FIRST CYCLE OF USER EXPERIENCE ON ASSISTIVE COURSEWARE FOR YOUNG LOW VISION (AC4LV) LEARNERS

Nurulnadwan Aziz[1], Ariffin Abdul Mutalib[2], and Siti Mahfuzah Sarif[3]

[1]Universiti Teknologi MARA (UiTM), Malaysia, nuruln746@tganu.uitm.edu.my
[2]Universiti Utara Malaysia, Malaysia, am.ariffim@uum.edu.my
[3]Universiti Utara Malaysia, Malaysia, ctmahfuzah@uum.edu.my

ABSTRACT. Reviews from literatures indicate that content application such as courseware which is specifically designed to cater the needs of low vision learners in learning is highly scarce. It was found that most of the existing content applications including courseware focus to the needs of normal student, in which most of this courseware mean too little to the low vision learners in terms of information accessibility, navigationability, and pleasure aspects. Having developed the intended courseware which is called as AC4LV it has to be tested to the targeted subjects. Thus, this study presents the first cycle of user experience testing related to the subjects' behaviors and reactions on AC4LV in effort to make it as one of the effective learning tools specifically for low vision children. It is called as user experience I. In user experience I, 8 subjects with the average age nine to 12 were involved. At this stage, observation was utilized as the data collection method.

Keywords: AC4LV, low vision children, user experience, observation.

INTRODUCTION

As discussed previously (Nurulnadwan, Ariffin, Siti Mahfuzah, & Mohd Saifullizam, 2013; Nurulnadwan, Ariffin, & Siti Mahfuzah, 2014a; Nurulnadwan, Ariffin, & Siti Mahfuzah, 2014b) young low vision learners need learning contents that are specifically designed for them. Courseware is one of the best learning content applications that could fulfill their needs in learning activities (Bocconi, Dini, Ferlino, & Martinoli, 2007). However, previous studies indicate that most of the available courseware are unable to fulfill their needs in learning activities specifically in terms of information accessibility, navigation ability, and pleasure aspects (Nurulnadwan et al., 2014a; Nurulnadwan et al., 2014b). To clarify that, Table 1 summarizes the problems, method of teaching, and materials that are currently used in teaching and learning of low vision learners.
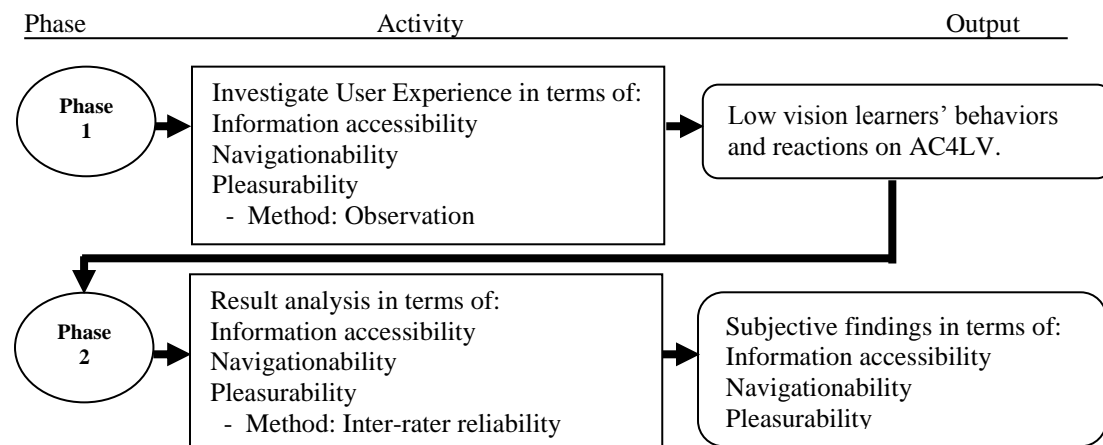
Therefore, this study attempts to fulfill their needs by providing a courseware that is specifically designed catering their needs. It is named as Assistive Courseware for Low Vision (AC4LV) learners (Nurulnadwan, Ariffin, & Siti Mahfuzah, 2014c). Having developed the prototype (Nurulnadwan, Ariffin, & Siti Mahfuzah, 2015), it has to be tested to the targeted users. Therefore the main aim of this study is to investigate user experience of AC4LV in terms of information accessibility, navigationability, and pleasurability. The next section discusses a series of activities involved in this study to achieve the objective.

Table 1. Current Problems and Methods of Teaching and Learning for Low Vision Learners

Details	Problems
Low vision learners	• The low learners face difficulties in grasping the knowledge delivered through conventional teaching method and available courseware. • Their difficulties are in terms of information accessibility and navigationability. • Due to facing a lot of difficulties, these influence them not to have pleasurability in learning activities.
Teaching method	• Conventional teaching methods are similar with normal students which are conducted in class or computer lab.
Material	• Typical text book, flash cards, book with pictures (i.e. big size), demo from the teachers, Close Circuit Television (CCTV), magnifying glass, online TC (i.e. nursery rhymes).

MATERIALS AND METHODS

In this study a series of activities were carried out, as shown illustratively in Fig 1. The figure explains that this study involves two phases of activities which are investigate user experience, and result analysis (Nurulnadwan, Nur Hazwani, & Ariffin, 2011). The activities involved in the first phase include observing the subjects behavior and reaction while using the AC4LV. While observing, the subjects' behaviors and reactions were recorded in the form of note taking, photographs, audio, and video. The second phase is result analysis, in which all the gathered data were transform in the form of transcripts. The transcripts were then given to two experts to review and validate prior to analyze it. It is called as inter-rater reliability. Having finished the second phase, the whole objective of this study is achieved.

Figure 1. Summary of Activities

Sampling and Sample Size

The subjects in this study were selected by utilizing purposive sampling as it focus on particular characteristics of a population which means the subjects are homogeneous (Teddlie & Yu, 2007). The particular characteristics focuses in this study are the subjects were low vision learners from standard three to six with the average age nine to 12. The focus of purposive sampling is the sample being studied is not representative of the population, but the sample being selected which enable the study to answer the research question (Battaglia, 2011).

Qualitative study only require a few data records (Sabrina, 2012) which is inline with Miles's and Huberman's contention that the most useful generalizations of qualitative studies are analytic not sample-to-population (Miles & Huberman, 1994). Also, there are no firm guidelines for sample size in qualitative study (Patton, 2002). In this study, the sample is composed eight subjects in user experience I. The sample size has provided sufficient data to respond to the research question, although the quantity is limited. As noted by Patton (2002) "qualitative inquiry typically focuses in depth on relatively small samples, even single cases (n=1), selected purposely".

RESULT AND DISCUSSION

In this user experience I, two research assistants were employed to assist the researcher in setting up the testing. Having setup the AC4LV on the desktop as well as other equipment for observation, the subjects were asked to sit next to each other as comfortable as they prefer. It has to be emphasized that getting natural setting of learning environments is important for this study to obtain the truthful results. Each of the subjects was attached to one desktop that was equipped with headset individually. Getting familiar scenario is important for qualitative study to obtain the valuable and truthful data. This is highly important in avoiding the subjects feeling weird, afraid, or stressed during the testing.

The Demographic Background of the Subjects

Testing of user experience I was conducted at Special Education Primary School of Alma (Visual impairment). As tabled in Table 2 there were eight subjects involved in the testing; six of them are male (75%) and the remaining are female (25%). This number of subjects is sufficient in qualitative study (Miles & Huberman, 1994). Most of the subjects have been introduced to computer since they were in standard three except for Subject 1, who mentioned that he learned to use computers since he was in pre-school. Also, all of them have experienced using online TC in school such as learning ABC, numbers, shapes, and school rhythm. All of them are exposed to the courseware as their school is specifically designed for VI learners which are complete with the required facilities. Figure 2 and Figure 3 illustrate the percentage of experience of using computer and experience of using TC.

Table 2. Demographic Background of the Subjects involved in User Experience I

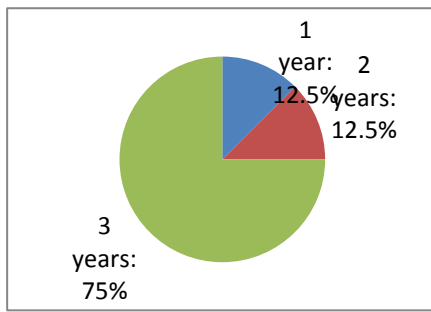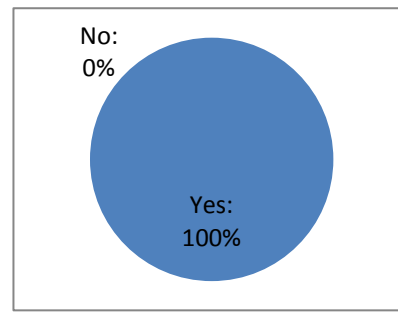| Subjects	Age	Gender	Race	Level of School	Experience of using computer (years)
Subject 1	9	Male	Malay	Standard 3	3 years
Subject 2	10	Male	Chinese	Standard 4	1 year
Subject 3	11	Male	Malay	Standard 5	2 years
Subject 4	12	Male	Malay	Standard 6	3 years
Subject 5	12	Male	Malay	Standard 6	3 years
Subject 6	12	Male	Malay	Standard 6	3 years
Subject 7	12	Female	Malay	Standard 6	3 years
Subject 8	12	Female	Malay	Standard 6	3 years

Figure 2. Experience of Using Computer

Figure 3. Experience of Using TC

ANALYSIS OF FINDINGS ON USER EXPERIENCE I

The findings on user experience I were analyzed based on three themes: (i) information accessibility, (ii) navigationability, and (iii) pleasurability.

Theme 1: Information Accessibility

User experience I investigated the information accessibility on the extend the low vision learners perceive the usefulness of texts, audio, graphics, animations, transitions, and inter-face layout. All those codes were gathered through their behavior while using the AC4LV. Their perceived usefulness on texts, audio, graphics, animations, and transitions were detected when the subjects were found speaking-aloud the content (i.e. "*Topik 4... Bunyi Haiwan*"). In particular, Subject 1 and Subject 2 express-aloud almost all the contents loudly. They also commented about the graphics (i.e. "*hi hi the butterfly is so beautiful*"). An example of the scenario can be seen in Figure 6.4. While the remaning subjects were also speaking-aloud softly. Sometimes, they also imitated the "Smiley" actions and sound effects (i.e. Smiley jump into the screen with sound effect "*toink, toink, toink*"). While using the AC4LV, all of them were found comfortable with their sitting. All this behavior and reactions indicate that the subjects have no problem in accessing the information in the AC4LV, which means they were able to see the texts and graphics, to hear the sound, and to capture the animations and transitions. On the other hand, through their ability to distinguish between texts, graphics, and menu it indicates that the subjects were able to accept the designed interface layout. This means that the interface layout of the AC4LV could assist the low vision learners in accessing the information presented on the screen.
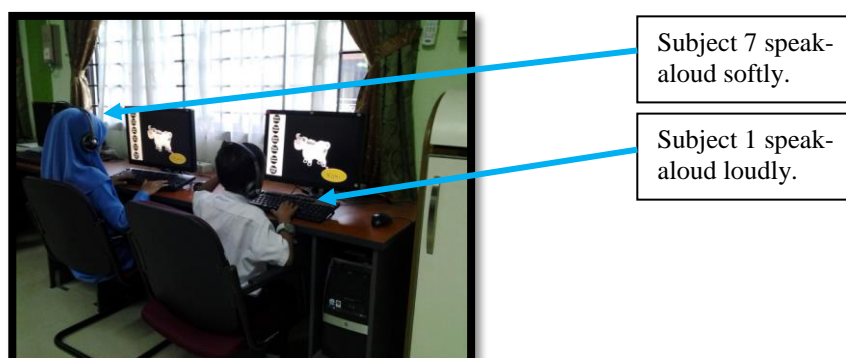

Figure 4. Speak-Aloud the Content

Theme 2: Navigationability

Navigational button, interface layout, and general interaction are codes found in theme 2; navigationability. All the subjects were found able to recognize the buttons. In fact, they pressed the buttons in advanced confidently by skipping the instructions after they got familiar with the AC4LV. They were able to have self interaction. This means the provided button in the AC4LV are able to assist the low vision learners in navigating the content in the AC4LV. Also, in terms of interface layout, through their ability to identify the content area and menu area, the subjects were found are able to navigate the AC4LV on their own without any interference or assistance from anybody (Figure 6.12). They were found confidently pressing the keys on the keyboard, showing that they have no problem in interacting with the AC4LV. This also indicates that instructions provided in the AC4LV are acceptable, which could guide the low vision learners to interact and navigate the content of AC4LV. Thus, navigational button, interface layout, and general interaction in the AC4LV have met the needs of the low vision learners in navigationability.
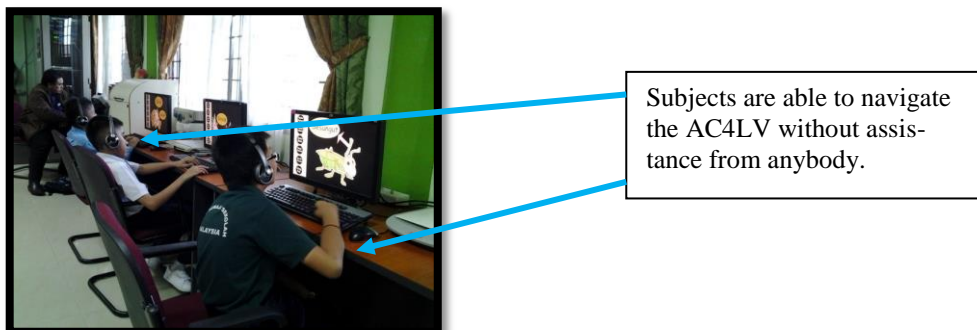

Subjects are able to navigate the AC4LV without assistance from anybody.

Figure 5. Navigate the AC4LV

Theme 3: Pleasurability

After installing the AC4LV in each computer and setup the subjects' position, Subject 3 and Subject 4 started the AC4LV without the permission from the researcher. Eventhough after the researcher requested them to wait for the minutes, Subject 4 asked the researcher *"teacher can I start?"*. This explains that the subjects were enthusiastic and excited to try new things which also indicate that the low vision children have similar behavior with normal children when they face new technologies. Simultaneously, it also indicates that curiosity was also in their mind. Throughout the experiment, all the subjects were found concentrating and stayed focus on the content. This means that the subjects were interested with the AC4LV. It is because they had no problem with information accessibility and navigationability which made them to feel released in learning.

Enthusiastic, excited, curiosity, and interested are positive behaviors that lead the low vision learners to feel pleasurability as well as have no pressure while using the AC4LV. All subjects were able to follow the contents without any pressure. They were relaxed and enjoyed learning all the contents comfortably (Figure 6). On top of that, Subject 1 was found communicating with his peers; Subject 7, Subject 5, and Subject 8 to clearly understand about the content. Besides, Figure 7 depicts a picture of Subject 7 who was looking at her peers' screen to ensure that the content is similar. This means AC4LV led social interaction among the learners, which sometimes made them laugh. This indicates that the AC4LV could entertain the low vision learners in learning. When comes to Topic 5 "*Gerak Haiwan*", all the subjects were found enjoying the song. Subject 1 and Subject 2 sang the song loudly. Meanwhile,

the other subjects sometimes sang it loudly and sometimes softly. Their voices were bobbing. They also imitated the "Smiley" voice (i.e. "*Hai kawan-kawan…*") and imitated the animals' sound, explaining that the subjects were enjoying the contents in the AC4LV. Besides, instead of enjoy, the subjects were also laughing when they heard the cows' mooing, indicating that the sound effects are humourous. They were also laughing with the "Smiley" response when they got wrong answer. For them it was glee. During the experiment, the subjects were found smiling especially everytime the "Smiley" appears on screen. This indicates that the AC4LV was amusing. After scoring 100% for the activities, the subjects clapped their hands. This indicates that they were happy. Enthusiastic, excited, curiosity, interested, released, comfortable, enjoy, sense of humor, amused, and happy are the behaviors found during the observation of user experience I which indicate that the AC4LV is pleasure.

Figure 6. Subjects Concentrate on the Content Comfortably and Relax

Subject 7 look at his peers' screen ensuring that the content is similar.

Figure 7. Ensuring the Similar Content

CONCLUSION

In the user experience I, each of the subjects experienced the AC4LV individually. It was observed that through their behavior and reactions the AC4LV caters to their needs in terms of information accessibility, navigationability, and pleasurability. This paper only discussed the data gathered through observation. It is believed that semi-structured interview is also important to support the findings which will be discussed in future works of the study. Also, in achieving the saturated results user experience II will be conducted at the similar location.

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