

The Story of Designing an Educational Mobile Application for Children in South of Jordan

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Most of the current educational mobile apps for children are developed from the perspectives of developed countries. Due to this, many times parents from the developing/underdeveloped countries do not consider these apps fit to their socio-cultural norms. Targeting this concern, we involved the kids, their parents, and their teachers from South of Jordan region in the requirements gathering and the design phases of an educational mobile app. This mobile app would educate and entertain kids through stories while keeping the social-cultural norms of the region. In this work, we present the requirements gathering and the design phase. Further, we provide details of a design evaluation study that we conducted with ten kids at a public school from South of Jordan region to get their feedbacks on our created design and the stories.

Child-computer interaction. Children educational apps. Requirements gathering. Story telling.

1. INTRODUCTION

Due to the increased usage of smart mobile devices (i.e., smart phones or tablets), researchers have developed many mobile applications (mobile apps) in order to use them for educating children of different ages (Donner, 2008). Further, researchers have started studying the influence of these devices on children from the social interaction and learning perspectives (e.g.: Jian et al., 2015; Lee and Wei, 2013; McEwen and Dubé, 2015). These mobile devices and apps, targeted at educating children, advance the emerging field of Child-Computer Interaction, which involves the design, development, and evaluation of interactive computer applications or systems (Hourcade, 2015) to be used by children.

However, most of the times these mobile apps are developed considering the developed countries and their socio-cultural norms. Only few work in this direction have been done from the perspectives of developing countries, especially the underdeveloped regions in these countries. One such example of work was done by Batat heg (2015), where the author conducted a study to see the social influence of iPads on hearing-impaired children belonging to low income families of Saudi Arabia. A common perception amongst many parents from the Middle East region is that mobile devices and apps consume children's time through

playing, without any benefit. Further, they think that these apps could cause health problems such as visual impairment (Batat heg, 2015). Moreover, it is widely believed in such regions that using tablets or smart phones by children could decrease their social interactions and can manipulate their thinking (Batat heg, 2015). That is why many parents in such regions have deep concerns when their kids use these smart devices on daily basis, even for learning objective.

In our work, we involved the kids, their parents, and their teachers from the region of South of Jordan in the designing process of an educational mobile app for children. This region was carefully selected, as it is considered one of the conservative and poor area in Jordan with limited resources. The goal of this proposed mobile app is to cover the commonly-agreed cultural aspects by teaching kids through stories in the proposed app some of the expected behaviours, which are accepted and warmly welcomed by their culture in order to increase their social interactions. The concentration in our work is on the children from the low-income class families from the South of Jordan region. By involving these kids, their parents, and their teachers we can get benefits of adjusting the design of the proposed app as per the socio-cultural aspects of the underlying region, while on the other hand it would encourage these parents and teachers to utilize such mobile apps for educating their kids.

In this paper, first we explain our process of directly involving kids, their parents, and their teachers from the mentioned region for getting their requirements and to build the stories for the proposed educational mobile app, while keeping the socio-cultural aspects in concentration. We also provide some details of the conducted design evaluation study with ten kids at a public school from South of Jordan region, in order to get their feedback about our created cartoony characters and the stories. The findings of this work would help us during the forthcoming development phase of this promised mobile app. Also, researchers and developers would get benefits of this work for designing and developing future educational mobile apps for such under-developed regions.

2. RELATED WORK

Researchers have conducted studies to examine children interaction with mobile devices and apps. For instance, Rhonda et al. (2015) conducted a study to evaluate the extend of the children interaction with an educational context displayed using tablet. Recently, Lanna and Oró (2016) presented the results of a content analysis of the visual and interaction design features of 100 educational apps that were recommended by experts for children aged from 6 months to 8 years old. Their main goal was to discover and promote the quality in mobile apps for children. Crescenzi et al. (2014) studied the factors that lead to a better design for children apps. For example, taking into account the child's development stage when formulating content and activities and then employing an appropriate interaction design to the child's cognitive development. Berggren and Hedler (2014) described the designing, testing and evaluation of CamQuest tablet app for educational practices in pre-schools. The goal was to enable children to search for photograph geometrical shapes in the surrounding using their tablet cameras. While Bonsignore et al. (2010) involved children in designing mobile tools for story creation. Their work suggested the need of those mobile apps that support children' unique storytelling habits, particularly interrupt ability and multimodality. While Batatheg (2015) conducted a study to prove that it is a wrong hypothesis that using smart devices decreases the social interaction of children.

3. INVOLVING END USERS IN THE DESIGNING PROCESS

In this section, we describe how we involved the kids, their parents, and their teachers from South of Jordan region during the process of requirements gathering and designing the stories for the proposed mobile app for children.

3.1 Requirements Collection Process

As a starting point, we collected the initial requirements by interviewing 6 mothers of 7 to 10 years old kids from South of Jordan region. We particularly asked them about their expectations or the list of values they prefer to be contained within the promised mobile app, which helped us in shaping the required values to be contained in our mobile app. Few examples of the values' requirements are: *dealing with each other's feelings respectfully, willingness to help each other, be contented, be fit and healthy, eat healthy nutritious, and follow the parents' directions and advices.*

After collecting the initial opinions, we had the challenge of how to formulate these requirements into a presentable form in the promised mobile app, and to make this presentation form simple, interesting, and intuitive for children. At this stage, we involved the teachers from this region to discuss the collected requirements and to get their opinions about how to shape these requirements in a presentable form that would be interesting for children. Therefore, we managed a focus group meeting with 3 teachers from a school of our targeted region, where most of the students were from the low-income families. In this focus group meeting, we came up with the idea of presenting these values' requirements in a form of famous and interesting stories in the promised app, but adjusting these stories to the local characters in order to make them more familiar for the children of that region.

3.2 Designing Stories

We created stories in collaborating with mothers and one elementary school teacher, who teaches 7 to 8 years old kids in a school at South of Jordan. In total, we composed 5 stories for the first version of our mobile app, where each story provides some values' messages to kids. The collaborating teacher showed us the classroom and explained us how she encourages kids to get engaged with her during the class. She explains that how she uses simple cartoony pictures to enhance explaining relatively complex statement to the kids in her class (see Figure 1).



Figure 1: The simple cartoony pictures used as educational tools in the classroom.

Therefore, we came up with the idea of designing our created stories using simple cartoony characters. Each story in our created five stories had association with a subset of these cartoony characters. For designing the cartoonish characters, we involved an expert illustrator who made drawing of these characters based on the recommendation by the kids' mothers and teachers. We asked this illustrator to draw these characters in some joyful colours and beautiful style so that they can easily be accepted by kids.

3.3 Digitalizing Characters and Stories

The drawings produced by the illustrator were primitive graphics. During this stage, the drawings were imported into the Adobe Illustrator using two layers. A lock was put on the layer holding the drawings. Shapes were drawn using the brush tool (as shown in Figure 2), and then the colours were selected. This process of digitalizing was done for all characters' drawings, earlier produced by the illustrator. Initially, some of the characters looked just like some famous cartoons. Therefore, amendments were conducted to avoid the similarities.

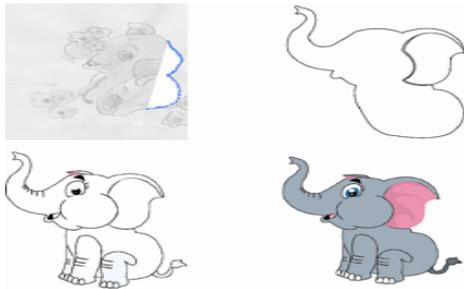


Figure 2: Producing a digital character of the initial sketched character.

At the end, we had total twelve characters. We gave them names commonly known in the region, so that kids will feel more familiarity with these characters. We initially presented these digital characters to a group of 6 kids from the same teacher's school, who was involved in the story creation phase. Based on their opinions, we modified the characters' designs and colours. Then we created story-boards (e.g., see Figure 3) for all the 5 stories and mapped the characters to these story-boards.

4. THE DESIGN EVALUATION STUDY

We conducted a field study in an elementary public school from South of Jordan region. In this field study, we invited 10 kids (6 girls and 4 boys), 7 to 8 years old, to participate in our design evaluation study. The evaluation process consisted of taking these kids' opinions about the characters, the story

line, the used colours and shapes, and the lessons learned from the stories.

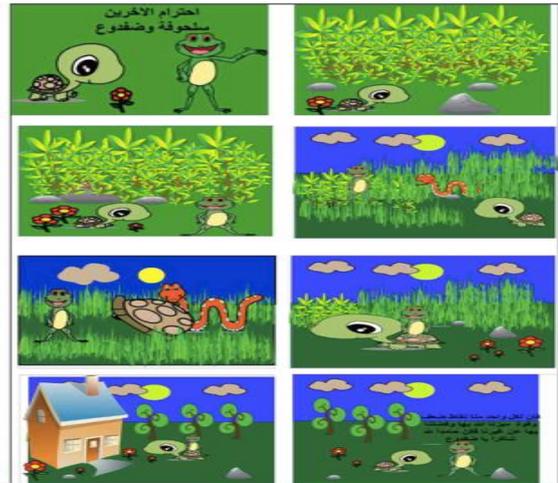


Figure 3: Producing a storyline using digital characters.

The study was executed by presenting the main characters to the kids using data show in computer lab. A storyboard was used to introduce these characters to them. All sessions were video recorded, after taking the permission from the kids' parents. The kids were seated and a researcher read the stories using the data show, as shown in Figure 4. The researcher presented all the 5 stories to kids. The participating kids watched the characters and listen the stories.



Figure 4: The design evaluation study session with the 10 kids from a public school at South of Jordan.

This session took about 45 minutes. Information was collected through observing kids' reactions. After each story, we asked these kids the following set of questions:

- Who are the main characters?
- Does the story need some audio/music in the background?
- Does it need animation or not?
- Does the story contain some learning lessons?

The participating kids were encouraged to give their opinions freely about the characters' designs, their colours, and the story itself, even during the story presentation. Before starting the new story,

we asked them to give their opinions about the previous presented story's moral values.

We observed that kids were excited to the storyline of each picture. They were giving us their feedback during the story presentation about their feelings towards the main characters of the story. They let us informed if they felt sympathy to any of the characters and what was the learned lessons from the story. Also, they gave some initial feedback about the drawn figures and the selected colours.

We observed that most of the kids in this evaluation session were attracted to the used bright colours. They also commented the need of audio or music in the background and animation in some parts to show happy or sad moments during the story.

Overall, kids liked the design of the presented characters, as they felt the used colours were beautiful and joyful. They also wished to see these characters moving in the scene. Currently, we are working on this step, i.e., producing animated version of each story for the promised app.

kids also notified us that some of the characters are similar to some famous cartoon characters. They helped us to identify these characters in order to modify them and to remove any similarity (for example, they recognized the "Anan" character similar to a well-known character). Results of this initial study enabled us to understand the basic ingredients of such educational app for children in such under-developed region and to make a clear shape of the proposed mobile app. We plan to take care of all these feedbacks during the current development stage of the promised mobile app.

5. CONCLUDING REMARKS

In this work, we presented our process of designing phased of a mobile app for children, while keeping the focus on the under-developed South of Jordan region. For this, we involved the kids of 7 to 8 years old, their parents, and their teachers in all the requirements and design activities of this mobile app. The main goal of the proposed mobile app is to respect the socio-cultural aspects of the mentioned region, and at the same time to educate the kids through entertaining some of the society values in order to enable their parents to improve their social behaviours.

We received encouraging feedbacks from the kids, their parents, and their teachers during all the conducted activities. The participated mothers in the design activities were very excited and provided us the feedback that they are looking forward to see the actual working mobile app so that they can use it for their kids. They felt pleased that we have involved them to take care of their socio-cultural aspects, as they feel that most of the available mobile apps do not represent their own culture,

which makes them reluctant to use them for their kids. The design evaluation study provided us valuable feedbacks that we are taking care during the current development phase of this promised mobile app. After developing the app, we plan to make evaluation studies with kids at different schools from the same region. After that, we intend to make it available online.

6. REFERENCES

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