources also serves as an opportunity to create a new product in the market of children's storybooks. Additionally, all three sources and this research are trying to prove that multimedia is beneficial in engaging young children within a story and teaching them linguistic skills. On the other hand Hirashima (2018), Krcmar and Cingel (2014) and this research agree that having an adult-to-child interaction when reading the story book aids in a more successful learning experience.

Through the argument above this research confirms that an augmented analog book can teach children Arabic if designed and used properly. The use of multi-media in children's storybooks can serve as both an educative and interesting teaching method (Hirashima, 2018). Furthermore, reading, especially parent-child joint reading leads to a number of positive outcomes such as stronger vocabulary and literacy skills, and better education (Krcmar and Cingel ,2014).

Research Methodology

In this paper, two research methods were used. First a focus group was conducted on a convenience sample of four Saudi mothers of young children whose ages range from four to seven years old, who are living in Jeddah, Saudi Arabia and are attending international elementary schools. The mothers participating care about reading with their children and want to improve the Arabic language skills in their children. A guided focus group was conducted via What's App), using the participants' personal phone numbers to create a special group for the focus group discussions. The participants fall into the primary target audience criteria of this paper. First they were invited by an invitation message clarifying that this study is ethical meaning their participation is risk-free, voluntary and they can withdraw at any time. The participants were also asked to sign an informed consent form where they agreed for this research to use some of their personal information such as their phone numbers, names, and voice recordings. Afterwards, two sets of previously written questions

were distributed once at a time to the participants. The participants were asked to answer and discuss the questions verbally through recorded voice messages. The first set of questions asked some general questions related to parent-child joint reading such as if the mothers read to their children, and how often, and if they agree that reading to their children improve their linguistic skills. After the participants answered the first set of questions the second set was distributed, which asked if their children are interested in digital devices, what are they interested in, and whether they think that combining digital devices with analog storybooks would make reading more fun and interactive to teach young children Arabic language skills. The data collected from the individuals including their personal information, voice recordings, and the translation of their verbal opinions into text were protected for their privacy and kept confidential for the use of this paper only. These guided questions helped in starting the discussion with the participants more easily and clearly. A focus group was chosen among other research methods because it helped in obtaining detailed and personal information from the mothers about their experiences with their children in terms of their reading habits with their children, their child's interest in digital devices, and their opinion about the outcome of this research which is the augmented analog book.

All four members of the focus group answered all questions of the first set. Even though their answers matched in terms of their confirmation of the information asked, each participant responded to the questions according to her own personal experience. For example all of the participants confirmed that they read to their children and that reading to their children improves their linguistic skills. However the first participant, W.K, said that "Reading to my child is very important to improve his Arabic or English language, the child learns new vocabulary and improves his expressive and imaginative skills through reading" (W. Kabli, *personal communication*). While the second participant, M.A added, "From a personal experience, reading to the child is very important. My child learns new words as they are repeated through the story, along with the supporting visuals, I don't need to translate or explain the meaning of the word whether it is in English or Arabic" (M. Abdu, *personal communication*). Similarly the third participant, D.J, added, "I usually read to my children twice a week. Of course they gain linguistic and even creative

imaginative skills" (D. Jamjoom, *personal communication*). The fourth participant, J.J, on the other hand pointed out that "Reading, especially by the mother to her child develops the love of exploration and curiosity and of course reading develops and strengthens the child's linguistic skills whether in Arabic or English" (J. Jamjoom, *personal communication*).

Similarly, the second set of questions were answered by all four participants in a similar way, while each participant added different information according to her personal opinion that is based on their personal experience. For example, 100% of the participants agreed that their children are interested in digital devices. However, none of the participating mothers pointed out that their child's interest in the digital device is a negative action, rather they saw is as a positive action that could benefit the child. 100% agreed that combining analog books with digital devices is a good idea. Ms. W.K said "All children nowadays are interested in digital devices and they learn good useful information from them, and if we combined traditional books with digital devices it will attract children to read the story in a very effective way" (W. Kabli, *personal communication*). Ms. M.A added that, "Digital devices are widely used by children even in schools. There are special storybook programs that combine, audio, text, and visuals, and they are really effective in teaching and engaging children, however they only exist in English and they are fully digital. I think having an analog book leads to a more sensational reading experience to the child." (M. Abdu, *personal communication*). Additionally Ms. J.J said that "All children nowadays love digital devices and I think that if analog books were combined with digital devices the child will be more interested and curious, and it will help convey the message of the story in a better way" and " It is a great idea to develop Arabic storybooks and make them more trendy, as the Arabic content in the media is not of a variety as compared to English" (J. Jamjoom, *personal communication*). Finally, Ms. D.J said that "If stories were combined with digital devices in a good way, it will be a success because children are attracted to such things, just like the educational animated music videos" (D. Jamjoom, *personal communication*).

Even though the results of this focus group were derived from the participation of four Saudi mothers only; their opinions and the information they have

given can be generalized across the rest of the primary target audience. With 100% of the participants agreeing that the outcome and the purpose of this research could be successful and useful in teaching children Arabic through combining digital devices with analog storybooks, this research can further develop the outcome in terms of the design, content, script, and functionality. Thus, this research can state that when a parent reads to the child, it not only creates a parent-child bond, but also it improves the child's linguistic skills; and is this situation, the Arabic language more specifically. This research can also state that because young Saudi children are highly interested in digital devices, and because their parents think these digital devices are beneficial and the parents care to improve the Arabic language skills in their children, an augmented analog Arabic story book that works in conjunction with a digital device would be a successful product that would teach young Arab children how to read in Arabic in a fun, and interactive way.This research also found out that an analog book is important to create a more sensational, and interesting reading experience. However, even though the participants' were mothers of young children attending international schools, the level of the complexity of the outcome's story and script could not be determined because the children's' level of Arabic proficiency were unknown. As a result, the outcome of this research can focus on only one specific level of complexity that suits one specific level of Arab children who are attending international schools.

The second research methodology in this paper is visual research. Visual research was conducted in order to observe, analyze, and compare previous projects in order to visualize a clearer outcome from this paper. In visual research three projects that are similar to this research's aimed outcome in terms of the concept are observed. However, because no augmented analog storybooks that are interactive with digital devices were found for observation and analysis, this research had to observe both analog Arabic storybooks to analyze the attractive visual styles and suitable script formats for the targeted children age range; and digital Arabic storybook programs to analyze their functionality and the features they contain within the digital program.

The first digital media example observed in this paper is Lamsa. Lamsa is an Arabic entertainment application for young children that contains digital storybooks with supporting audio and animation, Arabic educational games and activities. Lamsa matches this paper's outcome because it uses both stories and digital devices to teach children Arabic. However, some limitations in this project include that it is only a digital device program and does not work in conjunction with an analog book such as this research's outcome.

Figure1. Logo of Lamsa (Lamsa, 2016)

Figure 2. A screenshot from a digital story in Lamsa. (Lamsa, 2016)

The second observed example is Kadi and Ramadi. Kadi and Ramadi is a Saudi publication house that is specialized in publishing Arabic children's storybooks. They mainly publish analog storybooks, however they have a supporting digital program where they digitize their analog storybooks and add features such as animation and audio to the story. Kadi and Ramadi matches the outcome of this project because, it uses both analog storybooks and digital devices to teach children Arabic. They also target Arab parents, and they encourage adult-child joint reading. On the other hand this example is limited in terms of the interactivity between the analog storybook and the digital application; each medium works separately which doesn't match the outcome of this research which is an analog book that works in conjunction with a digital device.

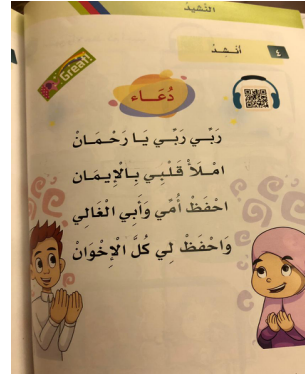Figure 3. Logo of Kadi and Ramadi. (Kadi and Ramadi, 2015)

Figure 4. A photo of a lesson with a QR code from the Arabic language book of the Saudi Ministry of Education for first graders. (*Lughati*, 2018)

The third observed project is an academic Arabic literature book for first graders created by the Saudi Ministry of Education, and is used as part of the Saudi teaching curriculum. The book contains some lessons where children can scan a QR code through a camera of a smart device. When scanned the QR code plays an audio of a song or poem. This technique not only makes it easier for little children to memorize the lessons, but also children were more excited due to the interactivity with the digital device, even though it is only audio. This example matches the outcome of this project because in combines both analog books and digital devices together with a special application, which is very similar to the aimed outcome of this project. The book is also made to teach Arab children Arabic.However this example has some limitations with include that it is an academic book and it is not a storybook, also in combines analog books and digital devices by audio features only; in contrast with this paper which aims to combine features like animation, text and audio with analog storybooks.

The fourth, fifth, and sixth observed examples are Arabic analog storybooks that all share a common limitation by being analog storybooks only and do not have any kind of interactivity with a digital device. However, they all match the outcome of this project by being Arabic analog children storybooks, they have a script that is suitable for the target children are range where the visuals support the vocabulary that are introduced and repeated throughout the script, and they have a visual style that is suitable for young children. They were all observed to analyze the script and to observe the visuals and illustrations of the story.

First a storybook which its title translates into *Caterpillars Don't Fly* is a storybook about a caterpillar that is constantly reminded by her fellow insects that she will never fly, however she keeps telling them that she will fly one day. They never believe her and tell her that she is lazy and al she can do is eat and sleep. Eventually the caterpillar hibernates and wakes up to be a beautiful butterfly

Photo of a spread from the storybook: *Caterpillars Don't Fly*. (Mutlaq, 2

Figure 5. Photo of the cover page of the storybook: *Caterpillars Don't Fly*. (Mutlaq, 2003) Figure 6.

Second a storybook called *Um Salim* (Shamsuldeen, 2000) is about a greedy old lady and her chicken. She feeds her chicken one handful of grains a day, and in return her chicken lays one egg to sell. One day the old lady assumes that if she fed her chicken more it will lay many eggs. The old lady fed her chicken all the grains she had. Eventually her chicken dies from overeating.
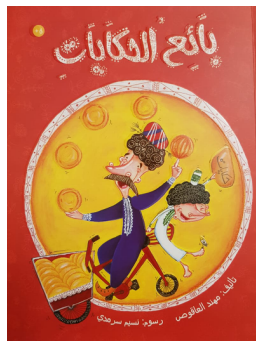

a spread from the storybook: *Um Salim* (Shamsuldeen, 2000)

Figure 7. photo of the cover page of the storybook: *Um Salim*. (Shamsuldeen, 2000) Figure 8. Photo of

Third a storybook which its title translates into *The Story Seller* (Aqoos, 2017), is a story about a boy and his father who sell loaves of bread in their neighborhood. Each day they take their cart that is filled with freshly baked bread and roam the neighborhood to sell it. Everyone bought loaves of bread from then, until one day a

fancy bakery that sells bread, sweets and cakes opened in the neighborhood. After that day no one cared to buy their bread and they went out of business; then the son had an idea of creating a story for each bread loaf based on the cracks that are created on the bread's surface when it is baked. They took their little cart and roamed the neighborhood saying "come buy a story" instead of "come buy bread". Everyone loved the idea and and each person bought a loaf of bread with a story.

spread from the storybook: *The Story Seller*. (Aqoos, 2017)

Figure 9.cover page photo of the storybook: *The Story Seller*.(Aqoos, 2017) Figure 10. Photo of a

The observed analog storybooks are examples that will help guide the design in terms of the visual style and the script format. According to the visual styles, all stories have an attractive visual design in terms of colors, composition, shapes, textures and rendering styles that are suitable for young children. In the storybooks *Caterpillars Don't Fly* (Mutlaq, 2003) (Figure 5) and *Um Salim* (Shamsuldeen, 2000) (Figure 7) appears to have a free-hand illustration style, combining different rendering mediums such as markers, pen and ink, and watercolor. They are not very clean and sharp, which suits children in a better way, because it appears more playful. However in *The Story Seller* (Aqoos, 2017) (Figure 9) the rendering style of the visuals are more complex, but they still show different textures of different mediums such as oil pastels, colored pencils and digital drawing as well. The visuals in *The Story Seller* (Aqoos, 2017) (Figure 16) are also very exaggerated. Exaggeration usually creates more interesting scenes, whether they were static or animated. Exaggeration also makes details easier to identify for little children.

The second step of visual research is creating a mockup of the aimed augmented storybook and test it on a focus group of the primary target audience. The mockup created will consist of a storyboard s that will be later made into the storybook and the digital animated scenes, and a script of the story to test it along

with the visuals of the storyboard sketches.

A focus group was conducted on a convenience sample of four Saudi mothers of young children whose age ranges from four to seven years old, who are living is Jeddah, Saudi Arabia and are attending international elementary schools. The mothers participating care about reading with their children and want to improve the Arabic language skills in their children. The focus group was conducted face to face with the participating mothers. The mothers were told that their participation is voluntary, risk free, they can withdraw at any time, and that the data collected from them will be confidential, and used for the sake of this paper only. The participants were asked to sign an informed consent form where they agreed for this research to use some of their personal information such as their phone numbers, names, and voice recordings. This focus group was conducted in order to test a draft of the outcome's story script, in terms of its complexity, and to test it along with the storyboard sketches in terms of their synchronization with each other. The storyboard sketches were also tested for the rendering style and its suitability for the story plot and script. The participating mothers are the same group of mothers who participated in the first focus group of this paper.

To start the focus group discussion, the aimed outcome of this paper, which is an augmented analog Arabic children's storybook was explained to them in details. Next, the plot of the mockup story was explained to them, and they were asked to view the mockup storyboard sketches. Following, a draft of the script was read to the participants. Then they were asked their opinion regarding the vocabulary of the script. Ms. W.K replied by saying "I think it is better to simplify the script it terms of vocabulary to suit the target age range which is from four to seven, however the script could introduce new complex vocabulary to be taught to the children, because the goal of your project is to teach children the Arabic language" (W. Kabli, *personal communication*). Ms. M.A added " The script should be simpler, and words should be easy to the sound and tongue" (M. Abdu, *personal communication*). Ms. J.J relied by saying " I agree, the words should be simpler to fit the target age range and the illustration style" (J. Jamjoom, *personal communication*). Next the participants were asked about the functionality of the supporting visuals of the storyboard, and whether

the rendering style should be texturized, simple and playful, or realistic and detailed, and what style would be more attractive to the target age range? Ms. W.K said " Personally I prefer childish illustrations that are inspired by young children's' illustration, however the rendering style of the story can mix between both childish and realistic illustrations" (W. Kabli, *personal communication*). Similarly, Ms. M.A said, " When the story has simple childish illustrations, it tends to be more friendly to the child and closer to his/her personality" (M. Abdu, *personal communication*). Ms. D.J added " I like children storybooks that have simple child-like illustrations, whenever the storybook has detailed realistic illustrations I don't tend to buy it" (D. Jamjoom, *personal communication*). Finally Ms. J.J said" I think a simpler rendering style is better, something similar to the storyboards we saw would be a perfect fit for the story and the target age range" (J. Jamjoom, *personal communication*).

Figure 11. Sketch of daughter's 7th birthday. (Jamjoom, 2017)

Figure 12. Sketch of birthday party. (Jamjoom, 2017)

Even though the results of this focus group were derived from the participation of four Saudi mothers only; their opinions and the information they have given can be generalized across the rest of the primary target audience. With 100% of the participants agreeing that the story script should be simple and easy to comprehend and read, and because the targeted children are attending international schools, which presumably makes their Arabic language proficiency low, this paper aims to design an augmented analog storybooks that would teach children how to read Arabic, through a simple vocabulary story script, combined with digital features such as animation, text and audio, thus creating a more enjoyable and interactive reading and learning experience. Furthermore, because the participants of the focus group

pointed out that a simple unrealistic illustration style is closer and more attractive to a child's personality, and because this research observed analog books that have a freehanded texturized illustration styles, this research can specify that the outcome's augmented storybook will follow simple unrealistic, yet texturized illustration style for the characters and their environment in both the analog book and the digital animation.

From this research methodology, this paper learned that Saudi mothers confirm that reading is effective in teaching their children new linguistic skills. This paper also learned that Saudi children are highly interested in digital devices, and this interest is viewed as a positive act by the parents, so as a result combining analog storybooks with digital devices will be a successful technique to teach children Arabic in an interesting way. Furthermore, it was confirmed that parent-child bonding occurs through reading storybooks. This research also learned how complex the script should be for the target children age range, what features should be displayed in the digital augmentation of the book, and what visual styles are appropriate for young children, through observing previous projects, and through testing the mockup script and storyboard sketches of the aimed outcome; which lead to the discovery that a script with repetitive, simple vocabulary, along with unrealistic texturized illustration that show textures of different colors and materials is best suitable for the target age range. Accordingly, an augmented analog book that is interactive with a digital device to teach children Arabic will be designed.

Discussion

Through the research methodology above and the literature review this research confirms that an augmented analog book that interacts with a digital device can teach children Arabic because, it combines the digital media that highly attracts children, with analog techniques that engage and provide a more sensational learning experience to the child in one product. The use of digital devices by children in a positive way, such as multi-media storybooks can serve both as an educative and as interesting teaching method. Multi-media storybooks also make the reading experience more interesting and appealing to the child. (Hirashima, 2018). Furthermore, storybook reading, especially parent-child joint reading not only creates

a strong bond between the parent and the child, but also it leads to a number of positive outcomes such as stronger vocabulary and literacy skills, the love of exploration and imagination, and better comprehension (Kecmar and Cingel, 2014; Phadung et al., 2013).. Through visual research this research found out that the story script should be simple, and the supporting illustrations should be rendered in and unrealistic way combining different textures through colors and materials to engage the children in the story and teach them new vocabulary. Additionally, this research discovered that analog books that are interactive with digital devices are not widely present in the Arabic market specifically, thus, this research may take the opportunity to introduce a new product in the Middle Eastern children storybooks market, that would successfully teach young Arab children how to read in Arabic.

Conclusion, Limitation, and Future work

An augmented analog storybook paired with a digital device using animated scenes, text, illustrations and audio can teach children to read better in Arabic. Combining storybooks with digital devices can improve linguistic and comprehensive skills, and create a bond between the child and the parent. The script of the storybook should be simple for the child to comprehend, but introduces new vocabulary repetitively. However, because the target age range of this research is children of ages four to seven who are attending international schools, it is presumable that their Arabic language proficiency varies, thus it is most appropriate to create augmented analog storybooks with multiple levels of linguistic complexity, however a limitations of this this paper is that it only focuses on producing one specific level that is suitable to teach Arabic to a specific level of children who are of the ages five to six. On the other hand, the illustrations, which play a big role in engaging and teaching the child, should follow a rendering style that is attractive to children. Thus, the primary deliverable of this paper is the Augmented features that will appear in the digital device such as the animated scenes accompanied with audio such as narration and music. These animated features will be related directly to the story, which was introduced in the mockup previously in this paper. The goal of these animated features is to make the process of reading Arabic more interesting and encouraging to children. The secondary deliverable of this paper is the Arabic analog storybook, which

will include all the static scenes with the characters and the full text of the story, that can be scanned by the by the digital device using photo recognition technology to display the digital augmentation of the book. Providing an analog book not only benefits the comprehension of the child, but also creates a more sensational learning experience as the child can touch the book and flip through the actual pages. This outcome would not only teach children new Arabic linguistic skills, but also it would create parent-child bonding by encouraging parent-child joint reading through the use of both an analog book and a digital device. Finally, this product will make the children's use of digital devices more beneficial and less negative.

The augmented analog storybook will be Titled "Toota's Birthday". In the first page of the book, instructions of how to display the augmented animation will be shown. The app that this book will be using to display this feature is an app called Hp Reveal. "Toota's Birthday" is a story about a little girl's special berry birthday cake that her mom bakes each year. On her 10th birthday all the berries were taken by a monster. Eventually the story ends happily when Toota and her mom get the berries, and everyone celebrates together.

In the Future his paper also aims to test the final prototype of the story on a wider audience. Accordingly, a better version of the final augmented analog storybook would be developed and published in order to make children's use of digital devices more beneficial for learning to read in Arabic.

shot of the texture used in the illustration. (Jamjoom, 2
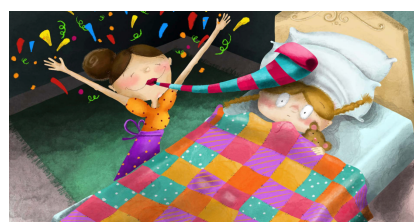

2019)   Figure 14. Color Pallet. (Jamjoom, 2019)   Figure 15. Close up

Figure 13. Cover page of Toota's Birthday Storybook. (Jamjoom,

Figure 18. Photo of the augmented animation feature in Toota's Birthday storybook.(Jamjoom, 201

screenshot of a page in Toota's Birthday storybook showing exageration. (Jamjoom, 2019)

Figure 16. Screenshot of a page in Toota's Birthday Storybook. (Jamjoom, 2019) Figure 17.

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