

Contents

List of Figures	iii
List of Tables	iv
1. Introduction.....	1
1.1 Overview	1
1.2 Aims and Objectives	2
1.3 Research Questions	2
1.4 Structure of the Thesis.....	2
2. Background.....	4
2.1 Autism.....	4
2.2 Autism and technology.....	4
2.3 Autism and mobile technology.....	7
2.4 Related work.....	10
3. Picaa.....	13
3.1 Objectives	13
3.2 Activities	14
3.3 Examples of Picaa Activities	20
3.4 Adaptation methods.....	21
3.5 Picaa case study	21
4. Methodology	22
4.1 Research design.....	22
4.2 Materials	22
4.3 Evaluation.....	23
4.4 Participants.....	23
4.5 Instruments	26
4.6 Procedures	26
5. Results	27
5.1 Skills survey's results	27

5.2 Activities Usage Survey's results	28
5.3 Samples analysis.....	28
5.3.1 Subject A	28
5.3.2 Subject B	29
5.3.3 Subject C	31
5.3.4 Subject D	32
5.3.5 Subject E.....	33
6. Discussion	35
7. Conclusion	38
References.....	40
Appendices.....	44

List of Figures

Figure 3.1 Creating New Activity.....	14
Figure 3.2 Example of Association Activity	15
Figure 3.3 Example of Puzzle Activity	16
Figure 3.4 Example of Exploration Activity	17
Figure 3.5 Example of Memory Activity.....	18
Figure 3.6 Example of Sorting Activity	19

List of Tables

Table 4.1 Description of the samples.....	24
Table 5.1 Results of Student's Skills Questionnaire	27
Table 5.2 Description of the percentage of activities usage.....	28
Table 5.3 Subject A's results	29
Table 5.4 Subject B's results	30
Table 5.5 Subject C's results	32
Table 5.6 Subject D's results.....	33
Table 5.7 Subject E's results.....	34

Chapter 1

Introduction

This chapter presents the importance of using mobile apps, specifically the ipad, in educational process for autistic students. Also, it states the aims and the objectives of the presented case study. In addition, the research questions for this study are mentioned as well. Moreover, in this chapter, the thesis structure is identified.

1.1 Overview

Individuals with autism have issues in social communications and their behaviours are repetitive, restricted, and stereotyped (Doenyas et al. 2014). Chapter 2 presents autism definition in more details.

Nowadays with the continues increasing in numbers of autistic children (Centers for Disease Control and Prevention. n.d.), many technologies appear to assist them in improving their social abilities.

Previous researches approved that using technological devices in teaching children with autism has more advantages over the traditional techniques. It was observed that individuals with autism become more motivated and attentive when they are using educational software programs. Based on these advantages, the ipad with its portability and easy to use touch screen offers entertainment in learning for children with autism (Doenyas et al. 2014). The ipad becomes more common due to its availability in the market and the cost effectiveness (Alliano 2012) and its widely utilized and has emerged as a common educational technology for individuals with ASD (Neely et. al. 2013).

As there are few researches have been discussing the importance of mobile apps in the Arab world in general and UAE in particular, this case study is an introduction to build educational basis for the autistic students using mobile apps technologies.

1.2 Aims and Objectives

The presented case study is based on an experiment that was conducted in Spain by FernáNdez-López et al. (2013) for students with special needs. The study evaluated the effectiveness of mobile application using the ipad called Picaa.

In this dissertation the case study is designed to measure the development of the autistic student's skills after using the ipad as a part of his/her learning operation. There are two main hypotheses that will be verified at the end of this study:

H1: Mobile app improves the main learning skills for children with autism in UAE setting.

H2: Learning purposes of children with autism are supported with mobile app's activities.

The student's improvements are measured using pre and post tests and the observation sessions recorded by educators throughout the experiment. The case study took place in Sharjah Autism Centre. The duration of the study was one academic semester in Sharjah Autism Centre (4 months) starting from September till December 2014.

1.3 Research Questions

The main target of the thesis is to find out the answers for the following research questions:

- Can mobile apps improve the scoring of UAE students over the 5 main skills?
- What challenges and difficulties are faced in practice when introducing students with special needs to such educational apps?
- What is lacking the current available apps with respect to the needs of Arab students?

1.4 Structure of the Thesis

The dissertation is structured as follows: chapter 2 explores the background about Autism and technology in general and then the mobile technology use. In Chapter 3, the ipad and its effectiveness in learning process for Children with ASD is shown through the recent researches and studies. Chapter 4 describes Picaa application that was applied in this case

study. Chapter 5 describes the research design and what are the procedures that were used to set up the experiment. Chapter 6 includes the result of the case study of using Picaa app on the autistic children. Chapter 7 presents the discussion and the analysis of the outcomes and the key findings of the case study. In addition, the main benefits of the proposed application on the educational techniques for children with autism are also included in this chapter. Finally, chapter 8 presents the conclusion and future work.

Chapter 2

Background

This chapter provides background about various topics including autism, autism and the used technologies and the mobile technologies that implemented to enhance the learning skills for children with autism. Also some of the researches that describe the effects of ipad on the autistic students are included.

2.1 Autism

Autism spectrum disorders are the disorders that influence initially communication, social and language skills for an individual (Lord & Volkmar 2002). Children with autism face difficulties in expressing their feeling and needs by relying more on using literal instead of the contextual meanings of words (Grynszpan et al. 2008). In addition to these characteristics, autistic individuals might have inappropriate behaviors as a consequence of lacking in social and communication skills such as self-injurious behaviors and tantrums. However, despite the deficits that these individuals suffer from, the individuals might be different among each other. For example, some of them don't have functional speech while others might have excellent language skills (Ploog et al. 2013).

2.2 Autism and technology

There are many technologies that were developed to assist the autistic children as explored in this section. Most of the embodied conversational agents are based on emotions and personality while the social and interpersonal aspects play main role in building emotionally intelligent tutors. In addition, it's not easy to figure out the mental state of a student. It depends on expectation of how a student behaves in certain situations & the record of previous interactions as well. That's why Heylen et al. (2003) have developed a tutoring system called INES by adding new components about tutor's social and emotional intelligence skills. The aim is to present a tutor agent that takes decisions based on the

mental state of the student state by constructing student model. Student model consists of 4 main variables: mental state, emotion axis, social emotions and interpersonal aspects. Also, the model used communication driven approach.

Another technology that focuses on the difficulties in communications and social interaction skills that may affect the academic and social achievements for children with ASD is the AVP. Using AVPs (Authorable virtual peers) Tartaro and Cassell (2006) conducted a pilot study on girl with ASD (8 years old) that examined her verbal and nonverbal behaviour and then compared the result with typical development children. AVPs are language –enabled, 3D life sized animated characters and are able to interact and respond to children’s input. AVPs depend on 3 interaction modes: interact, control and author that led to three interaction practices: rehearse, observe and construct. As a result, AVPs help children with ASD in developing their communication and social skills.

Continuing on the same technology as children with ASD have difficulties in learning from social interactions with peers previous researches focused on interactions between ASD children and adults. Therefore, Tartaro and Cassell (2008) examined the relation of collaborative narrative between children with ASD and typical developing (TD) peers and virtual peers and the differences abilities of children with ASD in dealing with TD and virtual peers. In this research data were collected from 6 high functioning children with ASD. Their ages were between 7 and 11 years old. Virtual peer which is a life sized animated child was using theory of mind (ToM) test. As the autistic individuals face difficulties in understanding that each individual have their own beliefs and desires various from each other, Theory of mind assessment is helping in understanding this concept. One of the significant findings that over the interactions between the children with ASDA and peers, contingent discourse were increased with virtual peers more than human peers.

Further to the previous technologies, day by day the explored systems and techniques for children with ASD become more specific and close to the main deficit that they suffer from. As children use multimodal sides of communication to express their social communication skills such as: gaze, facial expression and gesture Foster et al. (2010) proposed a system called ECHOES that is introduced as multimodal learning environment that assist children

with autism to explore and enhance their social interaction skills. SCERTS assessment model (social communication, emotional regulation and transactional support) used in ECHOES. ECHOES takes place in sensory garden with embodied virtual character that interacts with the child. ECHOES monitors the child's actions using computer vision to estimate the child's gaze orientation, express gestures using multi touch screen and estimate the affective user's state in real time. ECHOES consist of 4 main components:

- Visual processing: to track gaze behaviours.
- Multimodal fusion: create higher level multimodal events by collecting messages from the individual channels.
- Intelligent engine: provide users with meaningful learning activities.
- Rendering engine: responsible for audio visual output & low level interactive behaviour.

Moving forward to another technology, Since children with ASD are suffering from social impairment such as emotional expression and reciprocal social interaction, Tentori and Hayes (2010) applied a case study on 3 public schools that use social skills curriculum (26 lessons) that depend on behavioural and cognitive theory (the social compass). There were 14 children between (8 to 10 ages) who participated. As a result, this study presented the concept of interaction immediacy: social cues that provide signs about potential interactions, support proactive interactions and maintain the children engaged in different social contexts. These social cues support the children with ASD to interact immediately with any social situation that might face them outside the classroom. In addition, the study presented design principles for Ubicomp applications to support interaction immediacy concept. Moreover the interaction immediacy concept and the principles were validated in the study by presenting the Mobile Social Compass design. As a result, using interaction immediacy concept enhances the students in the following: identify their communication partner, interact with conversation initiators and maintain space proximity.

Based on Jensen, Wilson and Jordine (2011) Intelligent tutoring system (ITS) are designed for large categories of ordinary students but can't be used for individual with special needs who have their own individual educational plans (IEP). .

They proposed that the ideal ITS for children with special needs should consist of: EPA (Embodied Pedagogical Agents) that have a sensitive parts , Heart rate variability (HRV) to detect an acute anxiety case during the tutoring session, adopt the lesson content based on IEP for each student and system learning to keep track about every student case. With all the previous content, the system provides easy and effective means of control for teachers. ITS with EPA & DI can provide students with special needs with the necessary fundamentals for their academic achievements.

2.3 Autism and mobile technology

In this section some of the main mobile technologies that were implemented and offered were explored.

First of all, based on Picture Exchange Communication System (PECS), De Leo and Leroy (2008) developed software that can be used on smartphones. While PECS consumes time and efforts in preparing printed and laminated pictures to customize them depend on the ASD student needs and personality, the new software overcomes these issues. The software allows the students to form sentences by using their fingers to move the images and combine one sentence. Also, it offers flexibility in assisting teachers in customizing the pictures based on the preferences and interests for each student. This flexibility that saves time and efforts that used to be wasted in creating personalized cards.

Another effective mobile solution is called Mocoto that is a "mobile communication tools for children with special children" designed by Monibi and Hayes (2008). The first prototype from Mocoto was implemented on Nokia N800 cell phone. Mocoto comes with preinstalled cards that offer a comprehensive library. The user can add or create customized images that can be labelled with a name and meta-data which make it easy for searching and categorizing each image. Students with special needs can use the touch screen for the interaction with system.

Among the community of individual with special needs, mobile technologies became popular. Mobile devices are functioning as augmentative and alternative communication (AAC). They produce very supportive and effective features such as being affordable and a learning device that can be portable and used anywhere and anytime. Recently with the touch screen feature, mobile technologies play main role in offering practical communication assistants for autistics individual who have weaknesses in their motor skills (Yee 2012).

Moreover, most of the assertive technologies are designed to be used inside the classrooms which cause confusion to ASD children in how to generalize what they learned inside class to real situation outside the classrooms. For that reason Escobedo et al. (2012) set up an experiment that took place in South California at a public school. The participants were 12 students from both individuals with ASD and normal students. The experiment lasted for more than 7 weeks. This study presented an application called "Mobile Social Compass (MOSOCO). MOSOCO is a mobile assistive application that extends the Social Compass training and supports real-life social situations". This application showed positive results on the sample that increased the students' social interactions, reduced behavioural missteps and impacted effectively on children's social groups.

Another research was conducted by Husni and Budianingsih (2013) who designed an application for vocabulary learning specifically for children with autism using mobile devices that operate using Android operating system. The design is a client server application that offers various materials including pictures, cartoon characters and music that the child like or preferred which simplify the way of learning new vocabs. As a result, 60% of users were satisfied and recommended the use of the proposed application as a learning tool.

Day after day, iOS devices prove how they are powerful technologies that can be used to support the learning process of the individuals with ASD. FernáNdez-LóPez et al. (2013)

selected the iOS devices that include iPod touch, iPhone and iPad to operate their application that designed for students with the special needs for the below features:

Accessibility: easy to use with zoom and gesture based screen reader and high features.

Ease of acquisition: due to the success of iOS family devices have in the market, this supports the continuity of these devices for a long time. Moreover its easy to find them in shops and they are relatively inexpensive.

Touch screen: multi touch device can detect with high quality responsiveness the natural interactions using means of gestures. It's based on finger use rather than stylus use that is not required any learning skills and it is ideal for cognitive disabled users.

Mobility: activities can be performed at anytime and anywhere by the users

Design: minimalist design that has one button only at the front.

Connectivity: support work group and allow using Wi-Fi network or Bluetooth connectivity.

Varied interactions: innovating interactions can be done thanks to the built-in accelerometer that detects movements such as rotation or shakes.

2.4 Related work

This section explores some of the researches and case studies that used the ipad in the learning processes for the children with autism.

Earlier researches prove that involving technological devices in teaching concepts for children with autism has various advantages over the traditional teaching techniques. Applying the use of these devices during teaching processes are making the autistic children more motivated and more attentive and more willing to learn new vocabularies (Doeniyas et al. 2014). Fernandes et al. (2010) believe that adding computerized games to the autistic children therapy sessions leads to the following consequences on them: they were interactive, had more eye contact and communicative initiatives, made more action requests and used more verbalizations. Based on the above features of technology, many researchers used the ipads in their experiments because of its portable and engaging nature (Shah 2011).

Children with ASD whose speech has usually deficits in using vocabulary, complexity in forming the sentence in the right structure and there is no flexibility in doing conversations in compare with their normal peers. Ganz et al. (2014) investigated the effects of using visual scripts delivered via ipad on children with ASD on using verbs or nouns. There were three participants between 8 and 14 years old who used iCommunicate application in their ipad. The results demonstrated that there was an increase in using verbs & nouns for the participants. Ipad based visual scripts was conducted to communicate without intervention from other person. However, there were some limitations for this study such as the applied procedures were not clear enough for the students so they face difficulties in understanding the tasks. The study didn't perform comparison between paper visuals and ipad visuals. As future work, the authors are planning to address the use of sentences, phrases & descriptors such as adjectives and adverbs.

On the other hand, Van der Meer et al. (2012) examined three main communications methods to improve requesting any specific item by the autistic children. The authors compared between three augmentative & alternative communication (AAC) modes: manual signing using laminated picture with 4 line drawings, picture exchange using 4 laminated

photos and speech generating devices using ipad application called proloquo2Go. Four children with ASD participated in the experiment and tried the three methods. One of the main findings of this case study was that the participants preferred to use the proloquo2Go application to express what they want.

Another study was made by Flores et al. (2012) agreed that using ipad for making requests increase the communication behaviours for the autistic children more than using the non AAC systems that based on graphic symbols. Also the ipad demand less amounts of efforts for implementing the processes and the tasks in compare to the picture card system.

From a systematic review for 15 studies, Kagohara et al.(2013) concluded that the ipod, iphone and ipads are valuable and practical devices that can effect positively the teaching process in the educational programs for individuals with developmental disabilities. In addition, the results showed that such devices can be used successfully for improving academic, employment, communication and leisure skills for individuals with developmental disabilities.

Moreover, Kagohara et al. (2012) examined the effects of using the ipad in learning how to check the spelling of a word which is an important academic skill. This study suggested that using the video modeling intervention via an iPad to check the spelling of words using common word processing programs was more effective and showed better results in teaching children with autism.

Neely et al. (2013) implemented their study on two autistic students by comparing the outcomes of using traditional methods in learning and using the ipad for the same purpose. Both participants showed better academic correlation while using the ipad than the traditional materials. On the other hand, there was high level of challenging behaviours that were demonstrated during the use of traditional materials more than the use of iPad. As a result, using the ipad as a method of instructional delivery may decrease escape-maintained behaviour for some autistic children.

Beyond the challenges that facing children with autism such as social interactions and communications, they also have lacking in the academic behaviours like letter, grammar or

understanding of the numbers values. For the numerical skills the ipad based video modelling showed its effectiveness as a technique in teaching numeracy skills to autistic students. This is what Jowett, Moore and Anderson (2012) concluded from their case study. The study was applied on 5 year-old boy. They used generalization and maintenance observational measures for a single subject with various baselines over numeral design. The participant was successful in writing and understanding the quantities of numbers 1–7.

Chapter 3

Picaa

This chapter explains the mobile app that was the basis of our study, Picaa.

Picaa is a learning mobile platform that offers cooperative and adaptive learning tool for educators and students which works to meet the leaning objectives. Picaa is an application that is running on iOS devices. It contains features that allow users and educators to interact with various items based on the actions they are planning to perform and also the educational methods. Picaa aims to simplify the adaptation of the user with the curricular that the educator teaches. The provided activities must be adjusted by the educators according to the user's abilities, personality and environments in order to accomplish positive learning outcomes. (Rodríguez-Fórtiz, Fernández-López, & Rodríguez 2011).

3.1 Objectives

The objectives that the authors of the Picaa application consider while designing it for the students with special needs are the following:

- Help educators and families in designing the profile that tolerate each personalized learning activities for each user.
- Ease and facilitate the activities implementation at anytime and anywhere involving educators and family.
- Support the user's socialization choice by providing group exercises option.

Picaa platform allows creating several user profiles with the ability to be customized in how the information will be presented and what is the appropriate type of interaction that suite each user.

3.2 Activities

Picaa application offers five main activities that cover the basic learning objectives.



Figure 3.1 Creating New Activity

The activities are:

1. *Association*: there are sets that contain different elements. The student must identify the relationship between the elements and the sets they belong to. This activity builds the foundation of calculation, discrimination, memory exercises and categorization. Figure 3.2 shows an example of Association activity.

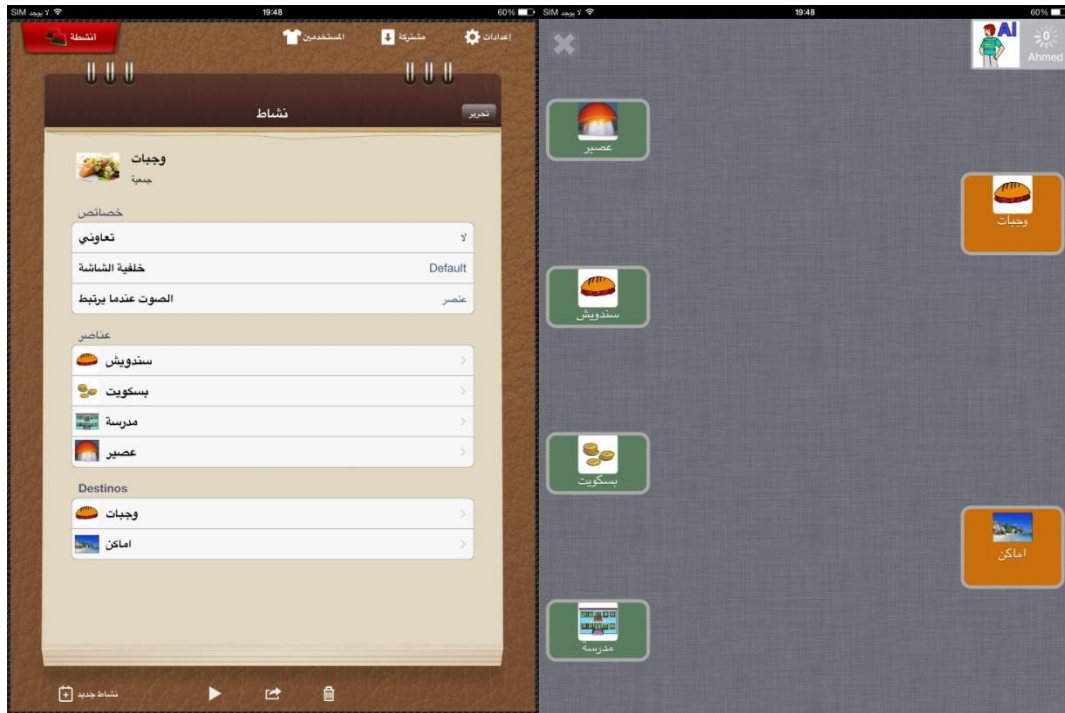


Figure 3.2 Example of Association Activity

2. *Puzzle*: includes image fragmented into number of pieces starting from (2-25) pieces with different shapes. The student needs to rebuild the image in the right order. The educator has the option to customize the image. Figure 3.3 shows an example of Puzzle activity.

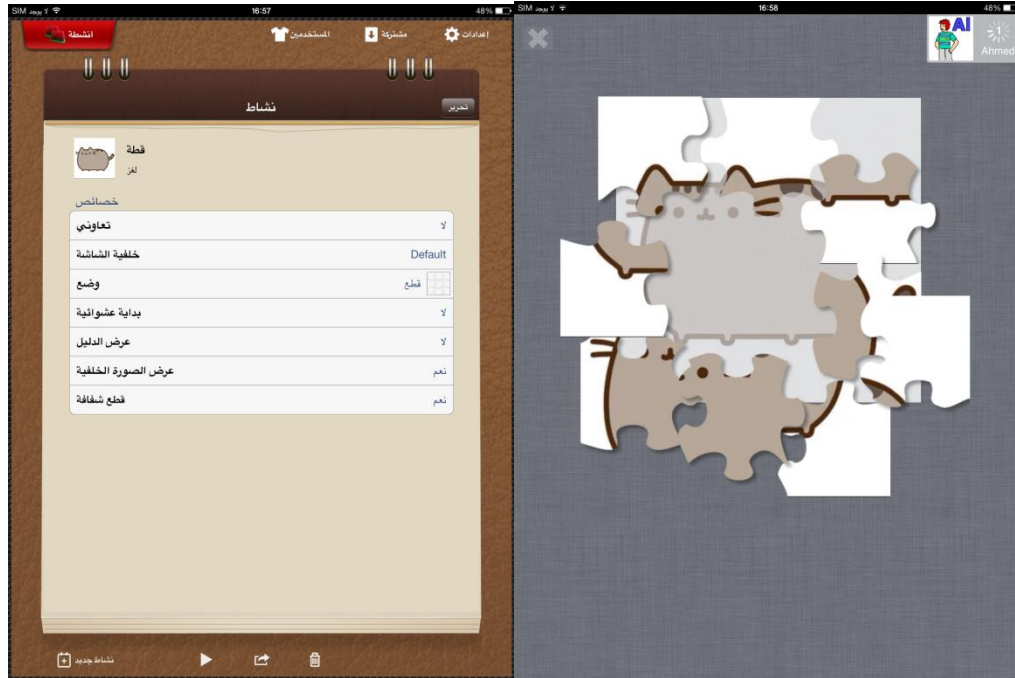


Figure 3.3 Example of Puzzle Activity

3. *Exploration*: ordering multimedia items that allow the students to navigate across a hypermedia system. Using this activity help the student to create simple stories, agendas and communicators. Also, it's possible to assign timing for each selected item. Figure 3.4 shows an example of Exploration activity.

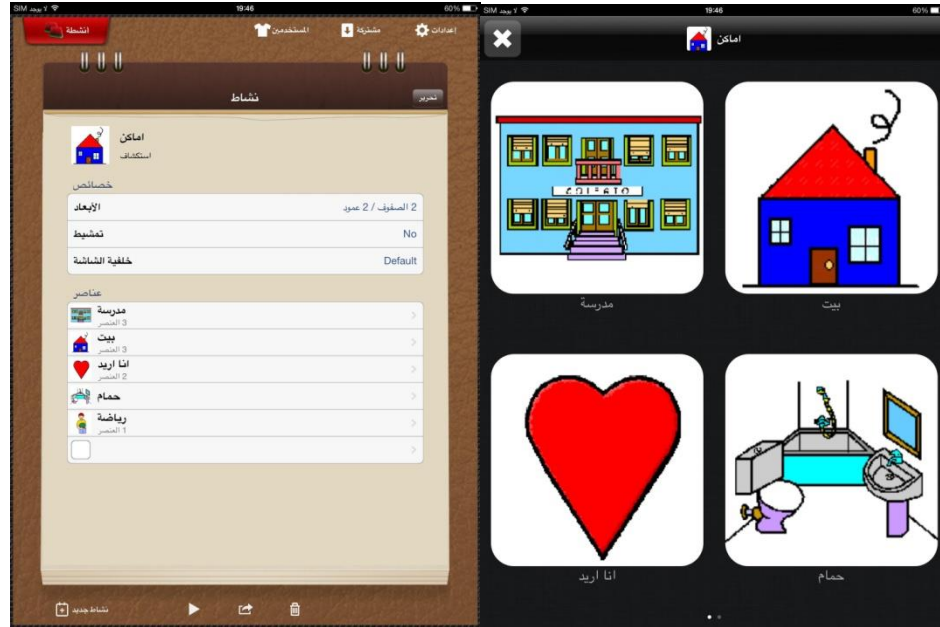


Figure 3.4 Example of Exploration Activity

Memory: an activity that let the educator to create set of items using hidden cards and the student has to turn each card to match it with its similar card. These cards could be images or images with their associated text. Figure 3.5 shows an example of Memory activity.

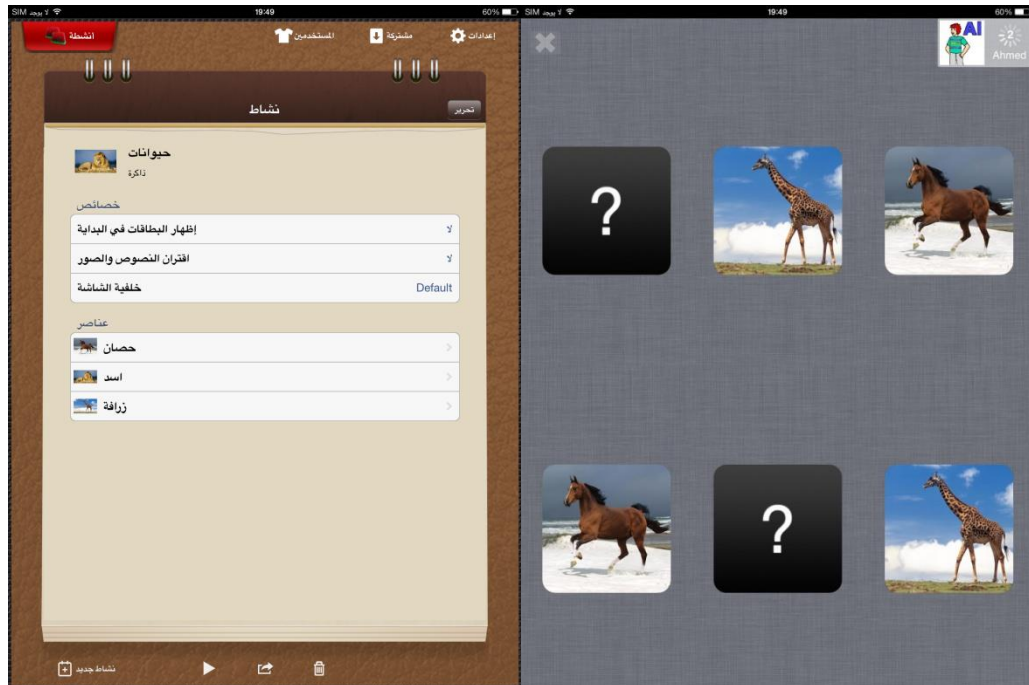


Figure 3.5 Example of Memory Activity

Sorting: Consist of list of elements that need to be ordered in the correct sequence. The elements can be text or graphics. Figure 3.6 shows an example of Sorting activity.

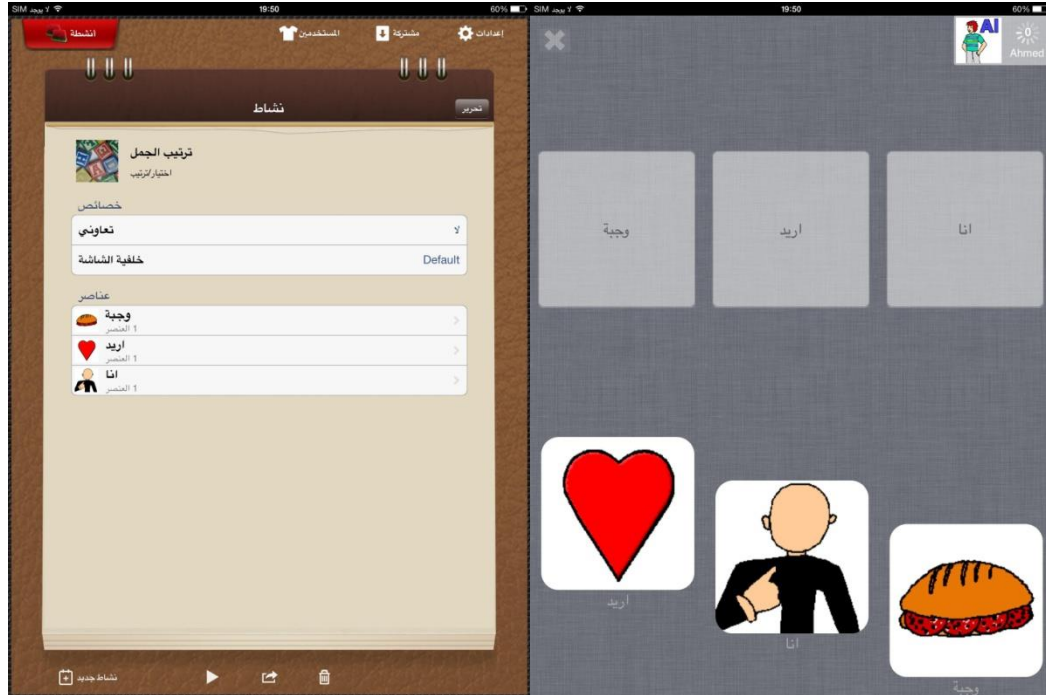


Figure 3.6 Example of Sorting Activity

As per Rodríguez-Fórtiz, Fernández-López, & Rodríguez (2011) these activities aim to improve the following abilities and skills:

- Improvement of memory
- Enhancement of the user's attitudes such as cooperation, collaboration and responsibility.
- Learning the idea of cause and effect.
- Improving mathematical skills.
- Acquisition of new vocabularies and understanding their meaning.
- Understanding and managing notions of time and space.
- Development of auditory discrimination, perception and visual.
- Learning how to use hand and eye together.
- Development strategies to solve simple problems.
- Examining interpretations, assumptions and conclusions.

3.3 Examples of Picaa Activities

The following are examples of activities that were assigned for the students by the educators in the conducted experiment:

Association Activity: was designed to help the student in finding the relationships between the objects and the sets that they belong to by making two sets for places and meals and different kind of objects that need to be classified to their correct group. This activity supports awareness environment skill. Also, match numbers with their sets that contain objects that express the number and this example was helpful for the math skills.

Exploration Activity: was used by the educators to develop the language skills of the students. It was implemented by connecting the object with its name after hearing it once the student selects the item. Also, autonomy skill was supported. For example the student can design his/her own agenda.

Puzzle Activity: was designed to increase the awareness of environment about the things that the student deal with it in a daily basis like ordering images of foods and transportations or images for his/her colleagues and family members that support the social skills.

Sorting Activity: was implemented by connecting the words with their images and complete simple sentence and this supports the language skill. Also math skill is improved by asking the students to order the numbers.

Memory Activity: helps the student in enhancing his/her memory by matching images such as animals and fruits. This activity supports the awareness environment skills. Also, images can be matched with their words such as people faces with their names and this support the social skills.

3.4 Adaptation methods

Fernández (2009) provided information about the application that has been modelled to meet the needs and requirements of many different categories of students with special needs. Picaa covers the following levels: cognitive, visual and auditory. In addition to that, Picaa can be adapted in different ways based on different types of students. There are four main ways to adjust and adapt the activities:

- Timing: allow to create a schedule of activities for each day.
- Complexity: change the way of presenting the activity and increase or decrease its difficulty.
- Aspect: provide different multimedia resources (animations, sounds, text, images, etc.) that can be used to build the activity.
- Interaction modes: offer different interaction ways that can be customized for each student including drag, move and touch.

3.5 Picaa case study

Fernández-López et al. (2013) conducted a case study in Spain over 39 students with special education needs who used Picaa application as a part of their learning process. The educators personalized Picaa for each sample based on each student's requirements. They used pre and post-test to evaluate the student's development. It was observed that using Picaa achieved highly positive effects on the students' basic skills that include math, social, language, autonomy and environmental awareness. This case study offered new mobile platform that can be customized in the content and the interface based on each student's needs. In addition, the presented activities have succeeded in supporting the learning aims for various types of impairments.

Chapter 4

Methodology

This chapter describes the procedures and the preparation of the experiment in details including the used materials and the participants.

4.1 Research design

This case study was held in Sharjah Autism Center which was founded in 2002 in Sharjah as a part of Sharjah City for Humanitarian Services (SCHS) especially for individuals with autism spectrum disorder starting from 5 years older. According to Sharjah City for Humanitarian Services (n.d.) the main objective for the centre is to offer the proper training and education for the autistic individuals and support their families to integrate them in the society. The centre offers evaluations activities that used to collect information about the student to find out the best diagnosis plan for each individual.

Before starting the experiment, three training sessions were delivered to the educators of the students to explain the objectives of the case study and how it should be implemented. The sessions included practical demo on how to use Picaa application. Four educators participated in the case study. The first session was conducted to explain the study for the management of Sharjah Autism Centre. Second session was to carry out to select the samples and meet the selected educators for the experiment. Final session was the practical training. During last session, the educators tried Picaa application and tried all different activities to be familiar with them.

Also, a user guide of the platform and some sample activities were given to the educators to help them in their mission.

4.2 Materials

During the experiment each educator has his/her own ipad. Therefore four ipads were used. Also, a tutorial in English and Arabic languages was prepared to explain the objective

and the producers of the experiment. In addition, a user guide that is provided by the application's author in Picaa website translated from Spanish into English and Arabic languages that used to explain Picaa application and its activities. Finally for the experiment evaluation there were two questionnaires that were used in FernáNdez-LóPez et al. (2013) case study that translated from English into Arabic language.

4.3 Evaluation

The Psychoeducational Profile-third edition (PEP-3) is an assessment tool that designed specifically for children with Autism between 2 and 7 years old. PEP-3 determines the weakness and strength areas in children's personality and helps in deciding suitable treatment and educational program. Also, PEP-3 evaluates the development level in personal self-care domains, maladaptive behaviors and communication. There are two sources that PEP-3 depends on to form two main parts: Performance Test (PEP3-PT) and Caregiver Report (PEP3-CR).

PEP3-PT is based on the direct observation and testing on the child. It includes 10 subsets: "cognitive verbal/preverbal (CVP), expressive language (EL), receptive language (RL), fine motor (FM), gross motor (GM), visual-motor imitation (VMI), affective expression (AE), social reciprocity (SR), characteristic motor behaviors (CMB), and characteristic verbal behaviors (CVB)". While PEP3-CR based on filling a questionnaire by the parents and the educators based on their daily observations on the child. It's combined of three subsets: adaptive behavior (AB), problem behaviors (PB) and personal self-care (PSC) (Fu et al. 2012).

4.4 Participants

The participants were five students in Sharjah Autism Centre. They were four male and one female who were already familiar with using the ipad. The students' ages are between 6 and 7 years old and their PEP3 results are close to each other. Table 4.1 shows the students' characteristics.

Student Name	Age (Years)	Duration studying in the centre (years)	PEP3 result		Educator
			Communication	Movement	
Subject A	6	1	27.3 (mid)	37.3 (mid)	Mr. Abdul Hadi
Subject B	6	2	19 (high)	33.3 (mid)	Ms. Sara
Subject C	7	2	30.3 (mid)	37 (mid)	Mr. Foda
Subject D	7	2	17.3 (high)	28 (high)	Mr. Sayed
Subject E	7	2	33 (mid)	40 (mid)	Mr. Sayed

Table 4.1 Description of the samples

Subject A

Subject A joined the centre from around one year. She is spending her time in the centre participating in the activities that are prepared for her. She enjoys the shared activities with her colleagues. Subject A able to understand the verbal instructions. She can form sentences from three to four words to express her demands. She is interested in playing games using the ipad, play with the devices that issue sounds, painting and drawing. The educators can communicate with Subject A through verbal instructions words and the description signs.

Subject B

Subject B is a student who attends regularly Sharjah Autism Centre since September 2013. He used to take classes such as evaluation, single and group training, family counselling, assistant activities and the permanent activities that are scheduled especially for him in daily basis and depending on his case. Subject B likes to participate in group activities with his colleagues and follow the social rules for each activity such as: waiting in the line, set properly on his own seat, etc. Also he is able to understand the verbal instructions like: set, close the door, bring and which class you have now. He keeps using his own daily routine in the centre (daily program) in different places like the kitchen and the sport room. He is

interested in listening to music, brows magazines, play ipad games and physical play. The educators are able to communicate with Subject B through images and description signs.

Subject C

Subject C is a hyperactive student who sometimes reflected on his rejection of new activities at the beginning. He has good vocabulary and he can read some words and long sentences. He can express what he needs. Subject C collaborate effectively with the centre's activities like talking sessions, sport activities and the single training. He is interested in reading magazines, playing games in the ipads, playing football and swimming. The educators can communicate with Subject C through verbal language that consists from few words to build sentences that explain his needs.

Subject D

Subject D is an active student who likes to participate in the centre's activities. He is enjoying the shared activities with his colleagues and the single and group training. He is able to understand the simple verbal instructions. Subject D can express himself using simple sentences formed of maximum two words. He is interested in playing games on the ipad and mobiles. The educators can communicate with Subject D through images, words and the description signs.

Subject E

Subject E is a friendly and funny student who is committed to attend the centre and benefit from the offered services such as: evaluation, single and group training participates in the daily scheduled activates for him. Also, used to follow the simple and hard verbal instructions. Subject E can build sentences that consist from two to three words. He is interested in playing games in the ipad. The educators can communicate with Subject E through the verbal language and go directly to the desired thing without asking for any help.

4.5 Instruments

To analyse the data, two measurement instruments have been used:

1. Students' skills questionnaire that evaluate the student's levels in five main skills: language, math, social, environmental, autonomy and awareness. This questionnaire was conducted by the educators before and after the experiment. Its include 51 items.
2. Activities usage questionnaire that check out the most preferable activities that used by the students and the motivation and acquisitions skills from using Picaa. Its include 15 items.

4.6 Procedures

There was three training sessions for the educators on how to use Picaa application before starting the experiment. Then the educators filled the student's profile and the skills assessment for each student before starting the use of Picaa application. The case study was monitored by holding regular meetings with the participated educators in Sharjah Autism Centre to collect comments and observations about the students' behaviours during the study. Also, regular visits were made to collect the observations about the students during the sessions. At the end of the experiment, the skills assessment was conducted to find out the differences on the students' skills before and after using Picaa. Moreover, the activities usage questionnaire was completed.

Chapter 5

Results

This chapter reveals the results of the implemented two questionnaires and describes the changes for each sample.

5.1 Skills survey's results

The following section demonstrates the improvements of the student's different skills after using Picaa application. Table 5.1 compares the five different skills before and after using Picaa, averaged over all participants.

Student's skills	Before Picaa	After Picaa
Language skills	45%	51.07%
Math skills	46.43%	55.72%
Environment awareness skills	54.38%	68.8%
Autonomy skills	48.57%	60.72%
Social skills	41.25%	55.63%

Table 5.1 Results of Student's Skills Questionnaire

By comparing the rates for each skill, the following points are noted:

- Language skills were increased up to 6.07% on average
- Math skills were increased up to 9.29 % on average
- Environment awareness skills were increased up to 14.42 % on average
- Autonomy skills were increased up to 12.15% on average
- Social skills were increased up to 14.38 % on average

Environment awareness skills show the highest improvement among the other measured skills. While language skills display the lowest improvement.

5.2 Activities Usage Survey's results

At the beginning of the experiment, the educators encouraging the students to try all Picaa's activities. Once the samples got familiar with all activities, educators gave the chance for them to freely work on the most interesting activity they found. It was observed as per the results from the implemented Activity Usage questionnaire (Appendix E) that puzzle activity was the most used and preferred activity by the samples among the other activities. This result might be because of the wide opportunity that the puzzle activity offers it by applying different images.

Table 5.2 demonstrates the percentage of users for each activity type based on the educators answers on the question that allow to select the frequency of using the activity varying from score 1 (never) to score 4 (always).

Activities used	Frequency of use			
	Never	Sometimes	Frequently	Always
Association	20%	20%	20%	40%
Exploration	40%	20%	20%	20%
Puzzle	0%	40%	0%	60%
Sorting	0%	20%	40%	40%

Table 5.2 Description of the percentage of activities usage

5.3 Samples analysis

The following section describes how each sample behaved and improved during and after using Picaa application.

5.3.1 Subject A

Subject A used Picaa application for three months in daily basis for 40 sessions. The association and sorting activities were the less used activities by Subject A. Puzzle activity is the most used activity. Most of the skills that were measured during the experiments have developed. After this experiment, Subject A became more able to distinguish people. For example, she started to recognize people's relationship with her as her social skills were affected positively more than any other skills. At the beginning, it was hard on

Subject A to deal with Picaa as she expressed her rejection by screaming and refuse to collaborate with the educator. However, Subject A didn't take long time to accept using Picaa and enjoy Picaa's activities. She preferred to work on exploration and puzzle activities. One example of Subject A's progress was starting the puzzle activity with two pieces until she reached 25 pieces. On the other hand, Subject A needed more help in memory activity. Moreover, Subject A's weakness in understanding numbers and their meaning were reflected on her measured performance in math skills. Table 5.3 shows the minor decrease in developed math skills after conducting the experiment. In addition, Picaa supported language skills of Subject A as she become able to form sentences from three words and repeat more words in association and exploration activities. Table 5.3 shows the significant changes in each measured skills.

Skills	Subject A	
	Before	After
Language skills	48%	57%
Math skills	60.5%	58.7
Environment awareness skills	65.5%	78%
Autonomy skills	57%	64.2%
Social skills	46.7%	65.5%

Table 5.3 Subject A's results

5.3.2 Subject B

Subject B have completed 40 sessions of exercising Picaa application during three months. He exercised the five activities. The sort activity was the less one that he exercised. Five skills were evaluated before and after the experiment. The skills are language skills, math skills, environment awareness skills, autonomy skills and social skills. It is observed that all five skills have improved progressively during sessions. Table 5.4 shows the rate of each of the five skills before and after the experiment. Autonomy skills were the most skills that were affected positively in compared to the other skills. At the beginning, Subject B resisted working on Picaa and he tried to close the application to play games on the ipad. He wasn't collaborating and couldn't give himself the chance to know and learn how to use the application. In order to enforce Subject B to use the Picaa application, the educator put a

ruler on the ipad button to keep the application opened. Subject B's skills started to improve from the third session. Also duration of the session increased to reach 15 minutes. He liked more the applications that support the sound effects and link the sound with the image. Subject B used to wait every time after doing any activity to hear sound encouragement similar to those he used to hear in most of the games that he plays it on the ipad. He tried to repeat the words after hearing it from the application. In order to encourage Subject B to spend more time using Picaa, the educator organizes his time by letting Subject B play games directly if he solves the given activities from Picaa. At the 6th session, Subject B stopped resisting Picaa. Day after day Picaa became part of his daily programme and he started to open the application by himself. Subject B use the mistake and try method in solving the given activities. It is noticed that he always needed help in using the memory activity. He reaches a level that he started opening Picaa in his free time. It was observed that Subject B became more independent in using the application and his language have improved since he started to pronounce and repeat words. He was able to build sentences from three words and communicate effectively with his educator. On the other hand, he was able to order the puzzles that contained nine pieces. In general, Picaa developed the communication skills effectively of Subject B and that let to enhance his language.

Skills	Subject B	
	Before	After
Language skills	37.5%	42.7%
Math skills	37.5%	51.7%
Environment awareness skills	43.7%	53.1%
Autonomy skills	46.2%	67.7%
Social skills	46.8%	56.2%

Table 5.4 Subject B's results

5.3.3 Subject C

Subject C used Picaa application for three months in daily basis for 40 sessions. He exercised the five activities. The association activity was the least one he used. The five skills that measured during the experiments were developed. The autonomy skill was improved more in compare to the other skills. Subject C faced difficulties at the beginning use of Picaa as he used to play games most of the time than using Picaa. He was getting bored faster and refused to use the application for a long time during the first sessions. While conducting the experiment, Subject C showed that he is willing to learn and trying to solve the activities even if he did mistakes. In order to encourage Subject C to use and interact with Picaa, the educator let him play games after spending the time in Picaa's activities. Picaa helped Subject C in focusing and pay more attention on things around him so he can properly interact and respond to the other actions. In addition it was observed that Subject C became more independent and faster in solving the provided activities session after session. It was noticed that whenever the educator add new activity, Subject C faced few difficulties at the beginning. He reached a stage where he can open the application independently and start selecting and solving the activities alone. He was enjoying solving puzzles activities as he started ordering from 4 pieces and reached 25 pieces. Memory activities were developed to reach five images to be matched by Subject C. Moreover, from the language side, Subject C's language improved and he was able to build a sentence from maximum three words. Picaa helped in improving the verbal communication as he started to repeat the heard words via Picaa. The application provides him with more vocabularies and meanings as Picaa's activities depend on link the image with the word. Although the observation showed positive effects, the statistical results displayed that there were some skills that Subject C get low level than before using Picaa application including the language skills. These results might be because of that the student didn't use the application for around two weeks because of his sickness. Table 5.5 explore Subject C's improvements in each skill.

Skills	Subject C	
	Before	After
Language skills	62.5%	41%
Math skills	50%	48.2%
Environment awareness skills	62.5%	56.2%
Autonomy skills	39.2%	50%
Social skills	28.1%	34.3%

Table 5.5 Subject C's results

5.3.4 Subject D

Subject D experienced Picaa application for three months 40 sessions. Exploration activity was the less used activity by Subject D while he was more interested in using association and sorting activities. Most of measured skills during experiments were positively enhanced. It is clearly noticed that the language area for Subject D was highly improved. Table 5.6 shows that exact rates before and after using Picaa application for the five main areas. Similarly to his colleagues, Subject D wasn't happy at the beginning of the experiment as he was trying to exit the application and open games on the ipad. Instead the educator used things that Subject D mostly likes as awards in order to encourage him to work on Picaa. From the fifth session, Subject D started to enjoy the application and to collaborate with the educator. The minimum average time spending using Picaa was 15 minutes until Subject D reached 30 minutes at the end of the experiment. He started to repeat the words that he was hearing in the application and to form sentences that led to increase his language skills. Subject D became more able to express what he needs verbally while he was using Picaa application. Memory activity was helpful for Subject D as it developed his visual memory. He can match up to four identical images. Moreover, Subject D was enjoying the use of Picaa not only during session time, but also in his free time. He was excited so that he was asking for more activities than the scheduled ones for his sessions. Table 5.6 express the differences in each skill before and after conducting the experiment.

Skills	Subject D	
	Before	After
Language skills	37.5%	58.9%
Math skills	41%	60.7%
Environment awareness skills	59.3%	78.1%
Autonomy skills	53.5%	50%
Social skills	46.8%	56.2%

Table 5.6 Subject D's results

5.3.5 Subject E

Subject E exercised Picaa for three months. He was interested more in sorting activity and he showed the least interest in exploration activity. Environment awareness skills for Subject E were doubled while he used Picaa. He can now recognize more objects and where it belongs. All measured skills during the experiments were increasingly developed. The educator spent few sessions to encourage Subject E to use Picaa and get familiar with it. He started to interact effectively from the fifth session where he communicated verbally with the educator and repeats what he is hearing from the application. During the experiment, Subject E showed that he is willing to learn more and solve new activities. He preferred to sort different objects to their belonging groups like animals and fruits. It was observed that day after day he was able to solve the activities faster than at the beginning of the experiment. He became more independent in working on the application with small gaudiness from his educator. Picaa enriched Subject E's vocabularies and assisted him in connecting images with sound. He can build sentences up to five words and can link the word to its related image through the association activity. Subject E became more aware about what was happening around him and he was more concentrating during the learning sessions. Table 5.7 reveals how Picaa affects each skill.

Skills	Subject E	
	Before	After
Language skills	39.2%	55.2%
Math skills	42.7%	58.7%
Environment awareness skills	40.6%	75%
Autonomy skills	46.2%	71.2%
Social skills	37.5%	65.6%

Table 5.7 Subject E's results

Chapter 6

Discussion

This chapter discusses and analyse the results of the experiments and how Picaa affect the samples educational performance.

This study is different than the one that was implemented in Spain (Fernández-López et al. 2013) by the following contributions:

1. This study is the first one that is implemented in UAE about the effects of using the ipad on learning processes of the autistic students.
2. It is the first experiment that implemented in Arabic language for Arab users to support the educational curriculum based on the autistic student's personality.

Sharjah Autism Center is using the ipad as a teaching tool by using very simple applications that support the students' learning process. However, ipad isn't used as a basic tool in the centre's learning curriculum. On the other hand, it was observed that all students in our samples resist and reject using Picaa in the beginning of the experiment. These feelings expressed in different reactions such as screaming, pressing the exit button in the ipad to close the application and get nervous and angry. Therefore, the educators tried to solve these problems and encouraged the students to interact and accept Picaa by using the rewards methods with them. For example, linking the playing time on the ipad after using Picaa which encouraged the student to complete the session in order to have his play time. Also, in order to prevent the student from closing the application, they fixed a ruler above the ipad button to prevent students from exiting the application. Despite the faced difficulties during the experiment, the samples displayed that they have strong desire for learning and they are eager learners. They kept trying to solve the activities and try to correct the mistakes by themselves. With increasing the number of Picaa sessions, students became better in using the five measured learning skills. Using Picaa application in daily basis and for around four months achieved highly positive results on the students. As a

result, H1 was proved that Picaa affects positively the improvement of the main learning skills.

Moreover, it was observed that autistic students need a continuous reassurance and encouragement to do the activities successfully. They were highly interacted with the cheering sounds that used in the activities as a signal of completing a task successfully. In addition, the social skills are the most challenging area for the autistic student and they showed high improvements after using Picaa application. That was obvious when the samples start expressing their feeling and desired using various ways like using words and form sentences that have useful meanings. This is because of the exploration and sorting activities that focus mainly on the language skills.

Moreover, it was observed that solving mathematical activities was challenging for all students. However, there was an increase in the math skills rates for most of the samples. They were interested while interacted with the activities. This is because of the format of Picaa activities that depend on the creativity techniques more than the mental methods to resolve the problems by using visual and sounds effects.

During the experiment, the educators sometimes exchange their knowledge about the different activities they implemented for their students.

Picaa's activities support most of the Sharjah Autism Centre aims of the learning curriculum of the autistic students. Picaa offers great opportunity for the educators and the students, as well, to get the most benefits on the autistic students by using the ipad. For instant, save time and costs are major advantages of Picaa. It was discovered that many of the activities that can be built and prepared using Picaa instead of preparing physical materials manually by the educators. For example, showing large cards that display the most common places a student is using it in daily basis can be done using the association activity. As a result, the educator can prepare him/her self easily for any session by saving the efforts on preparing the materials and the costs. Subsequently, this reveals that Picaa activities succeeded in supporting the learning methods that are applied in Sharjah autism centre and this can be clearly observed from the percentages usage of Picaa's activities. Consequently, H2 successfully approved.

Comparing to FernáNdez-LóPez et al. (2013) experiment's results, our results confirm both hypotheses and showed positive effects on the samples and confirmed that its an effective tool that support the learning process for the autistic students in the both case studies.

While Picaa has highly positive impacts on the samples, there are some drawbacks that the students and educators faced during the experiment. For example, sounds effects are not highly supported in compare to the other used ipad applications. The students used to wait to hear more sounds to be encouraged and to move forward in solving the activities. In addition, one major disadvantage of Picaa that it's not supporting the Arabic language. This issue appeared in the sorting activity while building a sentence from right to left as per the use of Arabic language. Picaa only supports the left to right languages. Therefore, this issue prevents connecting sounds with images or words.

Finally, the survey's results and the observational analysis reveal the following benefits of Picaa:

- Mobile apps can successfully support and complete the main goals of educational centres for autistic children which based on the students favourites to encourage him / her for learning.
- Mobile apps support the developmental abilities from the performance section of PEP3 test as the following: Communication subset is supported by sorting, association and exploration activities and motor subset is supported by puzzle and memory activities.

Chapter 7

Conclusion

This chapter explores the significant findings and contributions of the presented case study. Also, the answers of our research questions are included. Finally, the suggested future work is discussed.

In this thesis, an experiment was applied on five autistic children between 6 and 7 years old. The presented case study used the iPad as a mobile technology and Picaa app as an educational application. It's the first case study in the UAE that concentrates on the importance of using mobile apps in improving the academic levels of autistic children. Our study confirmed the effectiveness of mobile apps in the intervention of children with ASD. It was observed that mobile technology increases the interest of learning of autistic children. Also, the used app successfully has increased the performance of the children as per the statistical results.

Among the studied samples, most of the children's skills have enhanced in five main categories including: math, language, autonomy, social and awareness environment skills. Autonomy skills are the most positively affected skills at the end of the experiment. Picaa allows the educators to personalize the activities for each student based on their needs. During the experiment, the educators faced some challenges and difficulties with the samples. In the beginning of the experiment, the students resisted and rejected using the app as it was a new practice in their classes.

As a future work, this experiment can be implemented on large sample size to make it more generalized. In addition, the sample can be extended to apply on other students with special needs in addition to autistic students. For Picaa application, it's suggested to increase number of pieces that need to be ordered in the puzzle activity. Also increase the sound effects in Picaa especially cheering sounds that can be heard after the student solves

the activity. In addition, Picaa need to support Arabic language way (right to left) as Arab users can have good results on the learning levels of the autistic students.

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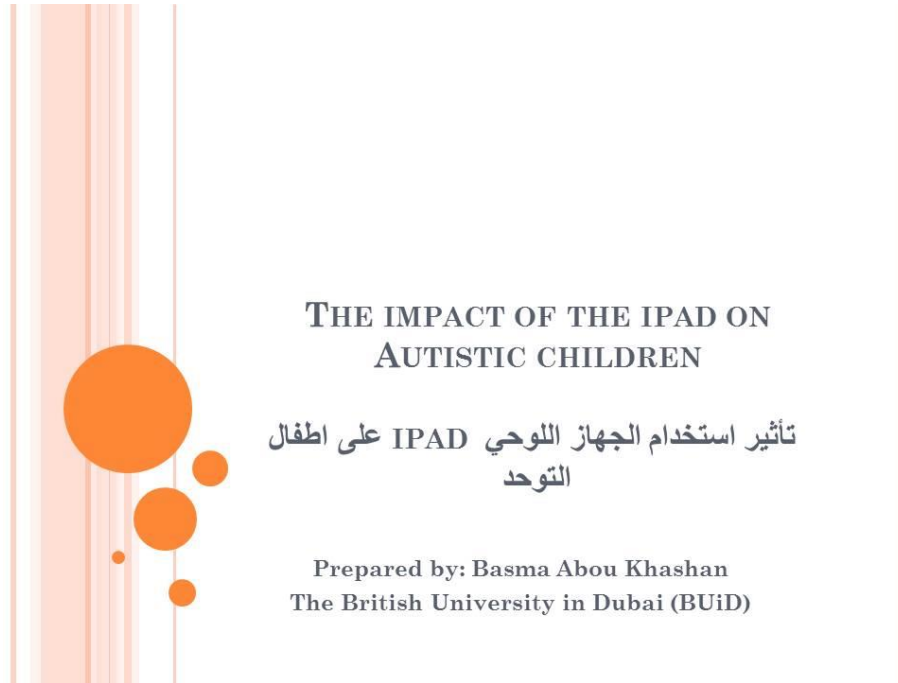
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Appendices

Appendix A

Experiment Preparation: The impact of the ipda on the autistic children



INTRODUCTION

المقدمة

○ هناك العديد من الدراسات التي أجريت لتقييم الأجهزة ذات شاشات اللمس (اي باد، اي فون وأجهزة أي بود). كانت النتائج إيجابية إلى حد كبير، وأظهرت أن هذه الأجهزة هي تكنولوجيا قيمة تدعم الأفراد ذوي الاحتياجات الخاصة. وبالإضافة إلى ذلك، فإن الأبحاث تشجع استخدام هذه الأجهزة لأهداف مختلفة مثل تطوير التواصل الأكاديمي ومهارات العمل والانتقال. الغرض من هذه الدراسة هو تحديد ما إذا كان استخدام الـ iPad لديه تحسينات فعالة على الأطفال التوحد أم لا.

OBJECTIVES OF THE STUDY (HYPOTHESIS)

أهداف الدراسة (الفرضيات)

- Picaa promotes the development of learning skills of students
- تطبيق picaa يعمل على تطوير المهارات لدى الطلاب.
- Picaa 's types of activities are suitable for learning process
- أنشطة تطبيق picaa مناسبة للعملية التعليمية.

PICAA ACTIVITIES

أنشطة تطبيق PICAA

- **Association activities** were used to work the language skill by creating pre-reading activities as joining letters with syllables, syllables with words or words with pictograms. They were also used for math skills, e.g., by joining numbers with pictures representing a set with the same number of objects.
- **أنشطة تعاونية:** تستخدم لتطوير المهارات اللغوية لدى الطالب عن طريق انشاء أنشطة تحضيرية للقراءة مثل ربط الحروف مع مقاطع الكلمات او مقاطع الكلمات مع الكلمات او الكلمات مع الصور. ايضا يستخدم هذا النشاط للمهارات الحسابية مثل ربط الرقم مع مجموعة من المكونات التي تمثله.

- **Exploration activities** were designed for use as alternative communication system (working language skill) such as time planning agenda (working autonomy skill) or address book (social skill).

○ **الأنشطة الاستكشافية:** صممت كبديل لنظام التواصل (المهارات اللغوية) مثل تخطيط الوقت (المهارات الاستقلالية) أو دفتر العناوين (مهارات اجتماعية).

- **Puzzle activities** are used as reinforcement for work on concepts such as transport, meals (environment awareness skill) or family members (social skill).

○ **أنشطة الألغاز:** تعمل على التعامل مع أهم المواضيع كالوجبات الغذائية المواصلات (مهارات الوعي البيئي) أو تعزيز الروابط مع أعضاء العائلة (المهارات الاجتماعية).

- **Memory activities** : remember the position of each element to associate with peers.

○ **أنشطة الذاكرة:** تذكر مكان كل عنصر لربطه مع شبيهه.

- **Sorting activities** were employed to teach about how to perform common tasks like washing the face (autonomy) or categorize objects by size as transport (environment awareness) or order numbered sets (math).

○ **أنشطة الترتيب:** تستخدم في تعليم القيام بالمهام الحياتية اليومية كغسل الوجه (مهارات استقلالية) أو تصنيف الأشياء حسب حجمها مثل وسائل المواصلات (الوعي البيئي) أو ترتيب مجموعة من الأرقام (الحساب)

AT THE END OF THE EXPERIMENT THE
FOLLOWING SKILLS WILL BE MEASURED:

في نهاية الدراسة سيتم قياس المهارات التالية:

- Language skills
 - المهارات اللغوية
- Math skills
 - المهارات الحسابية
- Environmental awareness skills
 - مهارات الوعي البيئي
- Autonomy skills
 - المهارات الاستقلالية
- Social skills
 - المهارات الاجتماعية

MATERIALS

الادوات المستخدمة

- iPads (ratio: 2 students per device)
- User Guide Manual for teachers (English & Arabic).
- اي باد (جهاز لكل طالبين)
- دليل المستخدم لتطبيق picaa للمعلمين (انجليزي وعربي)

DURATION

المدة

- 2-3 sessions to introduce Picaa to the teachers.
- Experiment duration starting from minimum 12-18 weeks. More time is recommended.
- Average (40-50) sessions.
- Session duration: Depend on the lesson difficulty (10 – 30 minutes) one or more activities using Picaa.
- ورشة عمل للمعلمين للتعريف عن تطبيق picaa وكيفية استخدامه.
- مدة التجربة: اقل مدة 12 اسبوع (3 اشهور) وقد تصل الى 18 اسبوع (ينصح بزيادة المدة كلما امكن للحصول على نتائج حقيقية اكثر).
- بمعدل 40-50 جلسة.
- مدة الجلسة: تعتمد على صعوبة الدرس (10-30 دقيقة) باستخدام نشاط او اكثر من التطبيق.

PARTICIPANTS

المشاركين

- Both gender (male and female)
○ مشاركة طلاب وطالبات.
- The student should have simple background about how to use ipad
○ يجب ان يكون لدى الطالب خلفية بسيطة عن كيفية استخدام الاي باد.
- Participants with similar characteristics matched with the experimental group in age and IQ or pathology.
○ المشاركون بالتجربة يمتازون بصفات متشابهة بينهم كالعمر ومستوى الذكاء او طريقة العلاج

INSTRUMENTS (ادوات التقييم)

PRE TEST (اختبار قبل الدراسة)

- A questionnaire assessing skills at different levels (language, math, environmental awareness, autonomy and social).
- The questionnaire was adapted with the aim to measure students' abilities based on a set of skills.
○ استبيان يقيم مهارات مختلفة للطلاب تشمل : مهارات لغوية، حسابية، وعي بيئي واجتماعية. يهدف الاستبيان الى قياس قدرات الطالب اعتمادا على مجموعة من المهارات.
- The teacher of each student conducted this evaluation before and after use of Picaa.
○ يقوم المعلم بتطبيق هذا الاستبيان قبل وبعد استخدام تطبيق picaa

- Student's competence questionnaire:
 - To evaluate the students competences about several subjects in their curriculum (maths, literacy, etc) to measure if they are improving these competences after using picaa or not.

○ استبيان كفاءة الطالب:

يتم تطبيق هذا الاستبيان قبل وبعد الدراسة لقياس مدى تأثير كفاءة ومستوى الطالب بالمناهج التي تدرس بالمركز (مثال الرياضيات، الادب.....الخ) عند استخدام تطبيق picaa

INSTRUMENTS

POST TEST (اختبار بعد الدراسة)

- An evaluation questionnaire on the use of activities by each student, indicating:
 - the frequency of use,
 - the suitability of the activity,
 - the acquisitions and student motivation when working.
- تطبيق استبيان بعد انتهاء الدراسة عن مدى استخدام الأنشطة لكل طالب متضمنة التالي:
 - عدد مرات الاستخدام
 - مدى ملائمة الأنشطة
 - مدى اكتساب المعرفة وتشجيع الطالب اثناء وبعد استخدام التطبيق.

PROCEDURES

خطوات التجربة

- **Before the study**, teachers were instructed in the use of the Picaa platform through classroom courses.
- قبل بدء الدراسة سيتم شرح كيفية استخدام تطبيق picaa من خلال ورش عمل مكثفة.
- Then, when the **study begin**, educators will complete a personal record and also the initial assessment of skills for each student.
- عند بدأ الدراسة يقوم المعلمين باكمال ملف الطالب والاستبيان المهارات لكل طالب.
- **During the completion of study**, its development will be monitored through regular visits to the center. Also a record of sessions of use was also conducted.
- يتم متابعة التجربة من خلال زيارات ميدانية بصفة منتظمة للمركز. ايضا يتم مواصلة توثيق المعلومات والنتائج لكل جلسة.
- **At the end of the study**, teachers will conduct a final evaluation of student skills. They also will complete the questionnaire on activities.
- في نهاية التجربة سيتم اكمال استبيان المهارات مرة اخرى بالاضافة الى استبيان الانشطة المستخدمة.

HOW MANY TIMES TO USE THE APP

كم عدد المرات التي سيستخدم فيها التطبيق

- Design activities depend on the class topic (lesson) for example: (transports/senses (hear, sight, etc.), numbers, ...etc.) to be used in Daily basis .
- يتم استخدامه بصورة يومية بناء على موضوع الدرس من الحياة اليومية، مثال: المواصلات/الاحساس:(السمع والنظر..الخ) ، ارقام...الخ.

ACTIVITIES' CHARACTERISTICS

صفات الانشطة

- Different activities for each student because it is very important the personalization, each student could need a different activity or the same activity but adapted.
- أنشطة مختلفة لكل طالب لأنه من المهم جدا مراعات الشخصية، كل طالب يمكن أن يحتاج إلى نشاط مختلف أو نفس النشاط ولكن مع تكييفه تبعاً للطالب.

HOW MANY ACTIVITIES ASSIGNED FOR EACH STUDENT?

كم عدد الأنشطة التي يجب ان تحدد لكل طالب؟

- Depend on the student it could be one or five (one for kind of activity). For example, if "insects" is the topic, the activities can be the puzzle of an ant, an exploration activity showing different insects, ordering insects from smaller to bigger, memory of three different insects and classification of insects and other kind of animals.
- اعتمادا على حالة الطالب قد تكون 1-5 أنشطة. مثال في حال موضوع الدرس عن الحشرات: نشاط اللغز لترتيب صورة نملة، نشاط الاستكشاف لترتيب مجموعة من الحشرات بمختلف الأحجام من الأصغر للكبير ، نشاط الذاكرة باستخدام 3 انواع للحشرات وتصنيفها حسب نوعها.

CAN WE USE THE SIMILAR ACTIVITIES FOR EACH STUDENT EVERY SESSION?

هل ممكن استخدام نفس النشاط للطالب في كل جلسة؟

- Depend on the child, it could be possible.
- ممكن ذلك اعتمادا على الطالب نفسه.

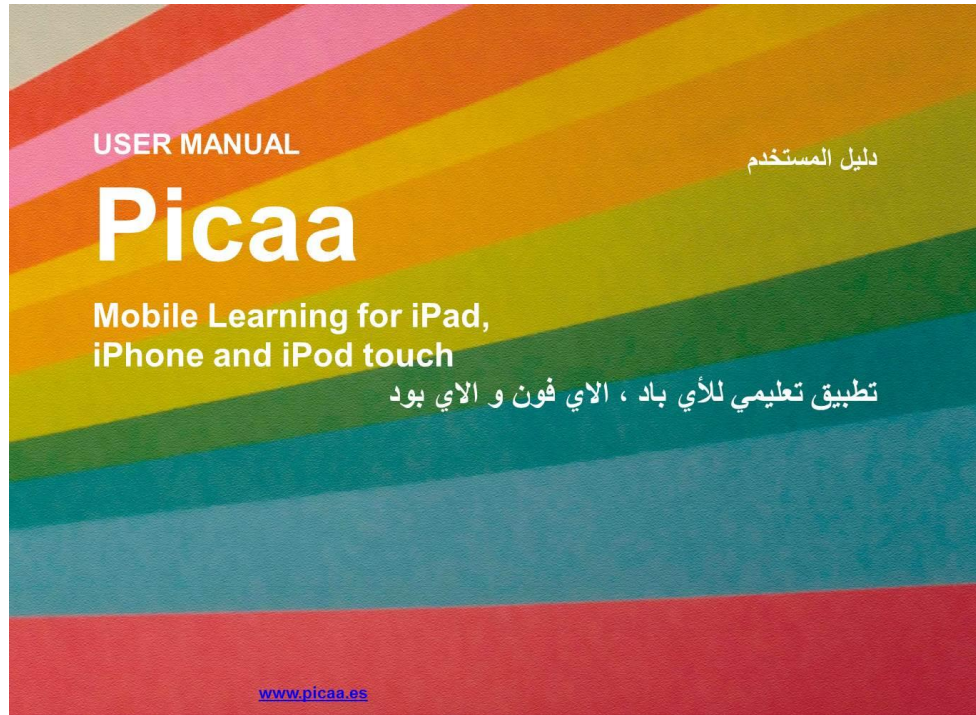
IMPORTANT POINTS

نقاط هامة

- The experiment will be in Arabic language.
○ الدراسة ستكون باللغة العربية.
- Each educator tested one or two children, exceptionally three.
○ كل معلم مسؤول عن 1-2 طالب وقد يصل عدد الطلاب استثناء الى 3.
- At the end of each Picaa Session: the teachers will complete an observational registry of sessions to collect aspects.
○ في نهاية كل جلسة للتطبيق على المعلم اكمال استمارة تفاصيل الجلسة وتسجيل جميع ملاحظاته ومدى تطور الطالب عن الجلسة السابقة. سيتم جمع 10 استمارات لكل طالب كل اسبوعين خلال مدة الدراسة.
- Collect comments and observations about the students' behaviours from the educators and parents.
○ في نهاية التجربة سيتم جمع ملاحظات عن سلوك الطالب بالمدرسة والبيت خلال فترة استخدام التطبيق من المعلمين والوالدين.

Appendix B

User manual: Picaa Mobile learning for ipad, iphone and ipod touch



- Picaa منصة التعلم التفاعلي ودعم العمل الجماعي هو نظام مصمم لخلق أنشطة من أجل تعليم ذوي الاحتياجات الخاصة.
- تقدم منصة Picaa عدة مساهمات في إنشاء واستخدام الأنشطة التعليمية:
- يعرض المحتوى التعليمي في إطار ترفيهي مسلي لذلك يمكن للمستخدمين الاستمتاع باللعب دون أن يدركوا اكتسابهم لمفاهيم تعليمية ومهارات اجتماعية.
 - يدعم العمل التعاوني حيث يقوم بمساعدة المعلم بإنشاء مجموعات للعمل مع بعضها.
 - تطبيق متكامل لاجهزة الهاتف المحمول حيث يمكن تثبيتها فورا واستخدامها من قبل المستخدم والمعلم وقادر على التكيف مع المستوى الفكري والتعليمي للمستخدم.

المعدات المطلوبة

تطبيق picaa يستخدم بالاجهزة التالية:

جميع اجهزة الاي فون والابود ذات شاشة اللمس والتي تسمح بالتصوير والتسجيل الصوتي.

البرامج المطلوبة

لابد من تواجد تحديث نظام التشغيل (iOS 4) على الاقل. بالإضافة الى إمكانية استخدام برنامج الاي تيونز (iTunes) المتاحة لجميع اجهزة الابل والتي تستخدم لتحميل الملفات المتعددة الوسائط.

تطبيق picaa متوافق مع الاي باد ، الاي بود والاي فون.

هذه الأجهزة محمولة وتشكل تحديا للمستخدم وتقدم الميزات التالية:

- قدرات الوسائط المتعددة
- إمكانية الوصول اليها بسهولة
- سهولة التفاعل (شاشة اللمس المتعدد والمتسارع)
- والاتصال اللاسلكي.

الفصل الثالث

الأنشطة

لدى تطبيق Picaa حاليا 5 أنواع من التمارين:
الشراكة، الاستكشاف، لغز، فرز / اختيار والذاكرة.

الاستكشاف: إنشاء وسائل اتصال
بسيطة، يوميات، قصص وحكايات.
تعرض الصور والأصوات والرسوم
المتحركة، التي تمكن من بناء
مجموعة جمل.



اللغز: ترتيب القطع في
اماكنها الصحيحة لحل
اللغز.



إدارة / الاختيار: ترتيب
العناصر في التسلسل الصحيح
(على سبيل المثال، ترتيب
الجملة)، أو اختيار واحد من
العناصر من مجموعة.

الشراكة: مجموعات من العناصر
بمثابة أساس لأداء تمارين الذاكرة،
والحساب والتمييز بين العناصر.



الذاكرة: تذكر مكان
كل عنصر لربطه
مع شبيهه.

الفصل الرابع

أداة المعلم

بالإضافة إلى الوظائف الأساسية لاستخدام الأنشطة من قبل الطلاب، Picaa يشتمل على
وضع المحرر. يزود هذا الوضع المعلمين بالأدوات اللازمة لتكوين ملفات تعريف
المستخدمين وتصميم تدريبات محددة.

يستخدم ضبط ملف المستخدم لربط المعلومات (الاسم، الصورة، الخ ..) وسلسلة من الخصائص
القابلة للتخصيص: نوع التفاعل و وضع المعلومات المفضل، ومستوى صعوبة أو ضبط مدى التوعية
الجماعية لتكوين الأنشطة التعاونية. يجب أيضا تعيين الجدول الزمني الخاص بكل طالب لتحديد
الأنشطة لكل يوم من أيام الأسبوع.

إدارة والتخصيص الأنشطة تقوم بها قوالب مخصصة. التغييرات تكون سريعة تبعا لأداء الطالب
ومدى تكيفه مع النشاط ويتم التغيير النشاط وفقا الى السياق التعليمي.

حالما يتم تصميم الأنشطة، يوفر التطبيق وسيلة للتفاعل مع أنشطة مصممة دون الوصول إلى
خيارات التحرير.



الوحدة الثانية

دليل المستخدم

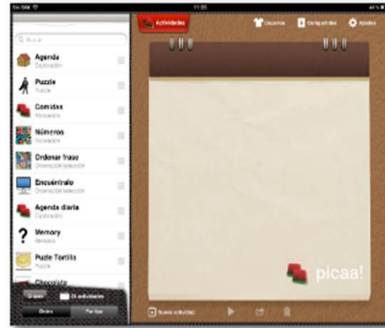
مع هذه الخطوات البسيطة يمكنك ضبط
أداة Picaa وخلق المحتوى التعليمي
وفقاً لاحتياجات المستخدمين.

الفصل الاول

البداية وادارة النشاط

اضغط على ايقونة picaa على الاي باد

يبدأ البرنامج في وضع المحرر



عند فتح التطبيق سيظهر على يسار الشاشة الأنشطة المنشأة وفي اعلى الشاشة سيظهر قائمة المستخدمين والاعدادات

بدء التطبيق في وضع الطالب:

هذا الوضع يمكن مستخدمين متعددين او مستخدم واحد من اختيار أي من المستخدمين المعروفين سابقا في التطبيق لاستخدام أنشطة التطبيق.

إذا نقرت على صورة المستخدم يتم عرض الأنشطة المقررة لهذا المستخدم المقرره ليوم محدد من أيام الاسبوع.



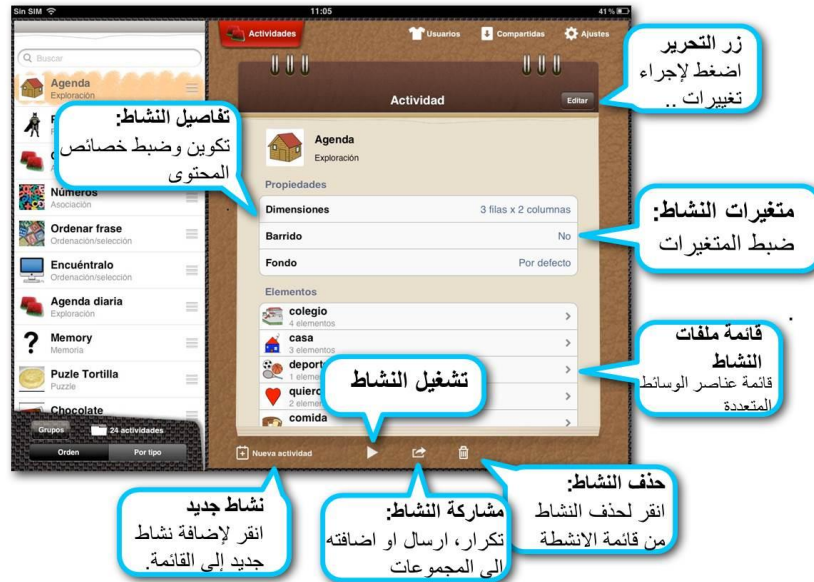
يتم عرض الرسم التخطيطي أو صورة المستخدم. الضغط على زر على أعلى الزاوية اليمنى يمكنك تغيير المستخدم المحدد أو يذهب إلى وضع محرر.



بدء التطبيق في وضع تحرير



ادارة الأنشطة



اضافة نشاط



انشاء العناصر بالانشطة

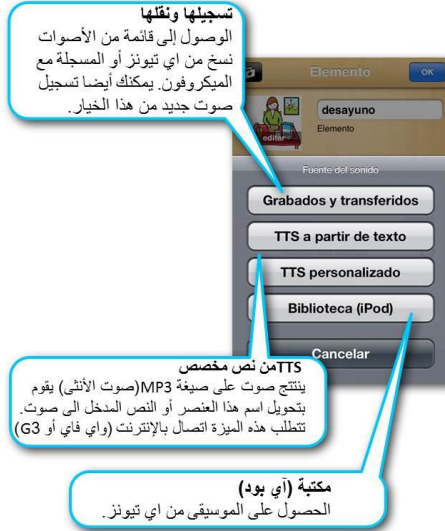
انقر فوق زر تحرير لإضافة عناصر، ضبط المتغيرات، تغيير اسم أو صورة، ... الخ

لكل عنصر يمكنك تعيين الصورة والنص والصوت واللون وغيرها من المعالم.



تدرجيا يمكنك تكوين النشاط وبالتالي تكيفه تماما تبعا لاحتياجات المستخدم.

اعدادات الاصوات الخاصة بالعناصر



ملف Picaa في الاي تيونز

اي تيونز < iPhone و iPad > تطبيقات < تبادل الملفات
في هذا المجلد الأصوات المنتجة/ سجلت تظهر.

يمكنك أيضا إضافة الأصوات WAV، CAF إلى MP3
ومن ثم استخدامها في Picaa.



أنشطة الاستكشاف



صفحة من العناصر:

العناصر التي تعد من مستويات أخرى
سوف يتم عرضها على صفحات
متعددة.

عرض التفاصيل

يتم عرض التفاصيل عند الوصول إلى آخر عنصر فرعي.
يمكن تكوينه كصورة مع أو بدون جهاز توقيت، والرسوم
المتحركة أو تسلسل عناصر نابضة يتم عرضها.

نصيحة: شريط مخفي يتم
عرضه عند النقر المزدوج
على الساعة.



أنشطة الجمعية

يجب تحديد العناصر ، المجموعات والعلاقات.

قائمة العناصر
قد تكون العناصر ذات صلة أو مجموعات غير مترابطة..

قائمة المجموعات
أنها قد تكون أو لا تكون مرتبطة العناصر.

مرتبطة
وجبات: المجموعة التي ينتمي إليها هذا العنصر (السندويش).

نصيحة: شريط مخفي يتم عرضه من خلال النقر مرتين على الموضوع.

الصورة الرمزية والترتيب
يتم عرض صورة المستخدم والنقاط التي أحرزتها.

يجب على المستخدم نقل العناصر إلى الوجهة. عند اختيار العنصر الصحيح، يتم نقل الصورة والصوت المرتبطة بها يتم تشغيله ثم يتم تعطيل العنصر.

أنشطة الالغاز

يجب تحديد الصورة وضبط اعداداتها.

صورة لغز
تحديد ما من الجهاز أو الكاميرا (إن وجدت).

قطع التركيب
ملئيات (2 قطعة) ومربعات (4)، وقطع طينية (16، 9) أو متعددة الأضلاع (25) أو (5).

اختيار إذا كانت الأجزاء سوف تظهر غير مرتبه

أجزاء شفافة
اختيار أن تكون الأجزاء شفافة.

اختيار إذا كنت تريد توجيهات لحل اللغز

إظهار الصورة لتسهيل حل اللغز.

فكرة: يمكنك تعطيل خيار بدء عشوائي بحيث اللغز يبدو صحيحا و ثم وضع فقط بعض الأجزاء عشوائيا و وبالتالي تقديم نشاط بسيط للطلاب.

الصور الفعلية: اللغز يمكن إنشاؤه تلقائيا من أي جهاز موجود فيه الصورة (أو النقاط صورة مع الكاميرا إن وجدت).

أنشطة الإدارة والاختيارات

يجب تحديد تسلسل العناصر الصحيح. لكل عنصر يمكنك تعيين سمات كل من المصدر والهدف.



يجب على المستخدم نقل العناصر التي تظهر غير مرتبة لتحديد التسلسل الصحيح.



التعزيز النهائي:

يتم تمييز نهاية تسلسل كل عنصر من العناصر ويتم تشغيل صوتهم إذا كان لديه أي شريك.

أنشطة الذاكرة

في هذا النشاط، يجب على المستخدم العثور على أزواج من البطاقات مع نفس الصورة أو أن تحدد نفس المفهوم (نص وصورة).



ترتيب الصور عشوائي تماماً.



الفصل الثاني

ادارة المستخدم

المحتوى

1. إدارة المستخدمين
2. ملف المستخدم
3. التقويم والأحداث

من هذا القسم يمكنك ضبط واختيار المستخدمين والأنشطة لكل واحد منهم والتحكم بملفاتهم.



من خلال تعيين سمات ملف المستخدم يمكن تحديد الصعوبة، ونوع الحروف و الجدول الزمني.

كما يمكنك تعيين المستخدم الحالي إلى التطبيق. هذا المستخدم اتخذت كمرجع للتكيف الأنشطة ليتم تنفيذها.

سيتم تكيف جميع الأنشطة وفقا للمعايير المحددة لكل المستخدم.



أجندة الأحداث

تخصيص الأنشطة لكل يوم من أيام الأسبوع.



القسم الثالث

اعدادات متقدمة

- المحتويات
1. إجراءات اضافية
 2. عناصر المكتبة
 3. اعدادات التطبيق

إجراءات متقدمة للنشاط

من قسم إدارة الأنشطة يمكنك القيام بما يلي:

تكرار: إضافة نسخة من النشاط إلى القائمة العامة.

تصدير: إرسال الملف مع جميع المعلومات عن النشاط و وضعه في إعدادات < قسم الأنشطة المشتركة لنسخه إلى الكمبيوتر عن طريق برنامج اي تيونز.

البريد الإلكتروني: إذا قمت بتكوين حساب بريد إلكتروني على الجهاز ويمكن استخدامه لإرسال النشاط.

تحرير مجموعات:

تحديد المجموعات التي تنتمي إلى النشاط.

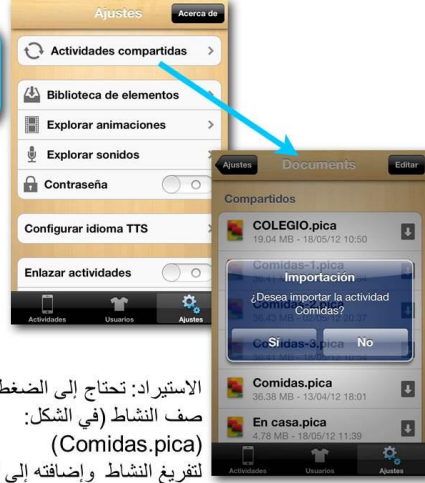
مشاركة إجراءات اضافية

من اي تيونز < الأجهزة > تطبيقات < قسم الملف المشترك > Picaa من الممكن استخراج الأنشطة المصدرة أو إضافة أنشطة مشتركة من قبل زملاء آخرين.



ملفات Picaa / السحب من سطح المكتب / لتصدير / الاستيراد.

ضمن إعدادات < أنشطة مشتركة غير مدرجة بملفات Picaa، لدينا تصدير أو سحب مجلد Picaa في اي تيونز.



نصيحة: يمكنك نسخ أنشطة Picaa في مجلد الكمبيوتر، أو قرص متحرك أو فلاش USB كنسخة احتياطية أو مشاركتها مع زميلك.

الاستيراد: تحتاج إلى الضغط على صف النشاط (في الشكل: Comidas.pica) لتفريغ النشاط وإضافته إلى القائمة العامة.

عناصر المكتبة

Picaa لديه مكتبة لتخزين / استرجاع العناصر أو سلسلة منها.

الأرشيف
الأرشيف الصحفي (الطبعة المنشطة) / نسخ / استرجاع العناصر.



استرداد العناصر من المكتبة.

نسخ
نسخ العناصر إلى المكتبة.

الضبط

عناصر المكتبة
مخزنة من الأنشطة

الرسوم المتحركة
الرسوم المتحركة المتاحة.

كلمة المرور
إذا مكن، وسيطلب كلمة مرور ("1234") لتغيير الوضع من وضع محرر طالب.

الأصوات
فحص الأصوات المسجلة أو المحولة أو الناتجة عن TTS

TTS
تعيين اللغة والجنس للصوت.

ربط الأنشطة
يشير إذا كان الطالب لديه ارتباط إلى النشاط التالي يتم عرض عندما ينتهي الحالي.

إخفاء الأنشطة
إذا مكن، وبالتالي فإن الطالب بعد الانتهاء من الأنشطة يتم إخفاؤها.

Appendix C

Session's Details Form

Session's Details (تفاصيل الجلسة)

معلومات الجلسة Session's information	
اسم الطالب Student's Name	
التاريخ Date	
رقم الجلسة Session no.	
المدة Duration	
وصف النشاط Activity's descriptions	
نوع النشاط Kind of activity	استكشاف ☐ Exploration جمعية ☐ Association لغز ☐ Puzzle ترتيب ☐ Sorting ذاكرة ☐ Memory
عناصر النشاط Activity's elements	
وصف النشاط ومدى صعوبته وتفاعل الطالب معه Characteristics of the activity related to the difficulty and interaction	
استجابة الطالب Student's responses	
الشعور Feelings:	
التعاون Collaboration:	
مدى التحسن مقارنة بالجلسة السابقة Improvements respect to last sessions:	
ملاحظات Comments	

Appendix D

Student's Profile

ملف الطالب

Student's Profile

معلومات الطالب Student's information		
الاسم Name		
العمر Age		
الجنس Gender	ذكر Male ☐	انثى Female ☐
IQ		
الصف Grade		
مدة انضمامه للمركز Duration (date of joining the centre)		
معتاد على استخدام الاي باد Familiar with using ipad	نعم Yes ☐	لا No ☐
معوقات الطالب Student's limitations		
البصر Visual		
السمع Hearing		
الحركة Mobility		
المعرفة Cognitive		

Appendix E

Activities usage survey

استبيان استخدام الأنشطة Activities usage survey

الأنشطة المستخدمة Activities used	تكرار الاستخدام Frequency of use			
	أبدا	أحيانا	بصفة متكررة	دائما
جمعية Association	1	2	3	4
استكشاف Exploration	1	2	3	4
لغز Puzzle	1	2	3	4
تصنيف Sorting	1	2	3	4

الإجراءات المتخذة من قبل المستخدم Actions taken by the user				
Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاختيار من 1 إلى 4 مع العلم أن الرقم 1 يمثل أدنى حد من الموافقة والرقم 4 يمثل الأعلى حد من الموافقة.				التقييم Assessment
1. الطالب قادر على تحديد مرحلة / المكان لاتخاذ الاجراء (المنزل، المدرسة، الحديقة، والطعام، الأماكن).				1 2 3 4
1. The student is able to select a stage/space in which to place the action (home, school, park, food, places.).				
2. يحدد الطالب الإجراءات / الأشياء بأسمائها / بالإشارة.				1 2 3 4
2. The student identifies actions/objects by their name/sign.				
3. الطالب قادرا على توزيع العناصر المختلفة من عدد أقل من أو يساوي مجموعات معينة.				1 2 3 4
3. The student is able to distribute different elements from a number less than or equal to given sets.				
4. الطالب قادر على تمييز عناصر مفيدة لحل المهمة.				1 2 3 4
4. The student is able to discriminate useful elements to solve the task.				
5. الطالب قادر على فرز العناصر الغير مرتبه مسبقا متبعا التسلسل الصحيح.				1 2 3 4
5. The student is able to sort items previously disordered following the correct sequence.				
المكتسبات Acquisitions				
يشجع التواصل والتفاعل الاجتماعي.				1 2 3 4
I. It encourages communication and social interaction.				
يتعلم الطالب ويستخدم المفاهيم الجديدة (مفردات / اشارات).				1 2 3 4
II. The student learns and uses new concepts (vocabulary/signs).				

III. The student is able to maintain a rhythm of action-pause-action during task performance (favouring the development of waiting times).	1	2	3	4
IV. It promotes the development of discrimination (visual/auditory).	1	2	3	4
V. The student anticipates actions or changes of space from images or sounds.	1	2	3	4
Motivation and development الدافع والتطوير				
a) The student manipulates the tool autonomously.	1	2	3	4
b) Sound reinforcement fosters motivation of the user while using the tool.	1	2	3	4
c) The student expresses his/her preferences regarding the selection of activities.	1	2	3	4
d) Failures during the development of the activity do not adversely affect its resolution.	1	2	3	4
e) The student participates actively in the development of activities.	1	2	3	4
نقاط او ملاحظات اخرى				
Other points to note:				

Appendix F

Students' skills survey

استبيان مهارات الطالب Students' skills survey

Language skills المهارات اللغوية				
التقييم Assessment				Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاقتدار من 1 الى 4 مع العلم ان الرقم 1 يمثل ادنى حد من الموافقة والرقم 4 يمثل الاعلى حد من الموافقة.
1	2	3	4	1. استخدام المصادر غير النطقية (الإيماءات والنظرات) من قبل المستخدم لتسهيل تواصله. 1. Use nonverbal resources (gestures, glances.) to facilitate his/her communication
1	2	3	4	2. استخدام نظام الاتصالات المعززة والبديلة للتواصل مع البيئة المحيطة بالطالب. 2. Use an Augmentative and Alternative Communication System to communicate with his/her environment.
1	2	3	4	3. يعرب الطالب عن احتياجاته من خلال اللغة الشفوية والمزاجية. 3. The student expresses through oral language needs and moods.
1	2	3	4	4. يربط الطالب المعلومات على حسب معلومات أثرت سابقا. 4. The student communicates information in response to issues previously raised.
1	2	3	4	5. يشرح الطالب بطريقة منظمة المعلومات التي تهم الحقائق والخبرات وغيرها في أي من السياقات المعتادة التي يعمل بها. 5. The student explains in organized way information concerning any fact, experiences, etc., in any of the usual contexts in which he/she operates.
1	2	3	4	6. يفهم الطالب وينفذ أوامر بسيطة. 6. The student understands and executes simple commands.
1	2	3	4	7. يتفاعل الطالب لفظيا مع مختلف الاشخاص (الأطفال أو البالغين) في البيئة المدرسية. 7. The student verbally interacts with different people (children or adults) in the school environment.
1	2	3	4	8. يستخدم الطالب المفردات المناسبة لعمره. 8. The student uses a vocabulary appropriate to his/her chronological age.
1	2	3	4	9. يقرأ الطالب ويفهم الكلمات. 9. The student reads and understands words.
1	2	3	4	10. يقرأ الطالب ويفهم العبارات البسيطة. 10. The student reads and understands simple phrases.
1	2	3	4	11. يفهم الطالب المعلومات المكتوبة التي تظهر في أجزاء مختلفة من بيئته. 11. The student understands the written information that appears in different parts of his/her environment.
1	2	3	4	12. الطالب قادر على كتابة نصوص بسيطة مع جمل بسيطة. 12. The student is able to write simple texts with simple sentences.

13. The student uses writing to respond to situations of everyday life and his/her learning.	1	2	3	4
14. The student expresses interest and enjoyment in participating in oral communication situations.	1	2	3	4
جوانب أخرى قد تهم بشأن المهارات اللغوية: Other aspects of interest to note regarding Language skills:				

المهارات الحسابية				
Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاقتدار من 1 إلى 4 مع العلم أن الرقم 1 يمثل أدنى حد من الموافقة والرقم 4 يمثل الأعلى حد من الموافقة.				التقييم Assessment
1. يصنف الطالب أنواع مختلفة من الأنشطة استجابة إلى المكان الذي تطورت فيه.	1	2	3	4
1. The student classifies different types of activities in response to the place where they are developed.				
2. يرتب الطالب مجموعة من العناصر حسب اللون أو الشكل أو الحجم.	1	2	3	4
2. The student orders series of objects by color, shape or size.				
3. يربط الطالب بطرق مختلفة (على سبيل المقارنة، أو التشابه) أنشطة في الحياة اليومية.	1	2	3	4
3. The student relates in different ways (by comparison, correspondence or seriating) the activities in daily life.				
4. يعرف الطالب الأرقام من 0 إلى 10، ويحدد المبلغ الذي تمثله.	1	2	3	4
4. The student knows the numbers from 0 to 10 and identifies the amount they represent.				
5. يعرف الطالب الأرقام 10-100، ويحدد المبلغ الذي تمثله.	1	2	3	4
5. The student knows the numbers from 10 to 100 and identifies the amount they represent.				
6. الطالب قادر على جمع كميات وأجراء عمليات حسابية بسيطة (والذي يؤدي إلى نتيجة أقل من 10).	1	2	3	4
6. The student groups amounts and performs simple sums (which results in less than 10).				
7. يتعرف الطالب على الأشكال الهندسية البسيطة (دائرة، مربع، مثلث).	1	2	3	4
7. The student recognizes simple geometric shapes (circle, square, triangle).				
8. الطالب قادر على حل المشكلات البسيطة من الحياة اليومية.	1	2	3	4
8. The student solves simple problem situations of everyday life.				
9. يعرف الطالب أيام الأسبوع ويربطها بأنشطة محددة.	1	2	3	4
9. The student knows the days of the week and relates them to specific activities.				
10. الطالب يربط بعض الأنشطة المعتادة التي تجري خلال اليوم (الاستيقاظ، تناول الطعام، والنوم) مع الوقت المحدد التي تنفذ فيه.	1	2	3	4
مع الوقت المحدد التي تنفذ فيه.				

10. The student associates some hours of the clock with regular activities that take place at that time (wake up, eat, sleep.).				
11. الطالب يتعرف على المال كوسيلة تبادل للحصول على الأشياء. 11. The student recognizes the money as an exchange to acquire objects.	1	2	3	4
12. يحدد الطالب قيمة بعض العملات / الفواتير. 12. The student identifies the value of some coin/bill.	1	2	3	4
13. الطالب يوجه في مكان متبعاً إرشادات بسيطة. 13. The student is oriented in space following simple commands.	1	2	3	4
14. الطالب قادر على التعامل مع المفردات الأساسية المتعلقة بمفاهيم المكان أو الزمان أو الحجم أو موقف. 14. The student handles a basic vocabulary related to concepts of space, time, size or position.	1	2	3	4
جوانب أخرى قد تهم بشأن المهارات الحسابية: Other aspects of interest to note regarding Math skills:				

Environment awareness skills مهارات الوعي البيئي				
التقييم Assessment				Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاقتدار من 1 إلى 4 مع العلم أن الرقم 1 يمثل أدنى حد من الموافقة والرقم 4 يمثل الأعلى حد من الموافقة.
1	2	3	4	1. يتعرف الطالب على الأشياء التي تنتمي إلى سياقات مختلفة (المطبخ، الحمام، غرفة النوم) ويحدد استخدامها. 1. The student recognizes objects belonging to different domestic contexts (kitchen, bathroom, bedroom.) and identifies their use.
1	2	3	4	2. يتعرف الطالب على الأشياء التي تنتمي إلى البيئة المدرسية (الصف، وملعب) ويحدد استخدامها. 2. The student recognizes objects belonging to the school environment (classroom, playground.) and identifies their use.
1	2	3	4	3. يتعرف الطالب على الأماكن المعتادة ويحدد الأنشطة التي تجري فيها. 3. The student recognizes usual places and identifies the activities that take place in them.
1	2	3	4	4. يتعرف الطالب على المنتجات التي يستهلكها عادة. 4. The student identifies his/her products commonly consumed.
1	2	3	4	5. يربط الطالب بين المنتجات الاستهلاكية و الأماكن حيث يتم شراؤها منها. 5. The student relates consumer products with the store where they are purchased.
1	2	3	4	6. يتعرف الطالب على وسائل النقل المختلفة. 6. The student recognizes different types of transport.
1	2	3	4	7. يصف الطالب فائدة وسائل النقل المختلفة. 7. The student describes the usefulness of different transport.
1	2	3	4	8. يحدد الطالب الأطعمة الشائع تناولها ويشير إلى المفضلة لديه.

8. The student identifies commonly consumed foods and indicates his/her preferences.				
جوانب أخرى قد تهم بشأن مهارات الوعي البيئي: Other aspects of interest to note regarding Environment awareness skills:				

Autonomy skills المهارات الاستقلالية				
Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاقتدار من 1 الى 4 مع العلم ان الرقم 1 يمثل ادنى حد من الموافقة والرقم 4 يمثل الاعلى حد من الموافقة.	التقييم Assessment			
1. يتعرف الطالب على صورته ويحدد الأجزاء المختلفة المكونة لجسمه. 1. The student recognizes his physical image identifying the different component parts of his/her body.	1	2	3	4
2. الطالب قادر على أهم ملامح جسده. 2. The student identifies the most significant features of his/her own body.	1	2	3	4
3. يتعرف الطالب على بعض التغييرات التي تحدث لجسمه مع مرور الوقت. 3. The student recognizes some changes that happen to his/her body as the time passes.	1	2	3	4
4. يشير الطالب الى اهتماماته ويستطيع ترتيب أولوياتهم له. 4. The student points out his/her interests and he/she prioritizes them.	1	2	3	4
5. الطالب يعبر عن مشاعره والاسباب التي تسببت في ظهورها. 5. The student identifies his emotions and feelings and relates to the causes that produce them.	1	2	3	4
6. الطالب مستقل في أداء الأنشطة الأساسية للحياة اليومية (المأكل والملبس والسفر والمرحاض). 6. The student is independent in performing basic activities of daily life (food, clothing, travel, toilet).	1	2	3	4
7. الطالب يعبر عن مبادراته الخاصة لتنفيذ بعض المهام. 7. The student expresses his/her own initiative to carry out some tasks.	1	2	3	4
جوانب أخرى قد تهم بشأن المهارات الاستقلالية: Other aspects of interest to note regarding Autonomy skills:				

Social skills المهارات الاجتماعية				
Express their agreement or disagreement with the issues presented below, scoring them for it with 1, 2, 3 or 4. Considering that 1 indicates the lower end, while the 4 refers to the highest end. عبر عن موافقتك أو الخلاف مع القضايا المعروضة بالاقتدار من 1 الى 4 مع العلم ان الرقم 1 يمثل ادنى حد من الموافقة والرقم 4 يمثل الاعلى حد من الموافقة.	التقييم Assessment			
1. يتعرف الطالب على الناس من سياقات مختلفة (المدرسة والأسرة)، ويحدد مصدرها. 1. The student recognizes people from different contexts (school, family.) and identifies their source.	1	2	3	4

2. يحدد الطالب ما هي علاقته/علاقتها مع أشخاص مختلفين. 2. The student identifies what is his/her relationship with different people.	1	2	3	4
3. يحافظ الطالب على علاقة عفوية ويتعامل بطلاقة مع بقية زملائه. 3. The student maintains a spontaneously and fluently relationship with the rest of his/her classmates.	1	2	3	4
4. يحافظ الطالب على علاقة عفوية ويتعامل بطلاقة مع معظم المهنيين الذين يهتمون به في المدرسة. 4. The student maintains a spontaneously and fluently relationship with most of the professionals who care for him/her at school.	1	2	3	4
5. يحافظ الطالب على علاقة عفوية ويتعامل بطلاقة مع الناس الذين يعيشون معه ضمن نطاق الأسرة. 5. The student maintains a spontaneously and fluently relationship with people living in his/her family unit.	1	2	3	4
6. الطالب قادر على التمييز بين الأشخاص الغرباء من المعروفين بالنسبة له. 6. The student is able to distinguish strange people of the already known.	1	2	3	4
7. يميز الطالب دور المهنيين العاملين في بعض الخدمات الاجتماعية والثقافية لبيئتهم المباشرة. 7. The student distinguishes the role of professionals working in some social and cultural services of their immediate environment.	1	2	3	4
8. الطالب على وعي ويقوم بتطبيق قواعد التعايش (المتعلقة الحركة في الشوارع، والتخلص من القمامة). 8. The student recognizes and applies rules of citizen coexistence (relating to movement on the streets, the garbage disposal.).	1	2	3	4
جوانب أخرى قد تهم بشأن المهارات الاجتماعية: Other aspects of interest to note regarding Social skills:				