

ARTICLE

# AIDING AUTISTIC CHILDREN LEARN ARABIC THROUGH DEVELOPING AN ENGAGING USER-FRIENDLY ANDROID APP

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## ABSTRACT

Study via cell phone technological innovation for children and also teenagers is designed suitable for healthy children as well as children with bodily and also psychological disabilities. Resulting from innate health issue of autistic children they comprehend idly which consists of poor communicating proficiency and split attention over the course of study procedure for instance Arabic alphabet. Thus, this article focuses at recommending a conceptual system that perceives the style as well as design challenges driven by preferred approach of tutoring to ensure it is more appropriate by blending the entertaining platform which includes audio, video and animation.

## INTRODUCTION

Autism is known as neurodevelopmental disorder which disturb the way of communication, emotion expression, thinking, sociability, language, behavior, and imagination[1]. Based on IQ and verbal or non-verbal communication disability High-Functioning Autism (HFA) and Low-Functioning Autism (LFA) exists[2]. It is reported that in 2010, the United State data indicates children with autism disorder as 1 in 68 [3]. Autistic children with low emotional control show aggressive behavior while not able to focus on learning sessions during teaching[4][5].

This paper aims to present a conceptual idea of autistic children application for learning Arabic alphabets with the aid of interactive element and augmented reality enhancement. A number of researches had been performed to support the learning process of the autistic children[6],[7] [8]. There are also studies that implementing augmented reality from various aspect in application built for the children with autism[9],[10][11].

## MATERIALS AND METHODS

The following [Fig. 1] shows the methodological frame work. Two facilities at Selangor and Malaysia were consulted to put together suggestions and even interviews.

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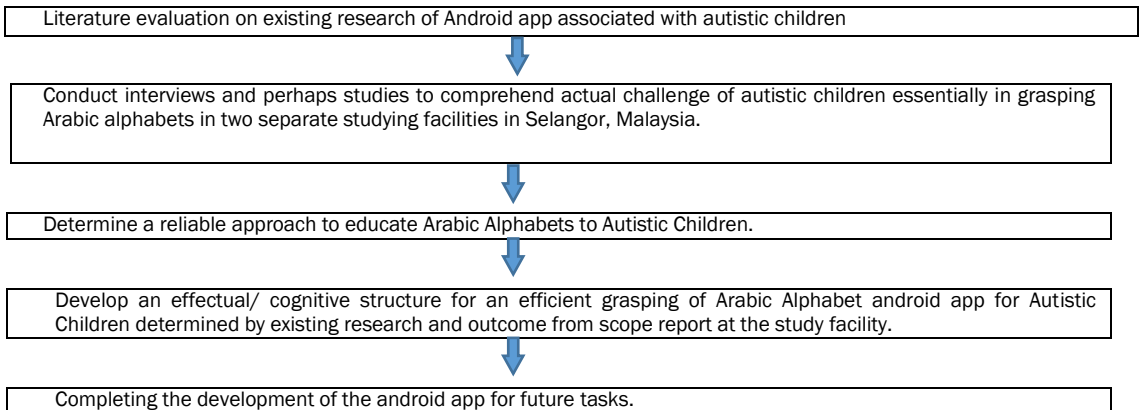


Fig. 1: Methodological frame work.

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### Literature review

To gain attention it is vital that the children must find interface of application attractive and graspable visual language so fakih method was introduced[6]. Researches have been made on qualitative and quantitative approaches of design according to autistic children profile. It has been found that the multimedia like video, animations and images are quite attractive for the autistic children while attraction may vary as human nature varies[8]. Several prototypes of digital game-based learning where listening, arranging, constructing and pronunciation skills were emphasized [7]. A mobile game application to teach a skill known as multiple cue was introduced which was initially refused but finally accepted when teacher shows how to play [12].

### Interview and observation at the learning center

Interviews conducted between two lecturers from Anjung Kasih, Bangi and two lecturers from Akademi Fakh Inteltek, Petaling Jaya. From the interviews, it is most certain that the autistic children have the ability to recall swiftly through Digital Pen Audio comparing other approach. The child has the ability to recall name of the alphabet though the child seems to have challenges in recalling the signs involved with the alphabet. In Iqra' approach; the children conjointly would be instructed methods to study the alphabet with the signs involved. Foremost, each alphabet would be instructed with top sign amid the pronunciation. After covering this top sign, subsequent tutorial to persist and replicate with bottom and front signs aiding in pronunciation for the whole distinct alphabet.

The following [Table 1] summarizes the observation on the autistic children and the current progress using existing teaching method.

**Table 1:** Autistic children observed at the center

Farhan (9 years old)	Fariz (9 years old)
<ol style="list-style-type: none"> <li>Using digital audio alphabets, but must guide by teacher and read together</li> <li>Repeat 2 to 3 times and break time</li> <li>Reward is a must after performed every task: reward given : play puzzle or hold a straw</li> <li>Current progress in identifying arabic alphabets: Alif to Jim alphabets names</li> <li>For identification process, the child introduce to Alif and Ba. Then, to test either the child can remember or not, a distractor included such as by introducing other alphabets, if he can remember Alif and Ba without fail, thats indicated he can remember well. The level of distractor depends on the autistic level.</li> <li>Learning session must be alternate with other activity such as writing activity during test of identification to avoid the child get bored</li> </ol>	<ol style="list-style-type: none"> <li>Using digital audio book and able read without teacher</li> <li>Repeat 2 to 3 times and break time</li> <li>Reward is a must after performed every task: reward given : jump on trampoline</li> <li>Current progress in identifying arabic alphabets: can recognize all alphabets names, so introducing to alphabets with signs</li> <li>The child is introduced to the three signs for a single alphabet directly. Example ! i straightforward with one shot lesson, to avoid confusion.</li> <li>Learning session must be alternate with other activity such as writing on a sheet together with pronunciation and intentionally hide the sheet.</li> </ol>

### Selection of learning method

There are various ways to tutor alphabets in Quran designed to be integrated in the app this includes Al-Furqan, Iqra, Al-Baghdadi, Al-jabari, and Qiraati although Iqra was meant for feasibility study. [Table 2] describe briefly about the methods to tutoring Alphabets in Quran.

**Table 2:** Methods for tutoring Arabic alphabets

Approach	Explanation
Al-Furqan	Offers learning method with only 14 Arabic characters which are selected on baby's first speech sounds which provide tones understood by newborn babies right after birth[13].
Iqra'	Iqra' method emphasis the teaching of reading Quran through the phonic method[14].
Al-Baghdadi	Marginal approach to muqaddamand iqra. A research was already held in Kuala Lumpur Tahfiz.
Al-Jabari	Practically, after 30 hours of learning Al-Quran through Al-Jabari method, the students might be able to read and write appropriately[15].
Qiraati	The method is from Indonesia alternative to Iqra brought through Malaysian Islamic Youth Assembly(ABIM) [16].

## RESULTS

### Development of a conceptual framework for android application

#### Interactive Multimedia

Attractive element of the application is called multimedia interactive. Visual, animation, video, audio and colorful display can be integrated in an application. Interactive and systematic visualization are suggested as main aspect of teaching for austictic children in order to attract attention[6]. Integrating the visual and audio learning system does not overload the limited working memory capacity of the autistic children so multimedia interactive van be proved a great solution to autism split attention[1].

#### Persuasive design

It is an established actuality and confirmed from the scrutiny that the autistic children are unable to actively focus for an extended time therefore their attentiveness is reached employing persuasive model

and this is a medium to sustain lasting attentiveness of autistic children to indulge in the studying app possibly in the kind of incentive or perhaps any kind of component of revitalizing or beneficial.

**Handwriting**

Due to motor abilities the handwriting impairment can be faced so by giving reward after completing task can motivate them sorting out the issue [17, 18]..

**Separation of categories**

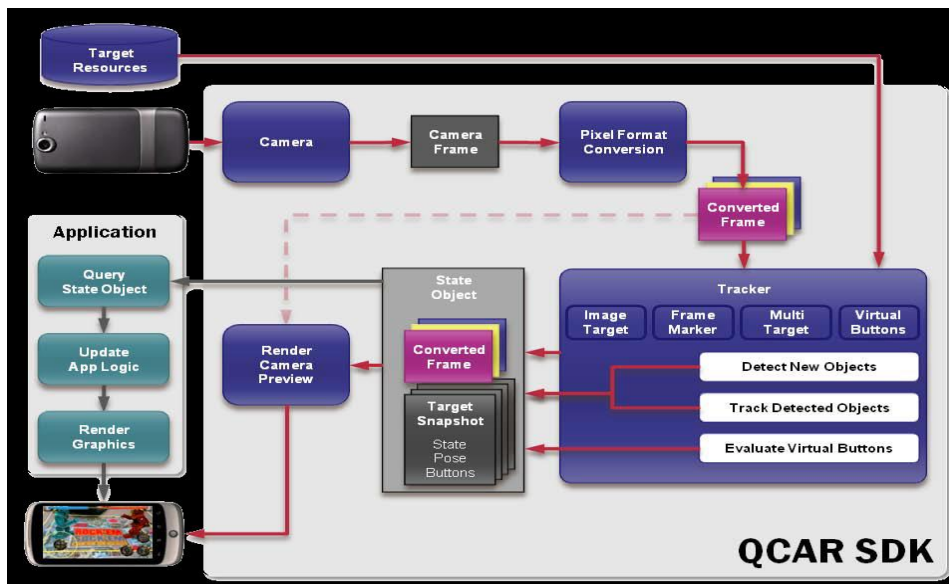
Dividing the alphabet with signs or without signs might be ascertained so induction of without sign alphabet after alphabet with sign can become proved to be more suitable approach after perception in the interviews.

**Augmented Reality as application’s additional feature**

The problem statement is to deal split attention so AR and interactive game is introduced to focus virtual and real admix.[19]Augmented Reality (AR) can be defined as a tool that allow virtual objects to overlaying real environment, coexist in the same view which result in a meaningful way of experiences. AR users used computers or HMD earlier [20-23. Medical visualization, maintenance and repair, annotation, robot path planning, entertainment, and military aircraft navigation and targeting and education are specified with AR.

**Development of AR**

To develop an AR for Arabic alphabet in the application, this study used Unity and one of the library of AR which is Vuforia. Autodesk 123D is used to create 3D alphabet and additional arts and decoration such as animals and cars. This study used marker-based to track instead marker-less which requires advance programming and setting. [Fig. 2] shows a workflow of how AR application to be developed.



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Fig.2: Vuforia workflow.

Vuforia uses following steps:

- a. Capturing pictures,
- b. tracking for marker detection,
- c. conversion into RGB565 format,
- d. evaluation by tracker
- e. accessible by application code,
- f. rendering to video background,
- g. output files are in binary file and an XML file and combination of application

**CONCLUSION**

This paper clarified the significant of developing an effective application for autistic children which mainly cause by inherent issue of split attention especially during education purposes [6]. The study focuses on how interactive technology motivates the learning experience of autistic children in the future.

### CONFLICT OF INTEREST

No conflict of interest

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