

KIBABII UNIVERSITY
INFORMATION TECHNOLOGY DEPARTMENT

Cover page

PROJECT TITLE: AUTISM APPROACH SOFTWARE

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BIT/0056/14

- A System Proposal in Partial Fulfilment of the Requirements for the Award of the Degree of Bachelor of Science in Information Technology of Kibabii University

Declaration and Approval

1. Declaration

Signature

Date

Name: Kelvin N Kamau

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2. Approval

Supervisor

Signature

Date

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ABSTRACT

As stated by the name, of the project ‘computerized autism approach software’ the software will be useful to people who suffer from autism. This work began by studying autism in detail and the people who suffer from it. The software should be fully interactive with user-parent (supervisor), children (individual suffering from autism), such that the supervisor can log in and schedule tasks to be covered by the child.

Autism spectrum disorders (ASDs) are primarily defined by problems with social interaction and communication, but they are also associated with a complex cognitive profile. Computerized Autism approach software is aimed at helping us approach this defect by integrating TQT with graphics (pictures) to help autistic children relate real life.

The objective is to seek to develop the software for autistic children with special needs that will help them improve their condition by engaging them into learning (scheduled tasks).

- Specific objectives:
 - For the developer:
 - To apply the skills taught in class on software development and problem solving in the real world.
 - To improve my knowledge on programming languages and coding skills.
 - To develop a system with a user-friendly interface where users can interact freely.
 - For the system:
 - To facilitate and aid in the growth of children diagnosed with ASD.
 - To help parents parenting kids with ASD train their children on how to undertake basic tasks that otherwise come naturally for normal kids.

- Scope:

The project covers psychology department such as Early Childhood Development. It can be useful to both the learners (people with autism disorder) and tutors to assign tasks to them.

- Methodology:

The project will be executed through the Incremental process model which involves both development and maintenance. This model combines the elements of the waterfall model with the iterative philosophy of prototyping. The product is said to be finished when it satisfies all of its requirements.

- Tools:

The tools required for success of the project include:

- Laptop
- Operating System
- Developer Apps i.e JDK, Net Beans

- Expected results:

To come up with a system that helps approach the disorder by helping the child relate with real life activities. This is achieved by integrating daily tasks with graphical images.

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List of Acronyms

AS -Asperger Syndrome

QT - Questions Task

ASDs – Autism spectrum disorders

ECDE - Early Childhood Development Education

App - Application

JDK – Java Development Kit

OS – Operating System

AAS – Autism Approach Software

Operation Definition of Terms

Documentation - Is the information that describes the product to its users.

Application - Is a software program that runs on a computer

Deliverables - Are tangible or intangible goods or services produced as a result of

System – a collection of entities (hardware, software and liveware) that are designed to receive, process, manage and present information in a meaningful format.

Software - collection of data or computer instructions that tell the computer how to work.

Programming - Is the process of designing and building an executable computer program.

2-tier architecture - It is like Client-Server architecture, where communication takes place between client and server.

Chapter One: Introduction

1.1 Background Information

Autism refers to a broad range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication. It's a syndrome that has been on increase for the recent years and everyone can expect to encounter or be affected by autism at any time during their lives. Actually, everyone has probably met or at least seen an individual that suffers from autism. Autism has been studied for almost a century now and many treatments and solutions have been laid out. The estimated extent of ASD in United Kingdom is around 1 out of 100 children, 1 of 59 children in the United States and 1 of 160 children globally. It also seems to affect more boys than girls with the ratio believed to be 3 boys for 1 girl (University of Sunderland, 2008). Autism is a sub-class of autism spectrum disorder which is divided into several categories according to the severity of the symptoms, age of onset and association with other disorders i.e:

- ❖ Asperger's syndrome
- ❖ Autistic disorder
- ❖ Classic autism (infantile autism)
- ❖ Childhood disintegrative disorder
- ❖ Pervasive developmental disorder (PDD or atypical autism)

In this proposal, the focus is on the first two categories which are classic autism and Aspergers syndrome and when the word autism is used, it is only a reference to those two categories. Classic autism is usually diagnosed when the child is between 18 – 36 months old. Persons who suffer from classic autism have a range of intellectual functioning from below to above average. Asperger syndrome is usually diagnosed later than classic autism since the symptoms are less severe. Person who suffer from Aspergers syndrome have in general intelligence from average to above average. People with Aspergers are harder to identify and are usually just considered eccentric (Organization for autism research, 2008). Most people who suffer from autism seem to be eager to escape from any situation which demands any communication with other persons at all. Most of them are being drawn more and more into the world of technology which can have both positives and negatives for them. The main aim of this project is to make contacts with people who are working in the field of autism. From there to see if it is possible to develop small software which is intended to help people with autism to better their lives and that can contribute to an improved social behavior.

1.2 Problem Statement

Autism spectrum disorders (ASDs) are primarily defined by problems with social interaction and communication, but they are also associated with a complex cognitive profile. One area of difficulty for children and adults with ASD is problem-solving, or the process of identifying a solution to a puzzle or question where the answer is hidden. This can be seen on the Twenty Questions Task (TQT), a commonly-used measure of verbal problem-solving and executive functioning. Children with autism are consistently less efficient than typically-developing children in their questioning on the task: for instance, rather than ask a general, category-based question (e.g. “Is it a living thing?”) they may ask about single items (“Is it the dog?”) or very restricted groupings (“Is it something you wear on your feet?”). This has previously been interpreted as an example of a concept formation deficit in autism, deriving from underlying difficulties with complex and integrative information processing. However, success in problem solving relies on a number of cognitive and linguistic processes that may be impaired in ASD.

Computerized Autism approach software is aimed at helping us approach this defect by integrating TQT with graphics (pictures) to help autistic children relate real life.

1.3 Justification

The system will aid in growth of the brain of the child affected by ASD, these children attentiveness and communication with other people is normally on a down low but they are drawn to imagery and self-involving activities. The system is therefore going to help communication and interaction between the parent and the child. Through the QTs, the child is able to learn and perform most of the fundamental activities in their day to day life.

The system is also beneficial in improving the ability of the child to socialize with other people by targeting areas in which the child maybe experiencing difficulties while assigning the tasks.

1.4 Purpose of the Project

Objectives

- ✓ To seek to develop software for autistic children with special needs that will help them improve their condition by engaging them into learning (scheduled tasks).
- ✓ To enhance autism infected children creativity relating the graphics (picture/images) in their study scheduled tasks, with real life situations.
- ✓ To increase in-seat behavior and overall attention span of autistic children by encouraging them to seat and tackle scheduled tasks.
- ✓ To develop technology that can be used to teach effective problem solving by allowing the individual to experience social situations and choose appropriate responses to unexpected events.
- ✓ To help teach numerous skills to children with autism by using repetitive viewing of videos/ graphics due to the "predictability" of the information given; that is, knowing what's coming up next.

These skills may include:

- **Language comprehension skills:**
Receptive vocabulary skills can be taught through videotaping (names of common everyday objects, toys, names of familiar people, animals, etc.). Directions to complete various routines can also be taught by the same videotaping strategy (e.g., making the bed, setting the table, getting dressed, going to the library, etc.).
- **Social skills:**
Numerous social situations can be videotaped and replayed to teach identification of appropriate/inappropriate social behaviors. Video taped segments can be made of any social area in which the child might be experiencing difficulties (e.g., asking for assistance, initiating varied topics, maintaining topics initiated by others, repetitive / perseverative speech or question asking, interrupting others, etc.).

System Level Objectives

- ✓ They system will have two accounts, the supervisors and students account.
- ✓ The supervisor creates the tasks for the student.
- ✓ The system will enable users to login using their login Ids and password for supervisors.
- ✓ The system will be able to validate user's information before login
- ✓ The users end for students will be open with no access restriction.
- ✓ The supervisor will be able to reset their password.
- ✓ The system will enable student view tasks loaded by the supervisor.
- ✓ The supervisor will have visibility of logs on the student's access to the tasks.
- ✓ The system will allow the supervisor to set tests to the student which involves matching images to tasks.
- ✓ The supervisor will evaluate performance on the test and grade performance for the student.
- ✓ The system will have a textual communication channel between the student and supervisor.
- ✓ The application will allow users to logout.

1.5 Scope

- The project covers psychology department such as ECD. Its targeted to be useful to both the children with ASD and tutors to assign tasks to them.
- The system will allow the tutors create tasks for the students to undertake, and is aimed at improving the connection between the two parties. This will help the tutor learn more about the student and understand communicational behavior.
- The tasks are designed by the supervisor hence complexity of the tasks will be attributed to the age of the student in the practice.

1.6 Significance

- The software is not complex and user friendly.
- The system will improve the parents understanding of their children with the disorder and also help develop the children communication and behavioral skills.
- With further research from the specialists such as Neurologists, the system could be improved to be more adequate by integrating more functionalities relevant to the aid in brain development of the children. This could then be adopted and integrated with medical systems for kids with autism globally.

1.7 Deliverables

- A complete, simple, effective system.
- A user friendly interface for both the supervisor and student.
- Reports on the students tests evaluation.
- The documentation of source code used to develop the application.
- System requirement and functional specification documents.

1.8 System Requirements

Functional requirements

Some of the functional requirements include:

1. *User data should input and stored:* This system should be able to record and store the user's information to allow easy log in.
2. *The Supervisor should be able to create task schedules:* These are tasks to be undertaken by the Student.
3. *The Supervisor can upload images or other multimedia files:* The user is able to upload files to aid in making the allocated tasks more vivid for comprehension.
4. *Ability to add, edit and delete task schedules:* The Supervisor should be able to add, edit and remove tasks scheduled for the student when need be.
5. *Student account refresh ability:* The Student's account should be able to refresh and update changes done by the Supervisor in the supervisor's account.
6. *Registration and creation of user profile:* For a user to login, they should register and create a user profile/account, the accounts are either Supervisor account or Students account.
7. *Send messages:* Both the Supervisor and Student should be able to communicate via messages.

Non-Functional requirement

- i. User-friendly - The system should not be difficult to learn and use due to its ease interface and easy functionalities.
- ii. Reliability - The system should be reliable and would depend on external database.
- iii. Portability - The application should be developed using standard software like Java and MySQL.
- iv. Availability - This software should be available in the internet for download.
- v. Maintainability - The system used the 2-tier architecture. The 1st tier the GUI, which is said to be front-end and the 2nd tier was the database, which uses MySQL server database which is the back-end.

1.9 Software Development tools

- Operating System
- NetBeans IDE
- Apache
- JDK

Hardware

- HP Probook laptop – for mobility to be able develop the software anywhere.
- Intel Core i7 1.8 GHz processors – for best performance.
- 8 GB Ram – to enhance performance by avoiding lags in operations of the development software and OS
- 45 WHr Battery – for reliability while developing in an environment with no power.

Programming Languages

Java

MySQL

Chapter Two: Literature Review

- This is empirical literature review. Show the success and failure of similar (systems, algorithms, technology etc.)
- Functional and non-functional requirements should be captured in the literature review.

Chapter Three: Methodology

3.1 DEVELOPMENT METHODOLOGY

The software development methodology intended to use is Incremental Model. This model is a method of software development where the model is designed, implemented and tested incrementally until the product is finished. It involves both development and maintenance. The product is defined as finished when it satisfies all of its requirements. Incremental model combines the elements of the waterfall model with the iterative philosophy of prototyping.

AAS composes of a number of components, each of which are designed and built separately. Each phase will be delivered to the user when complete. This helps avoid a long development time and allows the users to test and give informative feedback. This model of development also helps ease the traumatic effect of introducing completely new system all at once.

There are some problems with this model. One is that each new build must be integrated with previous builds and any existing systems. The task of decomposing product into builds not trivial either. If there are too few builds and each build degenerates this turns into Build-And-Fix model. However, if there are too many builds then there is little added utility from each build.

3.1.1 Reasons for Using Incremental Model

1. The requirements for the project are clear and can be implemented by phase wise.
2. Demand for an early release of a software product attributed to timelines for the final project presentation.
3. Manage risks involved in development due to lack of sufficient skill and experience.

3.1.2 Advantages of Incremental Model

1. Generates working software quickly and early during the software life cycle.
2. This model is more flexible – less costly to change scope and requirements.
3. It is easier to test and debug during a smaller iteration.
4. In this model users can respond to each build.
5. Easier to manage risk because risky pieces are identified and handled during its iteration.

3.2 RESEARCH METHODOLOGY

Some techniques of data collection I used to build the idea include:

- a) Research and site visits- I conducted research about the domain problem of autism disorder through the internet by reading articles and watching various talks from specialists and people living with the disorder.
- b) Observation – I have interacted with a child living with the condition and identified challenges in interaction with the guardian and problems he normally encounter in their real life living with the disorder.

References

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Appendices (*Should be on a new page*)

Chapter 4: Schedule

The schedule of the Computerized autism approach software comprises the following activities and their corresponding periods in the course of the study.

The various activities to be performed are:

1. Requirement gathering
2. Analysis and design of the system
3. Coding and debugging
4. Testing
5. Analysis and interpretation of the results
6. Documentation (Report writing)
7. Submission of the final Report

ACTIVITY		PERIOD: YEAR 2019/2020							
SN	ITEM	JAN		FEB		MAR		APR	
1	Requirement gathering								
2	Analysis and design of the system								
3	Coding and debugging								
4	Testing								
5	Analysis and interpretation of result								
6	Documentation								
7	Submission of final report								

Table: 4.1 Project Schedule

Chapter 5: Budget

Sn	Required Item	Unit	Quantity	Unit Price	Total Price
1	Laptop(core i7, 8GB RAM, 1.8Ghz, 1TB HDD)	Each	1	45,000	45,000
2	Flash Disk(8GB and above))	Each	1	1,500	1,500
3	Wireless modem	Each	1	7,000	7,000
4	Internet usage charge	Monthly	4	2,000	8,000
5	Jdk software				Free
6	NetBeans IDE 8.0 software				Free
7	Note book	Each	1	100	100
8	Report printing and binding	Each	2	500	1,000
9	Transport			2,000	2,000
10	Miscellaneous			10,000	10,000
	TOTAL COST				68,100

Table: 5.1 Budget

Chapter 6: SDLC Phases

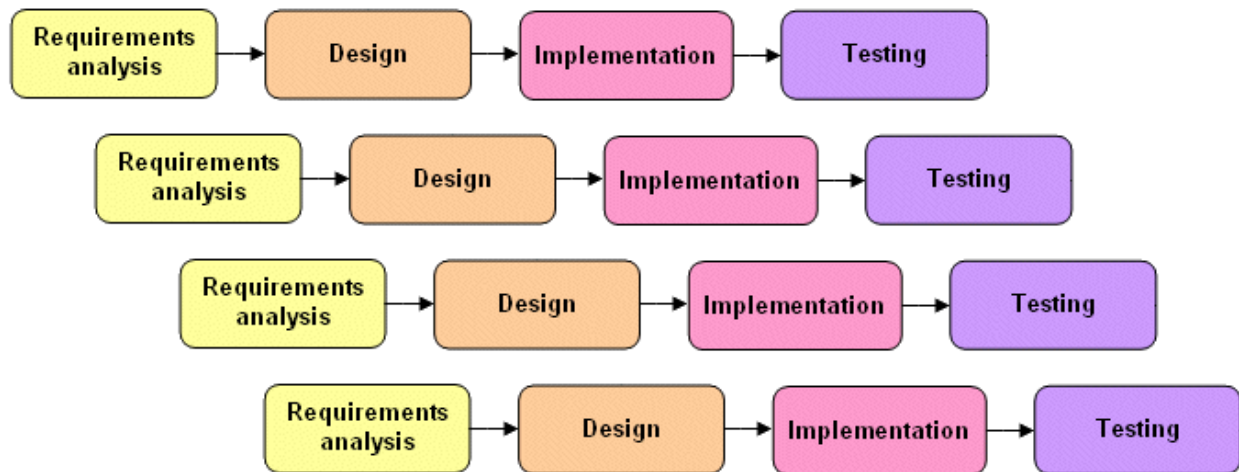


Fig: 6.1 SDLC Phases

1. Requirement Analysis

Requirement and specification of the software are collected.

2. Design and Development

In this phase the design of the system functionality and the development process is done successfully.

This phase is used each time when a functionality of the product has to be developed.

3. Implementation phase

The Implementation phase enables the coding phase of the under developed system. This phase includes the final coding of the system that design in the design and development. After completion of this phase the product working is enhanced and upgraded up to final system product.

4. Test

The testing phase of the incremental model checks the behavior of each existing function in the system under development as well as the additional functionality. Several testing methods are used under this phase to check the behavior of the each categorized function and system respond.