

CHILD DEVELOPMENTAL SCREENING  
TEST & PROGRESS MONITORING SYSTEM  
FOR LITTLE ONES EDUWORLD THERAPY  
CENTRE

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Bachelor of Degree Software Engineering

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CHILD DEVELOPMENTAL SCREENING TEST & PROGRESS MONITORING  
SYSTEM FOR LITTLE ONES EDUWORLD THERAPY CENTRE

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## ABSTRAK

Usia lima tahun dikenali sebagai usia emas untuk kanak-kanak berpeluang belajar dan mengalami sesuatu dalam kehidupan mereka melalui persekitaran mereka. Walau bagaimanapun, masih ramai kanak-kanak yang menghadapi dan mengalami kelewatan dalam perkembangan tumbesaran mereka. Dalam kes itu, kanak-kanak ini memerlukan penjagaan dan sokongan khas untuk memantau perkembangan mereka. Kaedah ujian saringan dilakukan untuk mengenal pasti potensi kelewatan dalam perkembangan kanak-kanak. Memandangkan kaedah ujian saringan kebanyakannya dilakukan secara manual, terdapat beberapa kelemahan yang dihadapi. Selaku syarikat Pusat Terapi LOE dan MZR yang dikenali sebagai pelanggan, mereka menyebut bahawa banyak tugas ujian saringan perlu diuruskan untuk empat kawasan pembangunan utama dan bilangan kanak-kanak yang menghadapi kelewatan perkembangan juga adalah besar yang perlu direkodkan dan disimpan untuk kegunaan masa hadapan. Selain itu, keputusan saringan juga berdasarkan Skala Denver yang perlu disemak silang dengan umur kanak-kanak. Dalam kes itu, sistem manual tidak cekap dan sesuai untuk mengendalikan dan menyimpan banyak data dan maklumat serta sangat memakan masa. Metodologi Scrum digunakan sepanjang pembangunan sistem sebagai pendekatan berulang dan inkremental yang mempunyai Sprint berterusan dengan pelanggan untuk kemas kini kemajuan secara berkala melalui pertemuan dan perbincangan tentang pelarasan, penambahbaikan dan maklum balas untuk projek. Oleh itu, sistem digital yang dikenali sebagai sistem CDST, sistem berasaskan web akan direka bentuk dan dibangunkan untuk tujuan melaksanakan ujian saringan untuk mengesan sebarang kelewatan perkembangan dan memantau perkembangan perkembangan kanak-kanak. Sistem ini akan digunakan untuk memantau perkembangan perkembangan kanak-kanak dalam masa yang singkat. Selain itu, sistem juga boleh mengurus dan mengendalikan banyak data yang diperlukan dengan lebih berkesan dan cekap serta akan disimpan dengan selamat dalam pangkalan data sistem untuk kegunaan masa hadapan. Akhir sekali, sistem CDST yang dimuktamadkan diuji oleh pelanggan iaitu MZR dan mendapat maklum balas positif daripada pelanggan MZR tentang kefungsiannya, kebolehgunaan dan keberkesanan sistem dan juga beberapa penambahbaikan kecil yang boleh dilaksanakan.

## **ABSTRACT**

The age of five years old is known as a golden age for the children to have the opportunity to learn and experience things in their life through their surroundings. However, there are still many children that are facing and suffering with delay in their growth development. In that case, these children need special care and support to monitor their development. A method of screening test is performed to identify the potential delay in a child's development. As the screening test method is mostly done in manual way, there are some disadvantages that are faced. As the LOE Therapy Center and MZR company known as the clients, they mentioned that many screening test tasks needed to be taken care of for four main development areas and the number of children that facing the developmental delay is also large that needed to be recorded and saved for future used. Besides, the screening result is also based on the Denver Scale that needed to be cross-check with the children' age. In that case, the manual system is not efficient and suitable to handle and store a lot of data and information and very time consuming. Scrum methodology is used throughout the system development as an iterative and incremental approach that have continuous Sprints with clients for progress update regularly through meeting and discuss on adjustments, improvements and feedback for the project. Therefore, a digital system known as CDST system, a web-based system will be designed and developed for the purpose of performing the screening test to detect any developmental delay and monitor the child's development progress. The system will be used to monitor child's development progress in short time. In addition, the system also can manage and handle a lot of data needed more effectively and efficiently and will be securely stored in the system database for the future used. Lastly, the finalize CDST system is tested by client which is MZR and gained positive feedback from clients of MZR of the functionality, usability and effectiveness of the system and also some minor improvement that can be implemented.

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## LIST OF ABBREVIATIONS

|       |  |
|-------|--|
| CDST  | Children Development Screening Test        |
| LOE   | Little Ones Eduworld                       |
| OT    | Occupational Therapist                     |
| SDLC  | Software Development Life Cycle            |
| NBC   | Naïve Bayes Classifier                     |
| HTTPS | Hypertext Transfer Protocol Secure         |
| ERD   | Entity Relationship Diagram                |
| PHP   | Hypertext Preprocessor                     |
| SQL   | Structured Query Language                  |
| SSL   | Secure Socket Layer                        |
| ACL   | Access Control List                        |
| OWSAP | Open Web Application Security Project      |
| DFD   | Data Flow Diagram                          |
| ERD   | Entity Relationship Diagram                |
| GB    | Gigabyte                                   |
| MB    | Megabyte                                   |
| CPU   | Central Processing Unit                    |
| GHz   | Gigahertz                                  |
| WEKA  | Waikato Environment for Knowledge Analysis |
| XML   | Extensible Markup Language                 |
| SUS   | System Usability Scale                     |
| UC    | Use Case                                   |
| UAT   | User Acceptance Test                       |
| WBCGS | Web-Based Child Growth System              |
| MVC   | Model-View-Controller                      |
| CSS   | Cascading Style Sheets                     |

## CHAPTER 1

### INTRODUCTION

#### 1.1 Introduction

The golden age of a child usually starts at the age of five years old as they will have the opportunity to get an expeditious period for their growth and development. During this golden age, children can absorb and learn information through their surroundings and environment. In that case, adults need to provide appropriate simulation to their children to guide and raise them toward an expected milestone of growth and development.

Nevertheless, there are still many children that are found to experience the situation of retardation in growth and life development that may occur from lack of care and attention given by an adult. Over nearly more than 240 million children are having and suffering from a developmental disorder in this world (*Children with Disabilities Overview*, 2022). These children that are having the developmental disorder are different from other normal children's growth development. It is because some of them cannot achieve the milestone of child development that was supposed to be achieved at a certain age. Some child developmental disorders comprise on learning disorders, emotional-social behavior, challenges, motor disorders, developmental language disorders, and cognitive abilities challenges (*Developmental Disorder*, 2022) (Acar et al., 2014). In fact, developmental disorders in children are prevalent from early life.

Children that have developmental disorders may require different ways to learn and be paying attention. Each of them is different and can evolve in different ways. In addition, some of the children that have developmental disorders can survive and live their life independently on their own while some of them require specific care and support in their life and may need to care and support for a life-long.

The fact that the importance of screening tests for young children has gained more recognition from researches, educators, healthcare and adults. The method of screening test is used to identify any potential delays in terms of all aspects of development that include motor skills, language vision and hearing, social and emotional behavior, and cognitive abilities (Acar et al., 2014). Early identification of developmental disorders is critical for young children's well-being and will give a huge concern toward their families, especially toward their parents. Screening tests hold importance and the ultimate goal of identifying immediate concerns and the potential need for any further evaluation. Unlike progress monitoring, the screening test is not used to diagnose or determine any developmental delay or disorder in young children but can identify when the young children have a high risk of developmental delay. This tool can provide the result of whether the children's score is achieved at the expected milestone or not achieved within the expected milestone of development based on their age. By referring to the screen test result, the healthcare experts or parents can take early action to provide specific treatment and care to their children if their children are facing a developmental disorder.

Above all, it is necessary to provide an efficient way to manage the screen test and progress monitor toward the children's development to ensure that the child's development and growth can be monitored at an early age. Denver developmental screening test method that also known as Denver Scale is one of the screening tools that can perform a test to identify any deviations from symptoms that occur in a child's development, and it has been used by health providers to identify the developmental problem that occurred in young children. In that case, early prevention can be done by giving specific treatment and care to the children that have developmental disorders that will prevent the deviation toward their development to increase. This method can be performed for children in the age range from 0 months until 6 years old.

An efficient system is important for the screening test and progress monitoring as there are many tasks to be performed and completed for the screening test that includes four main areas which are personal social, fine motor adaptive, language, and gross motor. As technology has now become more advanced, it can help to develop an efficient system for the screen test and progress monitoring to monitor a child's growth and development. In addition, with the help of advanced technology, it will provide a better and more accurate result toward a child's development progress. In short, early

prevention for children that have the symptoms of developmental disorders can be provided and will give a better result to reduce the amount children that have problems toward their growth and development in this world.

## **1.2 Problem Statement**

The screening test method used for the child's development has been widely used by healthcare and paediatricians to prevent early development disorders or delays in their children (Faruk et al., 2020) (Warren et al., 2021). However, the screening test method is receiving some sort of issues and problems. First, the number of children that take the screening test manually is hard to estimate as there are a large number of children that wanted to be recorded in the screening test and their progress monitored to monitor their development. In addition, recording many children to do the screen test and managing their test results in a manual way by using paper questionnaires and checklists are easily damaged or missing and not efficient (Sudarmilah et al., 2021).

Next, based on the requirements from the MZR company and LOE Therapy Centre which known as the clients, there are too many reliable screening tasks or items that need to be taken care of. As there are about 125 tasks for the screening test that are divided into four areas which are personal-social, fine motor-adaptive, language, and gross motor, it needs to use a lot of paper to separate the tasks based on their area which is not very efficient and may cause waste. The manual Denver Scale that is provided also will be used as a reference to cross-check the child's behaviour and the development areas' tasks based on child's age in order to give the screening test result. Besides, it also will cause a waste of time for the staff to search for specific tasks for a large number of children to perform, check the screen test, and continue with the specific treatment. It will make the work management become slow. In that case, the conversion of digital system of the Denver Scale is needed.

In addition, as there are many children that facing the developmental delay and many screening test tasks needed to be handled, the data and information needed to be stored securely in a secured system to be able to use all the data for the future used to monitor the child's development progress. In that case, the children's screen test records can be missing which will prevent them from proceeding to the next monitor progress

process and hat the child's development or exchange with other children that can cause huge problems toward their development progress as they are taking the wrong treatment and care when the screening test is done in manual way.

Despite that, the method of using a manual way to collect and monitor the data of the child's development progress by using paper is way too old and already abandoned with the advanced technology available nowadays. Besides, using the manual way to collect data is not very efficient as it is not in line with the current technology. The process to collect and analyze data on the screen test and progress monitor toward a child's development available today is by using a formal questionnaire and paper checklist using pen and paper.

In short, providing and developing a system for screening tests and progress monitoring toward a child's development will give a huge benefit to healthcare to make their work become more efficient and can be performed in a short amount of time. The problems that are mentioned above also can be prevented by using a systematic system to store all the results of the children's tests and progress development.

### **1.3 Objective**

- i. To study the requirements needed for the Children Developmental Screening Test & Progress Monitoring system.
- ii. To design and develop the Children Developmental Screening Test & Progress Monitoring system for Little Ones Eduworld Therapy Centre.
- iii. To evaluate the functionality of the Children Screening Test & Progress Monitoring system for Little Ones Eduworld Therapy Centre.

### **1.4 Scope**

- User Scope
  - i. Children between the age of 0 months until 6 years old.

- ii. LOE Administrator.
  - iii. Occupational Therapist (OT).
- System Scope
  - i. Covered the four domain areas in developmental progress which are personal social, fine motor-adaptive, language and gross motor.
  - ii. Covered the topic of child development and behavioral.
- Development Scope
  - i. Contains user interface graphics, text and image.
  - ii. Using the Laravel Framework with PHP programming language.
  - iii. Using Figma, Draw.io and XAMPP web server.

## **1.5 Thesis Organization**

This thesis report consists of five chapters that are represented in a sequence of Chapter 1,2,3,4 and 5. Chapter 1 discusses the project introduction that describes the general introduction of child development along with the screening test and progress monitoring system. In addition, the problem statement also mentioned and the real problem occurs according to the project's title along with the project's objective, project scope, and project thesis organization that summarize all five chapters represented in this thesis report.

The first remaining section is Chapter 2 described in the literature review which mentioned the existing problem and solution that was performed by other researchers. This chapter has highlighted the comparison with the existing system related to the project's title along with the advantages and disadvantages of the existing system. Besides, the features, tools, and techniques used by the existing system also will be included in this chapter to be compared.

Next, Chapter 3 will contain the methodology part that describes the project management framework of the Software Development Life Cycle (SDLC) that will be used in this project and thesis report. All the details of the development methodology that will be used throughout the project development will be discussed in this chapter. The proposed design contained the Context Diagram, Use Case Diagram, Activity Diagram and Flowchart also describe that related to the project's requirement. In addition, this chapter also mentioned the data design that was discussed on the database related such as ERD and Data Dictionary and also with the design prototype. The testing plan and potential use of the proposed solution also will be included.

As for Chapter 4, it will cover on the implementation of the CDST system include on the development tools used for the system development, environment setup using Laravel framework and database using phpMyAdmin software. The testing method also conducted with the client which is MZR Sdn Bhd to validate and verify the functionality and usability of the system and the result output and improvement idea discussed is provided with the user acceptance testing (UAT) form.

Lastly, the final of Chapter 5 summarizes on the overall final result of the CDST system development with objectives revised from early chapter that is achieved. Limitations and constraints throughout the CDST system development also included along with future recommendation and improvements.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction of Literature Review**

Early screening test and regular progress monitoring of child development hold an important role that contributes to preventing delays in a child's development and growth at an early age. In that case, adults, especially parents and healthcare hold a very important role to provide more efforts on monitoring the child's development. Several approaches have been proposed from previous research works from different years that summarized the use of the screening test and progress monitoring to detect and prevent the child's developmental delay. In this literature review, three existing systems and research from different authors have been chosen to be compared and discussed in terms of the techniques or methods used, technology, tools, features, advantages, disadvantages and more.

#### **2.2 Relevance of Existing System**

Work research from Sudarmilah et al. (2021) is about a Web-Based System for Growth and Development Monitoring Early Childhood. The authors summarize the importance of monitoring the child's development at an early age. An early test needs to be conducted to prevent delay in a child's development. The authors highlighted that transforming the pre-screening development from manual method to a web-based will provide more efficient method to conduct the screening or detection of a child's development. The waterfall method has been used throughout the project development consisting of four different phases and the screening test is based on the instrument of the Pre-Screening Development Questionnaire II.

Next, Kurniawati & Prabowo (2021) research is mentioned on the Dediaver System. The authors aim on developing a decision support system that is able to measure and monitor a child's development. The screening test for the child's development is based on the Denver II test instrument while the Naïve Bayes Classifier is included for the test result classification. Throughout the project development, the method of Incremental Development methodology used consists of two parts which are the first increment and the second increment. The first increment is about model classification using NBC which consists of analysis research, model design, design implementation, and data testing. Meanwhile, the second increment is about the application development consisting of analysis, design, implementation, and testing which is almost the same as the first increment.

Then, research from Y. Kurniawati (2013) developed a system named Developmental Phase Tool Based on the Denver Test II system. The author mentioned the detection of a child's development and growth at an early age based on the Denver Test II. An application is designed that uses the question from the Denver Test II instrument to monitor the child's development. The method of the Naïve Bayes Classifier is used to perform prediction on the calculation where all attributes are independent. The method used in the project development is Research method that has five different phases.

Lastly, in Mohd Ekhsan et al. (2012) for Smart Lexic system, the author summarizes that a suitable multimedia screening test tools is designed and developed specially for children with dyslexic to replace the paper-based screening test that is time consuming. This system focused on dyslexia disability that is not for diagnose but to identity the dyslexia disabilities. The screening dyslexic for children will be used in the system.

## **2.3 Description of Existing System**

### **2.3.1 Web-Based Child Growth & Development Detection Information System**

The Web-Based Child Growth and Development Detection Information System (Sudarmilah et al., 2021). The authors are focused on developing a web-based information system for monitoring the child's development and growth in terms of motor

and mental development. The system is made based on the methodology of the Waterfall model which is a sequential and systematic development process in each phase of project management. The sequences of the methodology are requirement analysis, design, coding, and testing where each phase needs to be done before continuing to the next phase.

The users involved in the system are three which are Admin, Parents, and Posyandu Officer users. The functional requirements involved for each user are firstly for the admin user, they can login and logout, add users, add questions, add Posyandu officer, view child information, and view inspection history. Parents and Posyandu officer users, can login and logout, and manage child information which includes adding, viewing, editing, and deleting child information, adding screen tests, viewing screen test results and viewing inspection history.

The detailed flow of the system for parents' users are that they need to login into the system first. The parents can add their child's information which are the child's name, parent's name, child's gender, child's date of birth, and home address. Besides, parents also can view, update or delete their child's information in the system. Then, they can perform the screening test based on the provided questions based on their child's current age. The screen test result can be viewed and printed by the parents. For Posyandu officer users, they have the same function as parents' users, but they have an additional function where they can view the list of children that perform screening tests and register an account for Posyandu officers.

Next, administration needs to login into the system and directly to the initial interface page. The administrator can manage users and Posyandu officers by adding, editing, deleting, searching, and viewing the information of users and Posyandu officers. The administrator can manage questions by adding new questions, deleting questions, and viewing the list of questions. Then, they also can view all information of registered children along with the test result, print the child's information and screen test result, and delete the registered child's information and test result.

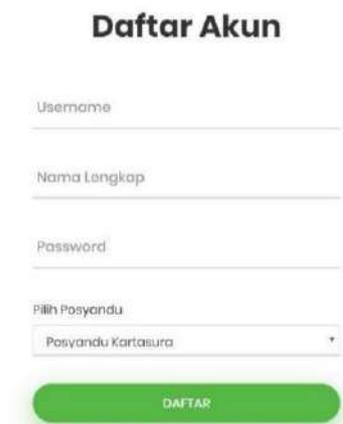
The system is designed with a wireframe using Codeigniter and developed using the PHP programming language. The testing process for the system is conducted using Black Box Testing and Usability Testing to check whether the system meets user

requirements and to test the website's function and effectiveness. Black Box Testing is performed to test the system's functionality and detect errors or system malfunction while Usability Testing is used to check the system with user's requirements and needs that include the efficiency, effectiveness and user satisfaction.



The image shows a 'Sign In' form. At the top, the text 'Sign In' is displayed in a bold, black font. Below this is a green hexagonal logo containing a white cross and a house icon. The form consists of two input fields: 'Username' and 'Password', each with a light gray border and a horizontal line below it. A prominent green button with the word 'LOGIN' in white capital letters is centered below the fields. At the bottom, there is a link that reads '• belum punya akun? Daftar'.

Figure 2.1 Login Page – Interface WBCGS



The image shows a 'Daftar Akun' (Account Registration) form. The title 'Daftar Akun' is centered at the top in a bold, black font. The form includes several input fields: 'Username', 'Nama Lengkap', and 'Password', each with a light gray border and a horizontal line below it. Below these is a dropdown menu labeled 'Pilih Posyandu' with 'Posyandu Kartasura' selected and a downward arrow. A prominent green button with the word 'DAFTAR' in white capital letters is centered at the bottom.

Figure 2.2 Account Registration Page – Interface WBCGS

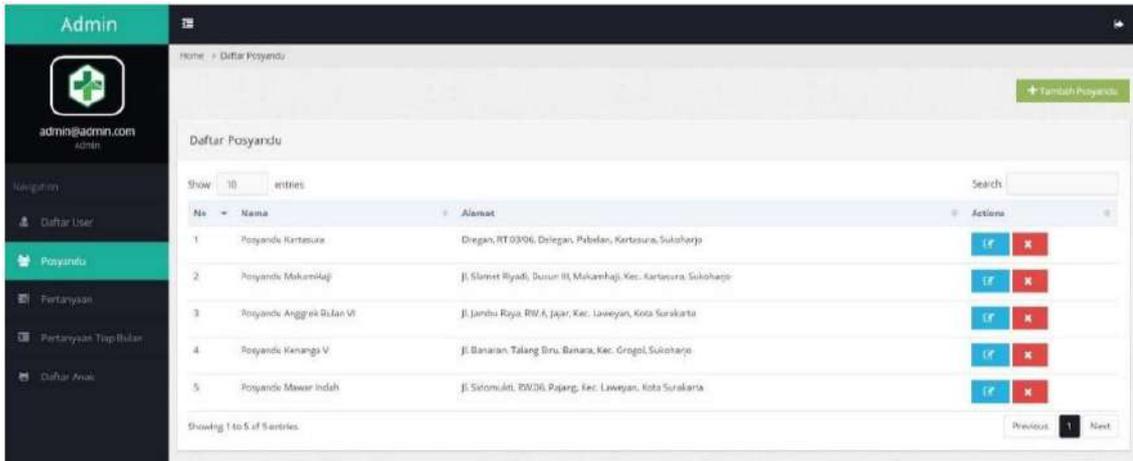


Figure 2.3 Manage Posyandu Page – Admin Interface WBCGS

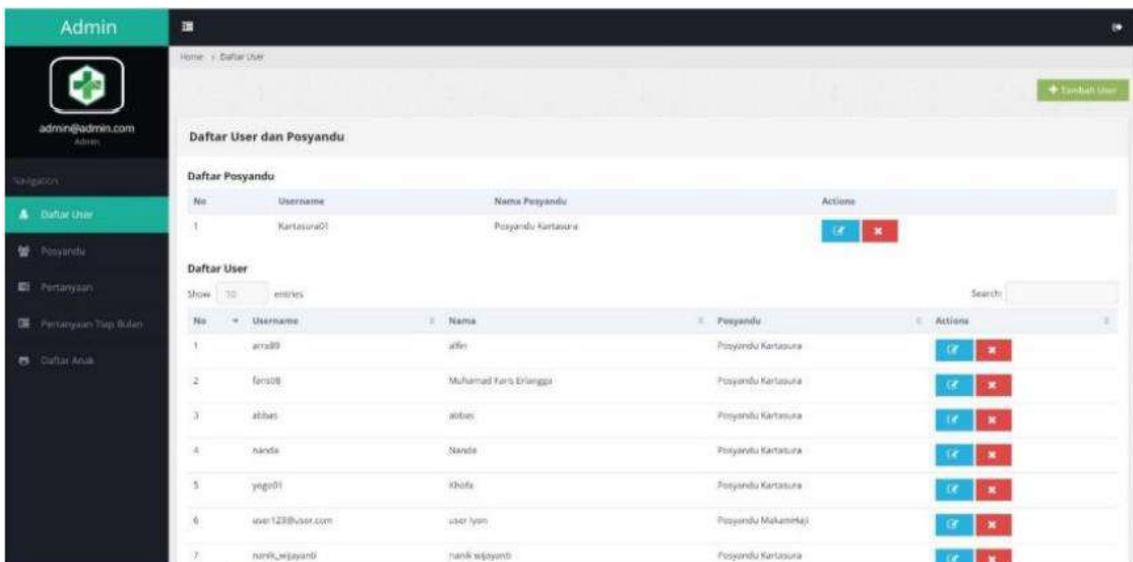


Figure 2.4 Manage User Page – Admin Interface WBCGS

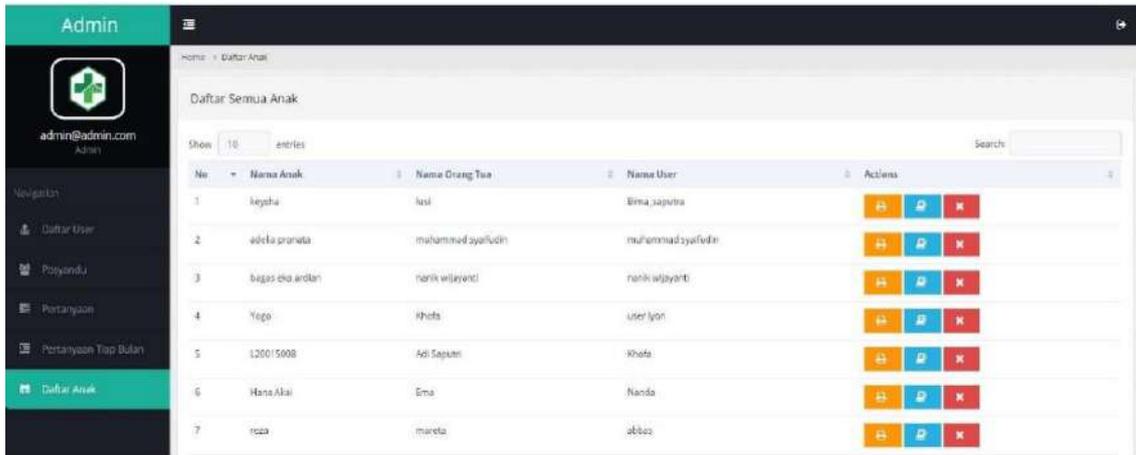


Figure 2.5 Manage Child Page – Admin Interface WBCGS



Figure 2.6 Manage Question Page – Admin Interface WBCGS

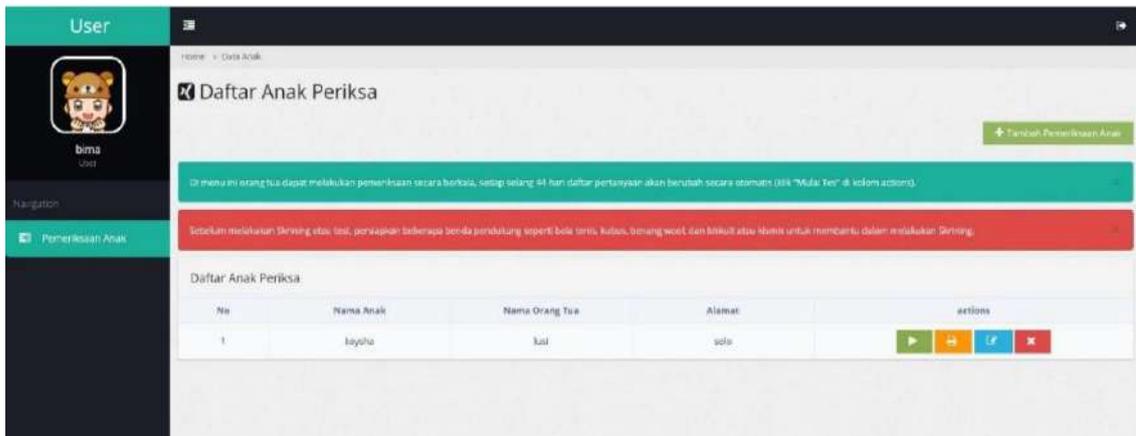


Figure 2.7 Add Child Page – Parents Interface WBCGS

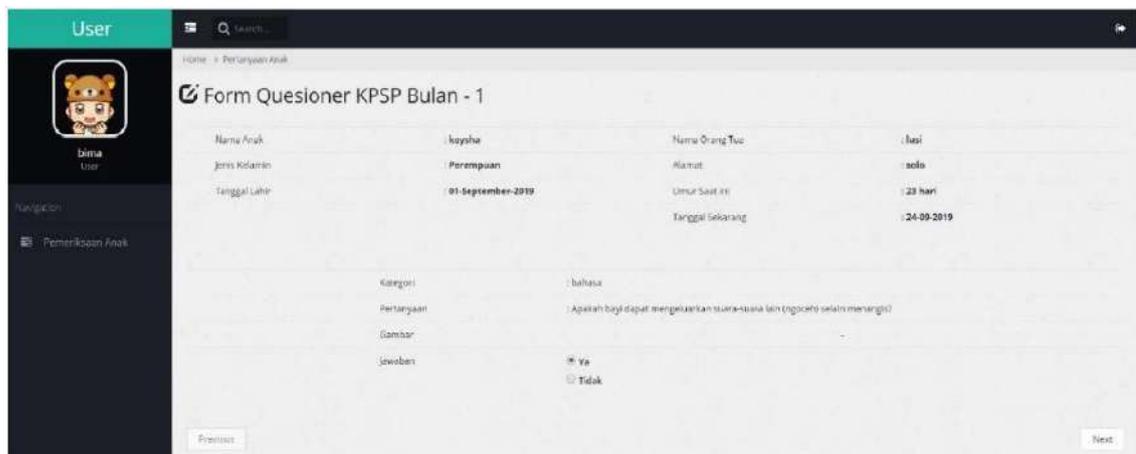


Figure 2.8 Screening Test Page – Parents Interface WBCGS

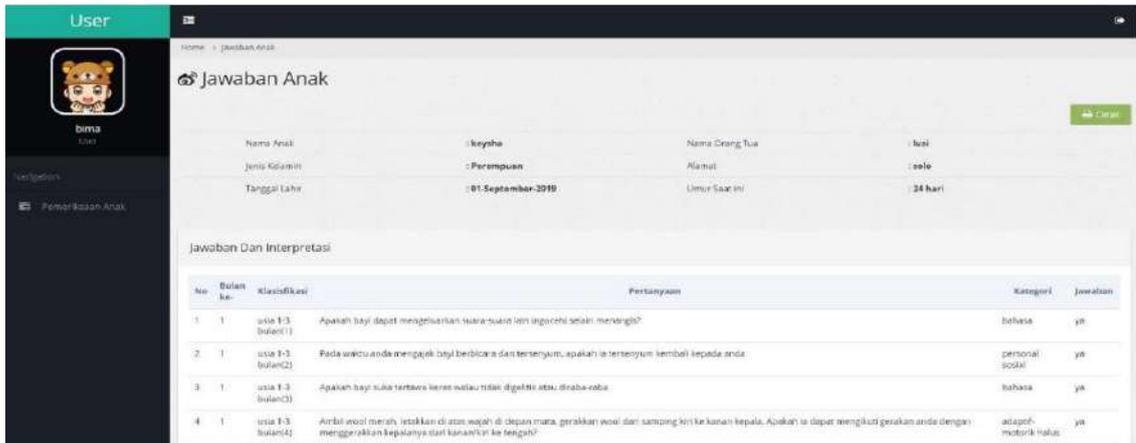


Figure 2.9 Screening Test Result Page – Parents Interface WBCGS



Figure 2.10 Print Test Result Page – Parents Interface WBCGS

### **2.3.2 Dediaver System**

The Dediaver System which is developed as a decision support system capable measuring and monitoring the child's development (Y. E. Kurniawati & Prabowo, 2021). DSS is known as one of the decision-makers supporting tools that can solve many kinds of problems. The system is developed based on the Denver II instrument using Naïve Bayes Classifier and is known as a Web-Based system. The incremental development method that is used is divided into the first increment for model classification and the second increment for application development.

The first increment divides into four phases. Phase 1 is the analysis that consists of determining the method for the project development and determining the software and hardware requirement for the system model. Next, phase 2 is the design that concludes with model classification where training data is classified based on NBC and is evaluated based on accuracy, precision, f-measure, and recall. Phase 3 is the implementation that is on data validation where the NBC that is used to make classification on the training data is using WEKA Data Mining Software. Phase 4 is a test that consists of the evaluation and testing of the model.

Moving on to the second increment which also divides into four phases. The first phase is the analysis which includes an analysis of user and system requirements. Functional requirements also are determined and analyzed in the first phase. Next, the second phase is the design of the application flowchart and interface. Then, the third phase is the implementation which consists of application implementation and development using coding. The last phase which is the fourth phase is the test where the testing and evaluation are performed on the system's functionality and error detection.

The flow of the system starts with account registration. If users have an account, they can login to the system and perform the screen test assessment. To perform the screen test assessment, the children's age is needed, and two parts are divided which are for 0-2 years old and above 2-6 years old. After the child's age is entered, the screen test assessment is displayed based on the child's age, and the user needs to complete the assessment.

Then, after the assessment is completed, the result of the screen test assessment will be given, and the children will continue on another screen test assessment that is

divided into the development sector. Development sector 1 is for children that are failed on the assessment based on their age, then they need to perform another assessment that is under their current age. If the assessment under the child's current age is passed, the status is cautious while if the result is not passed, the status is delayed. Moving on to the development sector 2 where the children pass the screen test assessment according to their age. They need to perform another assessment that is above their current age. If the result is passed, the status is advanced while if the result is failed, the status is normal.

Regarding the system's testing and evaluation, the system had been tested by using the method of black box testing to test the functionality of the system. All the functions involved in the system will be tested along with error detection. Overall, the system's functionality is fully-function without any error detection.



Figure 2.11 Main Page – Interface Dediaver System

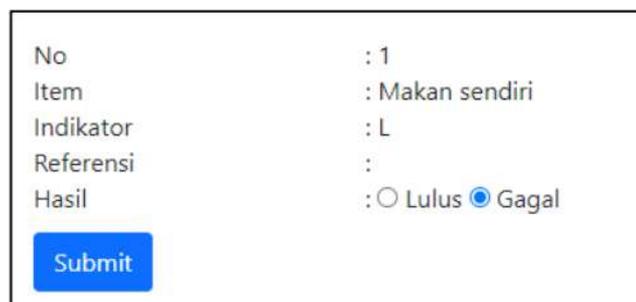


Figure 2.12 Screening Test Page – Interface Dediaver System

|   |                  |
|---|------------------|
| Hasil Tes   |                  |
| Usia  | :61 Bulan        |
| Tes Pesonal Sosial  | :Advance (Lebih) |
| Anak dapat melakukan tugas yang dilakukan oleh anak diatas usianya. |                  |

Figure 2.13 Screening Test Result Page – Interface Dediaver System

### 2.3.3 Dedipea System (Deteksi Dini Perkembangan Anak)

Dedipea System known as the developmetal phase tool based on Denver Test II is developed based on the Denver Test II aspect and method of Naïve Bayes Classifier for decision-making on the test result (Y. Kurniawati, 2013). The system has been tested using the Black Box testing method.

The methodology used throughout the project development is the research method. The first phase is data collecting which includes subject research, data collection method, and data source. The second phase is problem modelling which is problem analysis, determination of query items, and test evaluation. The third phase is involved with determining software and hardware requirements, and design. of Data Flow Diagram (DFD) and design of Entity Relationship Diagram (ERD). The fourth phase is database implementation, coding implementation, probability calculation, data learning, and testing. The last phase included report writing.

Moving on to the software and hardware requirements included in this system. The hardware used in the system development is a hard disk of 5GB capacity, a CPU of intel core I3-370M @ 2.40GHz, and 2048MB of memory. In addition, the software requirements are using the programming language of PHP 5.3.5, JavaScript, and MySQL 5.5.8. The database manager used is phpMyAdmin 3.3.9 and the web server of Apache 2.2.17 and XAMPP 1.7.4. The coding is written in the Notepad++ editing tools. The authors also use Microsoft Word 2007 and Google Chrome and WEKA 3.7 for supporting and testing tools. The operating system used is Windows 7 Home Premium 32-bit.

Next, there are two users involved in the system that known as patient and user. The patient user will enter their child's information such as date of birth and age and proceed on performing the screen test that is suitable for the current child's age. After the

screen test is conducted there are two conditions, first, if the test is passed and the result is normal, the child needs to perform another test for the age above the child's current age and if passed will get advanced result status. The second condition is if the screen test that is suitable to the current child's age is not passed, will get a caution result status and will proceed to test for the age above the child's current age if not passed will get delayed result status.

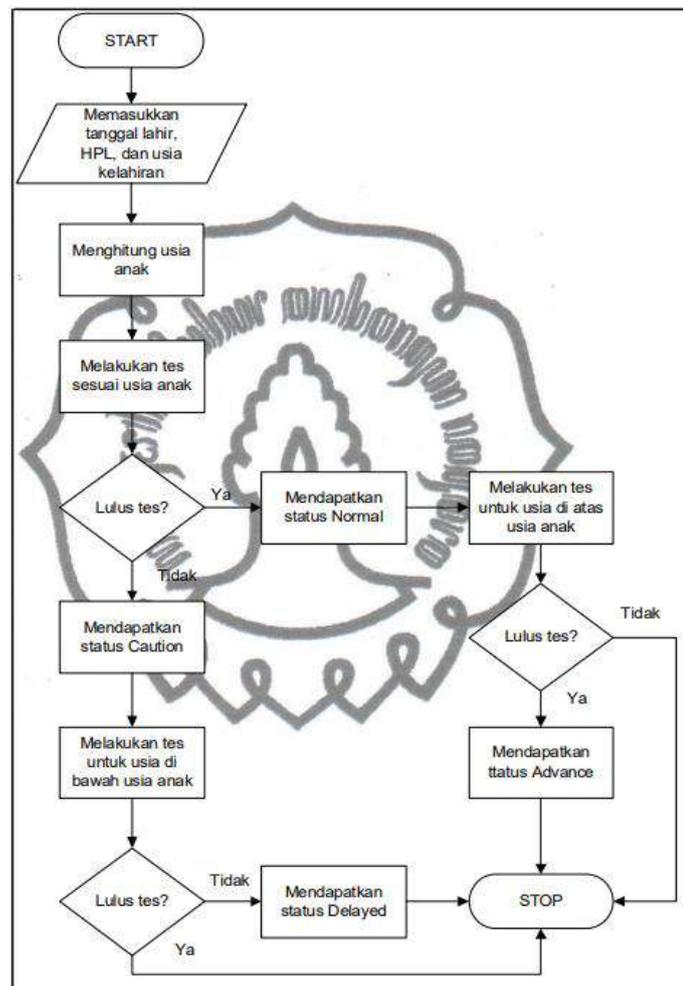


Figure 2.14 Flowchart Dedipea System

### 2.3.4 Smart Lexic System

Smart Lexic system is known as a Multimedia Screening Tool for Dyslexic Children that is developed based on dyslexic screening where this category is specially for children that have difficulties on reading word, word reversals, letter reversal and more. The screening test is performed using the computer-based in order to provide more accurate and precise result to detect the dyslexia disabilities on children development. Some multimedia is used in the system to make the system more interactive which are test, sounds, images, videos and animations (Mohd Ekhsan et al., 2012).

Basically, this system is developed by using Adobe Flash Professional CS5, Microsoft Paint, Audacity 1.3 Beta and Adobe Photoshop Elements. In addition, the system is designed that are more focused for the children from age 7 to 9 years old which is for early primary school children. Then, the system consists with four modules or functions which are Recognizing Letters, Recognizing Numbers, Recognizing Directions and Overall Result Score that is designed and developed in Malay language.

For module 1 of Recognizing Letters, it is developed by using the approach of drags and drops where children need to focus on choosing letters as correct answer based on provided sound that is most commonly confused for dyslexic children. As for module 2 for Recognizing Numbers, questions will be given with the provide answer options while module three for Recognizing Directions will be designed based on the real-world situations questions and answers related with dyslexic. Lastly, the system also provide acceptance testing for the teacher's users to get feedback and review on the system's development which are modules involved, system navigation, interface design and system's content.



Figure 2.15 Recognizing Letters Interface – Smart Lexic



Figure 2.16 Recognizing Numbers Interface – Smart Lexic



Figure 2.17 Recognizing Directions Interface – Smart Lexic



Figure 2.18 Overall Test Results Score Interface – Smart Lexic

## 2.4 Analysis of Existing System

### 2.4.1 Analysis of Comparison

Table 2.1 Analysis Comparison of Existing Sytem

| <b>Criteria</b>               | <b>System A</b><br>Web-Based Child Growth and Development Detection Information System | <b>System B</b><br>Dediaver System | <b>System C</b><br>Dedipea System (Deteksi Dini Perkembangan Anak) | <b>System D</b><br>Smart Lexic System |
|-------------------------------|--|------------------------------------|--|---------------------------------------|
| <b>Users</b>                  | Parents/Caregivers, Posyandu Officer, Admin  | Users, Administrator               | User, Patient  | Children, Teacher                     |
| <b>Acceptable Child's Age</b> | 0-6 years old  | 0-6 years old                      | 0-2 years old  | 7-9 years old                         |

|                             |  |  |  |  |
|-----------------------------|--|--|--|--|
| <b>Programming Language</b> | PHP  | Not mentioned  | PHP, MySQL, JavaScript   | Not mentioned  |
| <b>Features</b>             | <ol style="list-style-type: none"> <li>1. Provide a login and logout page for users.</li> <li>2. Provide a registration page for officer users.</li> <li>3. Able to manage child information which are add child information, edit child information, and edit child information.</li> <li>4. Able to perform a screening test.</li> </ol> | <ol style="list-style-type: none"> <li>1. Provide account registration for users.</li> <li>2. Provide a login and logout page for users.</li> <li>3. Able to perform screening assessments by child's age.</li> <li>4. Able to view the screen assessment result.</li> </ol> | <ol style="list-style-type: none"> <li>1. Provide a login page for users.</li> <li>2. Add patient's information.</li> <li>3. Able to do screening test.</li> <li>4. Able to get and view screening test results and status.</li> </ol> | <ol style="list-style-type: none"> <li>1. Do screening test of Recognizing Letters.</li> <li>2. Do screening test of Recognizing Numbers.</li> <li>3. Do screening test of Recognizing Directions</li> <li>4. Able to add and view overall score result.</li> <li>5. Able to store all results and information in database.</li> </ol> |

|                       |   |                   |                   |                         |
|-----------------------|---|-------------------|-------------------|-------------------------|
|                       | <p>5. Able to view and print screening test result.</p> <p>6. Able to view and print inspection history data.</p> <p>7. Able to manage users which are Posyandu officers and parents such as editing and deleting the user's information.</p> <p>8. Able to manage questions which are adding new and deleting questions.</p> |                   |                   |                         |
| <b>Testing Method</b> | Black Box Testing, Usability Testing  | Black Box Testing | Black Box Testing | User Acceptance Testing |

| <b>Method/Process</b> | Waterfall method   | Incremental method   | Research method  | Not mentioned  |
|-----------------------|--|--|--|--|
| <b>Advantages</b>     | <ol style="list-style-type: none"> <li>1. The system is well-functioned.</li> <li>2. The system is efficient to use.</li> <li>3. The graphical user interface of the system is minimalized and simple to understand.</li> <li>4. The data is stored in a database that is easier and more reliable for the users.</li> </ol> | <ol style="list-style-type: none"> <li>1. The system functionality is well-functioned.</li> <li>2. The model classification model using NBC is accurate and precise to measure a child's development.</li> <li>3. The system that is based on Denver Test II is affordable, very portable and does not need any intensive training.</li> </ol> | <ol style="list-style-type: none"> <li>1. The test result is accurate based on Naïve Bayes Classifier method.</li> <li>2. Able to perform screen tests in four main areas which are personal-social, fine motor-adaptive, language and gross motor.</li> </ol> | <ol style="list-style-type: none"> <li>1. Able to store all results and information in database securely to be access for future used.</li> <li>2. Provide interactive multimedia such as images, videos, animations and texts to attract children on using the system.</li> <li>3. Able to provide accurate and precise result scores.</li> </ol> |

|                      |   |   |  |  |
|----------------------|---|---|--|--|
| <b>Disadvantages</b> | <ol style="list-style-type: none"> <li>1. Does not provide a consultation function between parents and experts.</li> <li>2. The test result is checked manually based on SUS score.</li> <li>3. The system has some inconsistencies.</li> </ol> | <ol style="list-style-type: none"> <li>1. No validation for the screen test result with experts such as pediatricians or psychologists.</li> <li>2. Does not provide any consultation functions between parents and experts.</li> </ol> | <ol style="list-style-type: none"> <li>1. Does not provide a review test function for patients that get failed results.</li> <li>2. Does not provide consultation functions for patients and experts.</li> </ol> | <ol style="list-style-type: none"> <li>1. Does not provide consultation functions for children and experts.</li> </ol> |
|----------------------|---|---|--|--|

To sum up the information stated in Table 2.1, the Web-Based Child Growth and Development Detection Information System and the Dediaver System provide the age range of children to perform screening test which are 0-6 years old while other two systems is not provide the same age range. Other than, the features of performing screening test and viewing screening test results provided for all compared existing system but all of the four systems does not provide features to give consultation or review between parents and healthcare experts such as occupational therapist to monitor the child’s development progress that will be one of the disadvantages of the systems. Besides, all the compared systems can function well to perform the screening test and store all data and information securely in the system’s database.

## 2.4.2 Relevance of Comparison

Table 2.2 Relevance Comparison of Existing System

| Criteria       | System   |  |   |  |
|----------------|--|--|---|--|
|                | Web-Based Child Growth and Development Detection Information System  | Dediaver System  | Dedipea System (Deteksi Dini Perkembangan Anak)                           | Smart Lexic System   |
| Date Published | 2021   | 2021   | 2013  | 2012   |
| Author         | <ol style="list-style-type: none"> <li>1. Endah Surmilah</li> <li>2. Diyan Bima Saputra</li> <li>3. Adila Firdaus Binti Arbain</li> <li>4. Budi Murtiyasa</li> </ol> | <ol style="list-style-type: none"> <li>1. Yulia Ery Kurniawati</li> <li>2. Yulius Denny Prabowo</li> </ol> | <ol style="list-style-type: none"> <li>1. Yulia Ery Kurniawati</li> </ol> | <ol style="list-style-type: none"> <li>1. Hawa Mohd Ekhsan</li> <li>2. Siti Zulaikha Ahmad</li> <li>3. Syafnidar Abdul Halim</li> <li>4. Jiwa Noris Hamid</li> </ol> |

|                          |   |   |   |  |
|--------------------------|---|---|---|--|
|                          |   |   |   |  |
| <b>Publication</b>       | Journal of Physics: Conference Series   | 2021 International Conference on Data and Software Engineering (ICoDSE)   | None  | 2012 International Conference on innovation, Management and Technology Research                  |
| <b>Title of Research</b> | Web-Based System for Growth and Development Monitoring Early Childhood                                | Decision Support System to Measure Child Development Based on Denver II using Naïve Bayes Classifier                      | Alat Bantu Penentu Fase Tumbuh Kembang Anak Berdasarkan Instrumen Tes Denver II Menggunakan Metode Naïve Bayes Classifier | The implementation of interactive multimedia in early screening of dyslexia                      |
| <b>Focus of Research</b> | Develop a web information system to perform screening and detection on child's development using Pre- | Develop a decision support system to monitor child's development using Denver II to measure child's development and Naïve | Design a modify application for early detection on child's development with questions based on Denver Test II and         | Design and develop computer-based screening test tool for children with dyslexic disabilities to |

|                                    |  |   |   |   |
|------------------------------------|--|---|---|---|
|                                    | Screening Development Questionnaire method.  | Bayes Classifier for the test result classification.  | the result prediction based on Naïve Bayes Classifier.  | replace the manual screening test.  |
| <b>Relevance to Current Thesis</b> | The relevance is weak because the research is focused on developing the system based on Pre-Screening Development Questionnaire (KPSP) and does not provide on progress monitoring with experts. | The relevancy is medium because the system is develop based on the Denver Test II that is relevant, but the system does not provide on progress monitoring that refer with experts' groups. | The relevancy is medium. It is because the Denver Test II is used in the system to perform screen test, but the system does not have a section for progress monitoring on child's development with experts. | The relevancy is weak. It is because the Dyslexic criteria is used in the system to perform screen test and the system does not have a section for progress monitoring on child's development with experts. |
| <b>Methodology Used</b>            | Waterfall Methodology  | Incremental Methodology   | Research Methodology  | Not mentioned   |
| <b>Strengths</b>                   | 1. The system is well-functioned.  | 1. The system based on Denver Test II is affordable, very portable  | 1. Able to perform screen test in four main areas which are personal-social, fine motor-  | 1. Able to store all results and information in database securely to be access for future used.   |

|                           |   |  |   |   |
|---------------------------|---|--|---|---|
|                           | <ol style="list-style-type: none"> <li>2. The system interface design is minimalized.</li> <li>3. The system is efficient.</li> <li>4. The data is stored in a system database that is easier and more reliable.</li> </ol> | <p>and does not need any intensive training.</p> <ol style="list-style-type: none"> <li>2. The system is well-functioning.</li> <li>3. The model classification using NBC is accurate and precise to measure a child's development.</li> </ol> | <p>adaptive, language and gross motor.</p> <ol style="list-style-type: none"> <li>2. The screen test result is 80% accurate to be used based on Naïve Bayes Classifier method.</li> </ol> | <ol style="list-style-type: none"> <li>2. Provide interactive multimedia such as images, videos, animations and texts to attract children on using the system.</li> <li>3. Able to provide accurate and precise result scores.</li> </ol> |
| <p><b>Limitations</b></p> | <ol style="list-style-type: none"> <li>1. The system does not provide any consultation function with experts.</li> <li>2. The system has some inconsistencies.</li> </ol>   | <ol style="list-style-type: none"> <li>1. The system does not provide any validation with pediatricians or psychologists for the test result of Denver II.</li> <li>2. The system does not provide any consultation</li> </ol>                 | <ol style="list-style-type: none"> <li>1. The system does not have screen test reviews for users.</li> <li>2. The test only limited only for children until 2 years old.</li> </ol>       | <ol style="list-style-type: none"> <li>1. The test only limited only for primary school children.</li> <li>2. The system does not provide any consultation function with experts.</li> </ol>  |

|  |  |                                       |  |  |
|--|--|---------------------------------------|--|--|
|  | 3. The test result is checked manually based on SUS score. | function between parents and experts. | 3. The system does not provide any consultation function with experts. |  |
|--|--|---------------------------------------|--|--|

To sum up the information stated in Table 2.2, it can be found one existing system is from Malaysia which is the Smart Lexic System while other three existing systems is from outside Malaysia. Besides, two of the existing which are Dediaver System and Dedipea System (Deteksi Dini Perkembangan Anak) has medium relevancy with the CDST system where it used the Denver Test II as the screening tools to perform the sreening test. Meanwhile for other two existing system has weak relevancy as it use different screening tools which are Pre-Screening Development Questionnaire (KPSP) and Dyslexia Screening. In addition, the purpose of all exiting system is to provide digital and computer-based system on replacing manual screening test. Lastly, all the existing system has the same limitations which are not providing consultation between parents and experts such as OT to review and monitor the child’s development progress that can be made as improvement to the CDST system.

### 2.4.3 Comparison of Screening Test Tools

Table 2.3 Screening Tools Comparison

| <b>Screening Tools</b>            | <b>Denver II Test</b> | <b>Pre-Screening Development Questionnaire II</b> | <b>Dyslexia Screening</b> |
|-----------------------------------|-----------------------|---|---------------------------|
| <b>Children Age Range</b>         | 0-6 years old         | 0-6 years old                                     | 7-9 years old             |
| <b>Number of Tasks/Activities</b> | 125 tasks             | 105 tasks   | Not mentioned             |
| <b>Length of Test</b>             | 20-30 minutes         | 10-20 minutes                                     | Not mentioned             |
| <b>Average of Sensitivity</b>     | 56% - 83%             | 35.7%   | 27.17%                    |
| <b>Average of Specificity</b>     | 43% - 80%             | 75.8%   | 27.17%                    |

|                                  |  |  |  |
|----------------------------------|--|--|--|
| <b>Development Area Category</b> | Personal-social, fine motor-adaptive, language and gross motor | Personal-social, fine motor-adaptive, language and gross motor | Learning disability which are reading, writing and listening |
|----------------------------------|--|--|--|

The consideration on choosing the suitable instruments or tools to perform the screening test is based on range children age, number of tasks, length of test, average of sensitivity and specificity as mentioned in Table 2.3. As comparison the test result sensitivity and specificity are lower in the dyslexia screening instrument which are both 21.17% and only can be used for the children in age of 7-9 years (Mohd Ekhsan et al., 2012). Meanwhile, for the Denver II test, it has the validity of range between 56%-83% in terms of sensitivity and 43%-80% for specificity. It consists with total of 125 tasks that will be more specific to perform the screening test and can be completed in range of 20-30 minutes (Frankenburg et al., 2015). The pre-screening development questionnaire II has the validity which are 35.7% for sensitivity and 75.8% for specificity and can be completed within 10-20 minutes but with total of 105 tasks (*Commonly Used Parent - Report Developmental Screening Tools*, n.d.).

## 2.5 Summary

In short, other researches have mentioned some important information regarding the screening test on child's development and the importance of monitoring the child's development to avoid any delay in the child's development. Technology is nowadays able to help in developing a more efficient system to measure a child's development that can replace the manual way of performing screening tests and progress monitoring. In addition, the use of an instrument such as Denver II Test, Pre-Screening Development Questionnaire II, and Dyslexia Screening is recommended to be able to perform the screen test and monitor the child's development.

To sum up, reviewing other research report is important and encouraged to enhance the understanding and knowledge of the current topic. We can become more familiar with the current topic after reviewing some other research that has been done that is almost the same as ours. The improvement that can be made in the CDST system is by providing consultation function to review and monitor the progress of the child's development with the screening test result that is based on the analysis compared for all existing system in Table 2.1 and Table 2.2. In that case, the Denver II Test is chosen to be used as the instrument for the screening test as it is more suitable and widely used based on the comparison of the screening tools in Table 2.3 (*Child Development Assessment – Developmental Milestones and Denver Developmental Screening Test, 2022*).

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Introduction**

Throughout Chapter 3, it will cover and explain the project development methodology for the Child Development Screening Test & Progress Monitoring system. The description of the chosen methodology and frameworks will be discussed in detail through the system development process.

The methodology chosen to be used throughout the development of the Child Development Screening Test & Progress Monitoring system is Scrum framework. Scrum is chosen as the project sprint-based and involved with the stakeholders and is mainly focused on iterative progress on a well-defined project development goal. In addition, the feedback during the project development is very important to monitor on the progress while the project is being developed (Bhatt Jagdish, 2022) (Peek Sean, 2022).

#### **3.2 Project Management Framework**

Scrum framework is also known as one of the Agile frameworks that provide incremental and iterative process and progress. The framework is designed to prioritize on delivering the value of the project development to the customers. The project that is developed have well-defined goal to be achieved in a range of time called Sprints. It involves the sprints meetings that are done for the purpose of giving feedback. The project planning is important that is based on the given objectives and requirements. The use of scrum framework is very suitable for a project that requires the needs, requirement and feedback from the clients involved that will give effect on the project requirement through the project development. Scrum framework is also suitable to be used to upgrade any

existing systems or products. The most important in Scrum framework is that it involves a Sprint that can be considered as part of the project development process that includes with continuous feedback and reflection of all works, task progress completed within the time limited and given. Besides, the sprint involves breaking the process of development into manageable tasks to prevent any miscommunications during the development process and ensure that the project is able to be delivered and completed (*What Is Scrum Methodology? & Scrum Project Management, 2022*) (Khristich Slava, 2020).

As the Child Development Screening Test & Progress Monitoring system is a project that is requested from MZR company to make improvement on the manual system, it highly depends on the requirements and goals defined by the MZR company to be implemented throughout the project development. The review and feedback from the company also important to ensure that the project development is in the right track and follow the objectives given.

Based on the project requirement, objectives, goals, and planning of the project development, the Scrum framework is considered to be chosen as the methodology throughout the project development. In addition, this project involves with other members that in charge with different projects individually and hold sprint meetings once in two weeks for feedback and review session.

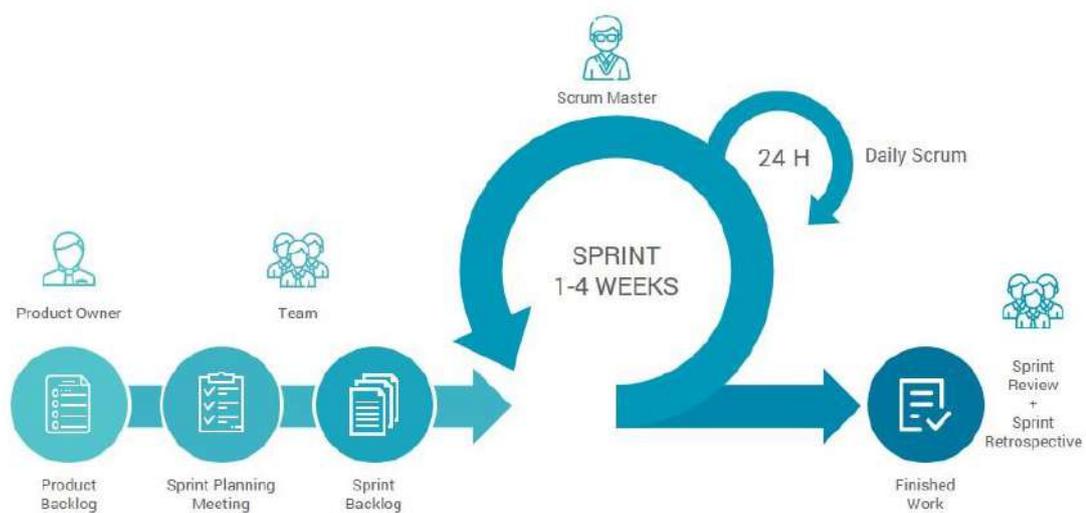


Figure 3.1 Scrum Framework – Methodology

The scrum framework consists of the phases of product backlog, sprint planning meeting, sprint backlog, sprint automation, sprint execution, daily scrum, sprint review meeting, sprint retrospective. In addition, in the Scrum framework, there are three different roles involved throughout the Scrum workflow which are product owner, scrum master and development team member.

- The product owner is connected with stakeholders and development team. The project's business, requirements and goals are aware by the product owner and will be responsible for managing the product backlog to ensure the project tasks and progress can be done within the planned time. The product owner involved in this Child Development Screening Test & Progress Monitoring system is the head of MZR Global Sdn Bdn company.
- The scrum master holds a role to monitor the progress and status of each project development by the development team member. Meetings are held between the scrum master and development team to track to track the progress, issues and constraints faced and planning ahead. The staff of MZR Global Sdn Bhd company will take the role as the scrum master to monitor the project development progress.
- Development team is person that is responsible for the given the project that have the well-defined goal and objectives. The project's tasks will be assigned to person in development team to be completed during the sprint.

The process and phases of the Scrum framework used throughout the development of Child Screening Test & Progress Monitoring system are:

- i. Product Backlog

The product owner involved are responsible for managing the product backlog. The product owner will be providing and listing all the plans and tasks that are needed in the project development. The project title, project requirement, objectives and projects flow throughout the project development will be prepared and discussed to collaborate with the scrum master before the sprint planning meeting to be explained and given out for the development team involved.

As for the Children Development Screening Test & Progress Monitoring system project, the head of MZR Global Sdn Bhd company will in charge in preparing the plans and requirements needed in the project by understanding the general system flow to be developed for the clients or stakeholders involved. Some documents will be prepared that consists of the project's requirements objectives and goals, and the general flow of the system before given out for the development team to develop the system. The planning on the project development also need to be aware by the head of MZR Global Sdn Bhs company to ensure that the project can be implement in a range of time.

ii. Sprint Planning Meeting

An online meeting session is held for the first sprint planning meeting with the product owner involved which is with the MZR Global Sdn Bhd company through the platform of Google Meet. The online session is involved between the scrum master which is the staff of MZR Global Sdn Bhd that in charge on monitoring the project development progress, development team's supervisor which is Dr Danakorn, UMP lecturer and development team which is the person in charge on developing the system. The scrum master assigned the project for development team where the project title is Children Development Screening Test & Progress Monitoring system that also known as CDST. The details of product backlog are presented and explained for the Children Development Screening Test & Progress Monitoring system that include on the purpose and objective of the project, the general flow of the project, the requirements, and tools. The planning of the project development is also discussed for the project's timeline where the development team need to prepare a Gantt chart for the tasks and time to be completed. In addition, after the scrum master present on the CDST project's requirement, any unclear flow or requirements is asked and discussed right after that to ensure that the development team can understand on the project.

As the result, the Children Development Screening Test & Progress Monitoring system is clarified that will be using Denver II Developmental Screening Test form to be transform to digital and the project is to develop a system to detect early child's development progress. The system is focused on the developing a web-based system that is used to do screening test on children's

development to detect on any delay throughout the children's development and monitor on the progress of children's development. The users involved in the CDST system is LOE administrator and occupational therapist that will be performing the screening test on the children.

### iii. Sprint Backlog

The tasks required from the product backlog will be listed by the MZR Sdn Bhd to be done and completed by the development team, which is the project's requirement, objectives, problem statement, scope of the project, methodology involved, the flowchart of the system and more. The tasks that are listed must be completed during the sprint. The development team member will decide and planned on completing the tasks given within the sprint time individually and the tasks are listed in the Gantt chart that is more easier to be referred to when doing the tasks progress. The Gantt chart will represent on all tasks involved during the project development from project introduction, literature review, methodology, development and testing until conclusion. The planned date also will be included in the Gantt chart for all the tasks to be referred when the tasks needed to be completed with the time planned. The development team effort is needed and required to complete and perform all the tasks given.

### iv. Daily Scrum

The development team which is the person in charge on developing the system will start on the project implementation starting with the project's report. The report of the CDST system consists with a total of five chapters. Chapter 1 involved with the project's introduction, problem statement, scope, objective and thesis organization where the research on the given project title is done that will be based on the given documents and requirements from MZR Global Sdn Bhd. Chapter 2 will be on the research for existing system that is mostly similar with the project title which is Children Development Screening Test & Progress Monitoring system to be compared for the literature review. Next, Chapter 3 will be doing on the methodology involved where the Scrum framework methodology is chosen for the project development. It also involved in determining the project requirement, proposed design, data design and testing plan where all the data and

diagram involved in the CDST system will be done. For the last two chapters which are Chapter 4 and Chapter 5 are for the project development, testing and conclusion.

Online meeting sessions are conducted six times which is for every two weeks for 30 minutes through the platform of Google Meet. The meeting involved the development team, scrum master, and development team's supervisor. During the daily scrum meeting, the development team will be presenting on the progress every two weeks that have been done to the scrum master. The development team also will be discussing the issues or constraints faced and occurred during the task's progress and the plan of the tasks progress for the next two weeks to be done and completed. The progress of the project is done in the form of a Gantt chart where all the tasks and progress will be inserted and updated in the Gantt chart that will be much easier to monitor on what tasks are complete and incomplete yet. The tasks progress that are included for the report of the project development is on Chapter 1, 2 and 3 that are for the introduction, literature review and methodology involved in the project. Chapter 4 and 5 will be the development and testing purpose. The scrum master also gave advice and encouragement for the development team member to solve the constraints and issues faced and committed to the planned sprint goal.

#### v. Sprint Review

A meeting session will be held among the scrum master, development team and supervisor of the development team at the end of the Sprint through online meet. The development team member will be presenting on the overall outcome of the Children Development Screening Test & Progress Monitoring system project that has been completed and implemented. The scrum master will review and give feedback on the outcome to the development team and discuss any changes if needed in the project. In addition, the scrum master also will re-check with the product backlog and update on any changes in planning to be changed referring to the project development outcome from the development team. The sprint review meeting goal is to review the project implementation and adapt with the product backlog. The quality of the project also will be checked to ensure that it is suitable for the customer needs.

vi. Sprint Retrospective

During the sprint retrospective, a meeting will be held at the end of the Sprint that is held after the Sprint Review meeting involve with scrum master and development team. It is held after the complete system of the Children Development Screening Test & Progress Monitoring system is implemented along with the report of the project. The development team will be reviewing and discussing on the work progress during the last sprint to ensure that the CDST system is implemented in the right track following with the given requirements from the MZR Global Sdn Bhd company. Any improvement for future works for the CDST project can be discussed and considered with the scrum master. The scrum master can provide help on any problems faced by the development team to find better ways to make improvement.

### **3.3 Project Requirement**

#### **3.3.1 Functional Requirement**

- i. The system should allow users to login using their account.
- ii. The system should allow the occupational therapist users to register an account to login to the system.
- iii. The system should allow the LOE administrator to view the details of registered child.
- iv. The system should allow the LOE administrator to search the registered children.
- v. The system should allow the occupational therapist to add child information for screening test.
- vi. The system should be able to calculate the child's age with the correct formula.

- vii. The system should display the tasks or activities for the screening test based on child age.
- viii. The system should allow the occupational therapist to do new screening test of the child for each area category which are personal social, fine motor adaptive, language and gross motor.
- ix. The system should be able to review the percentage of the task for current child age based on Denver II Scale.
- x. The system should allow the occupational therapist to add test score for the screening test tasks which are Pass, Fail, No Opportunity and Refusal.
- xi. The system should allow the occupational therapist to view the details screening test result.
- xii. The system should allow the occupational therapist to add consultation after the screening test is done.
- xiii. The system should allow the occupational therapist to view the details of the consultation.
- xiv. The system should be able to generate and display the reports of screening test and consultation.
- xv. The system should be able to export report to PDF file.

### **3.3.2 Non-Functional Requirement**

- i. Security Requirement
  - The system only can be used for the users with valid credentials.
  - Only users of LOE administrator and occupational therapist can view the children's detail information registered in the system.
  - The system should provide authentication for login users.

- The system should be able to store all the information related in the system database securely.
- ii. Usability Requirement
  - The system user interface is minimalized, user-friendly and easy to use by the users of the system.
- iii. Efficiency Requirement
  - The system loading time for each web page take less than 3 seconds.
  - The system shall provide each user's request within 10 seconds.
- iv. Integrity Requirement
  - The final result of the screening test needs to be maintained and not modified by any users.

### **3.3.3 Constraints and Limitations**

- i. As the system is a web-based application, it may lack in term of security while browsing the system in the web-browser.
- ii. The responsiveness of the system's user interface is limited via mobile devices.
- iii. Since the system shall access the database over the Internet, it is crucial to have Internet connection to be able using the system.
- iv. The system shall be used by the LOE administrator and occupational therapist users only.

### 3.3.4 User Requirement

The Children Screening Test & Progress Monitoring system focus on only two potential users that will involve in the system which are LOE Administrator and Occupational Therapist.

Table 3.1 User Requirement

| <b>USER</b>            | <b>EDUCATIONAL LEVEL</b>        | <b>BACKGROUND EXPERIENCE</b>  |
|------------------------|---------------------------------|---|
| LOE Administrator      | High level of education         | - Should have sufficient knowledge about the system.  |
| Occupational Therapist | Intermediate level of education | - Should have sufficient knowledge about the system.<br>- Should have sufficient knowledge on the child's development, growth and learning. |

The user requirements are based on the requirement from the MZR Global Sdn Bhd company. The meeting with the MZR company is held and some documents is shared from the MZR for the details requirements as shown in Table 3.1.

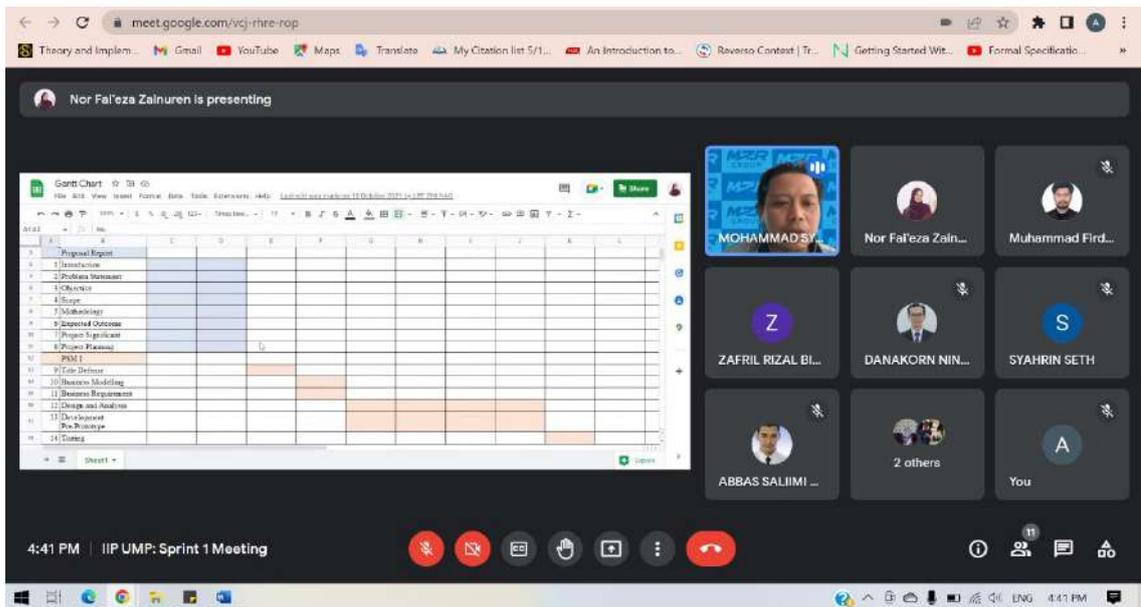


Figure 3.2 Online Meeting MZR – Planning and Project Introduction

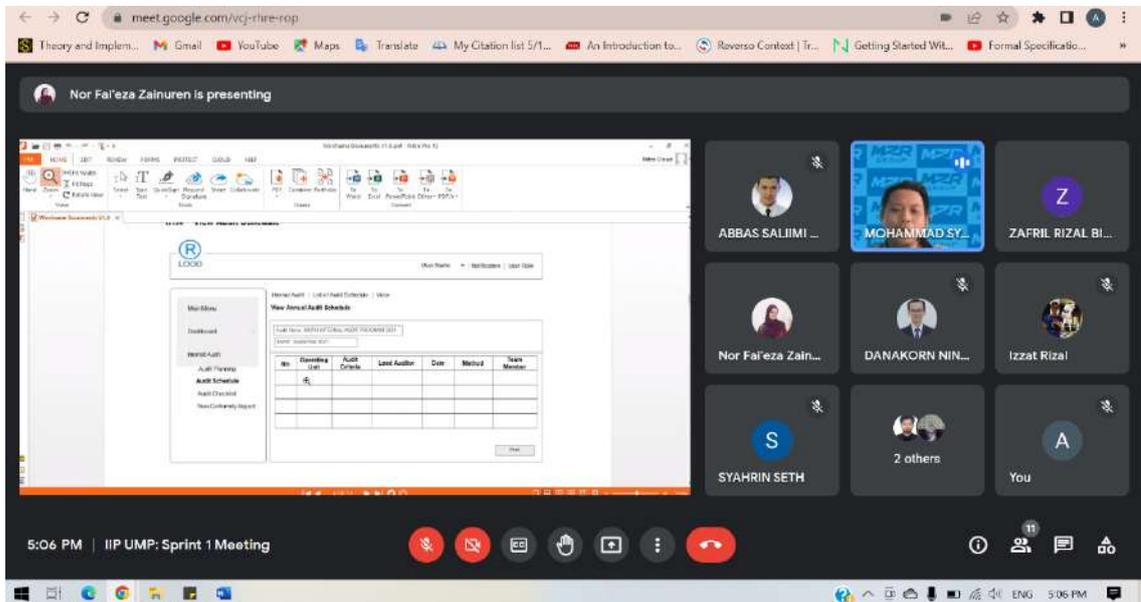


Figure 3.3 Online Meeting MZR – Review Example Wireframe

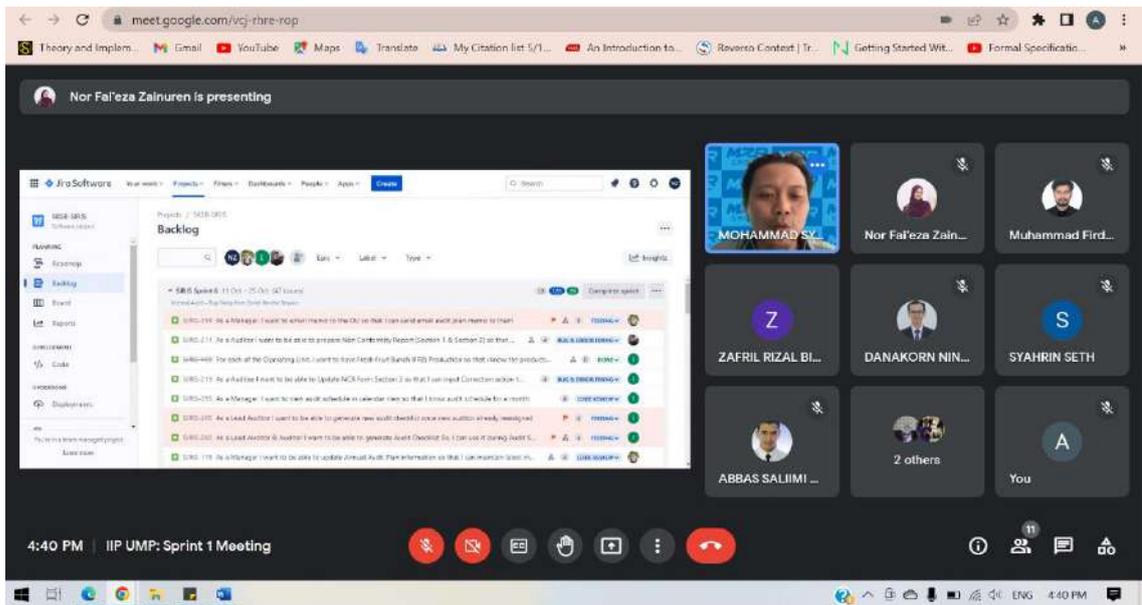


Figure 3.4 Online Meeting MZR – Project Discussion

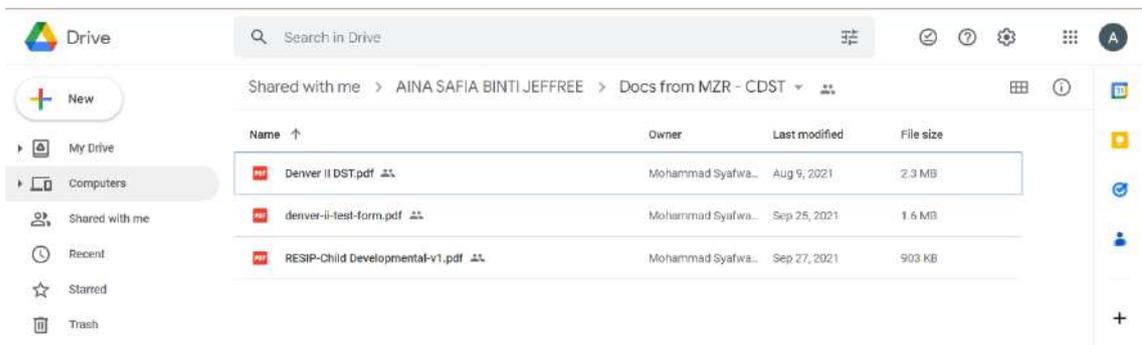


Figure 3.5 Shared Documents from MZR

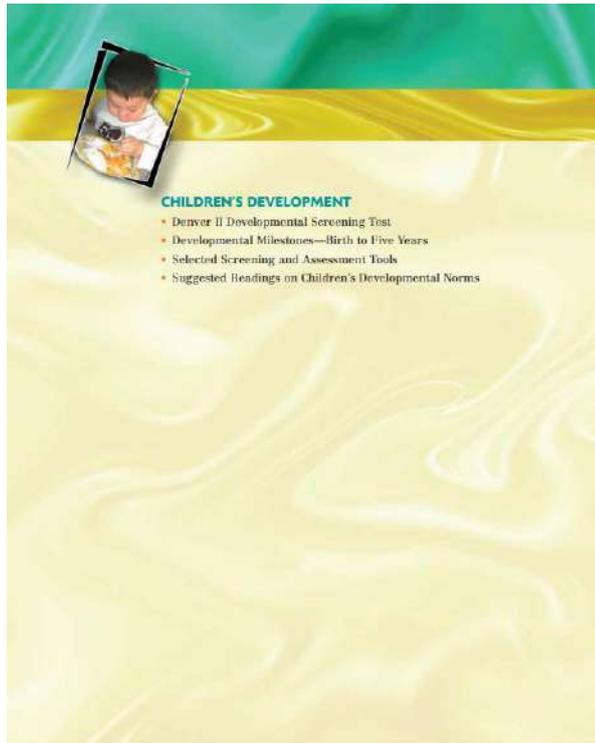


Figure 3.6 Document – Children Development

**DIRECTIONS FOR ADMINISTRATION**

1. Try to get child to smile by smiling, talking, or waving. Do not touch him/her.
2. Child must stare at least several seconds.
3. Parent may help guide toothbrush and put toothpaste on brush.
4. Child does not have to be able to tie shoes or button/zip in the back.
5. Move yarn slowly in an arc from one side to the other, about 2" above child's face.
6. Pass if child grasps satie when it is touched to the backs or tips of fingers.
7. Pass if child tries to see where yarn went. Yarn should be dropped quickly from right from tester's hand without arm movement.
8. Child must transfer cube from hand to hand without help of body, mouth, or face.
9. Pass if child picks up raisin with any part of thumb and finger.
10. Line can vary only 30 degrees or less from tester's line.
11. Make a fist with thumb coming upward and wiggle only the thumb. Pass if child imitates and does not move any fingers other than the thumb.



12. Pass any enclosed form. Fall continuous round motions.



13. Which line is longer? (Not bigger.) Turn paper upside down and repeat (pass 3 of 3 or 5 of 5)



14. Pass any lines crossing near midpoint.



15. Have child copy first. If failed, demonstrate.

When giving items 12, 14, and 15 do not name the forms. Do not demonstrate 12 and 14.

16. When scoring, each pair (2 arms, 2 legs, etc.) counts as one part.
17. Place one cube in cup and shake gently near child's ear, but out of sight. Repeat for other ear.
18. Point to picture and have child name it. No credit is given for sounds only. If less than 4 pictures are named correctly, have child point to picture as each is named by tester.







19. Using doll, tell child: Show me the nose, ears, ears, mouth, hands, feet, tummy, hair. Pass 6 of 8.
20. Using pictures, ask child: Which one flies? ... says meow? ... talks? ... barks? ... gallops? Pass 2 of 5, 4 of 5.
21. Ask child: What do you do when you are cold? ... tired? ... hungry? Pass 2 of 3, 3 of 3.
22. Ask child: What do you do with a cup? What is a chair used for? What is a pencil used for? Action words must be included in answers.
23. Pass if child correctly places and says how many blocks are on paper. (1, 5).
24. Test child: Put block on table, under table, in front of me, behind me. Pass 4 of 4. (Do not help child by pointing, moving head or eyes.)
25. Ask child: What is a ball? ... like? ... desk? ... house? ... banana? ... curtain? ... Pass if defined in terms of use, shape, what it is made of, or general category (such as banana is fruit, not just yellow). Pass 5 of 5, 7 of 8.
26. Ask child: If a horse is big, a mouse is ...? If fire is hot, ice is ...? If the sun shines during the day, the moon shines during the ...? Pass 2 of 3.
27. Child may use wall or rail only, not person. May not crawl.
28. Child must throw ball overhand 3 feet to within arm's reach of tester.
29. Child must perform standing broad jump over width of test shoe (8 1/2 inches).
30. Tell child to walk forward,  heel within 1 inch of toe. Tester may demonstrate. Child must walk 4 consecutive steps.
31. In the second year, half of normal children are noncompliant.

**OBSERVATIONS:**

Figure 3.7 Document –Screening Test Activities (Direction for Administration)

| DEVELOPMENTAL MILESTONES—  |  |  |
|----------------------------|--|--|
| Skills                     | Birth to 12 Months   | One Year to Two Years  |
| <b>Cognitive Skills</b>    | Follows moving object with eyes. Looks directly at faces and responds to gestures.<br>Plays toy in and takes toy out of container.<br>Beginning of memory—object permanence.<br>Looks for hidden objects.<br>Listens to and follows simple directions. | Imitates adults through actions and words.<br>Names simple objects.<br>Listens to and follows commands and requests.<br>Explores the environment.<br>Acts like "little scientist."<br>Matches simple objects.  |
| <b>Language Skills</b>     | Cries, babbles, and coos.<br>Looks at speaker when spoken to and responds using variety of sounds.<br>Capable of vowel and consonant sounds, often using repetition.<br>Begins to imitate sounds.<br>Begins to use intonation for meaning.             | Speaks first words.<br>Able to speak 50 meaningful words to communicate.<br>Identifies and names simple objects.<br>Uses gestures to enhance communication.<br>Indicates possession by using words mine, me.<br>Uses the word no frequently to voice autonomy.   |
| <b>Fine Motor Skills</b>   | Reaches for objects; grasps and plays with them.<br>Puts objects in mouth.<br>Uses pincer grasp.<br>Shifts objects between hands.<br>Drops objects; picks them up.   | Stacks three objects, such as blocks, in a tower.<br>Turns pages (two or three at a time).<br>Turns door knobs.<br>Throws small ball.<br>Scribbles, paints with large movements.<br>Holds brush with whole hand.<br>Drinks from a cup without help.<br>Begins using a spoon.<br>Places round objects into holes. |
| <b>Gross Motor Skills</b>  | Lifts head.<br>Turns from side to side; rolls over.<br>Sits with back straight and head steady.<br>Able to crouch.<br>Crawls.<br>Pulls self up into a standing position, then walk along furniture, using both hands.<br>Stands without support.       | Takes first steps.<br>Walks alone without help.<br>Stands without support.<br>Walks backwards.<br>Walks upstairs using one hand.<br>Jumps, using both feet.<br>Puffs and pokes eyes.<br>Throws a ball with overhead motion without falling.  |
| <b>Social Skills</b>       | Smiles spontaneously.<br>Discriminates between familiar people and strangers.<br>Responds to own name.<br>Understands words no, no.<br>Imitates simple actions of others.  | Shows emotions such as affection, joy, fear, anger, and jealousy.<br>Recognizes self in mirror.<br>Reacts to self by name.<br>Hugs and kisses.<br>Throws temper tantrums.<br>Loves to help put things away.<br>Imitates adult activities.<br>Initiates play.   |
| <b>Self-Mastery Skills</b> | Holds bottle.<br>Feeds self finger foods.<br>Holds cup with two hands; needs assistance to drink from it.<br>Cooperates with being dressed.  | Takes off shoes and other clothing, can unzip.<br>Verbalizes needs such as food, drink, and toilet.<br>Eats and drinks well without assistance.  |

Figure 3.8 Document – Developmental Milestone (1)

| BIRTH TO FIVE YEARS   |  |  |
|---|--|--|
| Two to Three Years  | Three to Four Years  | Four to Five Years   |
| Can name and recognize one color.<br>Matches shapes and objects by function.<br>Stacks objects, such as blocks five high.<br>Responds to simple direction.<br>Has limited attention span.<br>Identifies objects in picture books.<br>Can describe own activity.<br>Begins to understand function of objects in familiar environments. | Can name and recognize six colors.<br>Begins to understand concept of time, including past and present.<br>Understands concept of pretending.<br>Knows own full name and age.<br>Attention span is somewhat longer, but easily distracted.<br>Can watch by "family" group or function. | Matches pictures of familiar objects.<br>Draws people figures with recognizable parts.<br>Counts to five.<br>Knows street and town where he lives.<br>Points to and names six colors.<br>Matches commonly related objects.<br>Has extended attention span.<br>Has increased understanding of time, function, and whole and part. |
| Talks constantly.<br>Refers to self by proper pronouns.<br>Uses plurals.<br>Uses complete sentences consisting of three to four words.<br>Asks questions: why, where, how?  | Talks in sentences.<br>Can relate present or past experiences.<br>Uses past tense for verbs.<br>Has extensive vocabulary.<br>Can repeat a song or nursery rhyme.<br>Can understand and use size comparisons.<br>Asks questions for information.  | Has basic grammatical structure in use.<br>Uses increasingly complex language.<br>Has large vocabulary base.<br>Understands more complex directions.<br>Uses directions in play.<br>Able to listen to long stories.  |
| Can turn pages of book one at a time.<br>Paints using wrist action.<br>Holds crayon with fingers, not whole hand.<br>Moves fingers independently of others.<br>Stringy beads.<br>Cuts using scissors, but hasn't mastered it.<br>Shows hand preference.<br>Manipulates clay by rolling and pounding.                                  | Drives pegs into holes, nails into wood.<br>Can copy circle or cross.<br>Manipulates clay and play dough into recognizable objects.<br>Able to stack objects nine high.<br>Cuts using scissors.  | Cuts on a straight line.<br>Copies simple figures.<br>Prints a few capital letters.  |
| Runs well.<br>Kicks ball without losing balance.<br>Stands on one foot.<br>Jumps short distances with both feet.<br>Rides a tricycle, but has not necessarily mastered both steering and peddling.<br>Walks upstairs alternating feet.<br>Walks on tiptoe.  | Runs around obstacles.<br>Throws ball overhead, with direction.<br>Hops on one foot.<br>Climbs up slide and slides down unassisted.<br>Walks a line.<br>Can catch ball bounced to her.<br>Mastered riding a tricycle.  | Turns somersault.<br>Walks up and down stairs unassisted, alternating feet.<br>Jumps forward at many as ten times without falling.<br>Walks backward in a line, heel to toe.<br>Can swing at a stationary ball with a bat.   |
| Better control of temper tantrums.<br>Begins to share toys.<br>Plays near other children (parallel play).<br>Begins real dramatic play.<br>Participates in group activities like circle time.   | Plays with others (associative play).<br>Able to share and take turns.<br>Acts out whole scenes in dramatic play.  | Plays with other children (cooperative play).<br>Dramatic play resembles reality, including dressing up.<br>Pretending is acknowledged.<br>Acknowledges sex differences.   |
| Understands gender identity.<br>Feeds self.<br>Drinks from drinking fountain.<br>Takes off jacket or coat.<br>Toilets with help.<br>Opens doors.  | Knows own gender identity.<br>Buttons and unbuttons clothing.<br>Washes hands without help.<br>Pours well from small pitcher.<br>Spreads with knife.<br>Toilets without help.  | Laces shoes.<br>Follows instructions given in a group.<br>Uses knife to cut food.<br>Can help set table.<br>Can help in simple food preparation.<br>Knows name of city she lives in.   |

Figure 3.9 Document – Developmental Milestone (2)

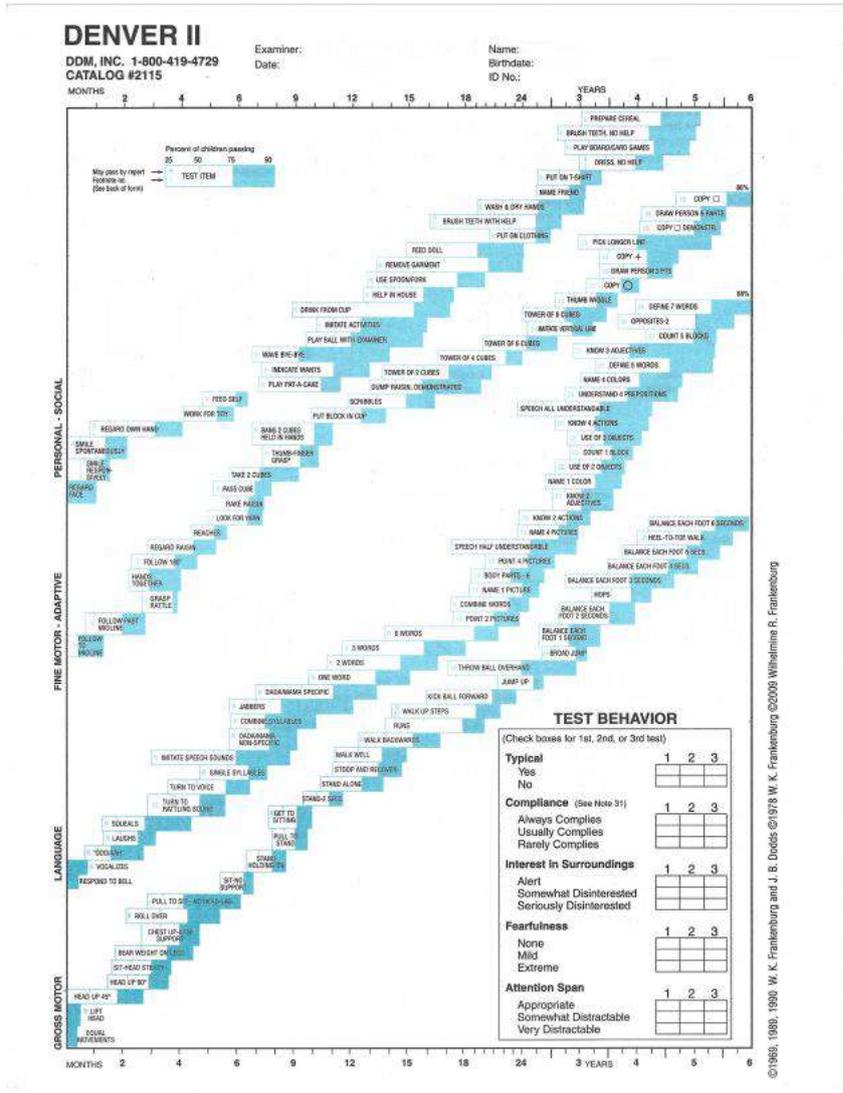


Figure 3.10 Document – Denver II Test

### 3.4 Proposed Design

#### 3.4.1 Flowchart

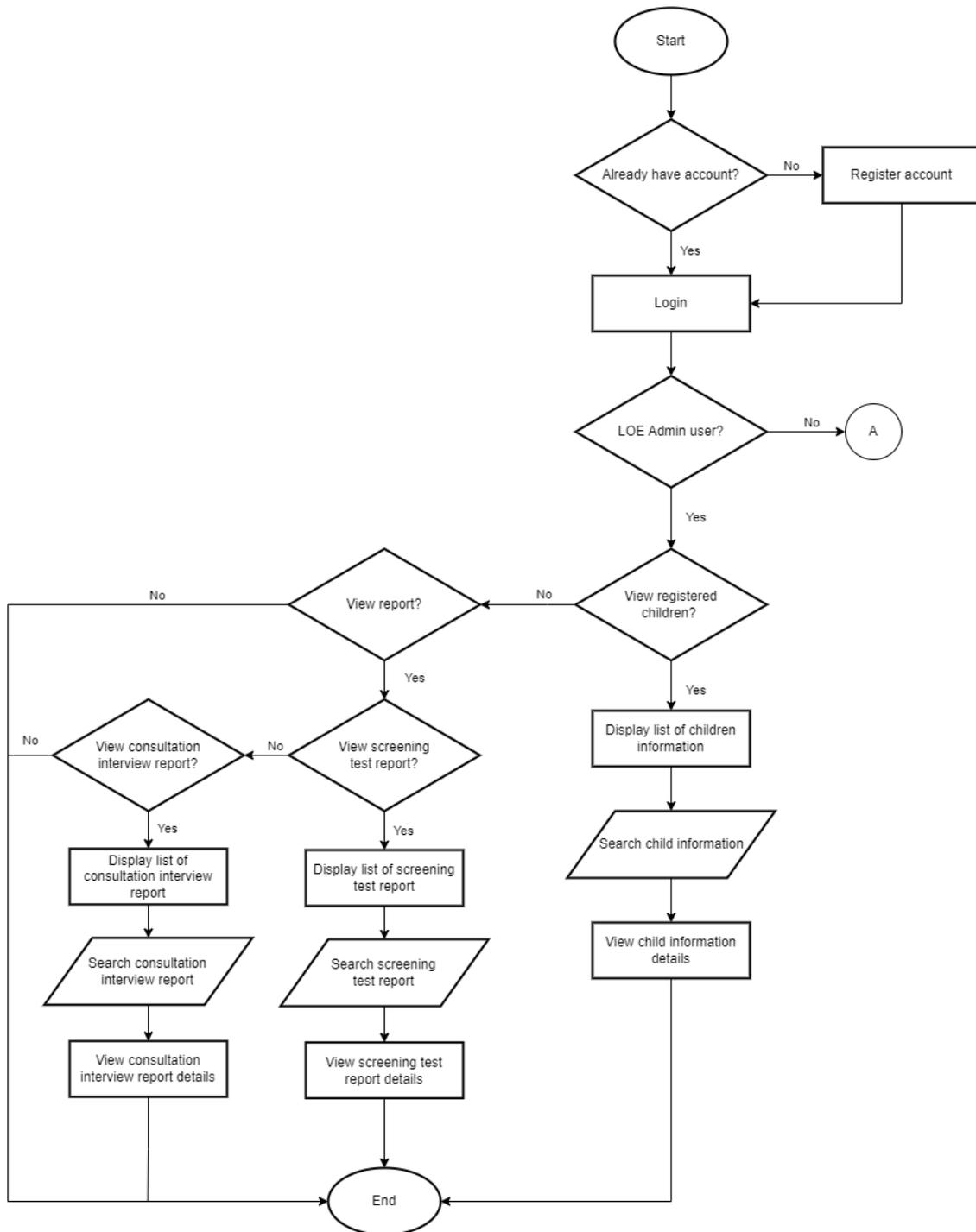


Figure 3.11 CDST Flowchart – LOE Administrator User

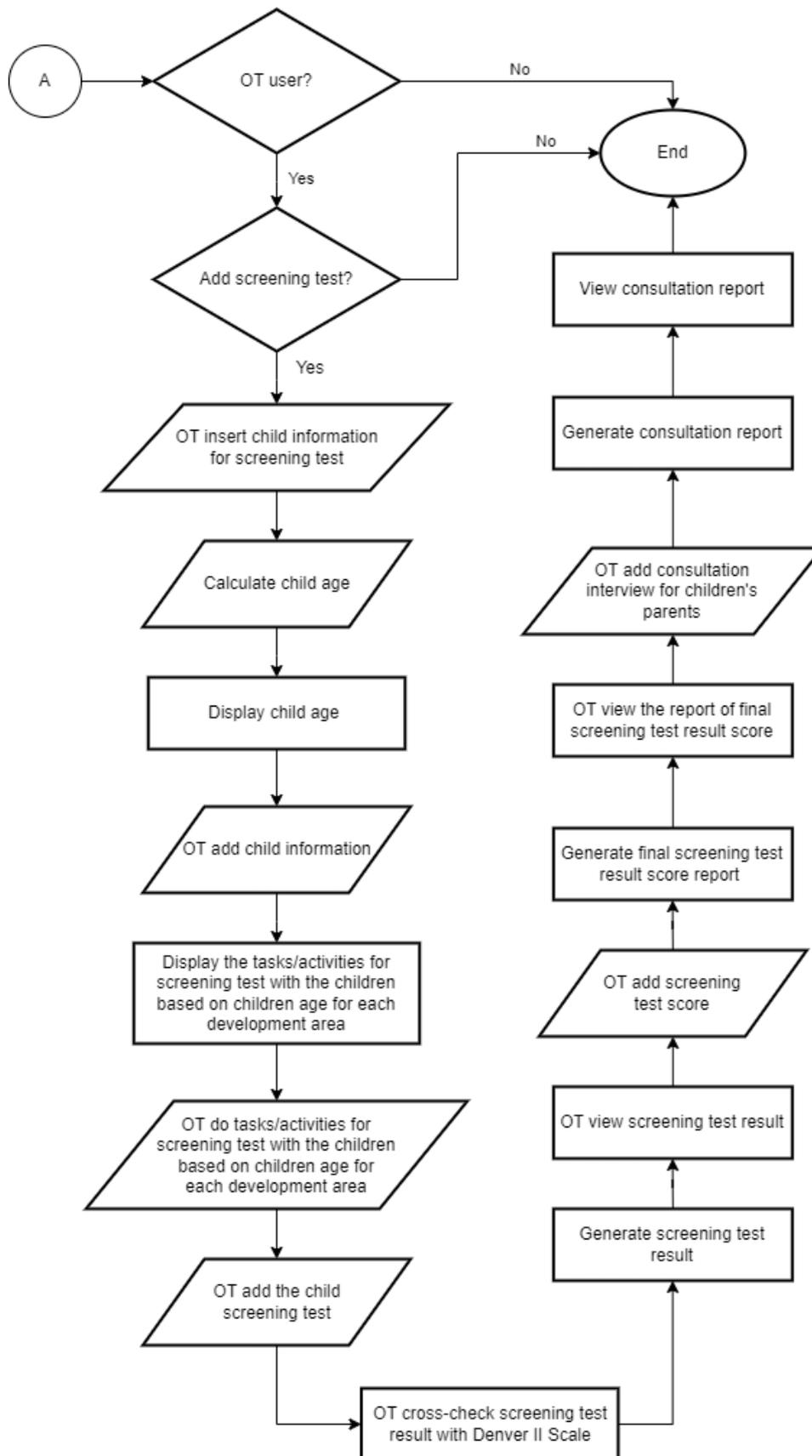


Figure 3.12 CDST Flowchart – Occupational Therapist User

### 3.4.2 Context Diagram

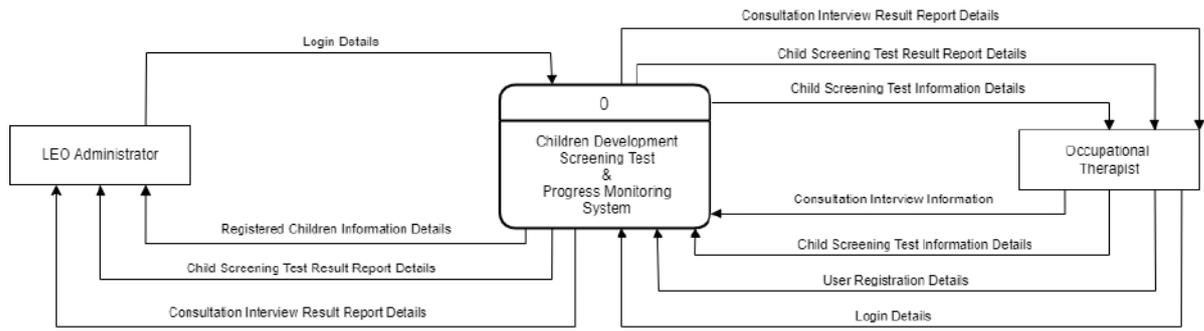


Figure 3.13 CDST Context Diagram

### 3.4.3 Use Case Diagram

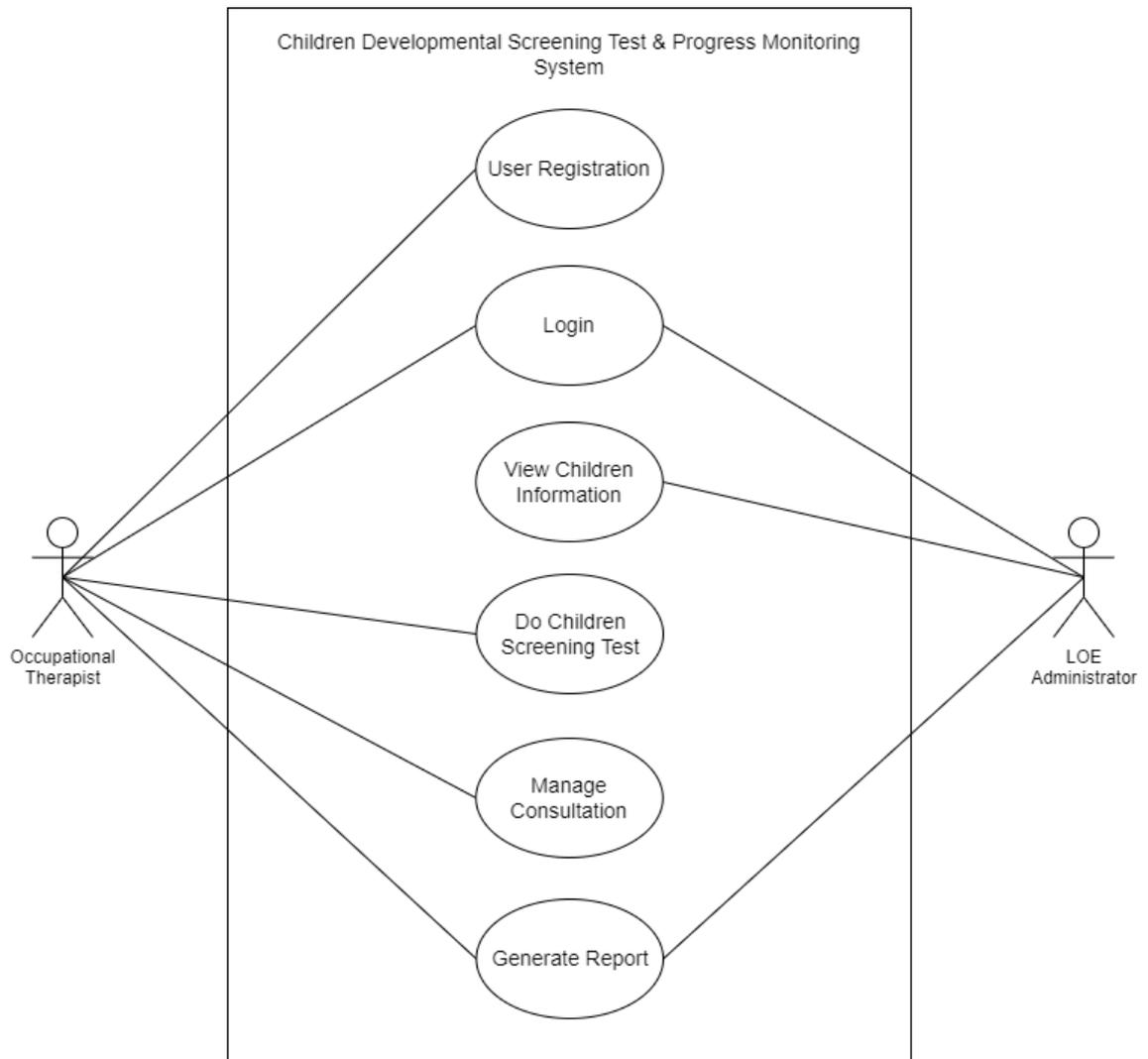


Figure 3.14 CDST Use Case Diagram

### 3.4.4 Use Case Description

#### 3.4.4.1 User Registration

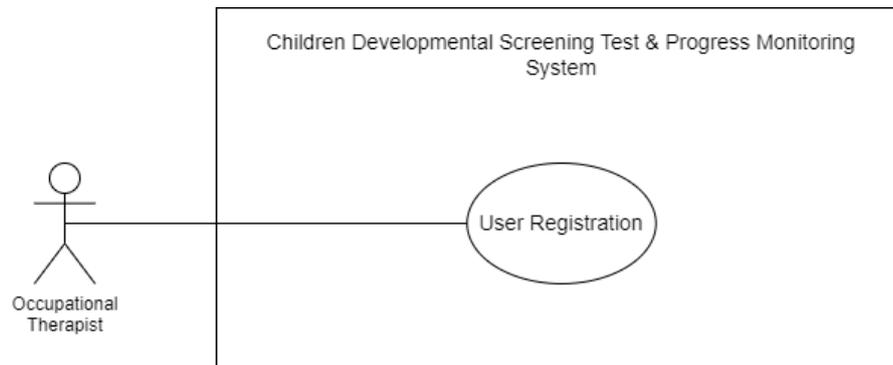


Figure 3.15 User Registration – CDST Use Case Diagram

Table 3.2 User Registration – CDST Use Case Description

|                          |  |
|--------------------------|--|
| <b>Use Case ID</b>       | UC-CDST-100  |
| <b>Brief Description</b> | This use case is initiated by the Occupational Therapist. It provides the Occupational Therapist the capability to register a new user account to the system.  |
| <b>Actor</b>             | 1. Occupational Therapist  |
| <b>Pre-Conditions</b>    | <ol style="list-style-type: none"> <li>1. Occupational therapist must not have any registered account in the system yet.</li> <li>2. Occupational therapist must have a valid email address.</li> <li>3. Occupational therapist's email must not be registered yet in the system.</li> </ol> |
| <b>Basic Flow</b>        | <b>Occupational Therapist</b>  |

|  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>1. The use case begins when the occupational therapist clicks on the &lt;&lt;Create an account&gt;&gt; link button.</li> <li>2. System requests the register new account page.</li> <li>3. System retrieves the register new account page.</li> <li>4. System displays the register new account page with input form.</li> <li>5. Occupational therapist views the register new account page.</li> <li>6. Occupational therapist inserts their details information for account registration such as full name, email, phone number, gender, address, password, confirm password, user category and qualifications. [E1: Email is not valid] [E2: Phone number is not valid] [E3: Invalid password] [E4: Confirm password does not match]</li> <li>7. Occupational therapist clicks the &lt;&lt;Sign Up&gt;&gt; button.</li> <li>8. System displays a confirmation message of “Are you sure want to register new account?”.</li> <li>9. Occupational therapist clicks the “Yes” button. [A1: Cancel register new account]</li> <li>10. System sends the occupational therapist new information details to registered. [E5: Email already registered]</li> <li>11. System saves the details information of the occupational therapist.</li> <li>12. System sends a successful message.</li> <li>13. System displays a successful message of “New user account successfully registered!”.</li> </ol> |
|--|--|

|                         |  |
|-------------------------|--|
|                         | <p>14. System displays the login page.</p> <p>15. The use case ends.</p>   |
| <b>Alternative Flow</b> | <p><b>A1: Cancel register new account</b></p> <p>1. Occupational therapist clicks the &lt;&lt;No&gt;&gt; button.</p> <p>2. The use case continues to step number 14 in basic flow.</p>   |
| <b>Exception Flow</b>   | <p><b>E1: Email is not valid</b></p> <p>1. The email entered is not in valid format.</p> <p>1. System displays an error message of “Please enter a valid email address format”.</p> <p>2. The use case continues to step number 6 in basic flow.</p> <p><b>E2: Phone number is not valid</b></p> <p>1. The phone number entered is not in valid format.</p> <p>2. System displays an error message of “Please enter a valid phone number”.</p> <p>3. The use case continues to step number 6 in basic flow.</p> <p><b>E3: Invalid password</b></p> <p>1. The password entered is not match with the given format.</p> <p>2. System displays an error message of “Please enter password with at least 8 characters”.</p> <p>3. The use case continues to step number 6 in basic flow.</p> <p><b>E4: Confirm password does not match</b></p> |

|                        |   |
|------------------------|---|
|                        | <ol style="list-style-type: none"> <li>1. The password entered is not match with the entered password.</li> <li>2. System displays an error message of “Password is not match”.</li> <li>3. The use case continues to step number 6 in basic flow.</li> </ol> <p><b>E5: Email already registered</b></p> <ol style="list-style-type: none"> <li>1. The email inserted already registered in the system database.</li> <li>2. System displays an error message of “The email address is already registered”.</li> <li>3. The use case continues to step number 6 in basic flow.</li> </ol> |
| <b>Post-Conditions</b> | <ol style="list-style-type: none"> <li>1. The new register account is successfully added and stored in system database.</li> <li>2. Occupational therapist users are able to login to the system with the new registered email and password.</li> </ol>   |
| <b>Rules</b>           | Not applicable  |
| <b>Constraints</b>     | <ol style="list-style-type: none"> <li>1. The email format must follow xxxx@gmail.com.</li> <li>2. The phone number format must follow xxx-xxxxxxx.</li> <li>3. The password must follow format of at least 8 characters with alphanumeric symbol, at least one uppercase alphabet and at least one number.</li> </ol>  |

### 3.4.4.2 Login

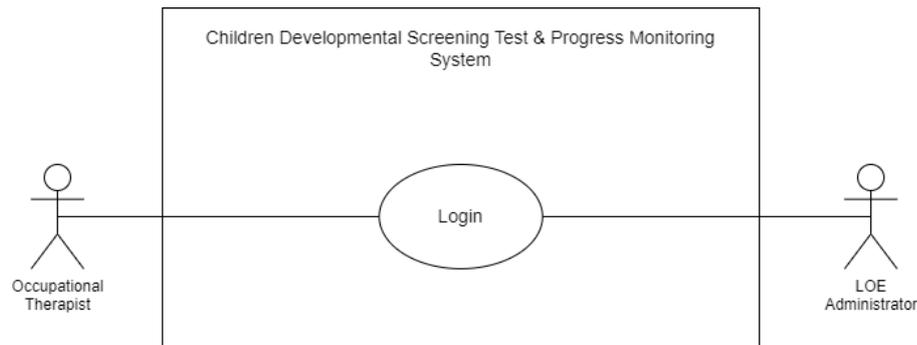


Figure 3.16 Login – CSDT Use Case Diagram

Table 3.3 Login – CDST Use Case Description

|                          |  |
|--------------------------|--|
| <b>Use Case ID</b>       | UC-CDST-200  |
| <b>Brief Description</b> | This use case is initiated by the LOE Administrator and Occupational Therapist. It provides the LOE Administrator and Occupational Therapist the capability to login to the system with registered email and password.   |
| <b>Actor</b>             | <ol style="list-style-type: none"> <li>1. Occupational Therapist</li> <li>2. LOE Administrator</li> </ol>  |
| <b>Pre-Conditions</b>    | <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist must already registered an account in the system.</li> </ol>  |
| <b>Basic Flow</b>        | <p><b>LOE Administrator &amp; Occupational Therapist</b></p> <ol style="list-style-type: none"> <li>1. The use case begins when the LOE administrator and occupational therapist go to the CDST system.</li> <li>2. System requests the login page.</li> </ol> |

|                                |   |
|--------------------------------|---|
|                                | <ol style="list-style-type: none"> <li>3. System retrieves the login page.</li> <li>4. System displays the login page with input form.</li> <li>5. LOE administrator and occupational therapist view the login page.</li> <li>6. LOE administrator and occupational therapist inserts their login details which are email, password and user category whether as LOE administrator or occupational therapist user.</li> <li>7. LOE administrator and occupational therapist clicks the &lt;&lt;Login&gt;&gt; button.</li> <li>8. System sends the login details. [<b>E1</b>: Email is not valid] [<b>E2</b>: Incorrect password]</li> <li>9. System saves the login session.</li> <li>10. System retrieves the dashboard page of the system based on login user.</li> <li>11. System displays the dashboard page of the system based on login user.</li> <li>12. LOE administrator and occupational therapist view the dashboard page of the system. [<b>A1</b>: Logout]</li> <li>13. The use case ends.</li> </ol> |
| <p><b>Alternative Flow</b></p> | <p><b>A1: Logout</b></p> <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist click the &lt;&lt;Logout&gt;&gt; link button.</li> <li>2. System displays confirmation message of “Are you sure want to logout?”</li> </ol>   |

|                              |   |
|------------------------------|---|
|                              | <ol style="list-style-type: none"> <li>3. LOE administrator and occupational therapist click the “Yes” button. [<b>A2:</b> Cancel logout]</li> <li>4. System ends the login session.</li> <li>5. System requests the login page.</li> <li>6. System retrieves the login page.</li> <li>7. System displays the login page.</li> <li>8. The use case continues to step number 13 in basic flow.</li> </ol> <p><b>A1: Cancel logout</b></p> <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist click the &lt;&lt;No&gt;&gt; button.</li> <li>2. The use case continues to step number 13 in basic flow.</li> </ol> |
| <p><b>Exception Flow</b></p> | <p><b>E1: Email is not valid</b></p> <ol style="list-style-type: none"> <li>1. The inserted email is not available in the systema database.</li> <li>2. System displays an error message of “Invalid login credentials”.</li> <li>3. The use case continues to step number 6 in basic flow.</li> </ol> <p><b>E2: Incorrect password</b></p> <ol style="list-style-type: none"> <li>1. The password entered is not available in the system database.</li> <li>2. System displays an error message of “Invalid login credentials”.</li> <li>3. The use case continues to step number 6 in basic flow.</li> </ol>                                      |

|                        |  |
|------------------------|--|
| <b>Post-Conditions</b> | 1. LOE administrator and occupational therapist able to login and view the dashboard page of the system. |
| <b>Rules</b>           | Not applicable   |
| <b>Constraints</b>     | Not applicable   |

### 3.4.4.3 View Children Information

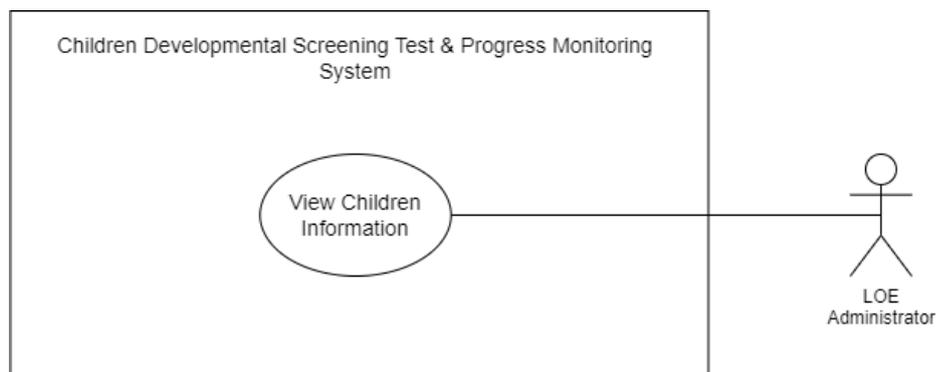


Figure 3.17 View Child Information – CDST Use Case Diagram

Table 3.4 View Child Information – CDST Use Case Description

|                          |   |
|--------------------------|---|
| <b>Use Case ID</b>       | UC-CDST-300   |
| <b>Brief Description</b> | This use case is initiated by the LOE Administrator. It provides the LOE Administrator the capability to search and view the registered children details information in the system. |
| <b>Actor</b>             | 1. LOE Administrator  |

|                       |  |
|-----------------------|--|
| <b>Pre-Conditions</b> | <ol style="list-style-type: none"> <li>1. LOE administrator must already login to the system.</li> </ol>   |
| <b>Basic Flow</b>     | <p><b>LOE Administrator</b></p> <ol style="list-style-type: none"> <li>1. The use case begins when the LOE administrator clicks the &lt;&lt;Children Information&gt;&gt; menu button from the side navigation menu.</li> <li>2. System requests the children information page with the registered children information.</li> <li>3. System retrieves the children information page with the registered children information.</li> <li>4. System displays the list of registered children information in a table on the children information page which are child name, child birth date, parent name, phone number and view details link button. [E1: No registered children available]</li> <li>5. LOE administrator views the list of registered children information displayed in a table. [A1: Search registered children]</li> <li>6. LOE administrator selects any registered children displayed in the table.</li> <li>7. LOE administrator clicks the &lt;&lt;View Details&gt;&gt; button.</li> <li>8. System requests the selected registered child information from the system database.</li> <li>9. System retrieves the details information of the selected registered child.</li> </ol> |

|                         |   |
|-------------------------|---|
|                         | <ol style="list-style-type: none"> <li>10. System displays the details information of the selected registered child which are child name, birth date, parent name, phone number and address.</li> <li>11. LOE administrator views the details information of the selected registered child.</li> <li>12. The use case ends.</li> </ol>  |
| <b>Alternative Flow</b> | <p><b>A1: Search registered children</b></p> <ol style="list-style-type: none"> <li>1. LOE administrator enters the keyword of child name in the search input field.</li> <li>2. LOE administrator clicks the &lt;&lt;Search&gt;&gt; button.</li> <li>3. System requests the registered children information based on entered child name keyword from system database.</li> <li>4. System retrieves the registered children information based on entered child name keyword. [E2: Keyword not found]</li> <li>5. System displays the registered children information based on entered child name keyword in the table.</li> <li>6. LOE administrator views the displayed registered children information based on entered child name keyword in the table.</li> <li>7. The use case continues to step number 12 in basic flow.</li> </ol> |
| <b>Exception Flow</b>   | <p><b>E1: No registered children available</b></p> <ol style="list-style-type: none"> <li>1. The registered children are not available in the system database.</li> </ol>   |

|                        |   |
|------------------------|---|
|                        | <ol style="list-style-type: none"> <li>2. System displays an error message of “No registered child available”.</li> <li>3. The use case continues to step number 12 in basic flow.</li> </ol> <p><b>E2: Keyword not found</b></p> <ol style="list-style-type: none"> <li>1. The entered keyword to search registered children information is not found.</li> <li>2. System displays an error message of “No registered child available”.</li> <li>3. The use case continues to step number 1 in alternative flow 1 of search registered children (A1).</li> </ol> |
| <b>Post-Conditions</b> | Not applicable  |
| <b>Rules</b>           | Not applicable  |
| <b>Constraints</b>     | Not applicable  |

#### 3.4.4.4 Do Children Screening Test

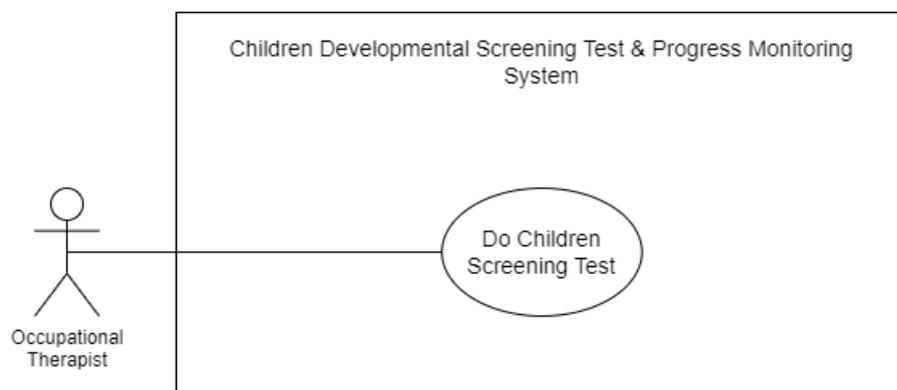


Figure 3.18 Do Child Screening Test – CDST Use Case Diagram

Table 3.5 Do Child Screening Test – CDST Use Case Description

|                          |  |
|--------------------------|--|
| <b>Use Case ID</b>       | UC-CDST-400  |
| <b>Brief Description</b> | This use case is initiated by the Occupational Therapist only. It provides the Occupational Therapist the capability to add child screening test information, search child screening test, view list of children screening test and view details information of child screening test.  |
| <b>Actor</b>             | 1. Occupational Therapist  |
| <b>Pre-Conditions</b>    | <ol style="list-style-type: none"> <li>1. Occupational therapist must already login to the system.</li> <li>2. The children information must already register in the system.</li> </ol>  |
| <b>Basic Flow</b>        | <p><b>Occupational Therapist</b></p> <ol style="list-style-type: none"> <li>1. The use case begins when the occupational therapist clicks the &lt;&lt;Screening Test&gt;&gt; menu button from the side navigation menu.</li> <li>2. System requests the child screening test page with the children's screening test information from system database.</li> <li>3. System retrieves the child screening test page with the children's screening test information.</li> <li>4. System displays the list of children's screening test information in a table on the child screening test page which are child name, child birth date, child age, parent</li> </ol> |

|                                |   |
|--------------------------------|---|
|                                | <p>name, screening test date and view details link button. [<b>E1</b>: No child screening test added]</p> <p>5. Occupational therapist views the list of children's screening test information displayed in a table.</p> <p>6. Occupational therapist is able to:</p> <ul style="list-style-type: none"> <li>a. Add children screening test. [<b>A1</b>: Add children screening test]</li> <li>b. Search the children screening test information. [<b>A2</b>: Search children screening test]</li> <li>c. View children screening test information details. [<b>A3</b>: View children screening test details]</li> </ul> <p>7. The use case ends.</p> |
| <p><b>Alternative Flow</b></p> | <p><b>A1: Add children screening test</b></p> <ol style="list-style-type: none"> <li>1. Occupational therapist clicks the &lt;&lt;Add New Screening Test&gt;&gt; button.</li> <li>1. System requests the add child screening test page.</li> <li>2. System retrieves the add child screening test page.</li> <li>3. System displays the add child screening test page.</li> <li>4. Occupational therapist views the add child screening test page with form.</li> <li>5. Occupational therapist inserts the child information for screening test which are child name, child birth date, examiner name, parent name, screening test date.</li> </ol>  |

|  |  |
|--|--|
|  | <p>6. Occupational therapist clicks the &lt;&lt;Calculate Age&gt;&gt; button.</p> <p>7. System calculates the child age with the given formula.</p> <p>8. System displays calculated child age.</p> <p>9. Occupational therapist clicks the &lt;&lt;Add screening test&gt;&gt; button.</p> <p>10. System requests the add screening test information based on child age for each development area category which are personal-social, fine motor-adaptive, language and gross motor along with inserted child information.</p> <p>11. System retrieves the add screening test information based on child age for each development area category which are personal-social, fine motor-adaptive, language and gross motor along with inserted child information.</p> <p>12. System displays the add screening test information based on child age for each development area category which are personal-social, fine motor-adaptive, language and gross motor along with inserted child information.</p> <p>13. Occupational therapist views the add screening test information based on child age for each development area category which are personal-social, fine motor-adaptive, language and gross motor along with inserted child information.</p> <p>14. Occupational therapist is able to:</p> <ul style="list-style-type: none"> <li>a. Do personal social skills tasks. [A4: Do personal social skills tasks]</li> </ul> |
|--|--|

b. Do fine motor adaptive skills tasks. [A5: Do fine motor adaptive skills tasks]

c. Do language skills tasks. [A6: Do language skills tasks]

d. Do gross motor skills tasks. [A7: Do gross motor skills tasks]

15. The use case continues to step number 7 in basic flow.

**A2: Search children screening test**

1. Occupational therapist enters the keyword of screening test date or child name in the search input field.

2. Occupational therapist clicks the <<Search>> button.

3. System requests the children screening test information based on entered screening test date or child name keyword from system database.

4. System retrieves the children screening test information based on entered screening test date or child name keyword. [E2: Keyword not found]

5. System displays the children screening test information based on entered screening test date keyword in the table.

6. Occupational therapist views the displayed children screening test information based on entered screening test date keyword in the table.

7. The use case continues to step number 7 in basic flow.

**A3: View children screening test details**

|  |   |
|--|---|
|  | <ol style="list-style-type: none"> <li>1. Occupational therapist selects any children screening test information displayed in the table.</li> <li>2. Occupational therapist clicks the &lt;&lt;View Details&gt;&gt; link button.</li> <li>3. System requests the selected children screening test information from system database.</li> <li>4. System retrieves the details information of the selected children screening test.</li> <li>5. System displays the details information of the selected children screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, personal social skills tasks with score, fine motor adaptive skills tasks with score, language skills tasks with score and gross motor skills tasks with score.</li> <li>6. Occupational therapist views the details information of the selected children screening test information.</li> <li>7. The use case continues to step number 7 in basic flow.</li> </ol> <p><b>A4: Do personal social skills tasks</b></p> <ol style="list-style-type: none"> <li>1. Occupational therapist clicks the &lt;&lt;Do Personal Social&gt;&gt; button.</li> <li>2. System requests the personal social skills tasks with score choice and percentage based on Denver II Scale and child information from system database.</li> <li>3. System retrieves the personal social skills tasks with score choice and percentage based on Denver II Scale and child information.</li> </ol> |
|--|---|

|  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>4. System displays the personal social skills tasks with score choice and percentage based on Denver II Scale and child information.</li> <li>5. Occupational therapist views the personal social skills tasks with score choice and percentage based on Denver II Scale and child information in quiz-like form.</li> <li>6. Occupational checks the child behaviour with the personal social skills task percentage based on Denver II Scale.</li> <li>7. Occupational therapist adds the answer test score of each personal social skills tasks provided using radio button choice based on child behaviour and percentage from Denver II Scale.</li> <li>8. Occupational therapist clicks the &lt;&lt;Finish&gt;&gt; button.</li> <li>9. System displays a confirmation message of “Are you sure want to add screening test?”.</li> <li>10. Occupational therapist clicks the &lt;&lt;Yes&gt;&gt; button.</li> <li>11. System sends the personal social skills tasks with score to the system database.</li> <li>12. System saves the personal social skills tasks with score.</li> <li>13. System sends a successful message.</li> <li>14. System displays a successful message of “Screening test successfully added!”.</li> <li>15. The use case continues to step number 14 in alternative flow 1 of add children screening test (A1).</li> </ol> <p><b>A5: Do fine motor adaptive skills tasks</b></p> |
|--|--|

|  |  |
|--|--|
|  | <ol style="list-style-type: none"><li>1. Occupational therapist clicks the &lt;&lt;Do Fine Motor-Adaptive&gt;&gt; button.</li><li>2. System requests the fine motor adaptive skills tasks with score choice and percentage based on Denver II Scale and child information from system database.</li><li>3. System retrieves the fine motor adaptive skills tasks with score choice and percentage based on Denver II Scale and child information.</li><li>4. System displays the fine motor adaptive skills tasks with score choice and percentage based on Denver II Scale and child information.</li><li>5. Occupational therapist views the fine motor adaptive skills tasks with score choice and percentage based on Denver II Scale and child information in quiz-like form.</li><li>6. Occupational checks the child behaviour with the fine motor adaptive skills task percentage based on Denver II Scale.</li><li>7. Occupational therapist adds the answer test score of each fine motor adaptive skills tasks provided using radio button choice based on child behaviour and percentage from Denver II Scale.</li><li>8. Occupational therapist clicks the &lt;&lt;Finish&gt;&gt; button.</li><li>9. System displays a confirmation message of “Are you sure want to add screening test?”.</li><li>10. Occupational therapist clicks the &lt;&lt;Yes&gt;&gt; button.</li><li>11. System sends the fine motor adaptive skills tasks with score to the system database.</li></ol> |
|--|--|

|  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>12. System saves the fine motor adaptive skills tasks with score.</li> <li>13. System sends a successful message.</li> <li>14. System displays a successful message of “Screening test successfully added!”.</li> <li>15. The use case continues to step number 14 in alternative flow 1 of add children screening test (A1).</li> </ol> <p><b>A6: Do language skills tasks</b></p> <ol style="list-style-type: none"> <li>1. Occupational therapist clicks the &lt;&lt;Do Language&gt;&gt; button.</li> <li>2. System requests the language skills tasks with score choice and percentage based on Denver II Scale and child information from system database.</li> <li>3. System retrieves the language skills tasks with score choice and percentage based on Denver II Scale and child information.</li> <li>4. System displays the language skills tasks with score choice and percentage based on Denver II Scale and child information.</li> <li>5. Occupational therapist views the language skills tasks with score choice and percentage based on Denver II Scale and child information in quiz-like form.</li> <li>6. Occupational checks the child behaviour with the language skills task percentage based on Denver II Scale.</li> <li>7. Occupational therapist adds the answer test score of each language skills tasks provided using radio button choice</li> </ol> |
|--|--|

|  |  |
|--|--|
|  | <p>based on child behaviour and percentage from Denver II Scale.</p> <ol style="list-style-type: none"> <li>8. Occupational therapist clicks the &lt;&lt;Finish&gt;&gt; button.</li> <li>9. System displays a confirmation message of “Are you sure want to add screening test?”.</li> <li>10. Occupational therapist clicks the &lt;&lt;Yes&gt;&gt; button.</li> <li>11. System sends the language skills tasks with score to the system database.</li> <li>12. System saves the language skills tasks with score.</li> <li>13. System sends a successful message.</li> <li>14. System displays a successful message of “Screening test successfully added!”.</li> <li>15. The use case continues to step number 14 in alternative flow 1 of add children screening test (A1).</li> </ol> <p><b>A7: Do gross motor skills tasks</b></p> <ol style="list-style-type: none"> <li>1. Occupational therapist clicks the &lt;&lt;Do Gross Motor&gt;&gt; button.</li> <li>2. System requests the gross motor skills tasks with score choice and percentage based on Denver II Scale and child information from system database.</li> <li>3. System retrieves the gross motor skills tasks with score choice and percentage based on Denver II Scale and child information.</li> </ol> |
|--|--|

|                       |  |
|-----------------------|--|
|                       | <ol style="list-style-type: none"> <li>4. System displays the gross motor skills tasks with score choice and percentage based on Denver II Scale and child information.</li> <li>5. Occupational therapist views the gross motor skills tasks with score choice and percentage based on Denver II Scale and child information in quiz-like form.</li> <li>6. Occupational checks the child behaviour with the gross motor skills task percentage based on Denver II Scale.</li> <li>7. Occupational therapist adds the answer test score of each gross motor skills tasks provided using radio button choice based on child behaviour and percentage from Denver II Scale.</li> <li>8. Occupational therapist clicks the &lt;&lt;Finish&gt;&gt; button.</li> <li>9. System displays a confirmation message of “Are you sure want to add screening test?”.</li> <li>10. Occupational therapist clicks the &lt;&lt;Yes&gt;&gt; button.</li> <li>11. System sends the gross motor skills tasks with score to the system database.</li> <li>12. System saves the gross motor skills tasks with score.</li> <li>13. System sends a successful message.</li> <li>14. System displays a successful message of “Screening test successfully added!”.</li> <li>15. The use case continues to step number 14 in alternative flow 1 of add children screening test (A1).</li> </ol> |
| <b>Exception Flow</b> | <b>E1: No child screening test added</b>   |

|                        |  |
|------------------------|--|
|                        | <ol style="list-style-type: none"> <li>1. The children screening test information are not available in the system database.</li> <li>2. System displays an error message of “No child screening test available”.</li> <li>3. The use case continues to step number 7 in basic flow.</li> </ol> <p><b>E2: Keyword not found</b></p> <ol style="list-style-type: none"> <li>1. The entered keyword to search children screening test is not found.</li> <li>2. System displays an error message of “No child screening test available”.</li> <li>3. The use case continues to step number 1 in alternative flow 2 of search children screening test (A2).</li> </ol> |
| <b>Post-Conditions</b> | <ol style="list-style-type: none"> <li>1. The children screening test information is successfully added and stored in the system database.</li> </ol>  |
| <b>Rules</b>           | Not applicable   |
| <b>Constraints</b>     | Not applicable   |

### 3.4.4.5 Manage Consultation

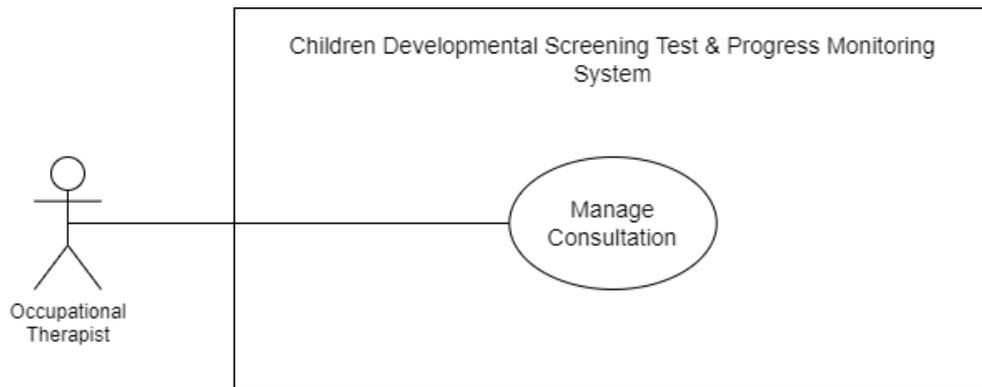


Figure 3.19 Manage Consultation – CDST Use Case Diagram

Table 3.6 Manage Consultation – CDST Use Case Description

|                          |  |
|--------------------------|--|
| <b>Use Case ID</b>       | UC-CDST-500  |
| <b>Brief Description</b> | This use case is initiated by the Occupational Therapist. It provides the occupational therapist the capability to add or delete the consultation interview with children's parent, view list of consultation interview, search consultation interview and view the details information of consultation interview. |
| <b>Actor</b>             | 1. Occupational Therapist  |
| <b>Pre-Conditions</b>    | 1. Occupational therapist must already login to the system.<br>2. The children must already register in the system and add screening test.   |
| <b>Basic Flow</b>        | <b>Occupational Therapist</b>  |

|                         |  |
|-------------------------|--|
|                         | <ol style="list-style-type: none"> <li>1. The use case begins when the occupational therapist clicks the &lt;&lt;Consultation&gt;&gt; menu button from the side navigation menu.</li> <li>2. System requests the consultation page with the children screening test information.</li> <li>3. System retrieves the consultation page with the children screening test information.</li> <li>4. System displays the consultation page with the list of children screening test information which are child name, child birth date, child age, parent name, screening test date, view details link button and add consultation link button in a table along with the details of child's screening test information. [E1: No child screening test added]</li> <li>5. Occupational therapist views the list of the children screening test information in the table on the consultation page.</li> <li>6. Occupational therapist is able to: <ol style="list-style-type: none"> <li>a. Add consultation information. [A1: Add consultation]</li> <li>b. Search child screening test information. [A2: Search child screening test]</li> <li>c. View consultation information details. [A3: View consultation information details]</li> </ol> </li> <li>7. The use case ends.</li> </ol> |
| <b>Alternative Flow</b> | <b>A1: Add consultation</b>  |

|  |   |
|--|---|
|  | <ol style="list-style-type: none"><li>1. Occupational therapist selects any children screening test information displayed in the table.</li><li>2. Occupational therapist clicks the &lt;&lt;Add Consultation&gt;&gt; link button.</li><li>3. System requests the add consultation page with the selected child information.</li><li>4. System retrieves the add consultation page with the selected child information.</li><li>5. System displays the add consultation page with the selected child information which are child name, child birth date, screening test date, parent name, child age and examiner name and consultation form.</li><li>6. Occupational therapist views the child information with the consultation form consist of consultation date, screening development area and history description.</li><li>7. Occupational therapist inserts the information for consultation which are consultation date, screening development area and history description. [A4: Add more consultation information] [A5: Remove consultation information]</li><li>8. Occupational therapist clicks the &lt;&lt;Submit&gt;&gt; button.</li><li>9. System displays a confirmation message of “Are you sure want to add consultation?”.</li><li>10. Occupational therapist clicks the &lt;&lt;Yes&gt;&gt; button.</li><li>11. System sends the consultation information to the system database.</li></ol> |
|--|---|

12. System saves the consultation information.
13. System sends a successful message.
14. System displays a successful message of “Consultation successfully added!”.
15. The use case continues to step number 7 in basic flow.

**A2: Search child screening test**

1. Occupational therapist enters the keyword of screening test date or child name in the search input field.
2. Occupational therapist clicks the <<Search>> button.
3. System requests the children screening test information based on entered screening test date or child name keyword from system database.
4. System retrieves the children screening test information based on entered screening test date or child name keyword. [E2: Keyword not found]
5. System displays the children screening test information based on entered screening test date or child name keyword in the table.
6. Occupational therapist views the displayed children screening test information based on entered screening test date or child name keyword in the table.
7. The use case continues to step number 7 in basic flow.

**A3: View consultation information details**

1. Occupational therapist selects any children screening test information displayed in the table.

|  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>2. Occupational therapist clicks the &lt;&lt;View Details&gt;&gt; link button.</li> <li>3. System requests the selected children screening test information with consultation information from system database.</li> <li>4. System retrieves the details information of the selected children screening test with consultation information.</li> <li>5. System displays the details information of the selected children screening test which are child name, child birth date, child age, parent name, examiner name, screening test date along with the consultation information which are consultation date and development area category and history description.</li> <li>6. Occupational therapist views the details information of the selected children screening test information with consultation information.</li> <li>7. The use case continues to step number 7 in basic flow.</li> </ol> <p><b>A4: Add more consultation information</b></p> <ol style="list-style-type: none"> <li>1. Occupational therapist clicks the “+ Add Row” button.</li> <li>2. System adds row of consultation form with screening development area and history description input fields.</li> <li>3. Occupational therapist clicks the &lt;&lt;X&gt;&gt; icon button.</li> <li>4. Occupational therapist inserts another consultation information of screening development area and history description.</li> </ol> |
|--|--|

|                              |   |
|------------------------------|---|
|                              | <p>5. The use case continues to step number 8 in alternative flow 1 of add consultation (A1).</p> <p><b>A5: Remove consultation information</b></p> <p>1. Occupational therapist selects any inserted consultation information displayed.</p> <p>2. Occupational therapist clicks the &lt;&lt;X&gt;&gt; icon button.</p> <p>3. System removes the inserted row of consultation information from the consultation information list displayed in the table.</p> <p>4. The use case continues to step number 8 in alternative flow 1 of add consultation (A1).</p>   |
| <p><b>Exception Flow</b></p> | <p><b>E1: No child screening test added</b></p> <p>1. The children screening test information are not available in the system database.</p> <p>2. System displays an error message of “No child screening tests available”.</p> <p>3. The use case continues to step number 7 in basic flow.</p> <p><b>E2: Keyword not found</b></p> <p>1. The entered keyword to search children screening test information is not found.</p> <p>2. System displays an error message of “No child screening tests available”.</p> <p>3. The use case continues to step number 1 in alternative flow 2 of search child screening test (A2).</p> |

|                        |  |
|------------------------|--|
| <b>Post-Conditions</b> | 1. The consultation information is successfully added and stored in the system database. |
| <b>Rules</b>           | Not applicable   |
| <b>Constraints</b>     | Not applicable   |

### 3.4.4.6 Generate Report

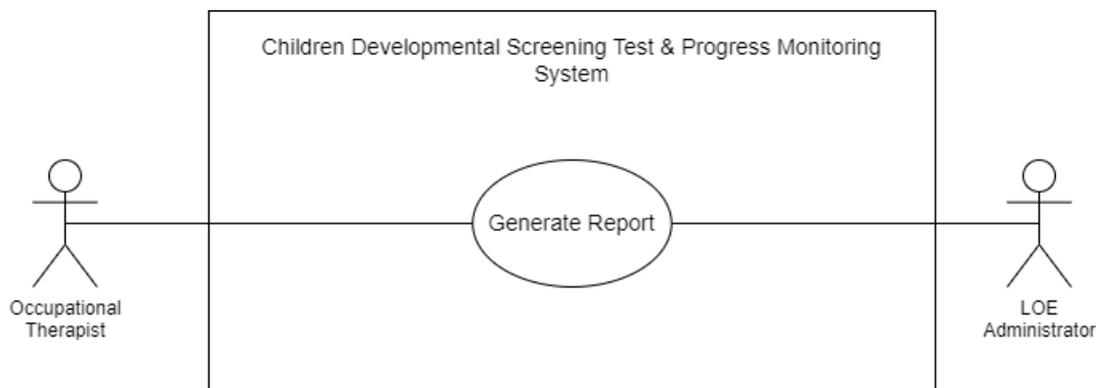


Figure 3.20 Generate Report – CDST Use Case Diagram

Table 3.7 Generate Report – CDST Use Case Description

|                          |  |
|--------------------------|--|
| <b>Use Case ID</b>       | UC-CDST-600  |
| <b>Brief Description</b> | This use case is initiated by the LOE Administrator and Occupational Therapist. It provides the LOE Administrator and Occupational Therapist the capability to view the list of consultation and screening reports, search and view details information of the screening test and consultation report. |

|                       |  |
|-----------------------|--|
| <b>Actor</b>          | <ol style="list-style-type: none"> <li>1. LOE Administrator</li> <li>2. Occupational Therapist</li> </ol>  |
| <b>Pre-Conditions</b> | <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist must already login to the system.</li> <li>2. The registered children must already add screening test.</li> <li>3. The occupational therapist must already add the consultation with children's parent.</li> </ol>  |
| <b>Basic Flow</b>     | <p><b>LOE Administrator and Occupational Therapist</b></p> <ol style="list-style-type: none"> <li>1. The use case begins when the LOE administrator and occupational therapist clicks the &lt;&lt;Report&gt;&gt; menu button from the side navigation menu.</li> <li>2. System requests the report page with the list of children screening test information.</li> <li>3. System retrieves the consultation page with the list of children screening test information.</li> <li>4. System displays the report page with the list of children screening test information which are child name, child birth date, child age, parent name, screening test date, screening test report link button and consultation report link button in a table. [E1: No screening consultation report]</li> <li>5. LOE administrator and occupational therapist views the list of the children screening test information in the table on the report page.</li> <li>6. LOE administrator and occupational therapist are able to:</li> </ol> |

|                         |   |
|-------------------------|---|
|                         | <ul style="list-style-type: none"> <li>a. Search children screening test information with report information. [A1: Search children screening test information with report information]</li> <li>b. View screening test report information details. [A2: View screening test report details]</li> <li>c. View consultation report information details. [A3: View consultation report details]</li> </ul> <p>7. The use case ends.</p>  |
| <b>Alternative Flow</b> | <p><b>A1: Search children screening test information with report information</b></p> <ul style="list-style-type: none"> <li>1. LOE administrator and occupational therapist enter the keyword of screening test date or child name in the search input field.</li> <li>2. LOE administrator and occupational therapist clicks the &lt;&lt;Search&gt;&gt; button.</li> <li>3. System requests the children screening test information with the report information based on entered screening test date or child name keyword from system database.</li> <li>4. System retrieves the children screening test information with the report information based on entered screening test date or child name keyword. [E2: Keyword not found]</li> <li>5. System displays the children screening test information with the report information based on entered screening test date or child name keyword in the table.</li> <li>6. LOE administrator and occupational therapist views the displayed children screening test information with report</li> </ul> |

|  |  |
|--|--|
|  | <p>information based on entered screening test date or child name keyword in the table.</p> <p>7. The use case continues to step number 7 in basic flow.</p> <p><b>A2: View screening test report details</b></p> <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist selects any children screening test information with report information displayed in the table.</li> <li>2. LOE administrator and occupational therapist clicks the &lt;&lt;Screening&gt;&gt; link button.</li> <li>3. System requests the selected children screening test information with screening test report details information from system database.</li> <li>4. System retrieves the details information of the selected children screening test with screening test report details information.</li> <li>5. System displays the details information of the selected children screening test which are child name, child birth date, child age, parent name, examiner name, screening test date along with the screening test report details information which are the personal social skills tasks with test score, fine motor adaptive skills tasks with test score, language skills tasks with test score and gross motor skills tasks with test score.</li> <li>6. Occupational therapist views the details information of the selected children screening test information with the screening test report details information. [A4: Export screening test report to PDF]</li> </ol> |
|--|--|

7. The use case continues to step number 7 in basic flow.

**A3: View consultation report details**

1. LOE administrator and occupational therapist selects any children screening test information with report information displayed in the table.

2. LOE administrator and occupational therapist clicks the <<Consultation>> link button.

3. System requests the selected children screening test information with consultation report details information from system database.

4. System retrieves the details information of the selected children screening test with consultation report details information.

5. System displays the details information of the selected children screening test which are child name, child birth date, child age, parent name, examiner name, screening test date along with the consultation report details information which are the consultation date, development area category and history description.

6. LOE administrator and occupational therapist views the details information of the selected children screening test information with the consultation report details information. [A5: Export consultation report to PDF]

7. The use case continues to step number 7 in basic flow.

**A4: Export screening test report to PDF**

1. LOE administrator and occupational therapist clicks the <<Export to PDF>> button.

|                              |  |
|------------------------------|--|
|                              | <ol style="list-style-type: none"> <li>2. System downloads the screening test report information.</li> <li>3. The use case continues to step number 7 in alternative flow 2 of view screening test report details (A2).</li> </ol> <p><b>A5: Export consultation report to PDF</b></p> <ol style="list-style-type: none"> <li>1. LOE administrator and occupational therapist clicks the &lt;&lt;Export to PDF&gt;&gt; button.</li> <li>2. System downloads the consultation report information.</li> <li>3. The use case continues to step number 7 in alternative flow 3 of view consultation report details (A3).</li> </ol>  |
| <p><b>Exception Flow</b></p> | <p><b>E1: No screening consultation report</b></p> <ol style="list-style-type: none"> <li>1. The children screening test information are not available in the system database.</li> <li>2. System displays an error message of “No child screening consultation report available”.</li> <li>3. The use case continues to step number 7 in basic flow.</li> </ol> <p><b>E2: Keyword not found</b></p> <ol style="list-style-type: none"> <li>1. The entered keyword to search children screening test information is not found.</li> <li>2. System displays an error message of “No child screening consultation report available”.</li> <li>3. The use case continues to step number 1 in alternative flow 1 of search child screening test information with report information (A1).</li> </ol> |

|                        |                |
|------------------------|----------------|
| <b>Post-Conditions</b> | Not applicable |
| <b>Rules</b>           | Not applicable |
| <b>Constraints</b>     | Not applicable |

### 3.4.5 Activity Diagram

#### 3.4.5.1 User Registration

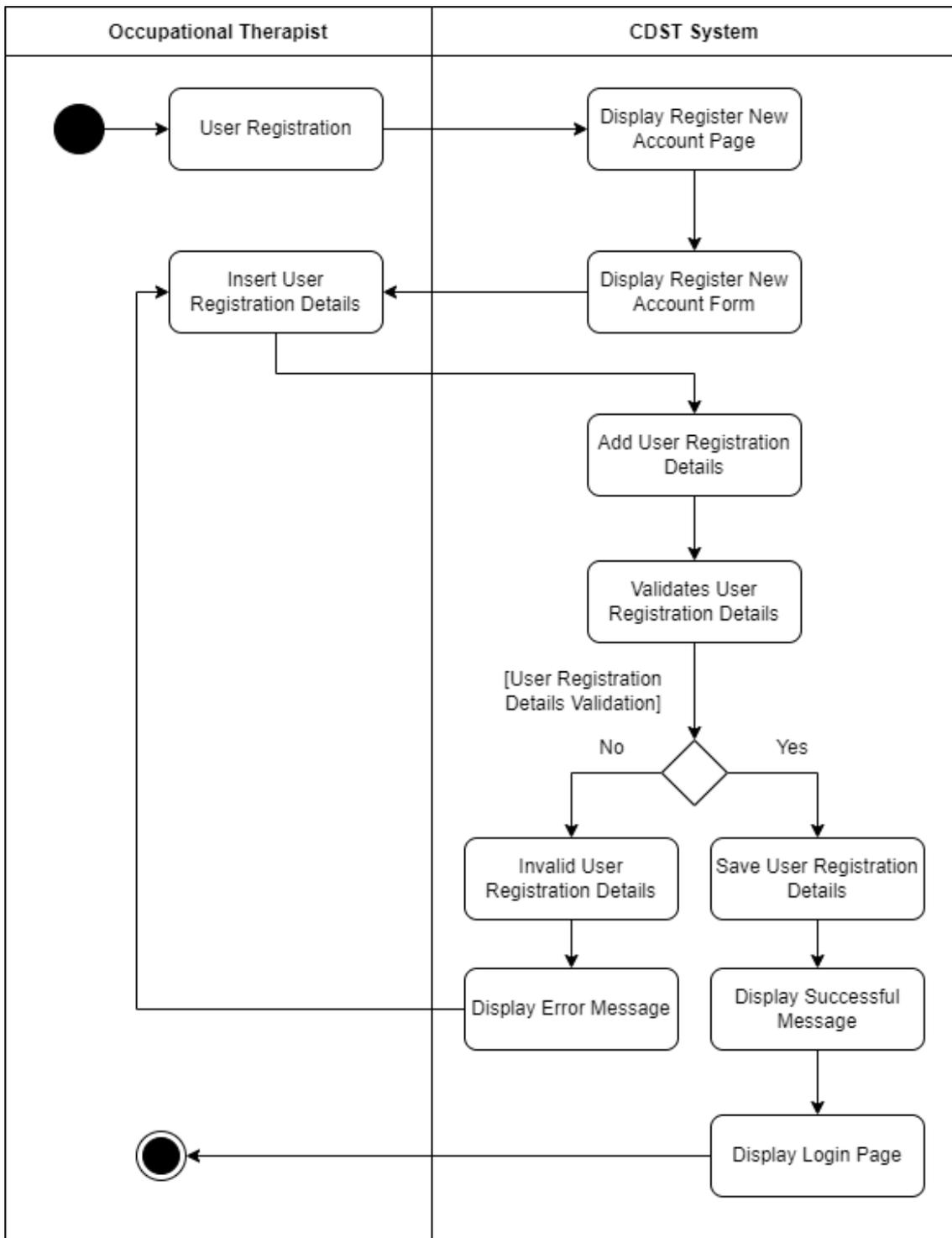


Figure 3.21 User Registration – CDST Activity Diagram

### 3.4.5.2 Login

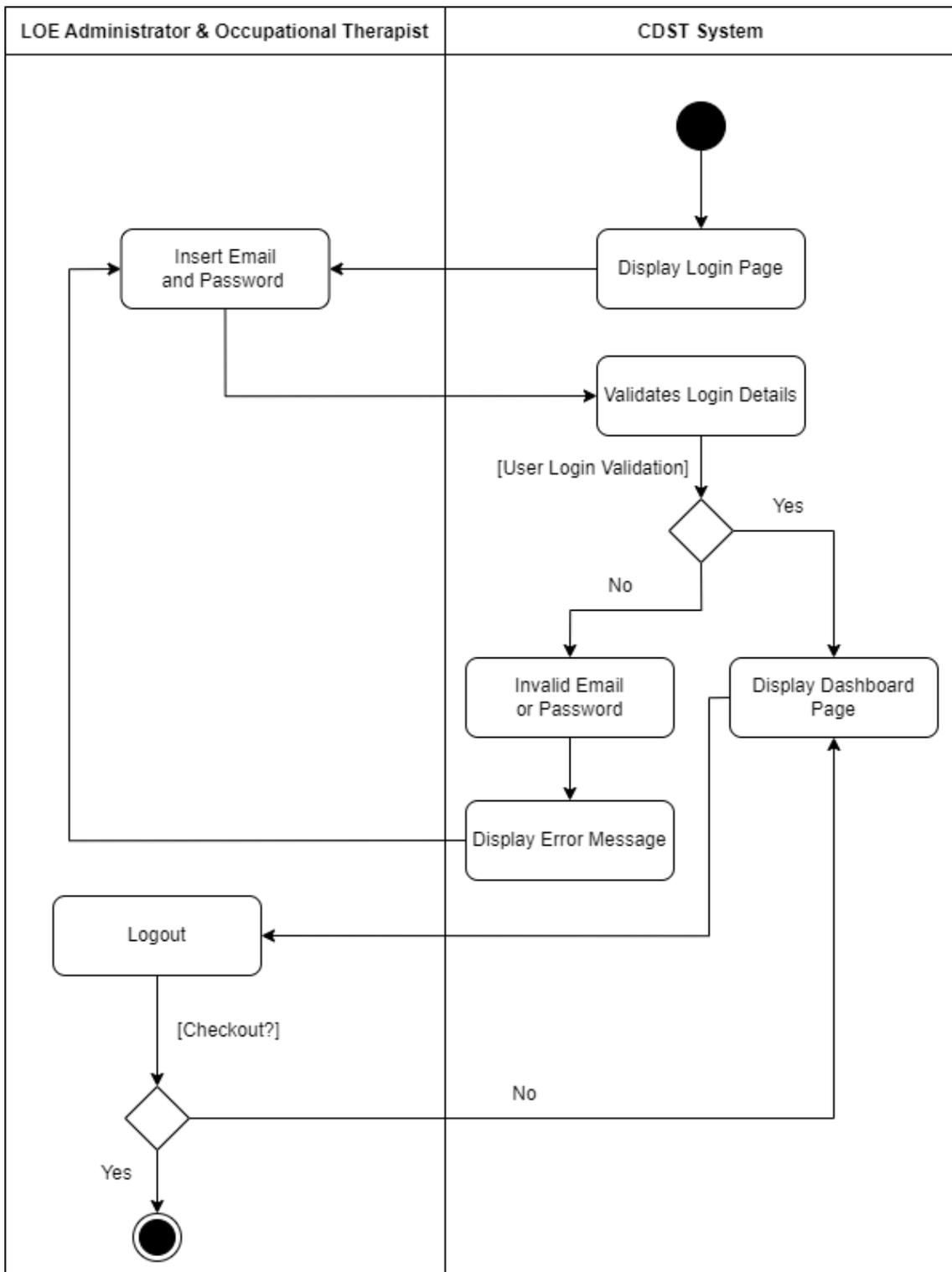


Figure 3.22 Login – CDST Activity Diagram

### 3.4.5.3 View Child Information

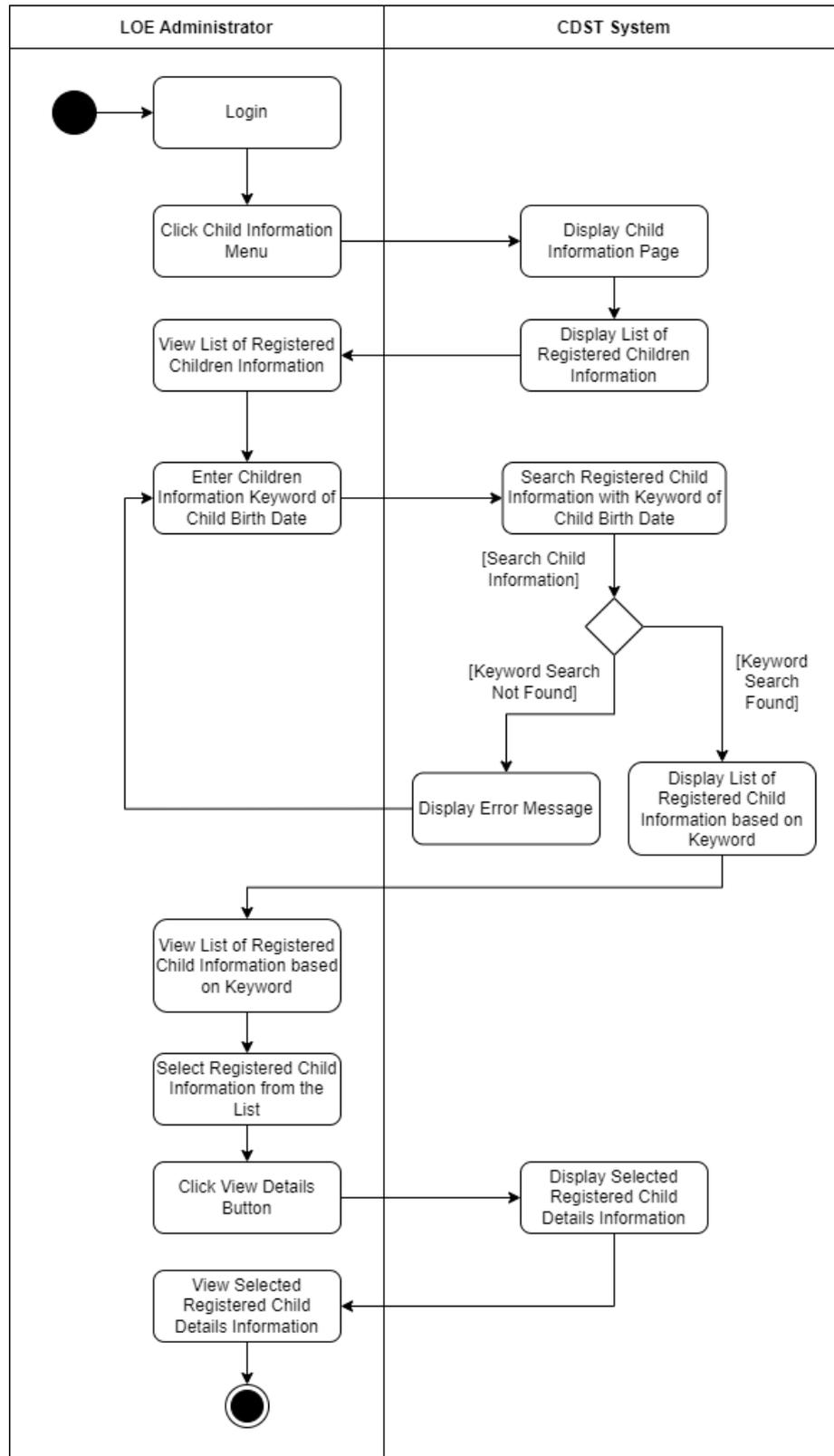


Figure 3.23 View Child Information – CDST Activity Diagram

### 3.4.5.4 Do Children Screening Test

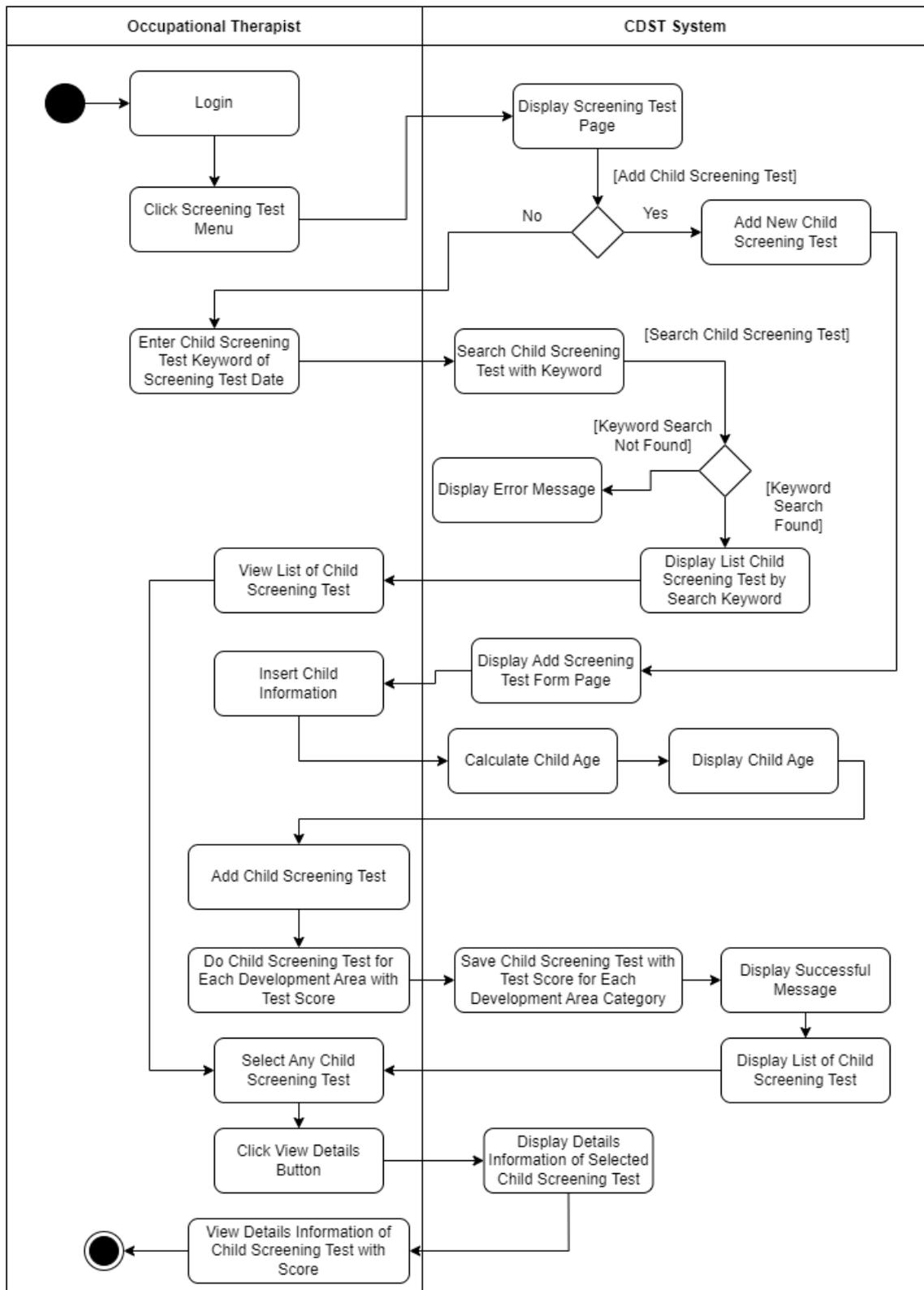


Figure 3.24 Do Children Screening Test – CDST Activity Diagram

### 3.4.5.5 Manage Consultation

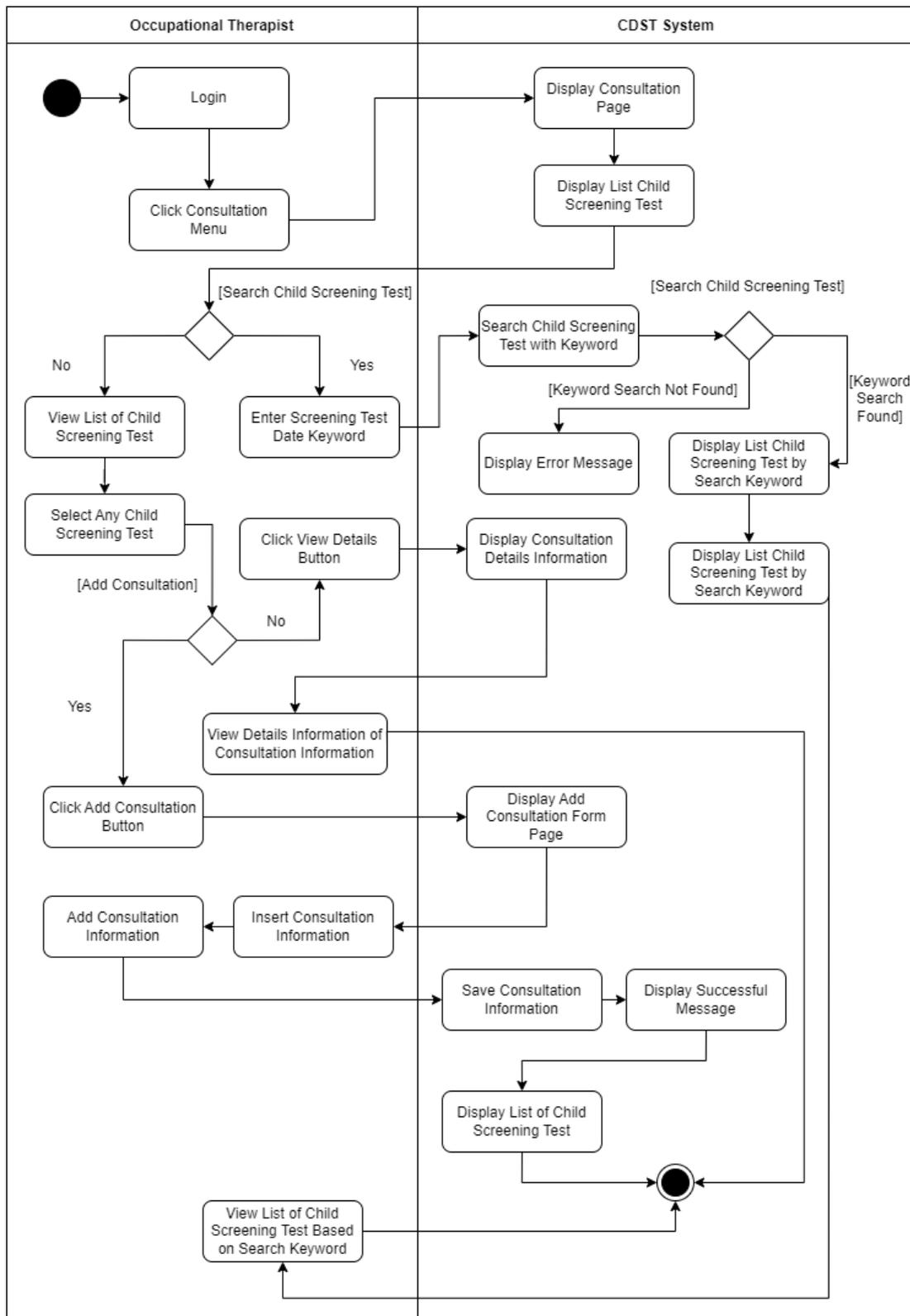


Figure 3.25 Manage Consultation – CDST Activity Diagram

### 3.4.5.6 Generate Report

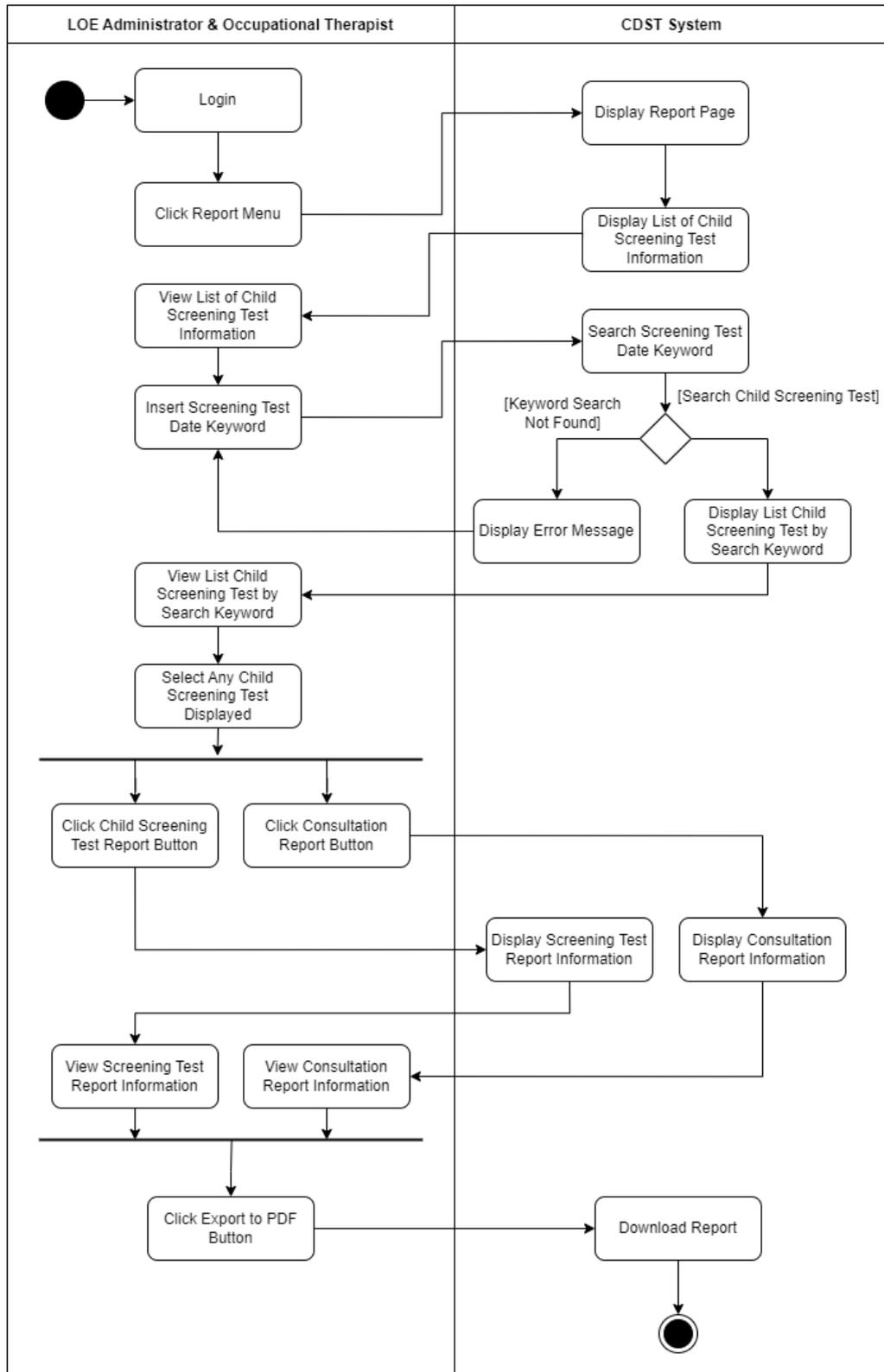


Figure 3.26 Generate Report – CDST Activity Diagram

## 3.4.6 Storyboard

### 3.4.6.1 LOE Administrator User

Little Ones Eduworld

CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING

**LOGIN HERE**

Email Address

Email Address

Password

Password

User Category

Select user

Login

[Create an account](#)

Figure 3.27 Login Page Interface – CDST

Description of Figure 3.27:

- This is the Login Page of the CDST system that also known as the first page of the system when they opened the system.
- The Login Page consists with an input form for login that include with three input fields which are for email address, password and user category.
- Users must fill in all the required input fields by entering user's email address, users password and user's category which as Occupational Therapist user.
- Users click the "Login" button to login to the CDST system that will navigate to the Dashboard Page of the system in Figure 3.28.

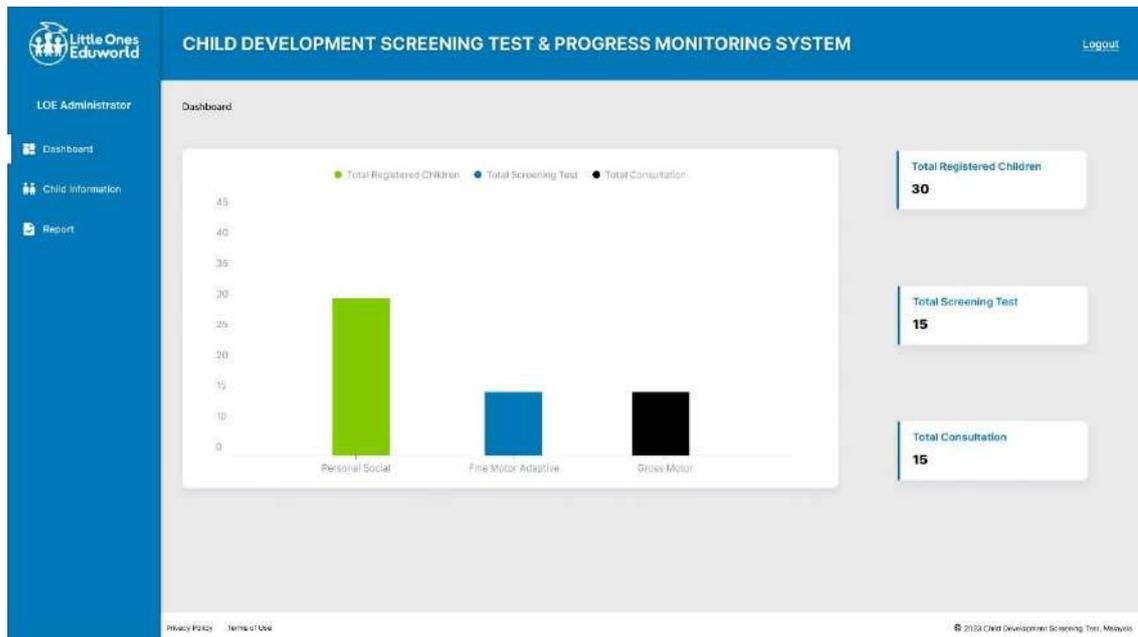


Figure 3.28 LOE Administrator Dashboard Page Interface – CDST

Description of Figure 3.28:

- This is the LOE Administrator Dashboard Page that will appear after users click the “Login” button from the Login Page of Figure 3.27.
- This page consists with a bar graph that show the data of the total registered children, total screening test and total consultation.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

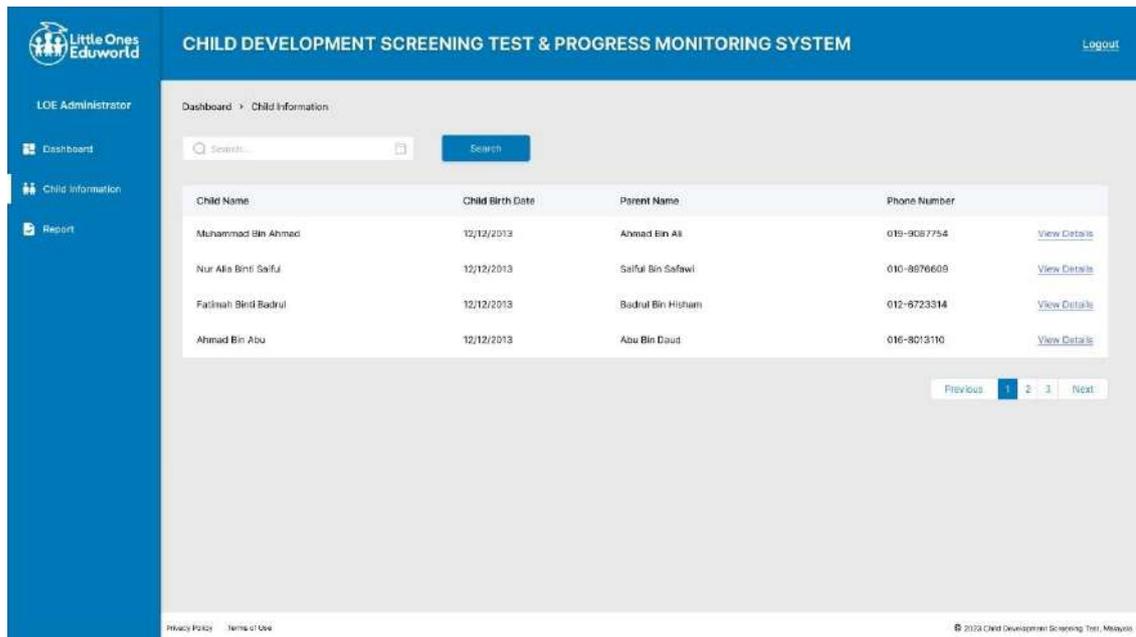


Figure 3.29 Child Information Page Interface – CDST

Description of Figure 3.29:

- This is the Child Information Page that will appear after users click the “Child Information” menu button from the side navigation menu at the left side of the page.
- This page consists of a table with list of registered children information which are child name, child birth date, parent name and phone number along with “View Details” link button and search input field to search for specific child information.
- Users can insert the keyword of name in the search input field to search for specific child information and click the “Search” button at the right of the search input field to retrieve and view the specific child information.
- Users can click the “View Details” link button from any of the registered children from the list displayed in the table to view the child details information that will navigate to the Child Information Details Page of Figure 3.30.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button

and “Report” menu button where each of the menu button will navigate to different pages.

- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

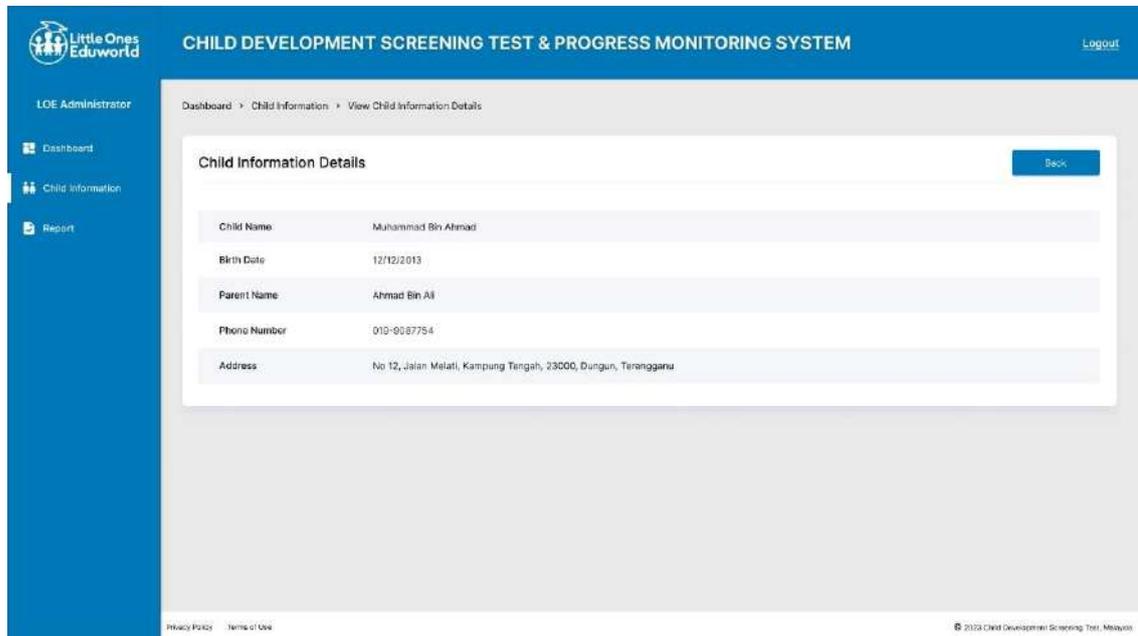


Figure 3.30 Child Information Details Page Interface – CDST

Description of Figure 3.30:

- This is the Child Information Details Page that will appear after users click the “View Details” link button from the list of registered children displayed in the table in Child Information Page of Figure 3.29.
- This page consists with the details information of the selected registered child which are child name, birth date, parent name, phone number and address.
- Users view the details information of the selected child information.
- Users click the “Back” button to return to the previous page of Child Information Page of Figure 3.29.

- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

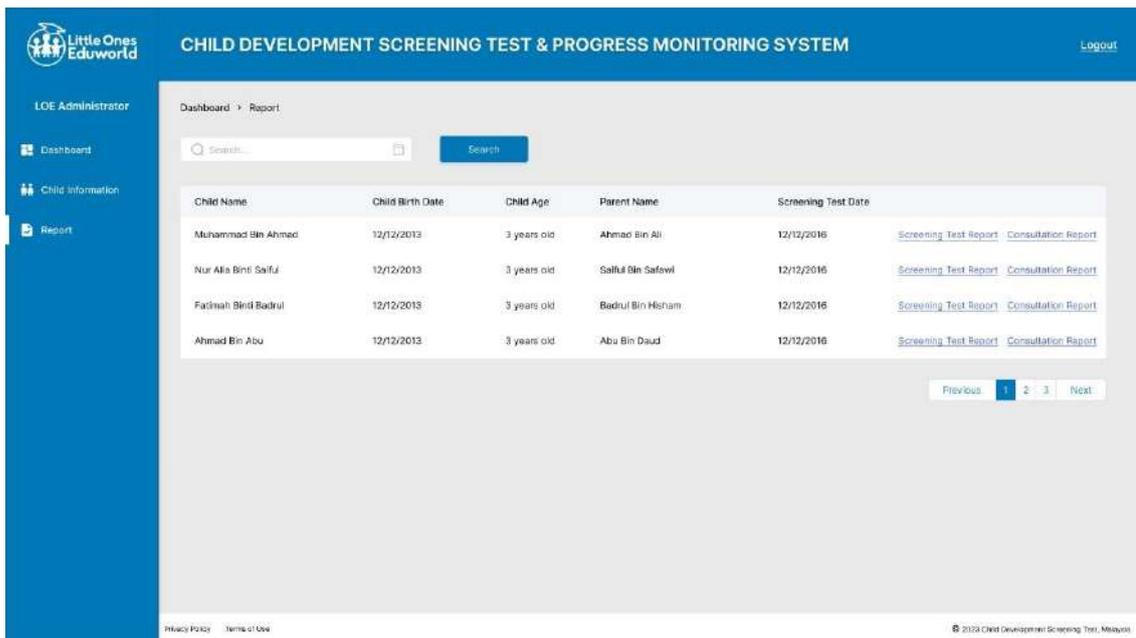


Figure 3.31 Report Page Interface – CDST

Description of Figure 3.31:

- This is the Report Page that will appear after users click the “Report” menu button from the side navigation menu at the left side of the page.
- This page consists of a table that displayed the list of child screening information which are child name, child birth date, child age, parent name and screening test date along with “Screening Test Report” and “Consultation Report” link buttons and search input field to search for specific child screening test.

- Users can insert the keyword of screening date or child name in the search input field to search for specific child screening test and click the “Search” button at the right of the search input field to retrieve and view the specific child screening test.
- Users click the “Screening Test Report” link button from any of the child screening test from the list displayed in the table to view the screening test report information that will navigate to the Screening Test Report Information Page of Figure 3.32.
- Users click the “Consultation Report” link button from any of the child screening test from the list displayed in the table to view the consultation report information that will navigate to the Consultation Report Information Page of Figure 3.34.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

Little Ones Eduworld CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

LOE Administrator Dashboard > Report > Screening Test Report

Dashboard Child Information Report

### Child Information Details

[Back](#) [Export to PDF](#)

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

### Personal Social Skills

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

### Fine Motor-Adaptive Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of "I"   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of "O" | Pass         |

### Language Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

### Gross Motor Skills

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.32 Screening Test Report Information Page Interface – CDST

Description of Figure 3.32:

- This is the Screening Test Report Information Page that will appear after users click the “Screening Test Report” link button from the list of child screening test displayed in the table in Report Page of Figure 3.31.
- This page consists with the screening test report details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, list of personal social skills tasks with result score, list of fine motor adaptive skills tasks with result score, list of language skills tasks with result score and list of gross motor skills tasks with result score.
- Users view the child screening test report details information of the selected child screening test.
- Users can click the “Export to PDF” button to convert the screening test report to PDF view that will navigate to the Convert Screening Test Report Page of Figure 3.33.
- Users can click the “Back” button to return to the Report Page of Figure 3.31.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

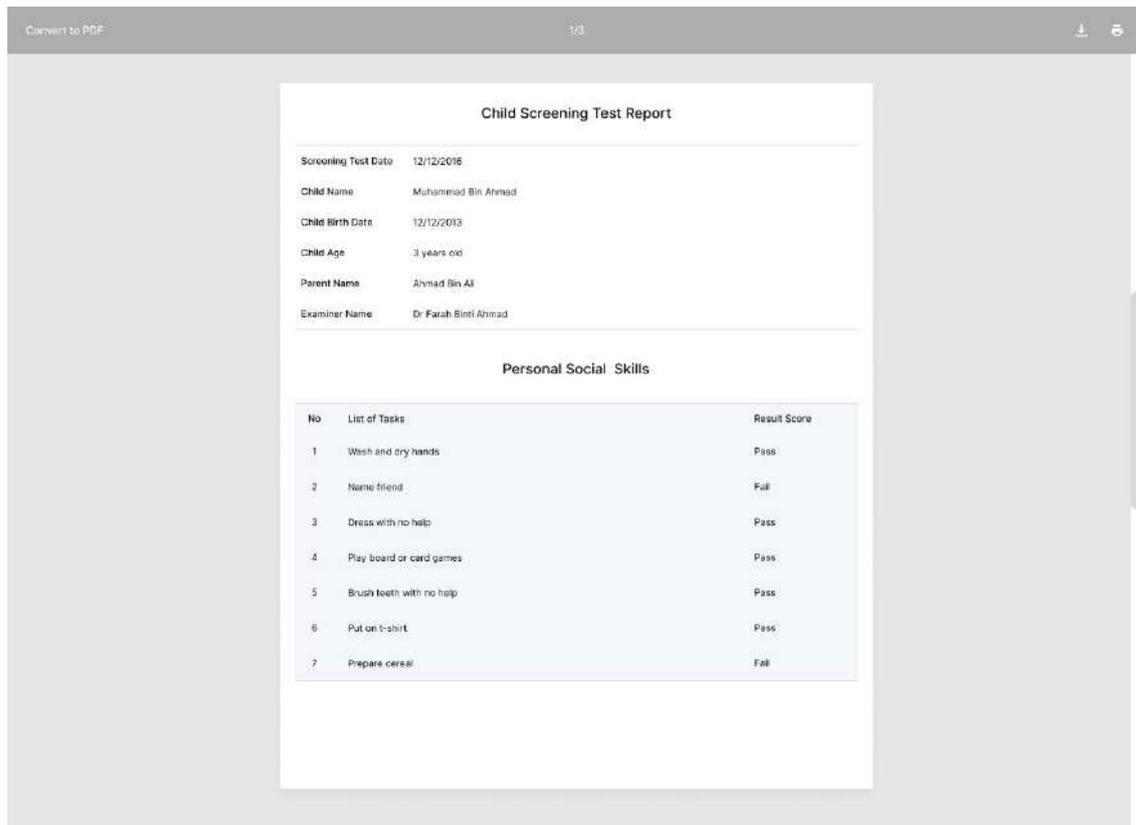


Figure 3.33 Convert Screening Test Report Page Interface – CDST

Description of Figure 3.33:

- This is the Convert Screening Test Report Page that will appear after users click the “Export to PDF” button from the Screening Test Report Information Page of Figure 3.32.
- This page consists with the details information of screening test report of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, list of personal social skills tasks with result score, list of fine motor adaptive skills tasks with result score, list of language skills tasks with result score and list of gross motor skills tasks with result score.
- Users view the details information of the screening test report.
- Users click the “Download” icon button at the top right of the page to download the current screening test report in PDF.

- Users can click the “Print” icon button at the top right of the page to print the current screening test report.

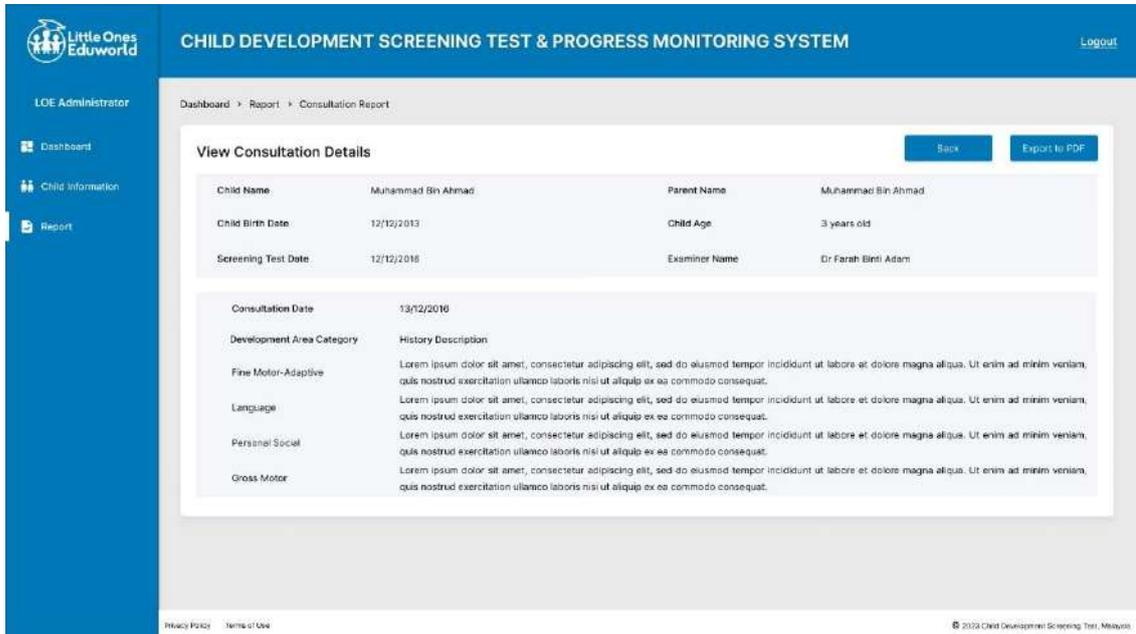


Figure 3.34 Consultation Report Information Page Interface – CDST

Description of Figure 3.34:

- This is the Consultation Report Information Page that will appear after users click the “Consultation Report” link button from the list of child screening test displayed in the table in Report Page of Figure 3.31.
- This page consists with the consultation report details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, consultation date, list of development area category with history description.
- Users view the consultation report details information of the selected child screening test.

- Users can click the “Export to PDF” button to convert the consultation report to PDF view that will navigate to the Convert Consultation Report Page of Figure 3.35.
- Users can click the “Back” button to return to the Report Page of Figure 3.31.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Child Information” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.36.

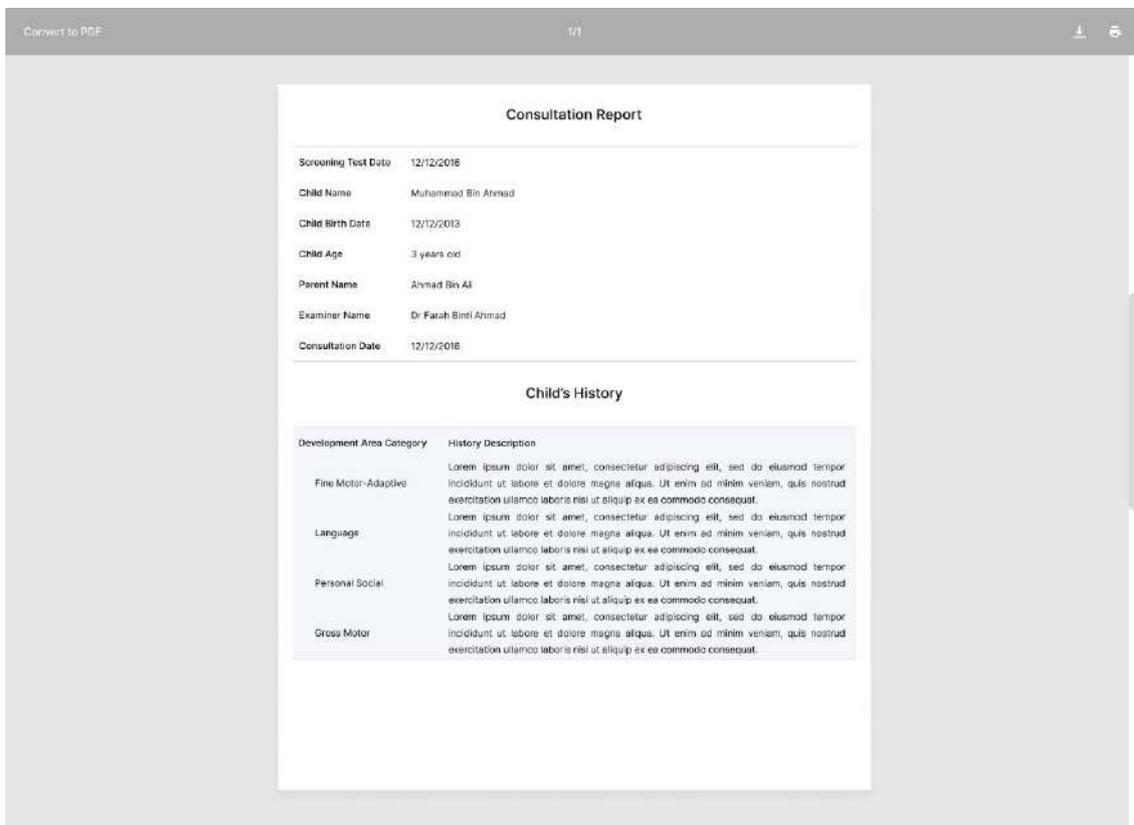


Figure 3.35 Convert Consultation Report Page Interface – CDST

Description of Figure 3.35:

- This is the Convert Consultation Report Page that will appear after users click the “Export to PDF” button from the Consultation Report Information Page of Figure 3.34.
- This page consists with the details information of consultation report of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, consultation date, list of development area category with history description.
- Users view the details information of the consultation report.
- Users click the “Download” icon button at the top right of the page to download the current consultation report in PDF.
- Users can click the “Print” icon button at the top right of the page to print the current consultation report.



Figure 3.36 Logout Confirmation Page Interface – CDST

Description of Figure 3.36:

- This is the Logout Confirmation Page that will appear after users click the “Logout” button at the top right of any web pages.

- Click the “Yes” button to continue logout from the system and will navigate to the Login Page of Figure 3.27.
- Click the “No” button to cancel logout from the system and will return to the current opened web page.

### 3.4.6.2 Occupational Therapist User

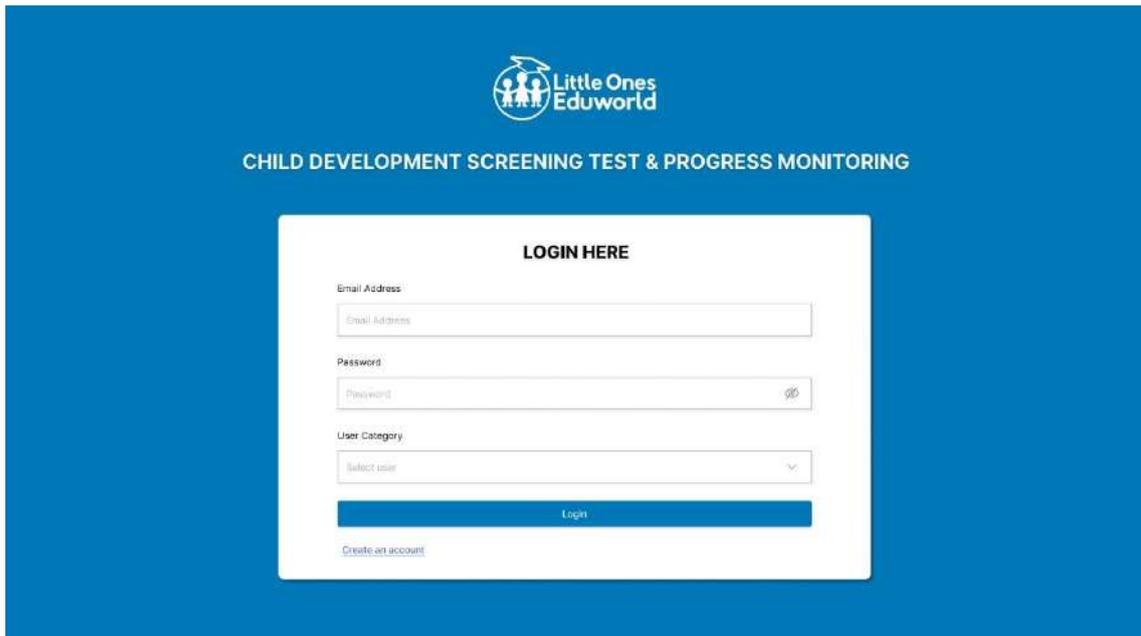


Figure 3.37 Login Page Interface – CDST

Description of Figure 3.37:

- This is the Login Page of the CDST system that also known as the first page of the system when they opened the system.
- The Login Page consists with an input form for login that include with three input fields which are for email address, password and user category.
- Users must fill in all the required input fields by entering user's email address, users password and user's category which as Occupational Therapist user.
- Users click the "Login" button to login to the CDST system that will navigate to the Dashboard Page of the system in Figure 3.40.
- Users click the "Create an account" link button at the bottom left on this Login Page to create a new account as occupational therapist user that will navigate to Figure 3.38 of Register New Account Page.

**REGISTER NEW ACCOUNT**

Full Name:

Gender:

Email:

Qualification:  No file selected

Phone Number:

User Category:

Password:

Confirm Password:

Address:

[Already have an account? Login here](#)

Figure 3.38 Register New Account Page Interface – CDST

Description of Figure 3.38:

- This is the Register New Account Page that will appear after users click the “Create an account” link button from the Login Page of Figure 3.37.
- This page consists with an input form to create a new account as occupational therapist user that include with a few input fields which are full name, email, phone number, gender, address, password, confirm password, user category and qualification.
- Users must fill in all the required input fields by entering the user’s full name, user’s email, user’s phone number, user’s gender, user’s address, user’s password, user’s confirm password, user’s category and user’s qualification file.
- Users click the “Sign Up” button to create an account to the CDST system that will navigate to the Sign Up Confirmation Message Page in Figure 3.39.

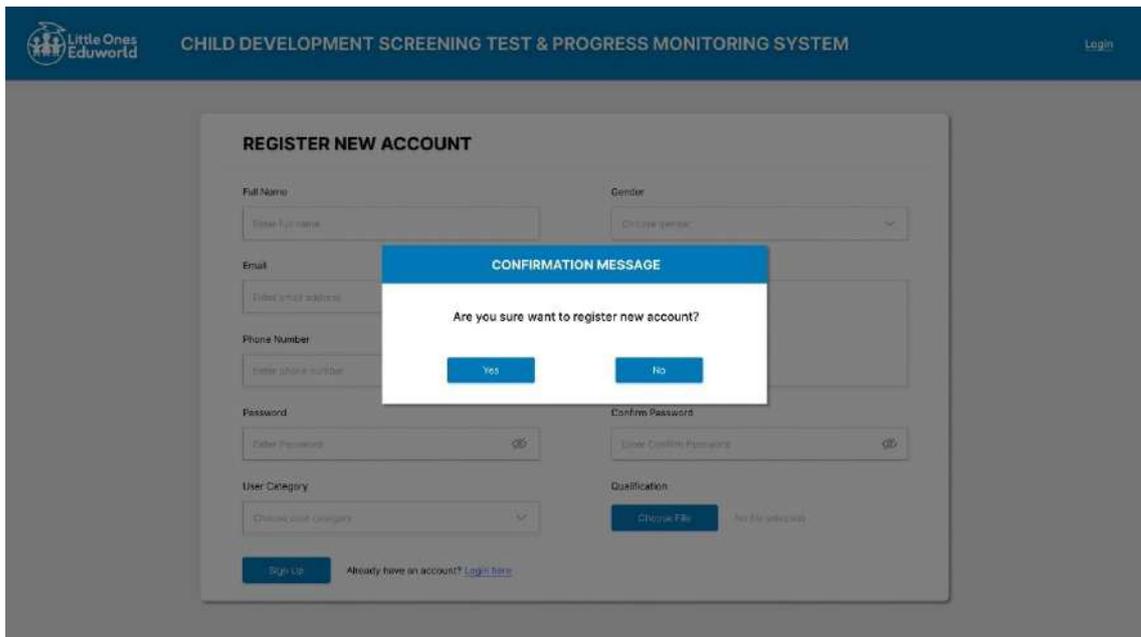


Figure 3.39 Sign Up Confirmation Message Page Interface – CDST

Description of Figure 3.39:

- This is the Sign Up Confirmation Message Page that will appear after users click the “Sign Up” button from the Register New Account Page of Figure 3.38.
- Click the “Yes” button to continue register an account successfully and navigate back to Login Page of Figure 3.37.
- Click the “No” button to cancel register an account to the system and will return to the Register New Account Page of Figure 3.38.

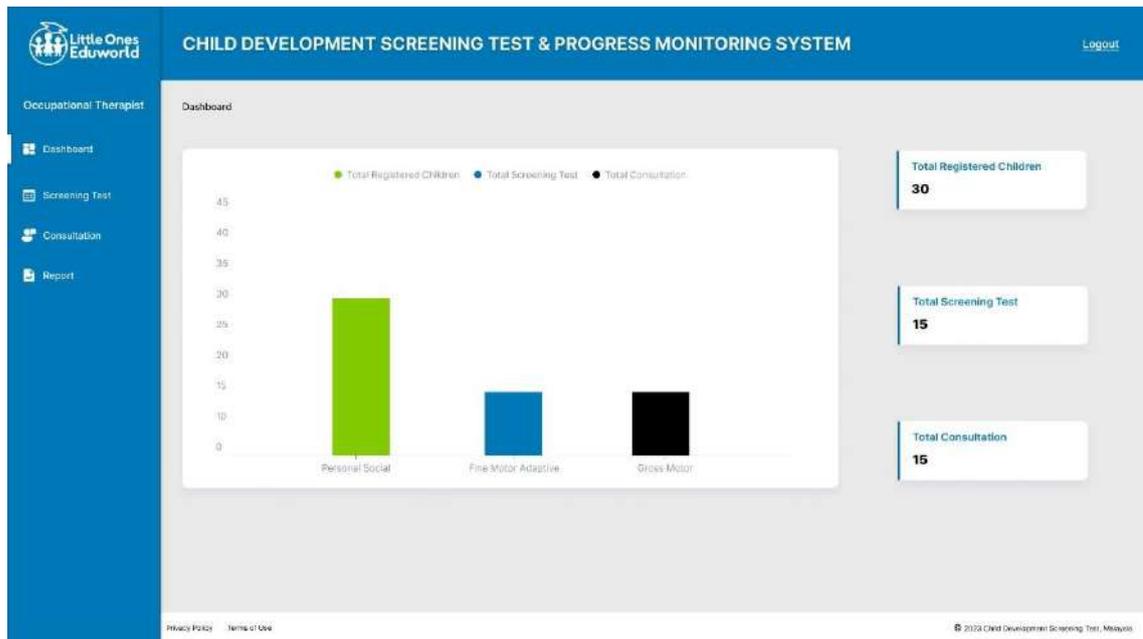


Figure 3.40 Occupational Therapist Dashboard Page Interface – CDST

Description of Figure 3.40:

- This is the Occupational Therapist Dashboard Page that will appear after users click the “Login” button from the Login Page of Figure 3.37.
- This page consists with a bar graph that show the data of the total registered children, total screening test and total consultation.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

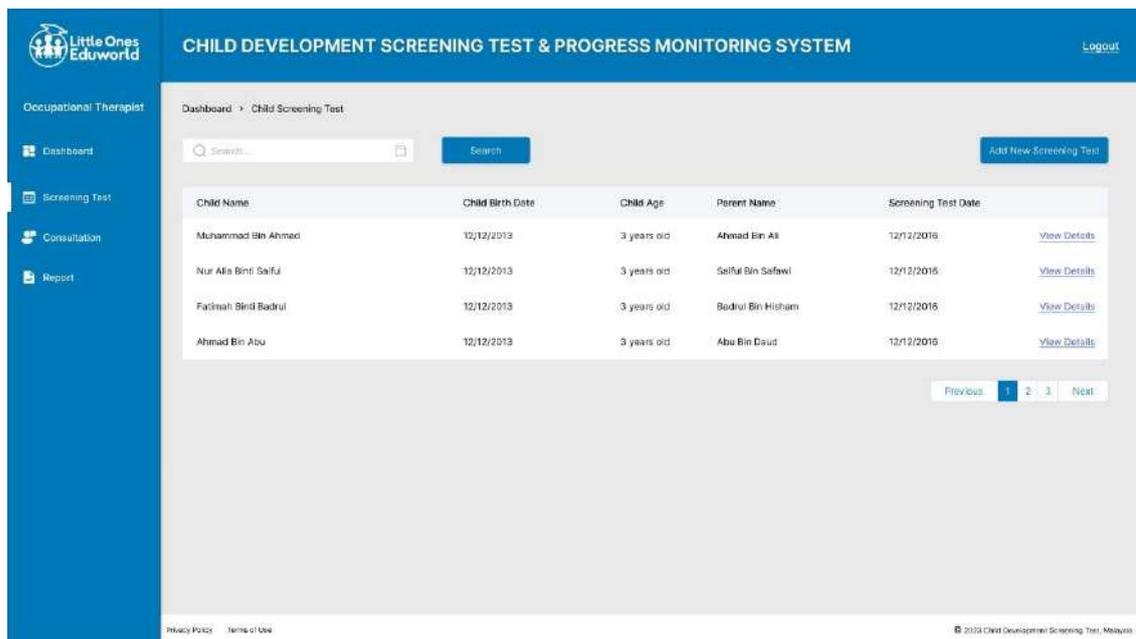


Figure 3.41 Screening Test Page Interface – CDST

Description of Figure 3.41:

- This is the Screening Test Page that will appear after users click the “Screening Test” menu button from the side navigation menu at the left side of the page.
- This page consists of a table that displayed the list of child screening test information which are child name, child birth date, child age, parent name, screening test date along with “View Details” link button and search input field to search for specific child screening test.
- Users can insert the keyword of screening date or child name in the search input field to search for specific child screening test and click the “Search” button at the right of the search input field to retrieve and view the specific child screening test.
- Users click the “Add New Screening Test” button to add new information of child screening test that will navigate to the Add Child Screening Test Page of Figure 3.42.
- Users click the “View Details” link button from any of the child screening test from the list displayed in the table to view the details information of the child

screening test that will navigate to the Screening Test Information Page of Figure 3.49.

- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

The screenshot displays the 'Add Child Screening Test' page. The header includes the 'Little Ones Eduworld' logo and the system name 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM'. A 'Logout' link is in the top right. The left sidebar shows navigation options: 'Occupational Therapist', 'Dashboard', 'Screening Test', 'Consultation', and 'Report'. The main form area is titled 'Child Information' and contains the following fields: 'Child Name' (text input), 'Parents Name' (text input), 'Birth Date' (calendar), 'Screening Test Date' (calendar), 'Examiner Name' (dropdown menu), and 'Child Age' (text input showing '0 years old'). At the bottom right of the form are three buttons: 'Cancel', 'Calculate Age', and 'Add Screening Test'.

Figure 3.42 Add Child Screening Test Page Interface – CDST

Description of Figure 3.42:

- This is the Add Child Screening Test Page that will appear after users click the “Add New Screening Test” button from the Screening Test Page of Figure 3.41.
- This page consists with a form for child information for screening test that include with a few input fields which are child name, birth date, examiner name, parent name, screening test date and a text field for the calculation result of child age.

- Users must fill in all the required input fields by inserting the child's name, child's birth date, examiner name, child's parent name, screening test date.
- Users click the "Calculate Age" button to calculate the child age based on formula of "screening test date – child birth date" and the child age will displayed in text field of child age.
- Users click the "Add Screening Test" button to continue add the child screening test information for all development area category that will navigate to the Screening Test Development Area Category Page of Figure 3.43.
- Users can click the "Cancel" button to cancel adding the child screening test and will redirect to the Screening Test Page of Figure 3.41.
- The side navigation menu at the left side of the page consists with a few menus button which are "Dashboard" menu button, "Screening Test" menu button, "Consultation" menu button and "Report" menu button where each of the menu button will navigate to different pages.
- Users can click the "Logout" link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

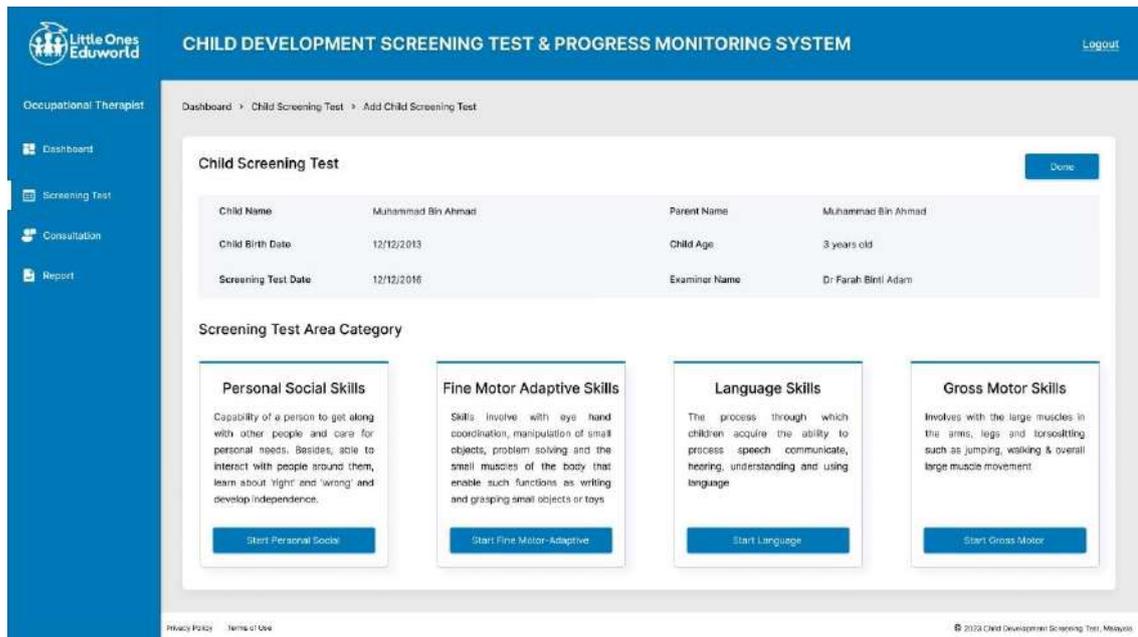


Figure 3.43 Screening Test Development Area Category Page Interface – CDST

Description of Figure 3.43:

- This is the Screening Test Development Area Category Page that will appear after users click the “Add Screening Test” button from the Add Child Screening Test Page of Figure 3.42.
- This page consists with the inserted child information for screening test from the Add Child Screening Test Page of ### which are child name, child birth date, screening test date, parent name, child age, examiner name along with the screening test area category button of personal social skills, fine motor adaptive skills, language skills and gross motor skills to perform the screening test tasks.
- Users click the “Start Personal Social” button that will navigate to Personal Social Skills Tasks Page of Figure 3.44, “Start Fine Motor-Adaptive” button that will navigate to Fine Motor Adaptive Skills Tasks Page of Figure 3.45, “Start Language” button that will navigate to Language Skills Tasks Page of Figure 3.46 and “Start Gross Motor” button that will navigate to Gross Motor Skills Tasks Page of Figure 3.47 to do the screening test tasks for each development area category for the child.

- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

The screenshot displays the 'Personal Social Skills' tasks page interface. The page features a blue header with the 'Little Ones Eduworld' logo and the system title 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM'. A 'Logout' link is visible in the top right corner. On the left, a vertical navigation menu includes 'Occupational Therapist', 'Dashboard', 'Screening Test', 'Consultation', and 'Report'. The main content area shows a breadcrumb trail: 'Dashboard > Child Screening Test > Add Child Screening Test > Personal Social Skills'. Below this, a table displays child information: Child Name (Muhammad Bin Ahmad), Parent Name (Muhammad Bin Ahmad), Child Birth Date (12/12/2013), Child Age (3 years old), Screening Test Date (12/12/2016), and Examiner Name (Dr Farah Binti Adam). The 'Personal Social Skills' section contains two tasks: '1 Wash and dry hands' and '2 Name friend'. Each task has four radio button options: 'Pass', 'No Opportunity', 'Fail', and 'Refusal'. Below each task, there is a 'Clear choice' link and a table of passing percentages for different age groups. A 'Finish' button is located at the bottom right of the task section.

Figure 3.44 Personal Social Skills Tasks Page Interface – CDST

Description of Figure 3.44:

- This is the Personal Social Skills Tasks Page that will appear after users click the “Start Personal Social” button from the Screening Test Development Area Category Page of Figure 3.43.
- This page consists with the inserted child information for screening test from the Add Child Screening Test Page of Figure 3.42 which are child name, child birth date, screening test date, parent name, child age, examiner name along with the tasks of personal social skills with result score in radio button input fields option.

- Users must choose and click the result score radio button based on the child’s behaviour for all the tasks to add the screening test for personal social skills.
- Users can click the “Clear choice” link button at the right side of each tasks provided to clear the result score selection.
- Users click the “Finish” button to add the personal social skills tasks that will navigate to Add Screening Test Confirmation Message Page of Figure 3.48.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.



Figure 3.45 Fine Motor Adaptive Skills Tasks Page Interface – CDST

Description of Figure 3.45:

- This is the Fine Motor Adaptive Skills Tasks Page that will appear after users click the “Start Fine Motor-Adaptive” button from the Screening Test Development Area Category Page of Figure 3.43.
- This page consists with the inserted child information for screening test from the Add Child Screening Test Page of Figure 3.42 which are child name, child birth date, screening test date, parent name, child age, examiner name along with the tasks of fine motor adaptive skills with result score in radio button input fields option.
- Users must choose and click the result score radio button based on the child’s behaviour for all the tasks to add the screening test for fine motor adaptive skills.
- Users can click the “Clear choice” link button at the right side of each tasks provided to clear the result score selection.
- Users click the “Finish” button to add the personal social skills tasks that will navigate to Add Screening Test Confirmation Message Page of Figure 3.48.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.



Figure 3.46 Language Skills Tasks Page Interface – CDST

Description of Figure 3.46:

- This is the Language Skills Tasks Page that will appear after users click the “Start Language” button from the Screening Test Development Area Category Page of Figure 3.43.
- This page consists with the inserted child information for screening test from the Add Child Screening Test Page of Figure 3.42 which are child name, child birth date, screening test date, parent name, child age, examiner name along with the tasks of language skills with result score in radio button input fields option.
- Users must choose and click the result score radio button based on the child’s behaviour for all the tasks to add the screening test for language skills.
- Users can click the “Clear choice” link button at the right side of each tasks provided to clear the result score selection.
- Users click the “Finish” button to add the personal social skills tasks that will navigate to Add Screening Test Confirmation Message Page of Figure 3.48.

- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

Figure 3.47 Gross Motor Skills Tasks Page Interface – CDST

Description of Figure 3.47:

- This is the Gross Motor Skills Tasks Page that will appear after users click the “Start Gross Motor” button from the Screening Test Development Area Category Page of Figure 3.43.
- This page consists with the inserted child information for screening test from the Add Child Screening Test Page of Figure 3.42 which are child name, child birth date, screening test date, parent name, child age, examiner name along with the tasks of gross motor skills with result score in radio button input fields option.

- Users must choose and click the result score radio button based on the child's behaviour for all the tasks to add the screening test for gross motor skills.
- Users can click the “Clear choice” link button at the right side of each tasks provided to clear the result score selection.
- Users click the “Finish” button to add the personal social skills tasks that will navigate to Add Screening Test Confirmation Message Page of Figure 3.48.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

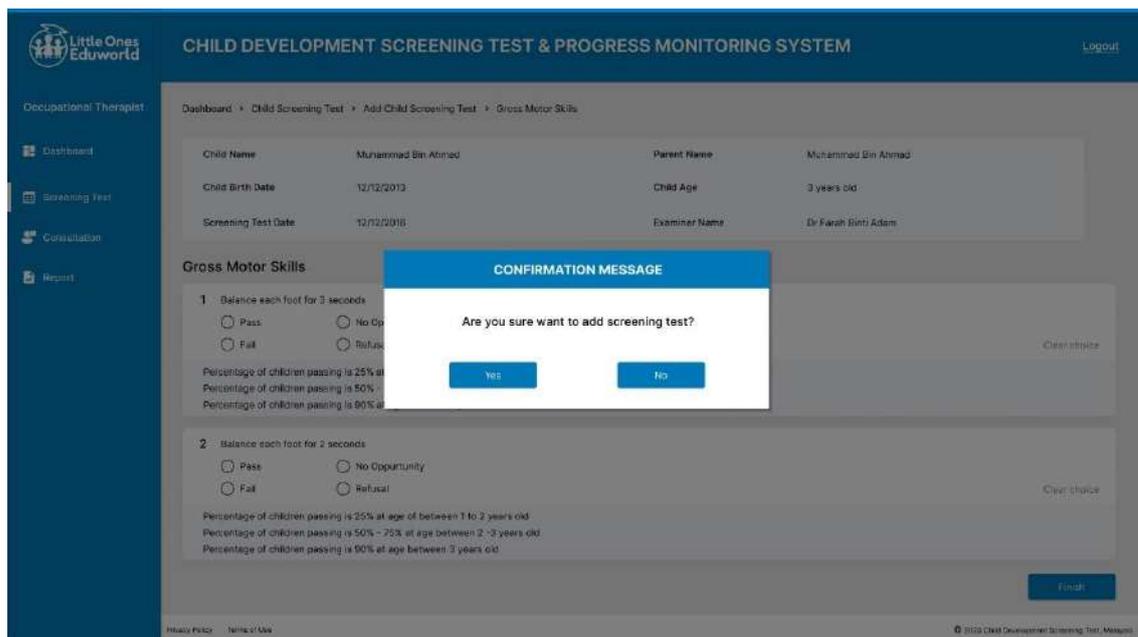


Figure 3.48 Add Screening Test Confirmation Message Page Interface – CDST

Description of Figure 3.48:

- This is the Add Screening Test Confirmation Message Page that will appear after users click the “Finish” button from any screening area test of xx, xx, xx or xx.
- Click the “Yes” button to confirm add the screening test for the current screening area category and stored in the system database. Then, it will redirect to the Screening Test Development Area Category Page of Figure 3.43.
- Click the “No” button to cancel add the screening test of the current screening area category.

**Little Ones Eduworld** CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

Occupational Therapist

Dashboard > Report > Screening Test Details

**Child Information Details** Back

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

**Personal Social**

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

**Fine Motor-Adaptive**

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of '+'   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of 'O' | Pass         |

**Language**

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

**Gross Motor**

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.49 Screening Test Information Page Interface – CDST

Description of Figure 3.49:

- This is the Screening Test Information Page that will appear after users click the “View Details” link button from the list of child screening test displayed in the table in Screening Test Page of Figure 3.41.
- This page consists with the screening test details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, list of personal social skills tasks with result score, list of fine motor adaptive skills tasks with result score, list of language skills tasks with result score and list of gross motor skills tasks with result score.
- Users view the child screening test details information of the selected child screening test.
- Users can click the “Back” button to return to the Screening Test Page of Figure 3.41.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

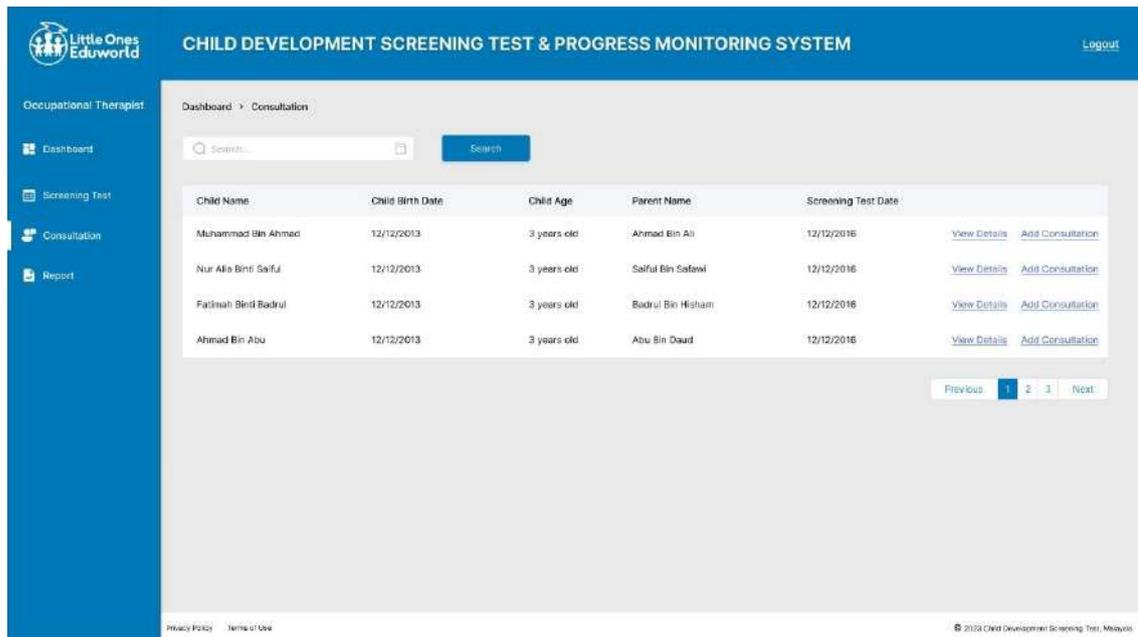


Figure 3.50 Consultation Page Interface – CDST

Description of Figure 3.50:

- This is the Consultation Page that will appear after users click the “Consultation” menu button from the side navigation menu at the left side of the page.
- This page consists of a table that displayed the list of child screening test information which are child name, child birth date, child age, parent name, screening test date along with “View Details” link button and “Add Consultation” link button and search input field to search for specific child screening test.
- Users can insert the keyword of screening date or child name in the search input field to search for specific child screening test and click the “Search” button at the right of the search input field to retrieve and view the specific child screening test.
- Users click the “Add Consultation” link button from any of the child screening test from the list displayed in the table to add consultation information that will navigate to Add Consultation Page of Figure 3.51.
- Users click the “View Details” link button from any of the child screening test from the list displayed in the table to view the details information of the

consultation information that will navigate to the Consultation Information Details Page of Figure 3.53.

- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

The screenshot displays the 'Add Consultation' interface. At the top, there is a blue header with the 'Little Ones Eduworld' logo, the system title 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM', and a 'Logout' link. Below the header, a breadcrumb trail shows 'Dashboard > Consultation > Add Consultation'. The main content area is titled 'Add Consultation' and contains a form with the following fields:

|                     |                    |               |                     |
|---------------------|--------------------|---------------|---------------------|
| Child Name          | Muhammad Bin Ahmad | Parent Name   | Muhammad Bin Ahmad  |
| Child Birth Date    | 12/12/2013         | Child Age     | 3 years old         |
| Screening Test Date | 12/12/2016         | Examiner Name | Dr Farah Binti Adam |

Below these fields is a 'Consultation Date' field with a date picker showing 'dd/mm/yyyy'. Underneath is a table with two columns: 'Development Area Category' and 'History Description'. The first row has a dropdown menu for 'Choose Category', an input field for 'Enter Description', and a blue '+' button. The second row has a similar dropdown and input field, but with a red 'X' button instead of a '+' button. At the bottom right of the form are 'Cancel' and 'Submit' buttons.

Figure 3.51 Add Consultation Page Interface – CDST

Description of Figure 3.51:

- This is the Add Consultation Page that will appear after users click the “Add Consultation” link button from the list of child screening test displayed in the table in Consultation Page of Figure 3.50.
- This page consists with the child information inserted for the screening test which are child name, child birth date, screening test date, parent name, child age and

examiner name along with input fields add the consultation information which are the consultation date, development area category choice for personal social skills, fine motor adaptive skills, language skills and gross motor skills with the history description.

- Users must fill in the input fields for add consultation information which are the consultation date and development area category with the history description.
- Users click the “+” icon button to add one per one of the inserted consultation information for the development area category with history description to the list before submit the consultation information.
- Users can click the “X” icon button to delete the row of added consultation information in the list.
- Users click the “Submit” button to continue add all the consultation information that will navigate to the Add Consultation Confirmation Message Page of Figure 3.52.
- Users can click the “Cancel” button to cancel adding all the inserted consultation information that will navigate to the Consultation Page of Figure 3.50.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

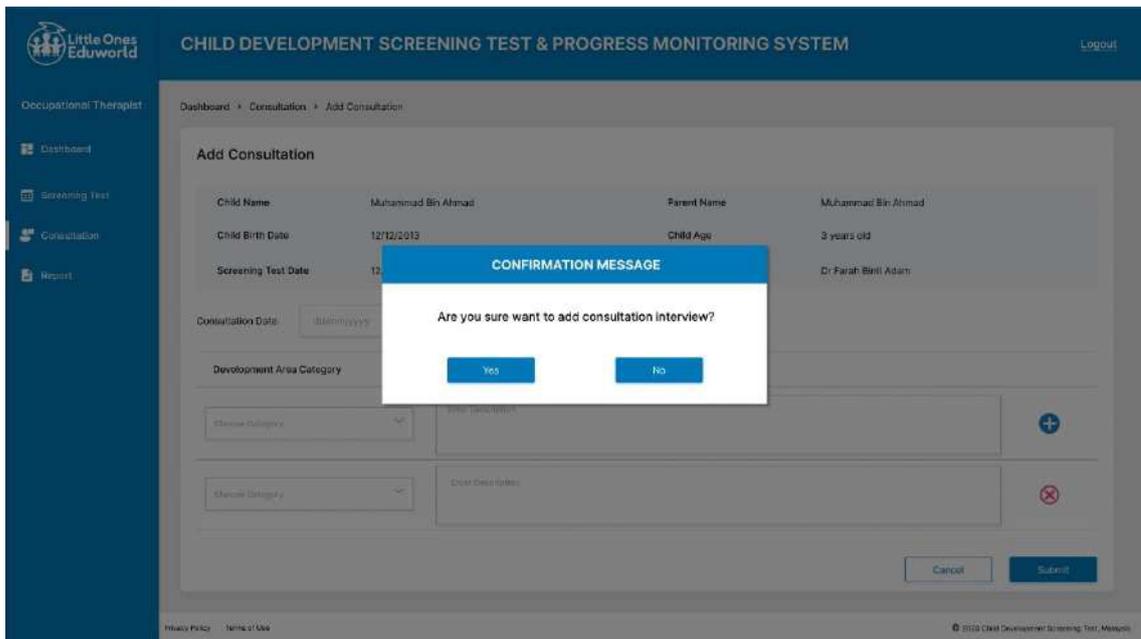


Figure 3.52 Add Consultation Confirmation Message Page Interface – CDST

Description of Figure 3.52:

- This is the Add Consultation Confirmation Message Page that will appear after users click the “Submit” button from the Add Consultation Page of Figure 3.51.
- Click the “Yes” button to confirm add the consultation information and will navigate to the Add Consultation Successful Message Page of **Error! Reference source not found.**
- Click the “No” button to cancel add the consultation information and will return to the Add Consultation Page of Figure 3.51.

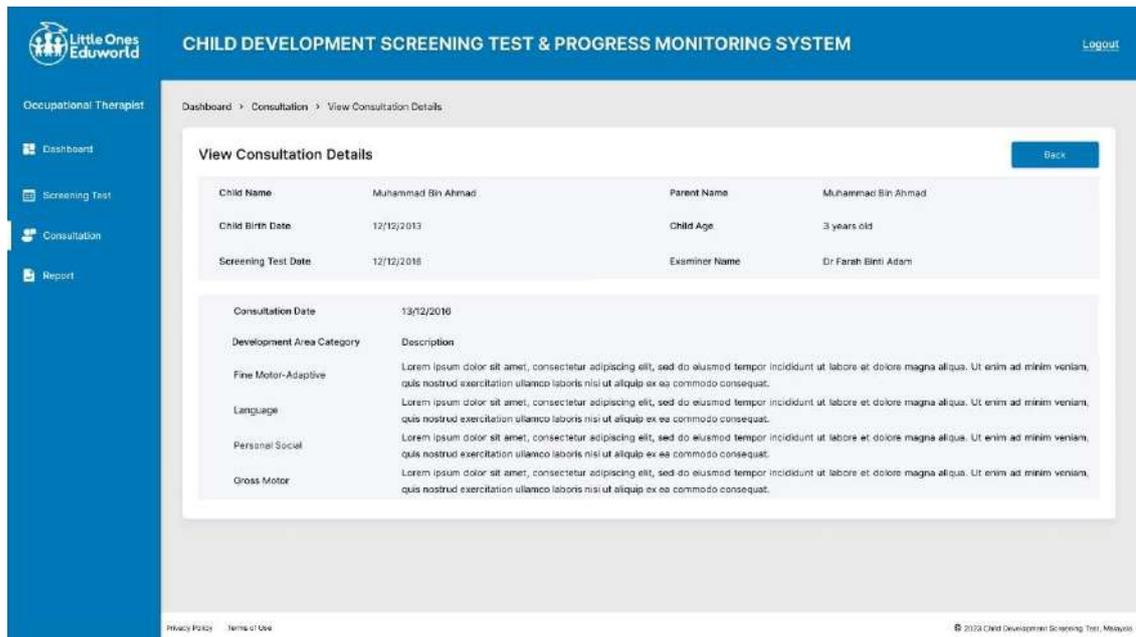


Figure 3.53 Consultation Information Details Page

Description of Figure 3.53:

- This is the Consultation Information Details Page that will appear after users click the “View Details” link button from the list of child screening test displayed in the table in Consultation Page of Figure 3.50.
- This page consists with the consultation details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, consultation date, list of development area category with history description.
- Users view the consultation details information of the selected child screening test.
- Users can click the “Back” button to return to the Consultation Page of Figure 3.50.
- The side navigation menu at the left side of the page consists with a few menu button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.

- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

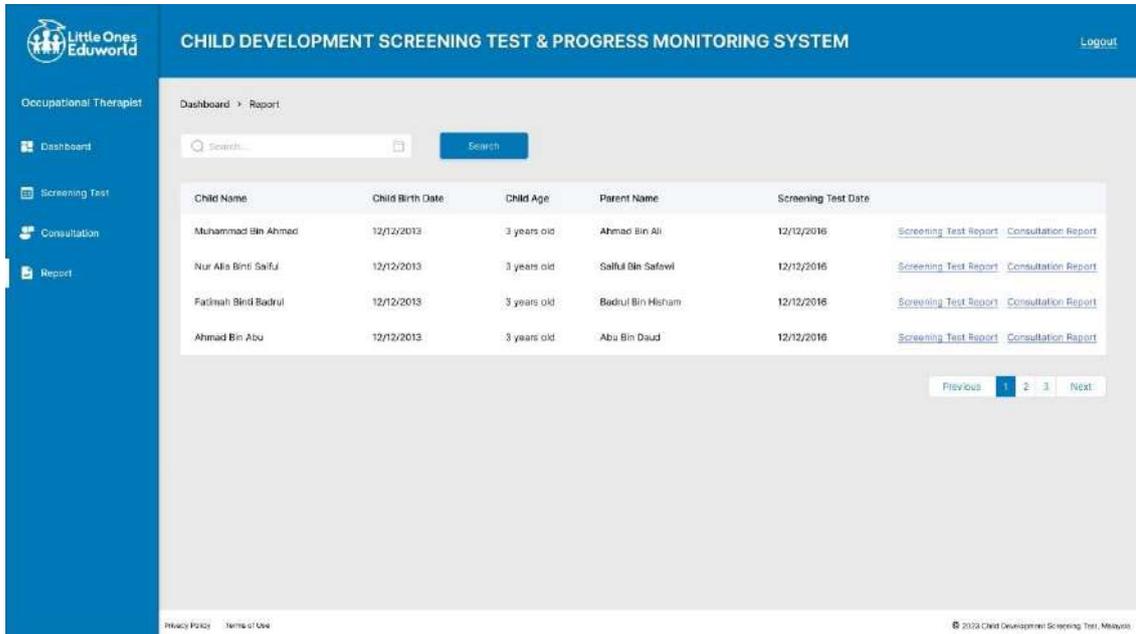


Figure 3.54 Report Page Interface – CDST

Description of Figure 3.54:

- This is the Report Page that will appear after users click the “Report” menu button from the side navigation menu at the left side of the page.
- This page consists of a table that displayed the list of child screening information which are child name, child birth date, child age, parent name and screening test date along with “Screening Test Report” and “Consultation Report” link buttons and search input field to search for specific child screening test.
- Users can insert the keyword of screening date or child name in the search input field to search for specific child screening test and click the “Search” button at the right of the search input field to retrieve and view the specific child screening test.

- Users click the “Screening Test Report” link button from any of the child screening test from the list displayed in the table to view the screening test report information that will navigate to the Screening Test Report Information Page of Figure 3.55.
- Users click the “Consultation Report” link button from any of the child screening test from the list displayed in the table to view the consultation report information that will navigate to the Consultation Report Information Page of Figure 3.57.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

Little Ones Eduworld

CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM

Logout

Occupational Therapist

Dashboard > Report > Screening Test Report

Dashboard

Screening Test

Consultation

Report

### Child Information Details

Back Export to PDF

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

### Personal Social Skills

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

### Fine Motor-Adaptive Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of "I"   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of "O" | Pass         |

### Language Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

### Gross Motor Skills

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.55 Screening Test Report Information Page Interface – CDST

Description of Figure 3.55:

- This is the Screening Test Report Information Page that will appear after users click the “Screening Test Report” link button from the list of child screening test displayed in the table in Report Page of Figure 3.54.
- This page consists with the screening test report details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, list of personal social skills tasks with result score, list of fine motor adaptive skills tasks with result score, list of language skills tasks with result score and list of gross motor skills tasks with result score.
- Users view the child screening test report details information of the selected child screening test.
- Users can click the “Export to PDF” button to convert the screening test report to PDF view that will navigate to the Convert Screening Test Report Page of Figure 3.56.
- Users can click the “Back” button to return to the Report Page of Figure 3.54.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

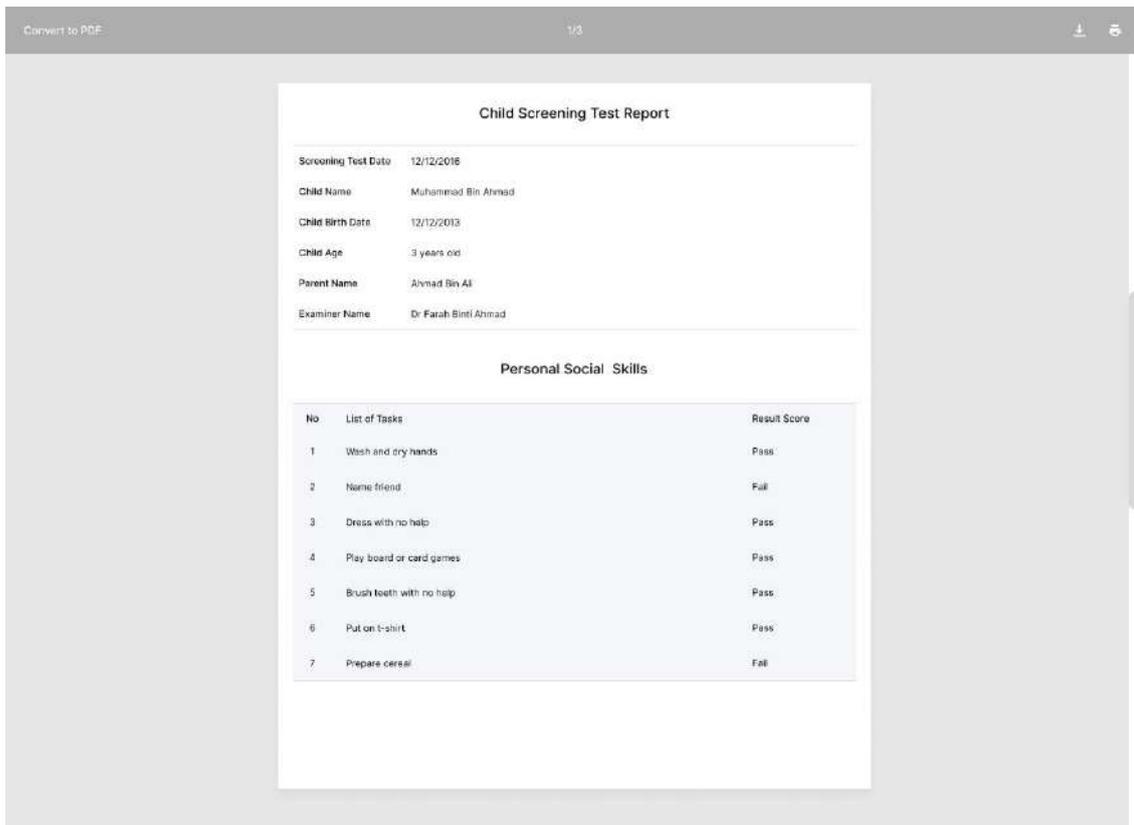


Figure 3.56 Convert Screening Test Report Page Interface – CDST

Description of Figure 3.56:

- This is the Convert Screening Test Report Page that will appear after users click the “Export to PDF” button from the Screening Test Report Information Page of Figure 3.55.
- This page consists with the details information of screening test report of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, list of personal social skills tasks with result score, list of fine motor adaptive skills tasks with result score, list of language skills tasks with result score and list of gross motor skills tasks with result score.
- Users view the details information of the screening test report.
- Users click the “Download” icon button at the top right of the page to download the current screening test report in PDF.

- Users can click the “Print” icon button at the top right of the page to print the current screening test report.

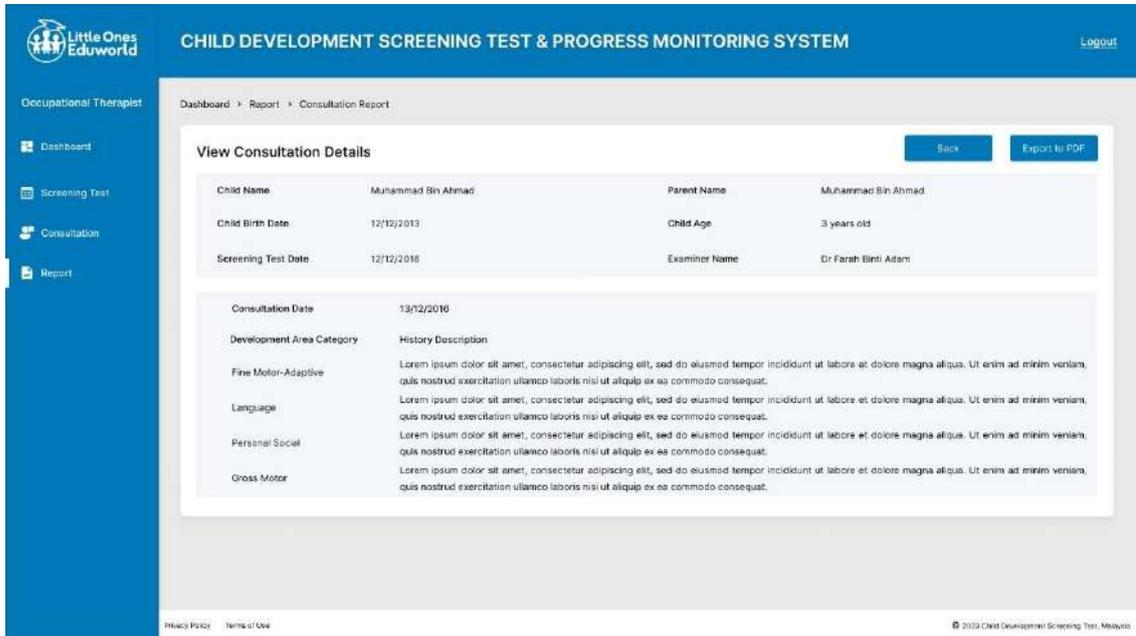


Figure 3.57 Consultation Report Information Page Interface – CDST

Description of Figure 3.57:

- This is the Consultation Report Information Page that will appear after users click the “Consultation Report” link button from the list of child screening test displayed in the table in Report Page of Figure 3.54.
- This page consists with the consultation report details information of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, consultation date, list of development area category with history description.
- Users view the consultation report details information of the selected child screening test.

- Users can click the “Export to PDF” button to convert the consultation report to PDF view that will navigate to the Convert Consultation Report Page of Figure 3.58.
- Users can click the “Back” button to return to the Report Page of Figure 3.54.
- The side navigation menu at the left side of the page consists with a few menus button which are “Dashboard” menu button, “Screening Test” menu button, “Consultation” menu button and “Report” menu button where each of the menu button will navigate to different pages.
- Users can click the “Logout” link button at the top right of the page to logout from the system and navigate to the Logout Confirmation Page of Figure 3.59.

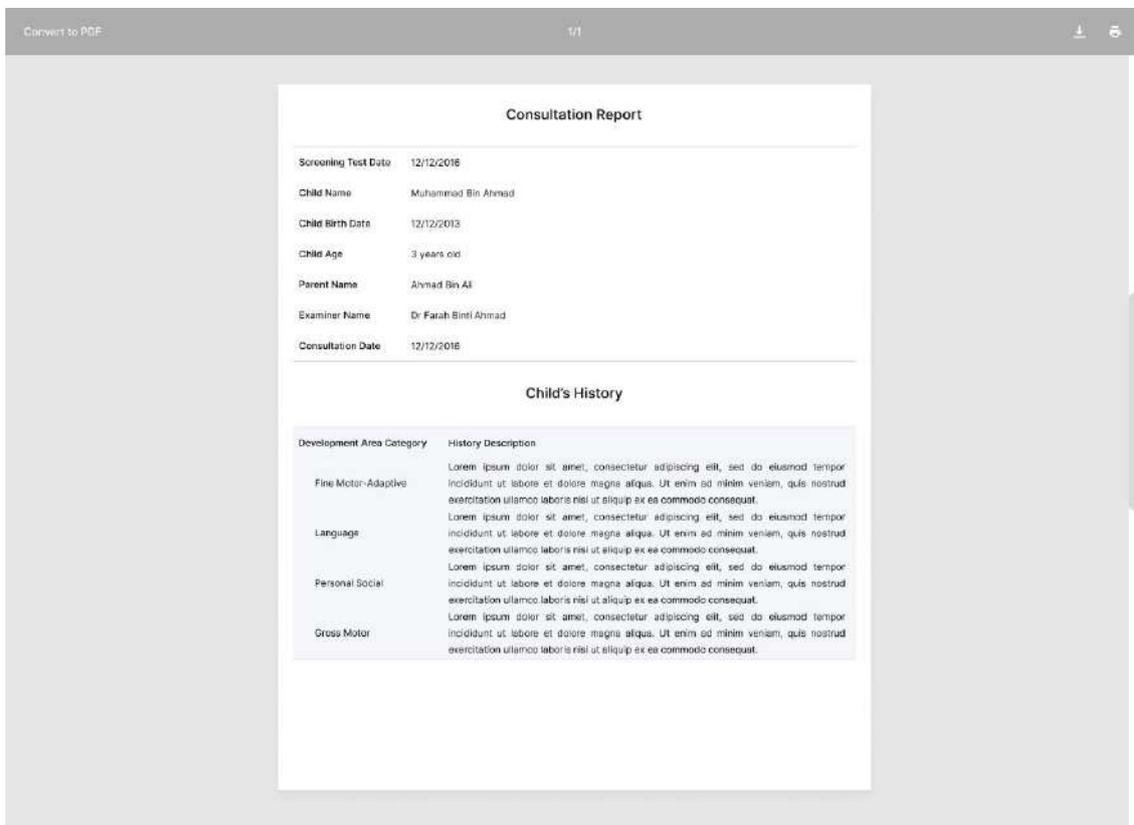


Figure 3.58 Convert Consultation Report Page Interface – CDST

Description of Figure 3.58:

- This is the Convert Consultation Report Page that will appear after users click the “Export to PDF” button from the Consultation Report Information Page of Figure 3.57.
- This page consists with the details information of consultation report of the selected child screening test which are child name, child birth date, child age, parent name, examiner name, screening test date, consultation date, list of development area category with history description.
- Users view the details information of the consultation report.
- Users click the “Download” icon button at the top right of the page to download the current consultation report in PDF.
- Users can click the “Print” icon button at the top right of the page to print the current consultation report.



Figure 3.59 Logout Confirmation Page Interface – CDST

#### Description of Figure 3.59

- This is the Logout Confirmation Page that will appear after users click the “Logout” button at the top right of any web pages.

- Click the “Yes” button to continue logout from the system and will navigate to the Login Page of Figure 3.37.
- Click the “No” button to cancel logout from the system and will return to the current opened web page.

### 3.5 Data Design

#### 3.5.1 Entity Relationship Diagram (ERD)

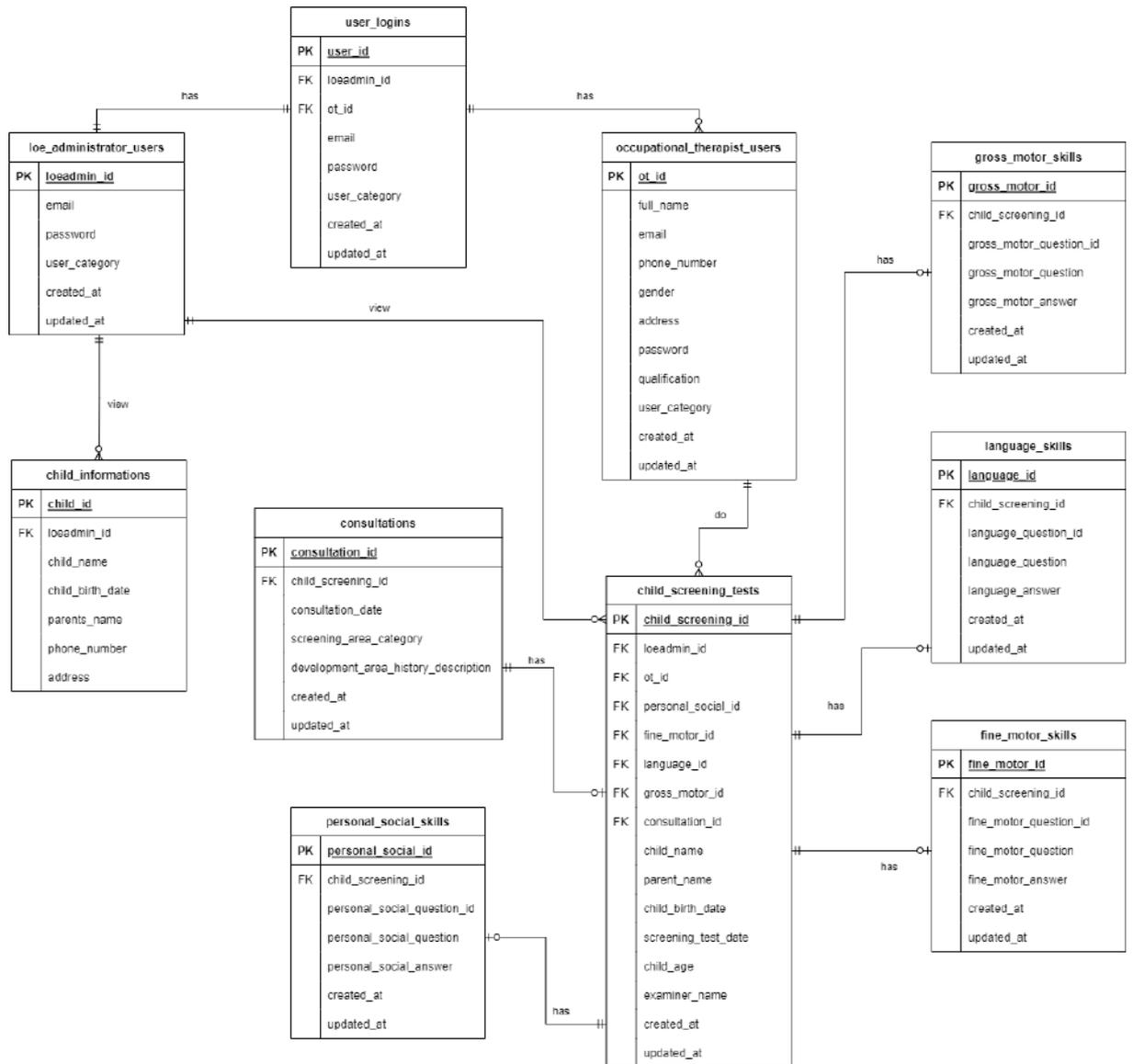


Figure 3.60 CDST Entity Relationship Diagram (ERD)

### 3.5.2 Data Dictionary

#### 3.5.2.1 user\_logins

Table 3.8 Users Login Table – Data Dictionary

| Field Name    | Description   | Data Type    | Constraint   |
|---------------|---|--------------|--------------|
| user_id       | The unique ID for users   | bigint(20)   | PK, not null |
| loeadmin_id   | The unique ID for LOE administrator user                                | bigint(20)   | FK, not null |
| ot_id         | The unique ID for occupational therapist ID                             | bigint(20)   | FK, not null |
| email         | User's login email address  | varchar(255) | not null     |
| password      | User's login password   | varchar(255) | not null     |
| user_category | User's category which are LOE administrator and occupational therapist. | varchar(255) | not null     |
| created_at    | The timestamp of the users login added in the database                  | timestamp    | null         |
| updated_at    | The timestamp of the users login recent change in the database          | timestamp    | null         |

### 3.5.2.2 loe\_administrator\_users

Table 3.9 LOE Administrator Table – Data Dictionary

| Field Name    | Description  | Data Type    | Constraint   |
|---------------|--|--------------|--------------|
| loeadmin_id   | The unique ID for LOE administrator user   | bigint(20)   | PK, not null |
| email         | LOE administrator's email address  | varchar(255) | not null     |
| password      | LOE administrator's password   | varchar(255) | not null     |
| user_category | User's category which are LOE administrator                                      | varchar(255) | not null     |
| created_at    | The timestamp of the LOE administrator user added in the database                | timestamp    | null         |
| updated_at    | The timestamp of the LOE administrator information recent change in the database | timestamp    | null         |

### 3.5.2.3 occupational\_therapist\_users

Table 3.10 Occupational Therapist Table – Data Dictionary

| Field Name    | Description  | Data Type    | Constraint   |
|---------------|--|--------------|--------------|
| ot_id         | The unique ID for occupational therapist user          | bigint(20)   | PK, not null |
| full_name     | Occupational therapist's full name                     | varchar(255) | not null     |
| email         | Occupational therapist's email address                 | varchar(255) | not null     |
| phone_number  | Occupational therapist's phone number                  | varchar(255) | not null     |
| gender        | Occupational therapist's gender whether male or female | varchar(255) | not null     |
| address       | Occupational therapist's home address                  | varchar(255) | not null     |
| password      | Occupational therapist's password                      | varchar(255) | not null     |
| qualification | Occupational therapist's qualification                 | blob         | not null     |

|               |   |              |          |
|---------------|---|--------------|----------|
| user_category | User's category which are LOE administrator and occupational therapist.               | varchar(255) | not null |
| created_at    | The timestamp of the occupational therapist user added in the database                | timestamp    | null     |
| updated_at    | The timestamp of the occupational therapist information recent change in the database | timestamp    | null     |

### 3.5.2.4 children\_informations

Table 3.11 Children Information Table – Data Dictionary

| Field Name       | Description                              | Data Type    | Constraint   |
|------------------|--|--------------|--------------|
| child_id         | Child information's ID                   | bigint(20)   | PK, not null |
| loeadmin_id      | The unique ID for LOE administrator user | bigint(20)   | FK, not null |
| child_name       | Child's full name                        | varchar(255) | not null     |
| child_birth_date | Child's birth date                       | date         | not null     |

|              |                                 |              |          |
|--------------|---------------------------------|--------------|----------|
| parent_name  | Child's parents name            | varchar(255) | not null |
| phone_number | Child's parent's contact number | varchar(255) | not null |
| address      | Child's home address            | varchar(255) | not null |

### 3.5.2.5 child\_screening\_tests

Table 3.12 Screening Test Table – Data Dictionary

| Field Name         | Description                                   | Data Type  | Constraint   |
|--------------------|---|------------|--------------|
| child_screening_id | The unique ID of child screening test         | bigint(20) | PK, not null |
| loeadmin_id        | The unique ID for LOE administrator user      | bigint(20) | FK, not null |
| ot_id              | The unique ID for occupational therapist user | bigint(20) | FK, not null |
| personal_social_id | The unique ID of personal social skill        | bigint(20) | FK, not null |
| fine_motor_id      | The unique ID of fine motor adaptive skill    | bigint(20) | FK, not null |

|                     |  |              |              |
|---------------------|--|--------------|--------------|
| language_id         | The unique ID of language skill  | bigint(20)   | FK, not null |
| gross_motor_id      | The unique ID of gross motor skill   | bigint(20)   | FK, not null |
| consultation_id     | The unique ID of child screening consultation                                  | bigint(20)   | FK, not null |
| child_name          | Child's name for screening test  | varchar(255) | not null     |
| parents_name        | Child's parents name   | varchar(255) | not null     |
| child_birth_date    | Child's birth date   | date         | not null     |
| screening_test_date | Date of the screening test is performed  | date         | not null     |
| child_age           | The calculation of child age based on child birth date and screening test date | varchar(255) | not null     |
| examiner_name       | The examiner's name which is the Occupational Therapist name                   | varchar(255) | not null     |
| created_at          | The timestamp of the child screening test added in the database                | timestamp    | null         |

|            |   |           |      |
|------------|---|-----------|------|
| updated_at | The timestamp of the child screening test information recent change in the database | timestamp | null |
|------------|---|-----------|------|

### 3.5.2.6 personal\_social\_skills

Table 3.13 Personal Social Skills Table – Data Dictionary

| Field Name                  | Description   | Data Type    | Constraint   |
|-----------------------------|---|--------------|--------------|
| personal_social_id          | The unique ID of personal social skill                          | bigint(20)   | PK, not null |
| child_screening_id          | The unique ID of child screening test                           | bigint(20)   | FK, not null |
| personal_social_question_id | The ID of the personal social question tasks                    | varchar(255) | not null     |
| personal_social_question    | The questions task name of personal social                      | text         | not null     |
| personal_social_answer      | The answer score of each personal social question               | text         | not null     |
| created_at                  | The timestamp of the personal social task added in the database | timestamp    | null         |

|            |   |           |      |
|------------|---|-----------|------|
| updated_at | The timestamp of the personal social task recent change in the database | timestamp | null |
|------------|---|-----------|------|

### 3.5.2.7 fine\_motor\_skills

Table 3.14 Fine Motor Adaptive Skills Table – Data Dictionary

| Field Name             | Description   | Data Type    | Constraint   |
|------------------------|---|--------------|--------------|
| fine_motor_id          | The unique ID of fine motor adaptive skill                          | bigint(20)   | PK, not null |
| child_screening_id     | The unique ID of child screening test                               | bigint(20)   | FK, not null |
| fine_motor_question_id | The ID of the fine motor adaptive question tasks                    | varchar(255) | not null     |
| fine_motor_question    | The questions task name of fine motor adaptive                      | text         | not null     |
| fine_motor_answer      | The answer score of each fine motor adaptive question               | text         | not null     |
| created_at             | The timestamp of the fine motor adaptive task added in the database | timestamp    | null         |

|            |   |           |      |
|------------|---|-----------|------|
| updated_at | The timestamp of the fine motor adaptive task recent change in the database | timestamp | null |
|------------|---|-----------|------|

### 3.5.2.8 language\_skills

Table 3.15 Language Skills Table – Data Dictionary

| Field Name           | Description  | Data Type    | Constraint   |
|----------------------|--|--------------|--------------|
| language_id          | The unique ID of language skill                          | bigint(20)   | PK, not null |
| child_screening_id   | The unique ID of child screening test                    | bigint(20)   | FK, not null |
| language_question_id | The ID of the language question tasks                    | varchar(255) | not null     |
| language_question    | The questions task name of language                      | text         | not null     |
| language_answer      | The answer score of each language question               | text         | not null     |
| created_at           | The timestamp of the language task added in the database | timestamp    | null         |

|            |  |           |      |
|------------|--|-----------|------|
| updated_at | The timestamp of the language task recent change in the database | timestamp | null |
|------------|--|-----------|------|

### 3.5.2.9 gross\_motor\_skills

Table 3.16 Gross Motor Skills Table – Data Dictionary

| Field Name              | Description   | Data Type    | Constraint   |
|-------------------------|---|--------------|--------------|
| gross_motor_id          | The unique ID of gross motor skill                          | bigint(20)   | PK, not null |
| child_screening_id      | The unique ID of child screening test                       | bigint(20)   | FK, not null |
| gross_motor_question_id | The ID of the gross motor question tasks                    | varchar(255) | not null     |
| gross_motor_question    | The questions task name of gross motor                      | text         | not null     |
| gross_motor_answer      | The answer score of each gross motor question               | text         | not null     |
| created_at              | The timestamp of the gross motor task added in the database | timestamp    | null         |

|            |   |           |      |
|------------|---|-----------|------|
| updated_at | The timestamp of the gross motor task recent change in the database | timestamp | null |
|------------|---|-----------|------|

### 3.5.2.10 consultations

Table 3.17 Consultation Table – Data Dictionary

| Field Name                           | Description  | Data Type  | Constraint   |
|--------------------------------------|--|------------|--------------|
| consultation_id                      | The unique ID of child screening consultation  | bigint(20) | PK, not null |
| child_screening_id                   | The unique ID of child screening test  | bigint(20) | FK, not null |
| consultation_date                    | The date of the consultation is added  | date       | not null     |
| screening_area_category              | The name of screening area category such as personal social, fine motor adaptive, language and gross motor | text       | not null     |
| development_area_history_description | The child history description of the screening area category   | text       | not null     |

|            |   |           |      |
|------------|---|-----------|------|
| created_at | The timestamp of the child screening consultation added in the database                     | timestamp | null |
| updated_at | The timestamp of the child screening consultation information recent change in the database | timestamp | null |

### 3.6 Proof of Initial Concept

#### 3.6.1 Interface Design

##### 3.6.1.1 LOE Administrator Interface Design

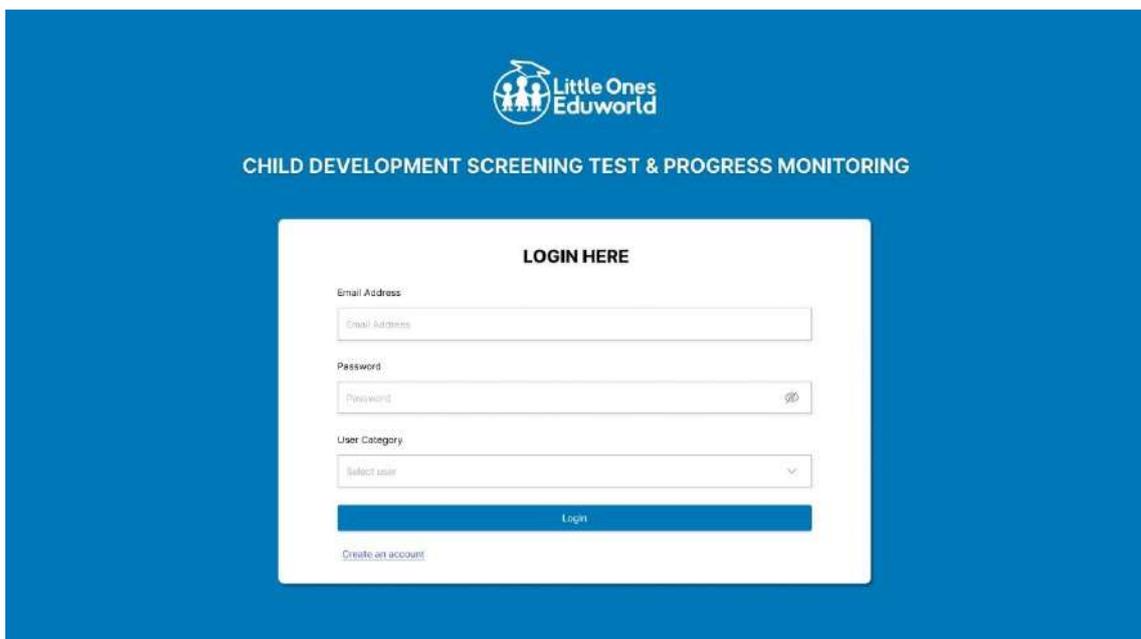


Figure 3.61 CDST Login Interface – LOE Administrator

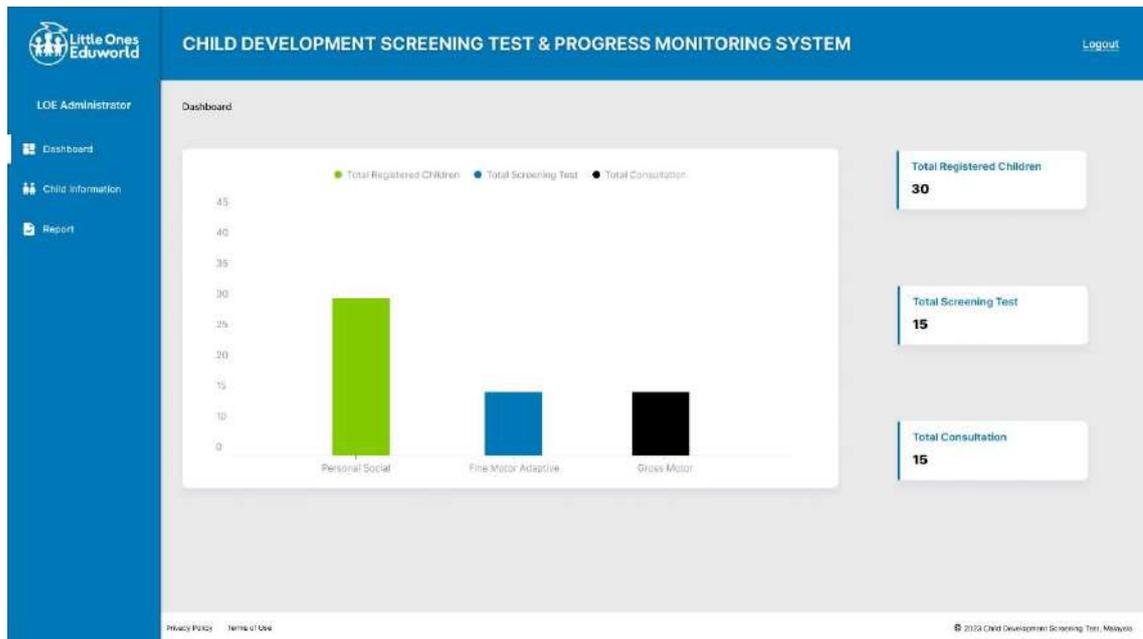


Figure 3.62 CDST Dashboard Interface – LOE Administrator

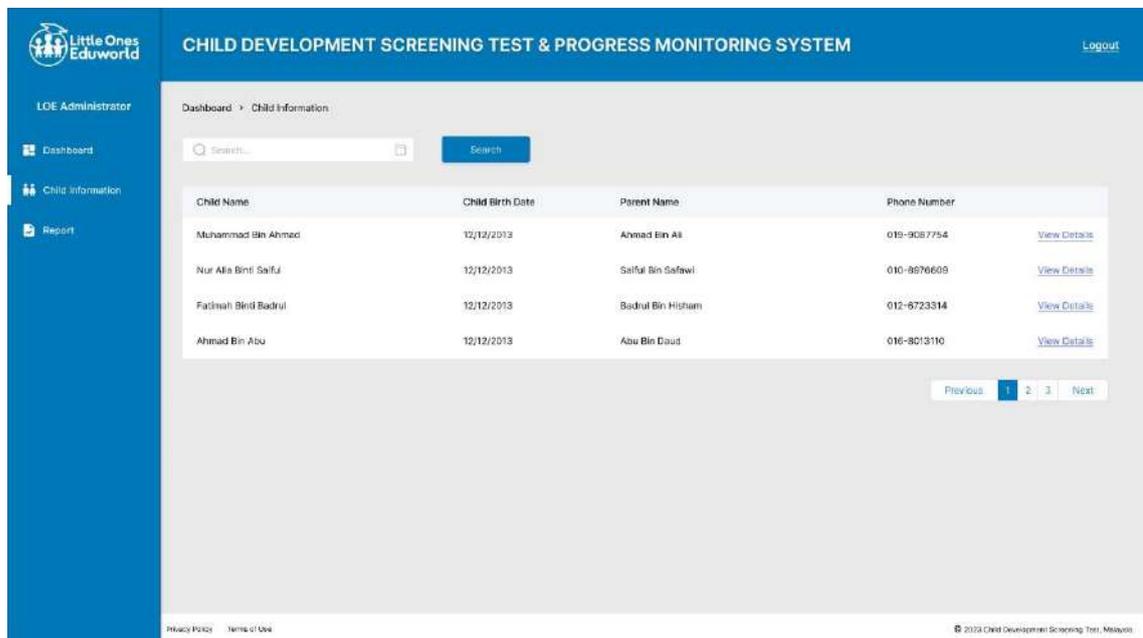


Figure 3.63 CDST Child Information Interface – LOE Administrator



Figure 3.64 CDST Child Information Details Interface – LEO Administrator

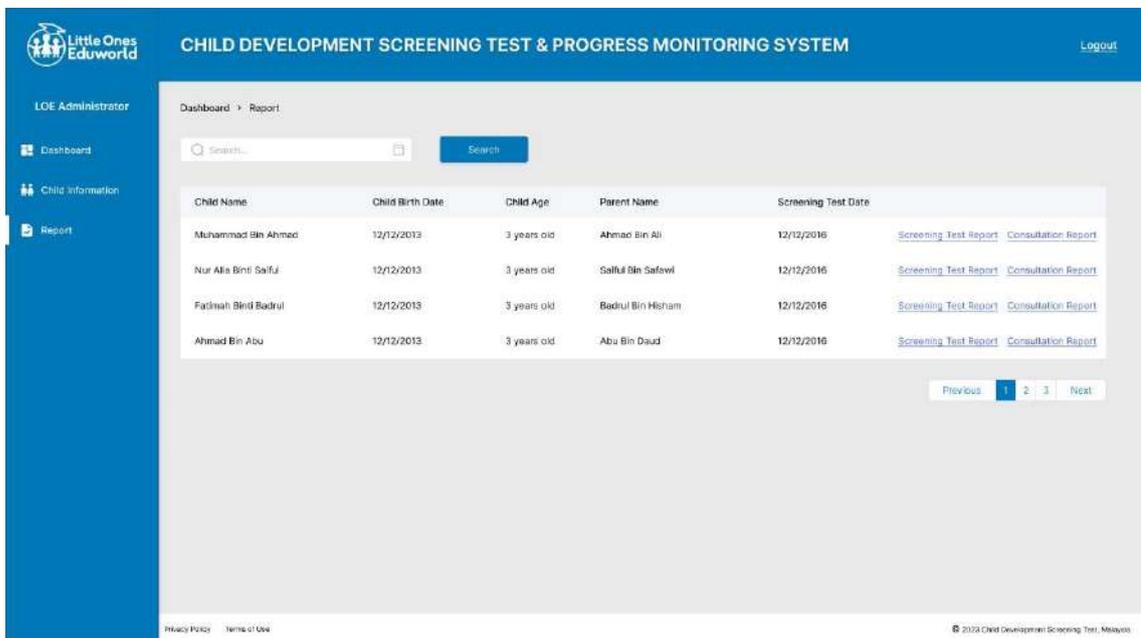


Figure 3.65 CDST Report Interface – LEO Administrator

Little Ones Eduworld CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

LOE Administrator Dashboard > Report > Screening Test Report

Dashboard Child Information Report

### Child Information Details

Back Export to PDF

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

### Personal Social Skills

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

### Fine Motor-Adaptive Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of "I"   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of "O" | Pass         |

### Language Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

### Gross Motor Skills

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.66 CDST Screening Test Report Details Interface – LEO Administrator

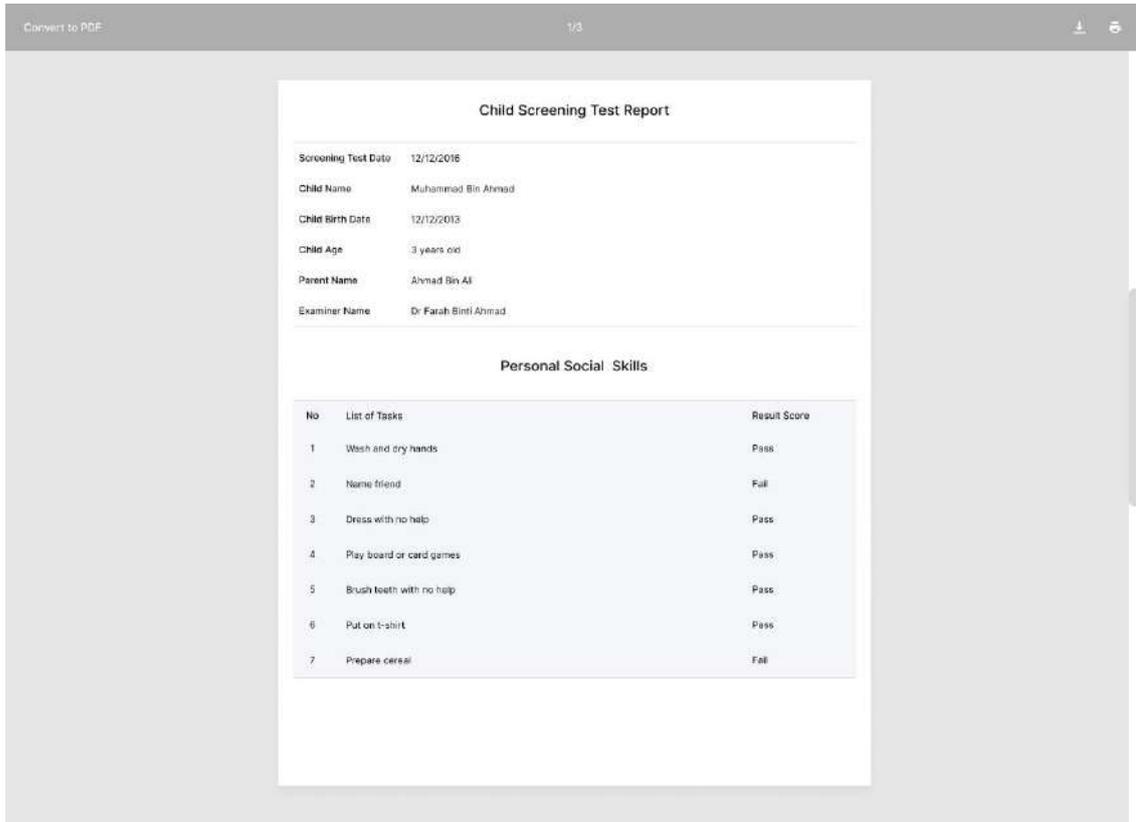


Figure 3.67 CDST Convert Screening Test Report Interface – LEO Administrator

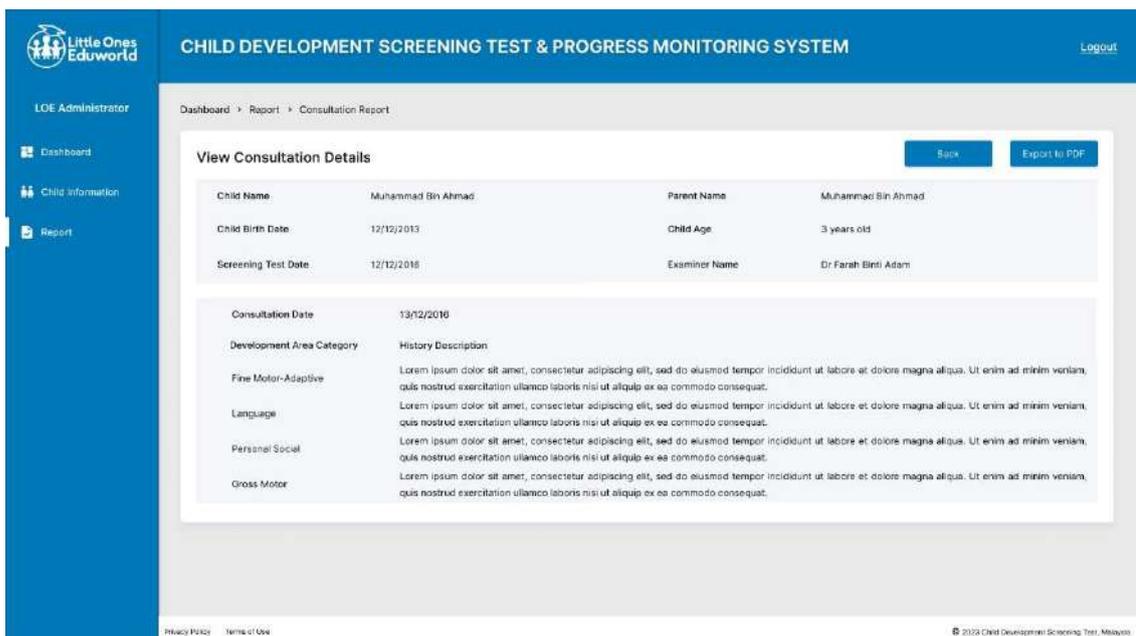


Figure 3.68 CDST Consultation Report Details Interface – LEO Administrator

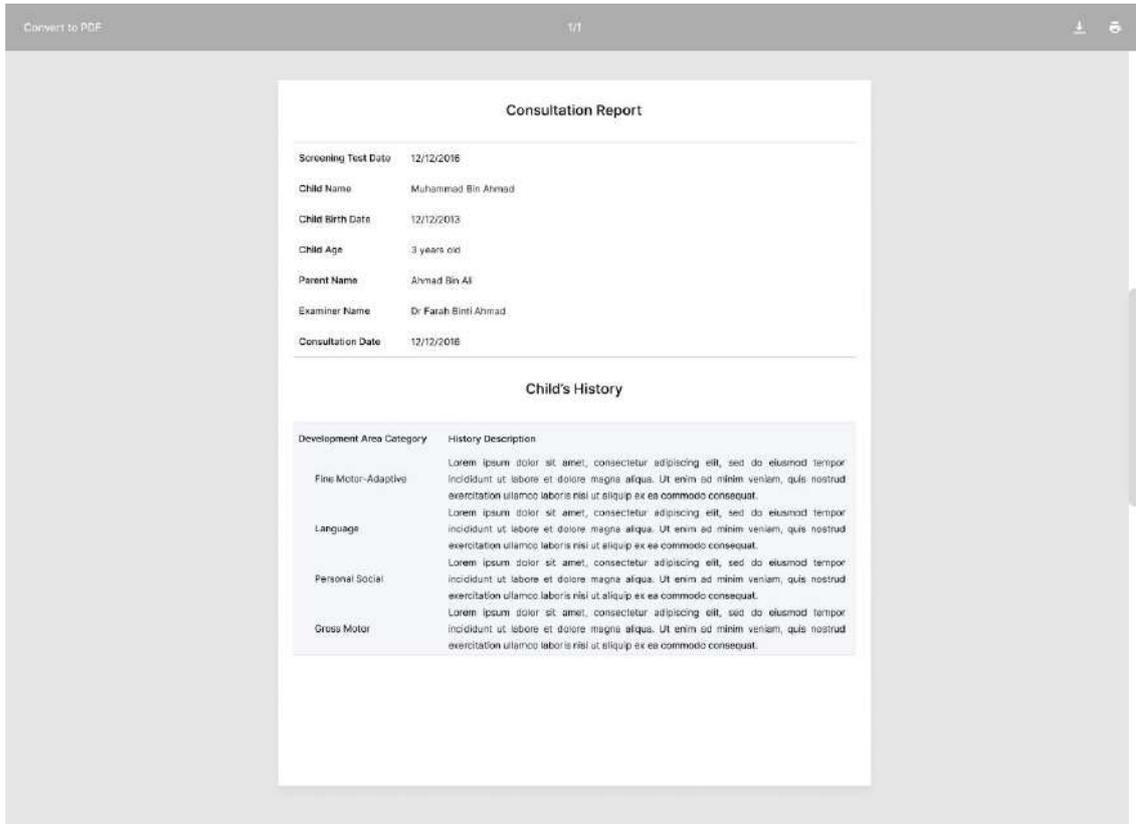
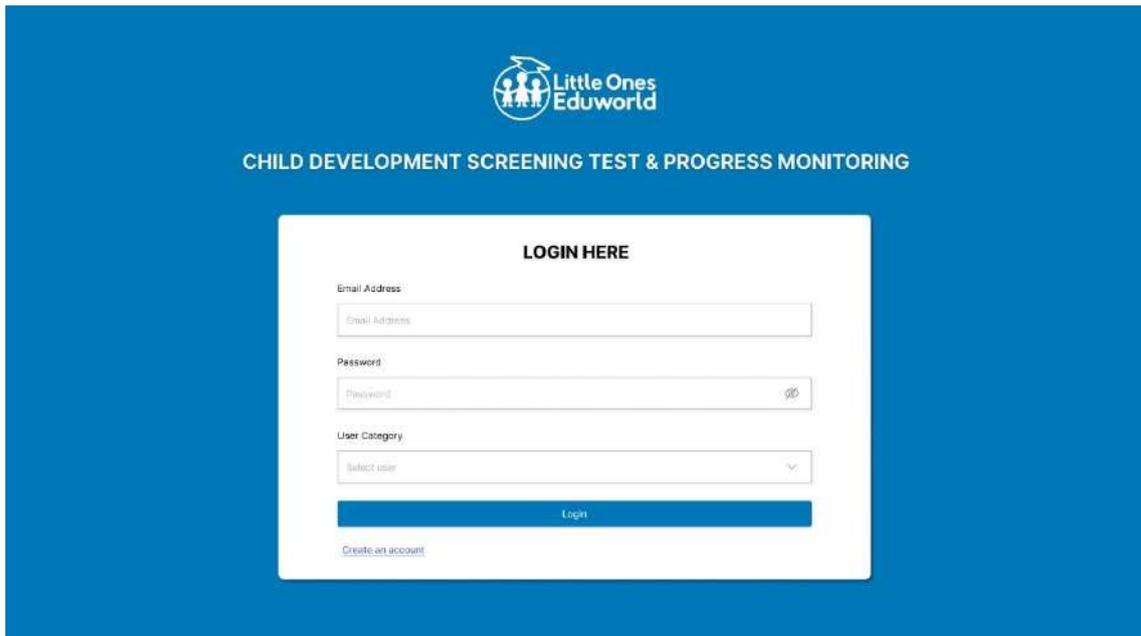


Figure 3.69 CDST Convert Consultation Report Interface – LEO Administrator



Figure 3.70 CDST Logout Confirmation Interface – LEO Administrator

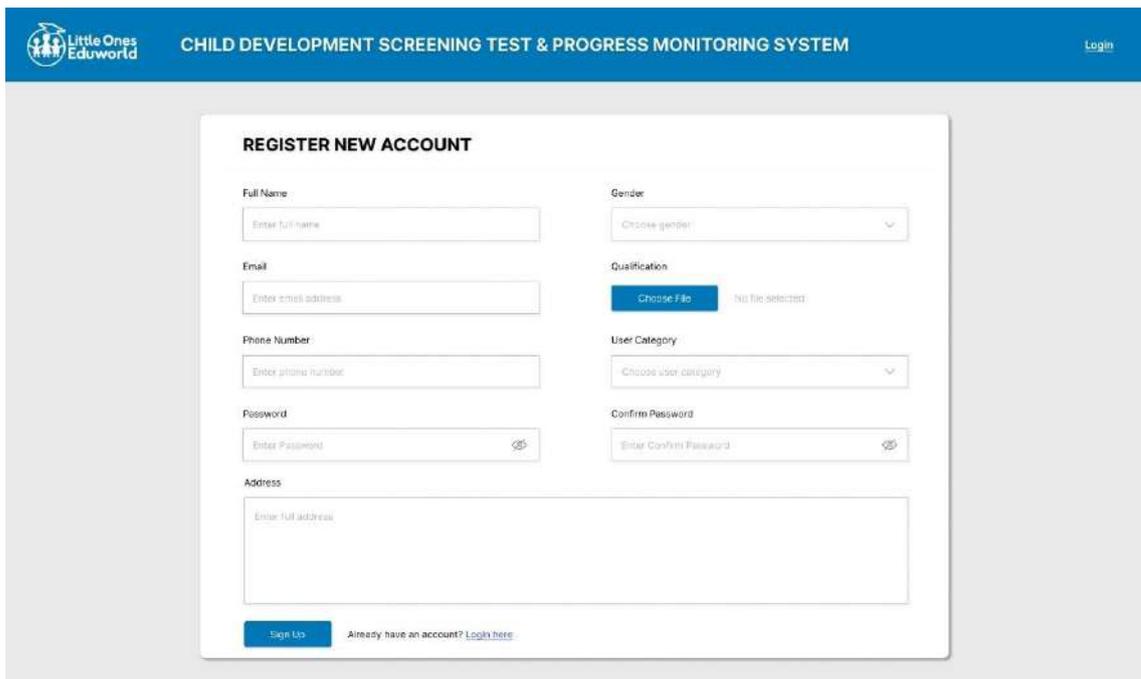
### 3.6.1.2 Occupational Therapist Interface Design



The screenshot shows a login interface for the 'Little Ones Eduworld' system. The header includes the logo and the text 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING'. The main content is a white box titled 'LOGIN HERE' containing the following fields:

- Email Address:** A text input field with a placeholder 'Email Address'.
- Password:** A text input field with a placeholder 'Password' and a toggle icon for visibility.
- User Category:** A dropdown menu with the placeholder 'Select user'.
- Login:** A blue button.
- Create an account:** A link below the login button.

Figure 3.71 CDST Login Interface – OT



The screenshot shows a registration interface for the 'Little Ones Eduworld' system. The header includes the logo, the text 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM', and a 'Login' link. The main content is a white box titled 'REGISTER NEW ACCOUNT' containing the following fields:

- Full Name:** A text input field with a placeholder 'Enter full name'.
- Gender:** A dropdown menu with the placeholder 'Choose gender'.
- Email:** A text input field with a placeholder 'Enter email address'.
- Qualification:** A file upload field with a 'Choose File' button and the text 'No file selected'.
- Phone Number:** A text input field with a placeholder 'Enter phone number'.
- User Category:** A dropdown menu with the placeholder 'Choose user category'.
- Password:** A text input field with a placeholder 'Enter Password' and a toggle icon for visibility.
- Confirm Password:** A text input field with a placeholder 'Enter Confirm Password' and a toggle icon for visibility.
- Address:** A large text input field with a placeholder 'Enter full address'.
- Sign Up:** A blue button.
- Already have an account? Login here:** A link.

Figure 3.72 CDST Register New Account Interface – OT

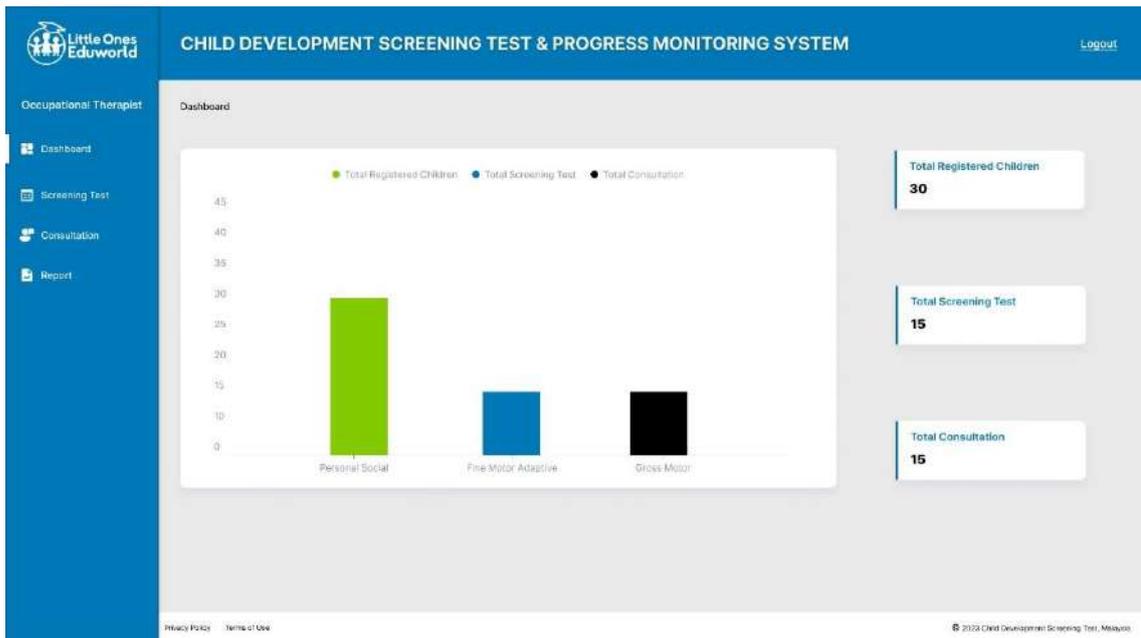


Figure 3.73 CDST Dashboard Interface – OT

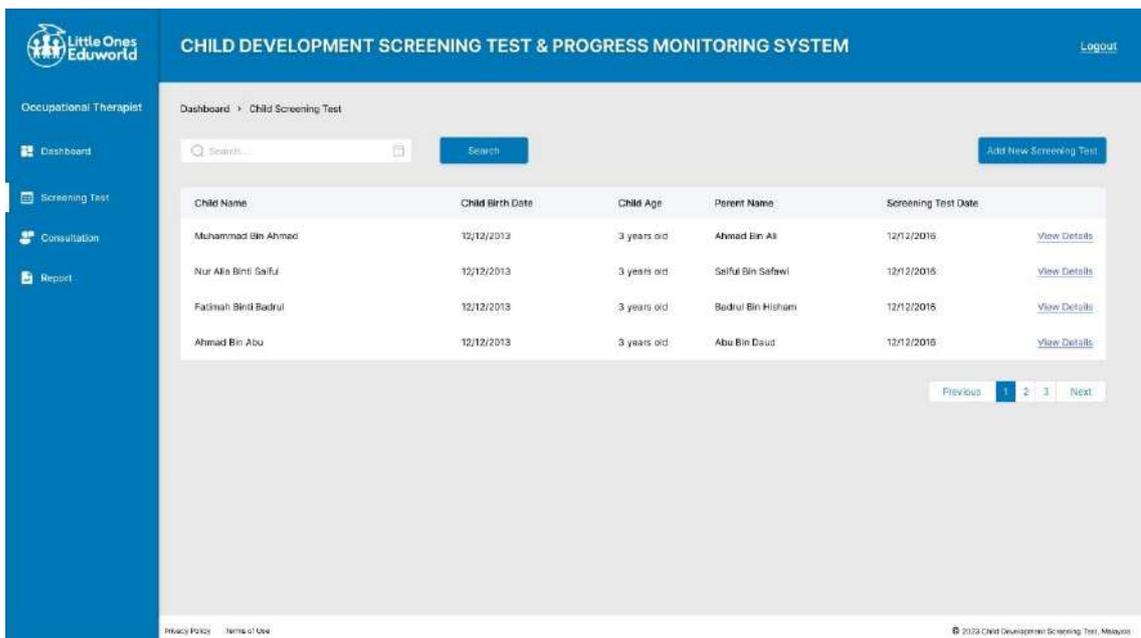


Figure 3.74 CDST Screening Test Interface – OT

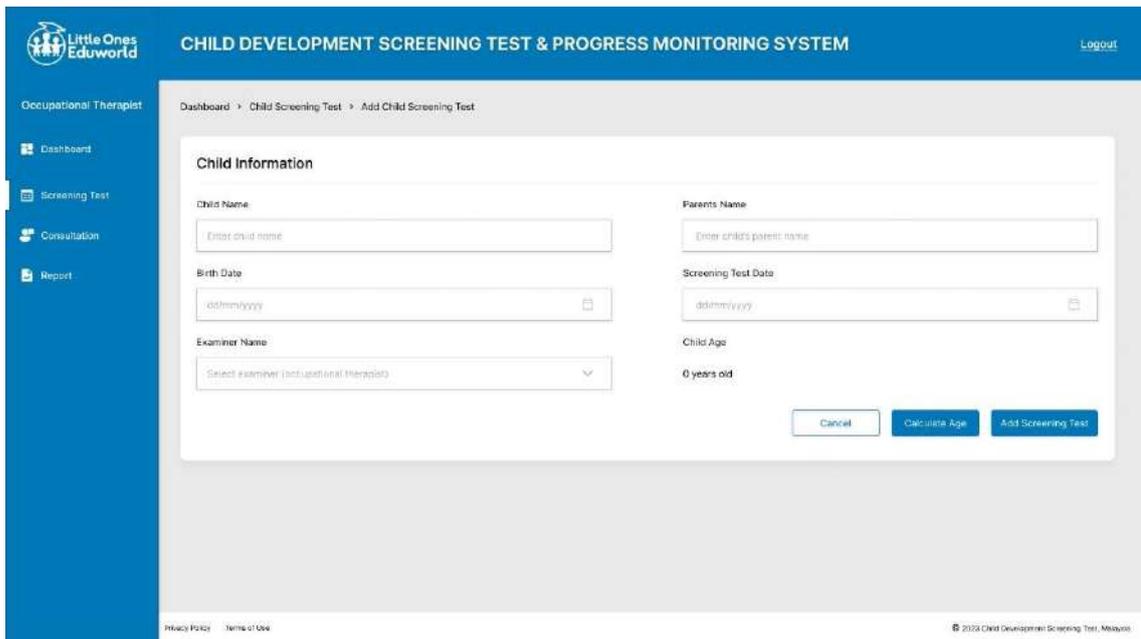


Figure 3.75 CDST Add Screening Test Information – OT

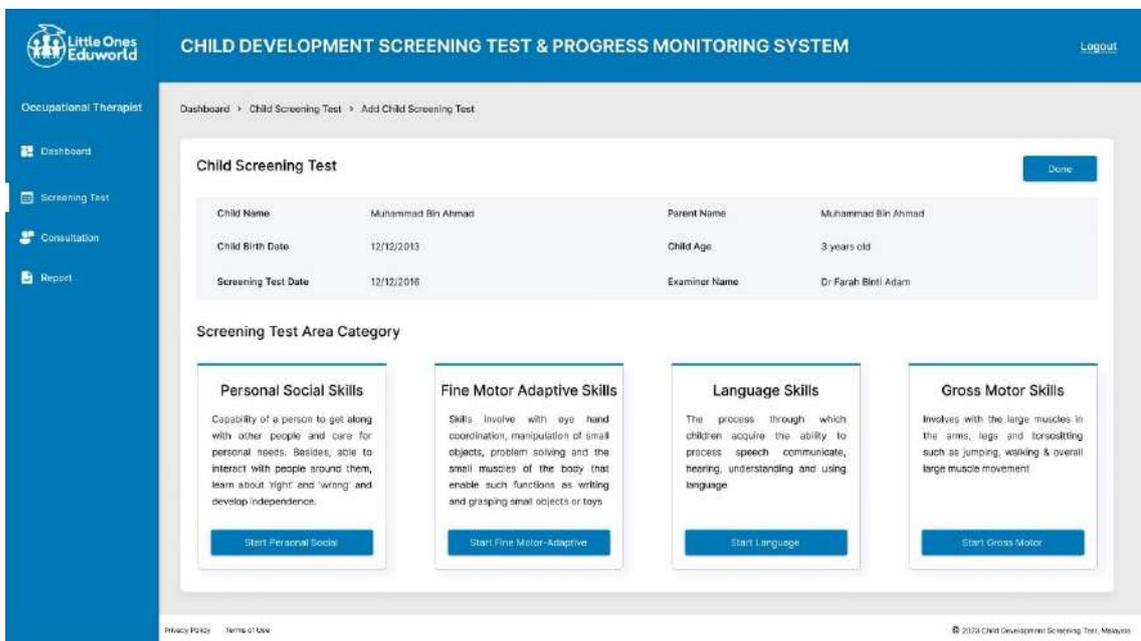


Figure 3.76 CDST Screening Test Development Area – OT



Figure 3.77 CDST Personal Social Skills Tasks Interface – OT



Figure 3.78 CDST Fine Motor Adaptive Skills Tasks Interface – OT



Figure 3.79 CDST Language Skills Tasks Interface – OT

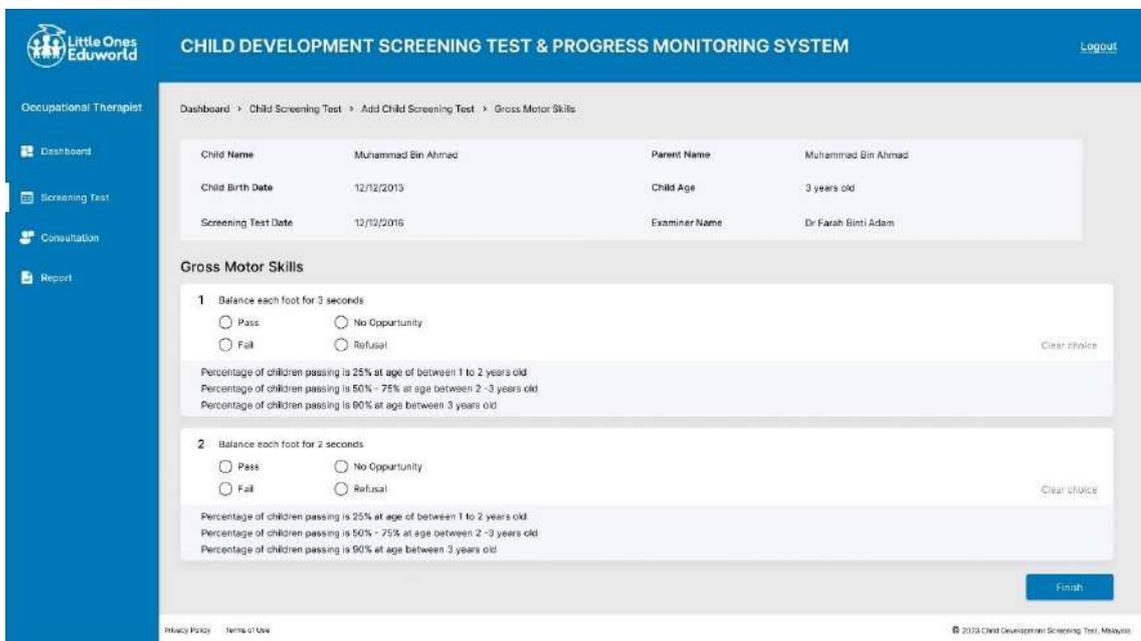


Figure 3.80 CDST Gross Motor Skills Tasks Interface – OT

Little Ones Eduworld CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

Occupational Therapist

Dashboard > Report > Screening Test Details

**Child Information Details** Back

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

**Personal Social**

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

**Fine Motor-Adaptive**

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of '+'   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of 'O' | Pass         |

**Language**

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

**Gross Motor**

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.81 CDST Screening Test Details Interface – OT

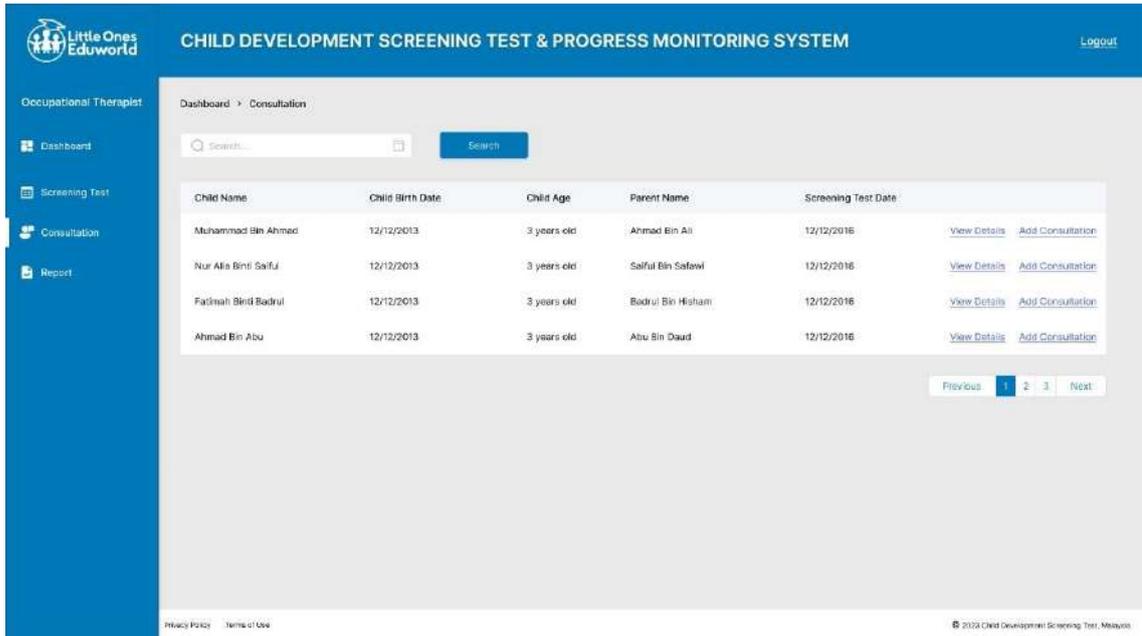


Figure 3.82 CDST Consultation Interface – OT

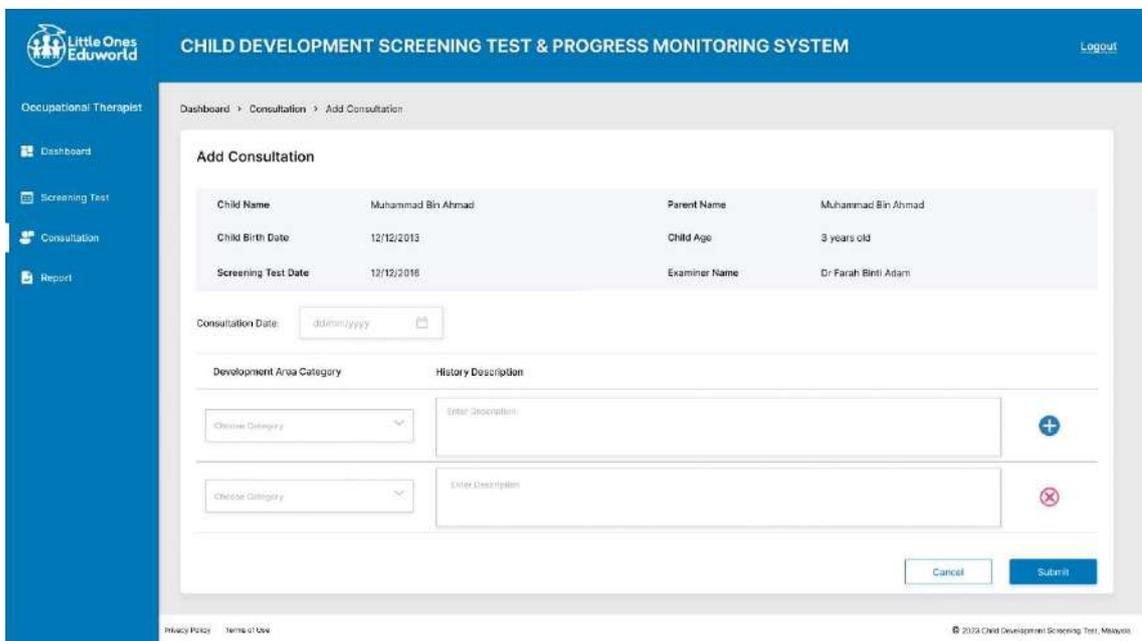


Figure 3.83 CDST Add Consultation Interface – OT

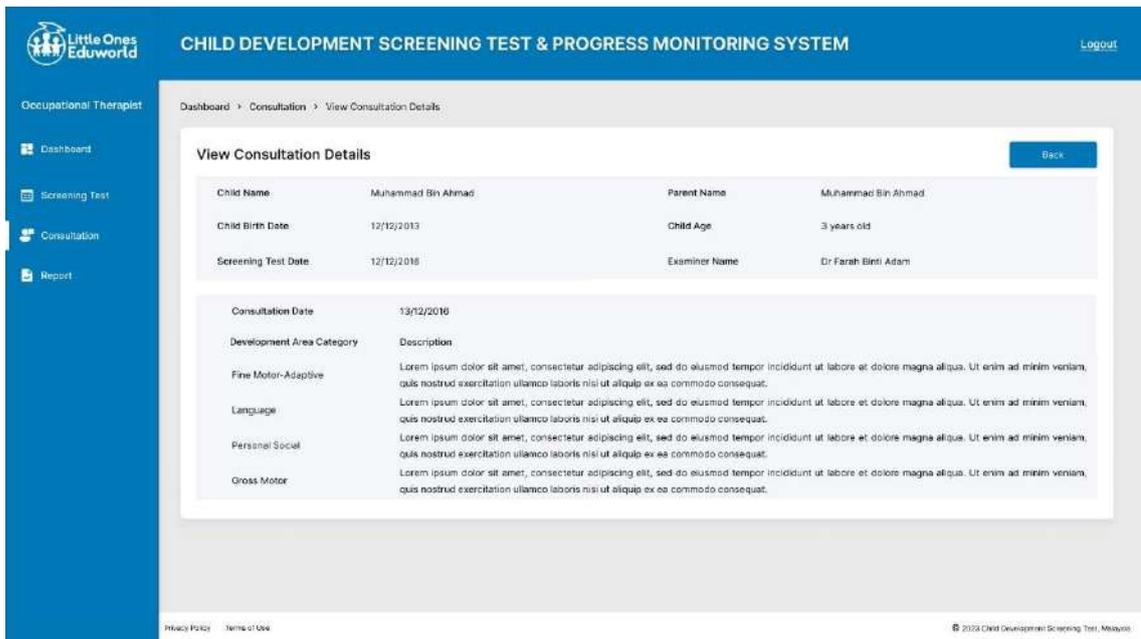


Figure 3.84 CDST Consultation Details Interface – OT

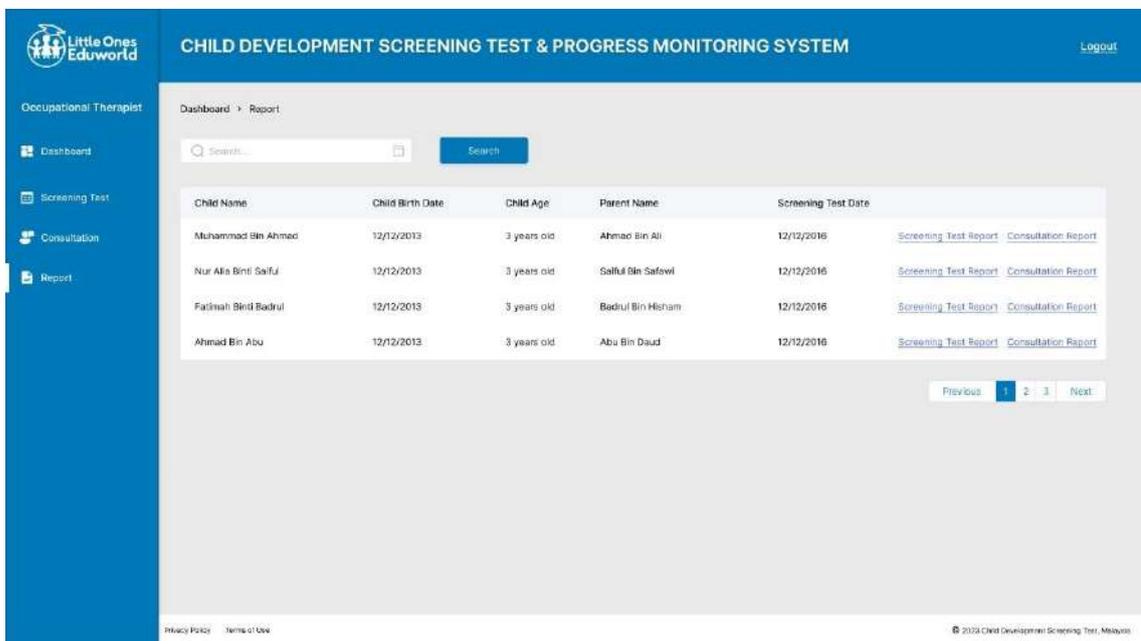


Figure 3.85 CDST Report Interface – OT

**Little Ones Eduworld** CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

Occupational Therapist

Dashboard > Report > Screening Test Report

Dashboard | Screening Test | Consultation | Report

### Child Information Details

[Back](#) [Export to PDF](#)

|                     |                    |
|---------------------|--------------------|
| Child Name          | Muhammad Bin Ahmad |
| Child Birth Date    | 12/12/2013         |
| Child Age           | 3 years old        |
| Parent Name         | Ahmad Bin Ali      |
| Examiner Name       | Dr Farah Bin Ahmad |
| Screening Test Date | 12/12/2016         |

### Personal Social Skills

| No | List of Tasks            | Result Score |
|----|--------------------------|--------------|
| 1  | Wash and dry hands       | Pass         |
| 2  | Name friend              | Fail         |
| 3  | Dress with no help       | Pass         |
| 4  | Play board or card games | Pass         |
| 5  | Brush teeth with no help | Pass         |
| 6  | Put on t-shirt           | Pass         |
| 7  | Prepare cereal           | Fail         |

### Fine Motor-Adaptive Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Pick longer line of "I"   | Pass         |
| 2  | Thumb wiggle              | Fail         |
| 3  | Tower of 8 cubes          | Pass         |
| 4  | Imitate vertical line     | Pass         |
| 5  | Copy a round shape of "O" | Pass         |

### Language Skills

| No | List of Tasks             | Result Score |
|----|---------------------------|--------------|
| 1  | Know 3 adjectives         | Pass         |
| 2  | Name 4 colors             | Fail         |
| 3  | Understand 4 prepositions | Pass         |
| 4  | Speech all understandable | Pass         |
| 5  | Use of 3 objects          | Pass         |

### Gross Motor Skills

| No | List of Tasks                   | Result Score |
|----|---------------------------------|--------------|
| 1  | Balance each foot for 3 seconds | Pass         |
| 2  | Balance each foot for 2 seconds | Pass         |
| 3  | Broad jump                      | Pass         |
| 4  | Throw ball overhand             | Pass         |

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Figure 3.86 CDST Screening Test Report Details Interface – OT

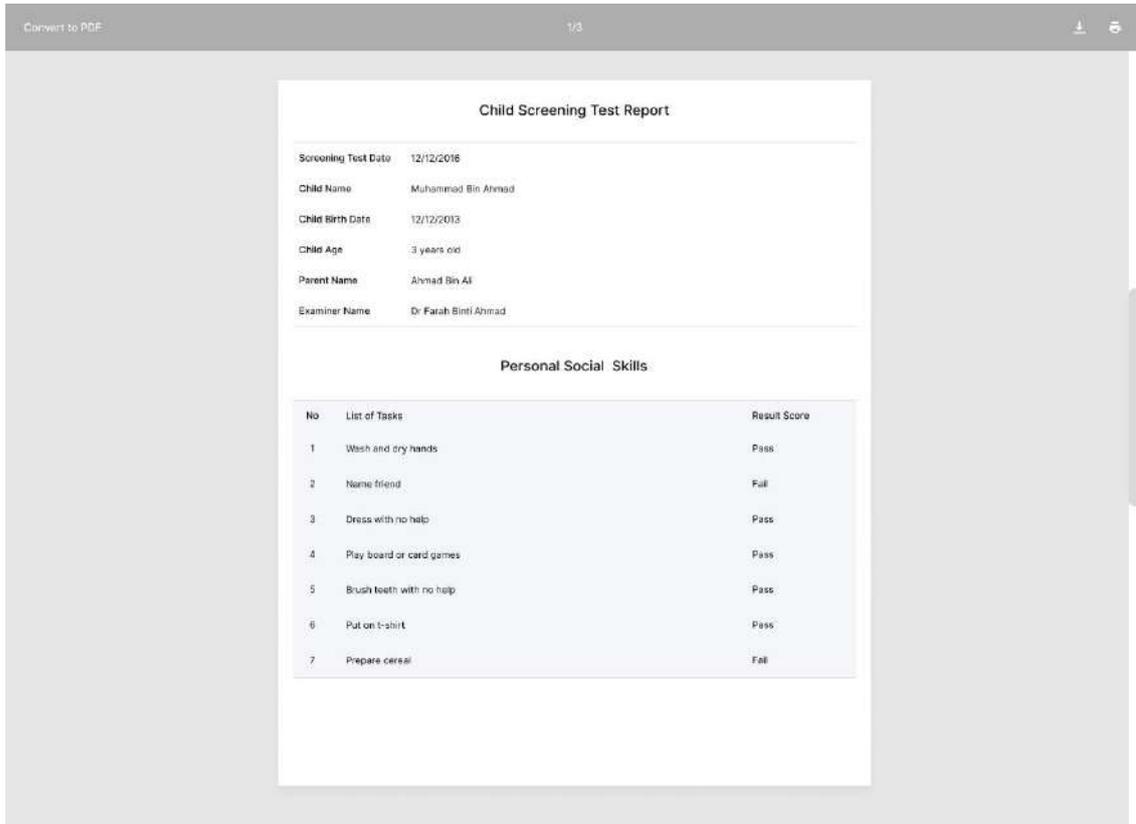


Figure 3.87 CDST Convert Screening Test Report Interface – OT



Figure 3.88 CDST Consultation Report Details Interface –OT



Figure 3.89 CDST Convert Consultation Report Interface – OT



Figure 3.90 CDST Logout Confirmation Interface – OT

### 3.7 Test Planning

The User Acceptance Test (UAT) is used for the purpose of testing the Child Development Screening Test and Progress Monitoring System. All the functionalities in the system will be tested after the development phase by users or clients. Throughout the functionalities testing, any error detected, or test failed will be discussed and fixed or changed according to the suitability of the system flow.

Table 3.18 Test Planning – CDST System

| Activities   | Input | Expected Result  | Actual Result | Pass/Fail | Comments |
|--|-------|--|---------------|-----------|----------|
| <b>Login</b>   |       |  |               |           |          |
| Login with valid email address, password and user category |       | <p><b>LOE Administrator User</b></p> <p>Redirect to the LOE administrator dashboard page.</p> <p><b>Occupational Therapist Users</b></p> |               |           |          |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
|  |  | Redirect to the occupational therapist user dashboard page.                             |  |  |  |
| Login with invalid email address, password and user category |  | System displays an error message of “Invalid login credentials.”                        |  |  |  |
| Login with empty fields                                      |  | System displays a validation message for each input field “Please fill out this field.” |  |  |  |
| <b>User Registration</b>                                     |  |   |  |  |  |
| Sign up with valid user registration information             |  | System displays a confirmation message of “Are you sure want to register new account?”, |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
|  |  | then and will redirect to the login page with a successful message of “New user account successfully registered!” |  |  |  |
| Sign up with invalid information             |  | System displays error validation for the invalid information.   |  |  |  |
| Sign up with different confirmation password |  | System displays error validation of “Password is not match”.  |  |  |  |
| Sign up without inserting any information    |  | System displays error validation of “Please fill out this field”.   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Sign up with the same email address           |  | System displays an error message of “The email address already registered”.              |  |  |  |
| Sign up with invalid format for email address |  | System displays error validation of “Please enter a valid email address format”.         |  |  |  |
| Sign up with invalid password format          |  | System display error validation of “Please enter a password with at least 8 characters”. |  |  |  |
| Sign up with invalid format for phone number  |  | System displays error validation of “Please enter  |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
|  |  | a valid phone number of 10 digit with dash (-)".  |  |  |  |
| <b>View Children Information</b>                                 |  |   |  |  |  |
| View the list of registered children information                 |  | System displays the list of registered children information in a table that include child name, child birth date, parent name and phone number. |  |  |  |
| Search with no inserted keyword of child name                    |  | System displays a message of "No registered child available".   |  |  |  |
| Search for not available child name keyword of child information |  | System displays a message of "No registered child available".   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Search with invalid keyword             |  | System displays a message of “No registered child available”.          |  |  |  |
| Search with valid keyword of child name |  | System displays list of screening test with child name “Farah”         |  |  |  |
| View selected child information details |  | System displays detailed information of the selected registered child. |  |  |  |
| <b>Do Children Screening Test</b>       |  |  |  |  |  |
| No child screening test available       |  | System displays a text field of “No child screening test available”.   |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| Add new child information for screening test                     |  | System displays next page with input form of child information for screening test   |  |  |  |
| Cancel add child screening test                                  |  | System displays confirmation message of “Are you sure want to cancel add child screening test?”, then system redirect to main screening test page |  |  |  |
| Add child information for screening test with blank input fields |  | System displays error validation of “Please fill out this field”.   |  |  |  |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| Calculate child age with inserted child birth date and screening test date |  | System displays the output value of child age in the child age text field.   |  |  |  |
| Add child information for screening test without child age calculation     |  | System displays error validation message of “Please calculate child age”   |  |  |  |
| Add valid child information for screening test                             |  | System displays confirmation message of “Are you sure want to add child screening test?”, then system redirect to next page of screening test of screening area category |  |  |  |

|   |  |   |  |  |  |
|---|--|---|--|--|--|
| Add child screening test for personal social screening area         |  | System redirect and displays next page of personal social screening area with required tasks  |  |  |  |
| Cancel add screening test of personal social area                   |  | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page |  |  |  |
| Empty personal social screening area tasks for child screening test |  | System displays error message of “Please select screening test answer for each question”  |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| <p>Incomplete personal social screening area tasks for child screening test</p> |  | <p>System displays error message of “Please select screening test answer for each question”</p>  |  |  |  |
| <p>Complete personal social screening area tasks for child screening test</p>   |  | <p>System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Personal Social” button</p> |  |  |  |

|   |  |   |  |  |  |
|---|--|---|--|--|--|
| Add child screening test for fine motor adaptive screening area         |  | System redirect and displays next page of fine motor adaptive screening area with required tasks  |  |  |  |
| Cancel add screening test of fine motor adaptive area                   |  | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page |  |  |  |
| Empty fine motor adaptive screening area tasks for child screening test |  | System displays error message of “Please select screening test answer for each question”  |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| <p>Incomplete fine motor adaptive screening area tasks for child screening test</p> |  | <p>System displays error message of “Please select screening test answer for each question”</p>  |  |  |  |
| <p>Complete fine motor adaptive screening area tasks for child screening test</p>   |  | <p>System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Fine Motor Adaptive” button</p> |  |  |  |

|   |  |   |  |  |  |
|---|--|---|--|--|--|
| Add child screening test for language adaptive screening area |  | System redirect and displays next page of language screening area with required tasks   |  |  |  |
| Cancel add screening test of language area                    |  | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page |  |  |  |
| Empty language screening area tasks for child screening test  |  | System displays error message of “Please select screening test answer for each question”  |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| <p>Incomplete language screening area tasks for child screening test</p> |  | <p>System displays error message of “Please select screening test answer for each question”</p>   |  |  |  |
| <p>Complete language screening area tasks for child screening test</p>   |  | <p>System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Language” button</p> |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| Add child screening test for gross motor adaptive screening area |  | System redirect and displays next page of gross motor screening area with required tasks  |  |  |  |
| Cancel add screening test of gross motor area                    |  | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page |  |  |  |
| Empty gross motor screening area tasks for child screening test  |  | System displays error message of “Please select screening test answer for each question”  |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| <p>Incomplete gross motor screening area tasks for child screening test</p> |  | <p>System displays error message of “Please select screening test answer for each question”</p>  |  |  |  |
| <p>Complete gross motor screening area tasks for child screening test</p>   |  | <p>System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Gross Motor” button</p> |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Complete add child screening test for all screening area category |  | System redirects to child screening test details page  |  |  |  |
| View the list of child screening test                             |  | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent name and screening test date. |  |  |  |
| Search with no inserted screening test date inputs                |  | System displays a message of “No child screening tests available”.   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Search for not available date keyword of child screening test |  | System displays a message of “No child screening tests available”.           |  |  |  |
| Search with invalid keyword                                   |  | System displays a message of “No child screening tests available”.           |  |  |  |
| Search with valid keyword of screening test date              |  | System displays list of screening test with screening test date “01/11/2021” |  |  |  |
| View the details of child screening test information          |  | System displays the detailed information of the child screening test.        |  |  |  |
| <b>Manage Consultation</b>                                    |  |  |  |  |  |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| No child screening test available                  |  | System displays a text field of “No screening consultations available”.  |  |  |  |
| View the list of child screening test              |  | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent name and screening test date. |  |  |  |
| Search with no inserted screening test date inputs |  | System displays a message of “No screening consultations available”.   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Search for not available date keyword of child screening test |  | System displays a message of “No screening consultations available”.         |  |  |  |
| Search with invalid keyword                                   |  | System displays a message of “No screening consultations available”.         |  |  |  |
| Search with valid keyword of screening test date              |  | System displays list of screening test with screening test date “01/11/2021” |  |  |  |
| Add consultation for child screening test                     |  | System redirect and displays add consultation page with consultation form    |  |  |  |

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| Cancel add consultation                                      |  | System displays confirmation message of “Are you sure want to cancel add consultation?”, then system redirect to main consultation page |  |  |  |
| Add consultation information with empty required information |  | System displays an error validation message of “Please fill out this field” for the required input field.                               |  |  |  |
| Add row for consultation information                         |  | System add row for screening area category and history description  |  |  |  |
| Delete row of consultation information                       |  | System displays confirmation message of “Are you sure want to   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
|   |  | delete consultation row?”, then system delete the selected consultation row  |  |  |  |
| Add consultation information for child screening test with required information |  | System displays a confirmation message of “Are you sure want to add consultation?”, then the system displays a successful message of “Consultation successfully added!” and redirect to main consultation page |  |  |  |
| View the details information of consultation interview                          |  | System displays detailed information of the consultation interview.  |  |  |  |
| <b>Generate Report</b>  |  |  |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| View the list of child screening test                         |  | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent name and screening test date. |  |  |  |
| Search with no inserted screening test date inputs            |  | System displays a message of “No screening consultations available”.   |  |  |  |
| Search for not available date keyword of child screening test |  | System displays a message of “No screening consultations available”.   |  |  |  |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| Search with invalid keyword                           |  | System displays a message of “No screening consultations available”.         |  |  |  |
| Search with valid keyword of screening test date      |  | System displays list of screening test with screening test date “01/11/2021” |  |  |  |
| View the details information of screening test report | Choose and click “Screening” link button from the list | System displays the detailed information of the screening test report.       |  |  |  |
| Export screening test report                          | Click the “Export to PDF” button                       | System redirects download the screening test report                          |  |  |  |

|  |   |  |  |  |  |
|--|---|--|--|--|--|
| View the details of information of consultation report | Choose and click “Consultation” link button from the list | System displays the detailed information of the consultation report. |  |  |  |
| Export consultation report                             | Click the “Export to PDF” button                          | System redirects download the consultation report                    |  |  |  |

### **3.8 Potential Use of Proposed Solution**

The development of the digital system for children screening test and progress monitoring is not much as mostly it is done by using papers, pen and file to record the information of the child screening test and progress monitoring that will consume more time and waste of energy. In that case, the proposed system of the Child Screening Test and Progress Monitoring system allows users to manage the child screening test and progress monitoring automatically and digitally, that will replace the manual way on recording the child information for screening test which is more easier and save more time and energy. Besides, the CDST system also can eliminate the amount of papers needed to be used to record the large amount of area tasks covering for the personal social, fine motor adaptive, language and gross motor.

Furthermore, the proposed CDST system used a digital way to cross-check the child age with the tasks in Denver II Scale that will be more systematic and save time. In that way, the users involved can easily monitor and check the tasks needed for the child based on their age to give test score on their growth development progress. The CDST system also helps to keep and save all the records of the child screening test and progress monitoring information in secured and will be easily to be find, as nowadays there are a a lot of children that needed the care to monitor their growth development, so it is crucial to monitor the child development progress in early age with more advance system as there are a large amount of child's record to be done.

## **CHAPTER 4**

### **IMPLEMENTATION, RESULT AND DISCUSSION**

#### **4.1 Introduction**

Chapter 4 will cover and discuss the implementation of the CDST system that includes the development environment, system implementation that includes the code programming on the user interface design and functionality and database implementation. The results and discussions also will be included in this chapter which will cover the CDST functionality testing and user acceptance testing that will involve will the end users that will test the developed system. In that case, all six modules involved in the Children Screening Test & Progress Monitoring System will be developed using a few software which is Visual Studio Code and phpMyAdmin. The testing on the developed CDST system also will be conducted to ensure all the functionality is correctly functioning and fixed any occurred errors.

#### **4.2 Implementation Process**

Throughout the implementation section, it will describe the methods, tools and software used in developing the Children Screening Test & Progress Monitoring system. In general, the CDST system is developed using the Laravel web application framework.

### 4.2.1 Development Tools

Table 4.1 CDST Development Tools

| No | Tools/Software  | Description/Purpose   |
|----|---|---|
| 1  | Visual Studio Code<br> | An open-source code editor that is used for code scripting that provides ease of writing and editing code for the CDST system using PHP, HTML and CSS. Besides, it can be used for code debugging, integrated terminal and task automation. |
| 2  | XAMPP<br>            | An open-source web server is used to build and developed the system's database using MySQL for the CDST database management and PHP for the server-side scripting for the CDST web pages.   |
| 3  | phpMyAdmin<br>       | A web-based tool used to manage and store all the MySQL database for the CDST system.   |

The CDST system is developed based on the Laravel framework that is written in PHP. The Laravel framework will be following the MVC architecture design which includes with model, view and controller in the project. The web languages that are used throughout the development of the CDST system are PHP, HTML and CSS. To be more precise, the elements used to create and design the web pages of the CDST system is by using HTML while CSS is used as a style sheet for the purpose of adding visual style to the HTML document to create a more visually appealing design of the CDST user interface. In addition, PHP is used as server-side scripting to execute the CDST system's functionality on the server and interactivity. All of these web languages are created and coded by using Visual Studio Code software as in the Figure 4.1 below as the code editor.

Overall, the visual studio code is an important tool used in the CDST project development as a code editor and scripting for all used programming languages and for the code and system execution.

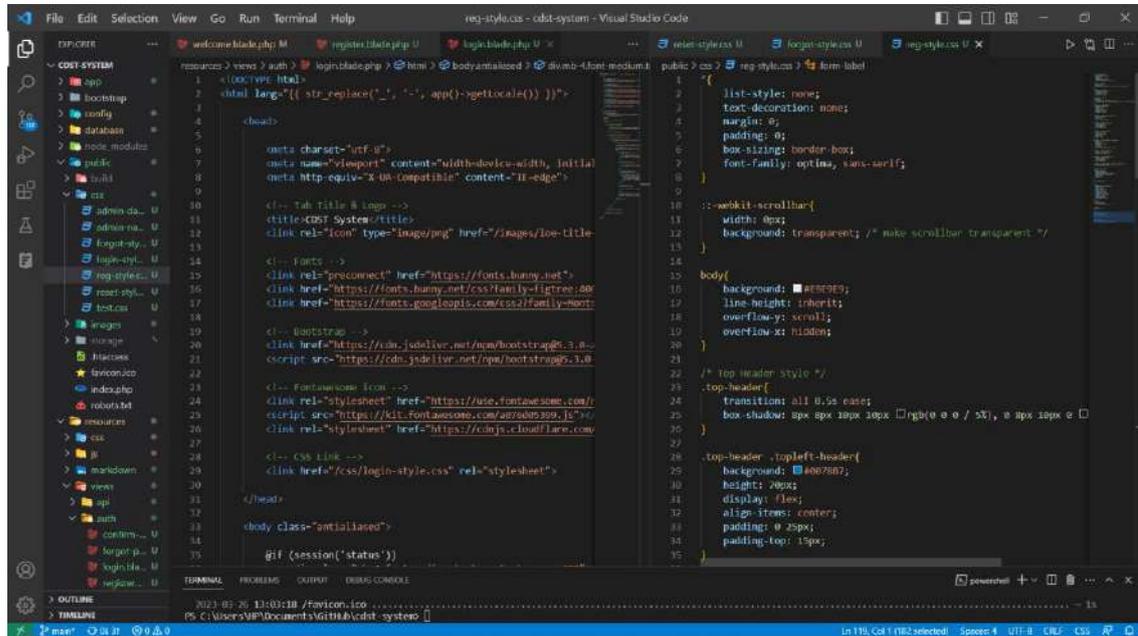


Figure 4.1 Visual Studio Code

As for the database, XAMPP as in Figure 4.2 below is used as a web server. phpMyAdmin is used as the CDST system's database server throughout the system's development and is used to manage the MySQL databases, tables and queries. To access all the information of the CDST system, the XAMPP server of Apache and MySQL module needs to be used and started where it contains MySQL as the database server and Apache as the web server for the CDST project. In addition, the connection of Apache and MySQL in XAMPP is able to execute and test the system development which is the web pages involved in the CDST system and the connection of the MySQL database used in the system. Next, to access and manage the connected database with the CDST, can click on the "Admin" button from the MySQL row and will redirect to the phpMyAdmin web interface.

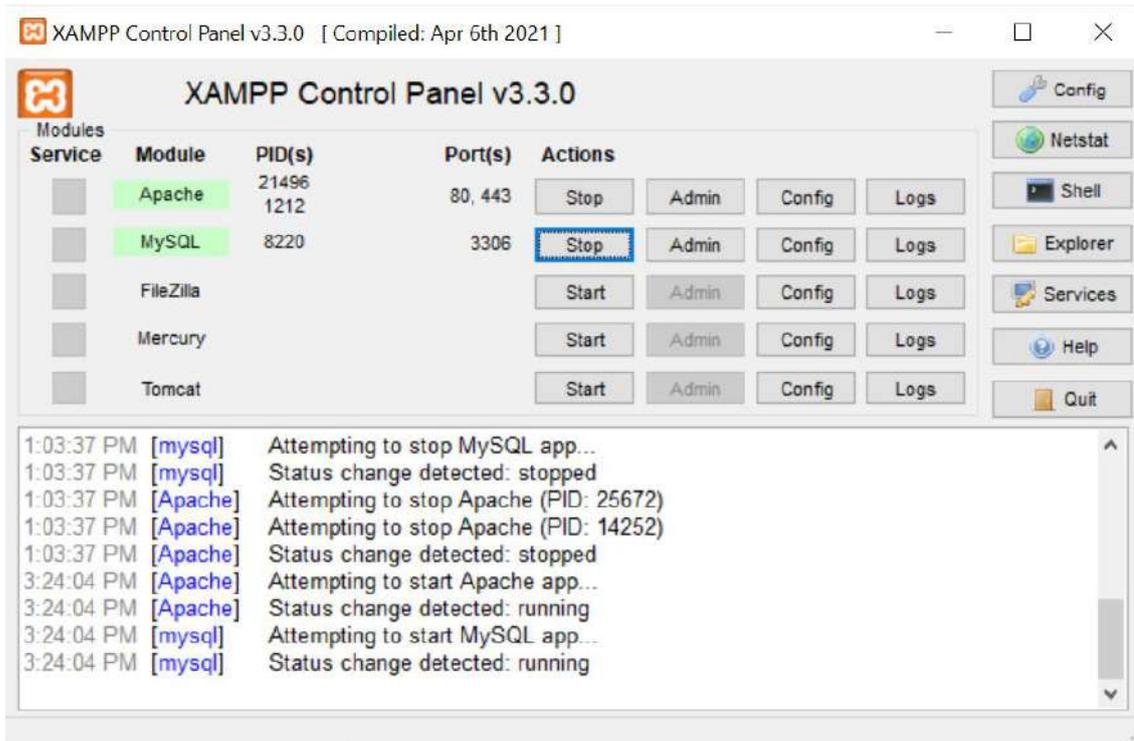


Figure 4.2 XAMPP

The phpMyAdmin web interface as in Figure 4.3 below is used to manage the database for the CDST system that consists of all the tables along with the attributes needed referring to the ERD diagram that will manage and store all the information and data used in the CDST system in a structured manner.

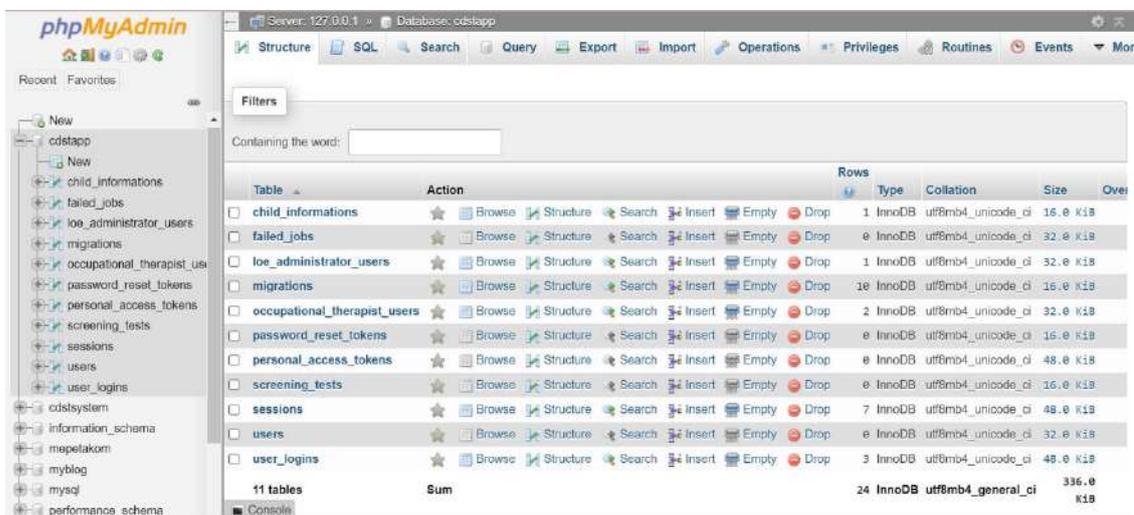


Figure 4.3 phpMyAdmin

#### 4.2.2 Setup Laravel Environment

The Child Development Screening Test and Progress Monitoring system is developed using the Laravel Framework which requires some steps to set up the system environment.

- Visual Studio Code (VS Code) installation on the local machine.
- Web server installation which is XAMPP in the local machine for system testing and development.
- PHP installation in the local machine where the version is PHP 7.3 and above for the Laravel framework.
- Composer installation in the local machine that is used to install and manage Laravel dependencies involved.
- Node.js installation in the local machine that is used to provide a flexible toolset for front-end development of the CDST system.
- Laravel project installation by running the command “composer create-project laravel/laravel cdst-app” in the visual studio code’s terminal to create the CDST Laravel project in the cdst-app directory.
- Manage the configuration of the environment of the Laravel project which is the CDST system by configuring the environment variables in the .env file which are the name of the system and database connection.
- Create a new database for the CDST system in the phpMyAdmin named cdstapp.
- Run the migration to manage the tables involved in the CDST database to manage the tables and attributes or fields involved. Then, run the command “php artisan migrate” in the vs code terminal to create the involved CDST tables to store data.
- Test and run the created cdst-app system locally using the built-in PHP development server “php artisan serve” and the CDST system is run and accessible in the browser.
- Create the necessary routes involved in the CDST system to map the URLs to specific controllers and actions.

- Create the necessary controllers for the CDST system for processing HTTP requests and generating responses of the CDST system.
- Create the necessary views for the CDST system to create and display the interface of the CDST system.
- Create the necessary models for the management of the system database.
- Testing and deployment of the CDST system to live server to the complete CDST system.

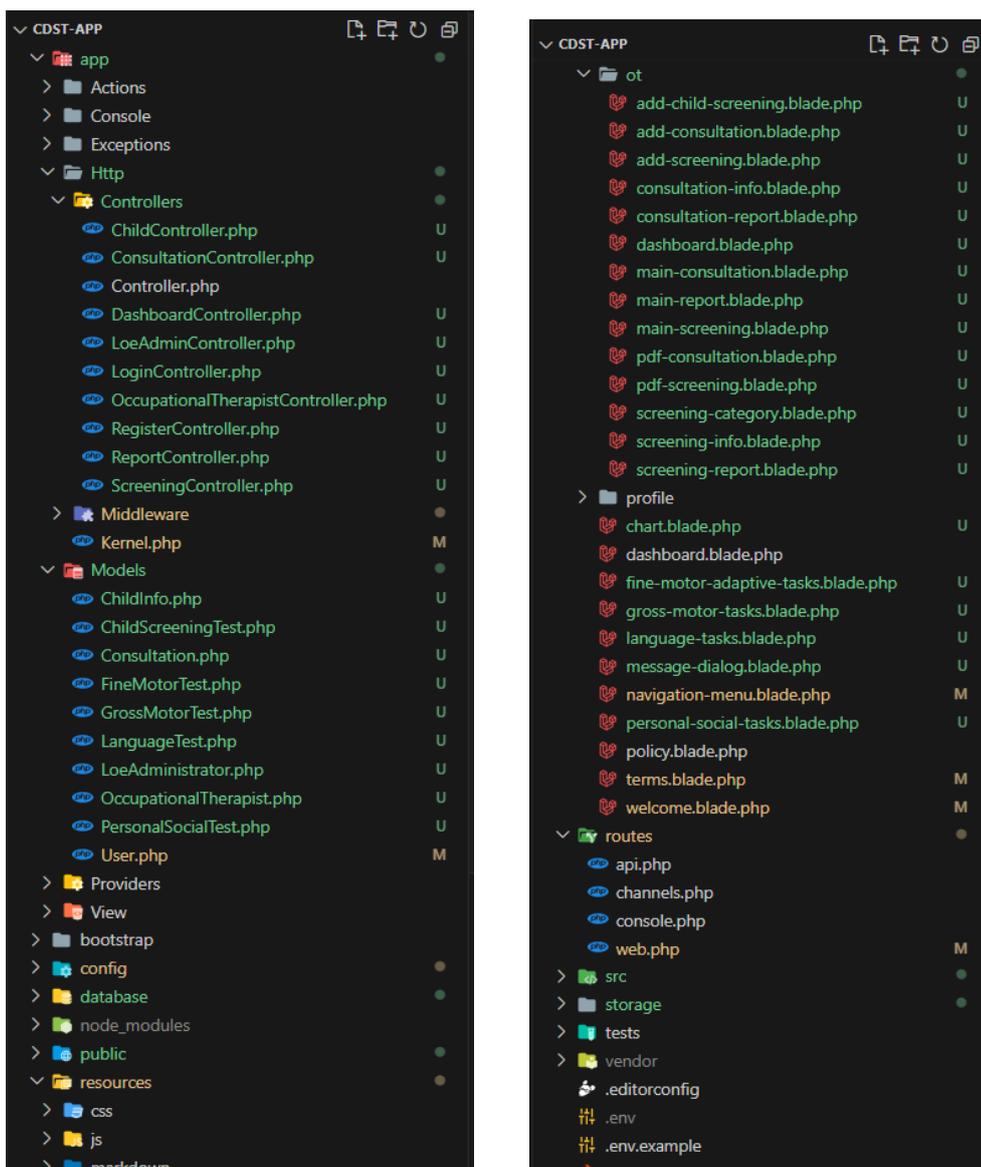
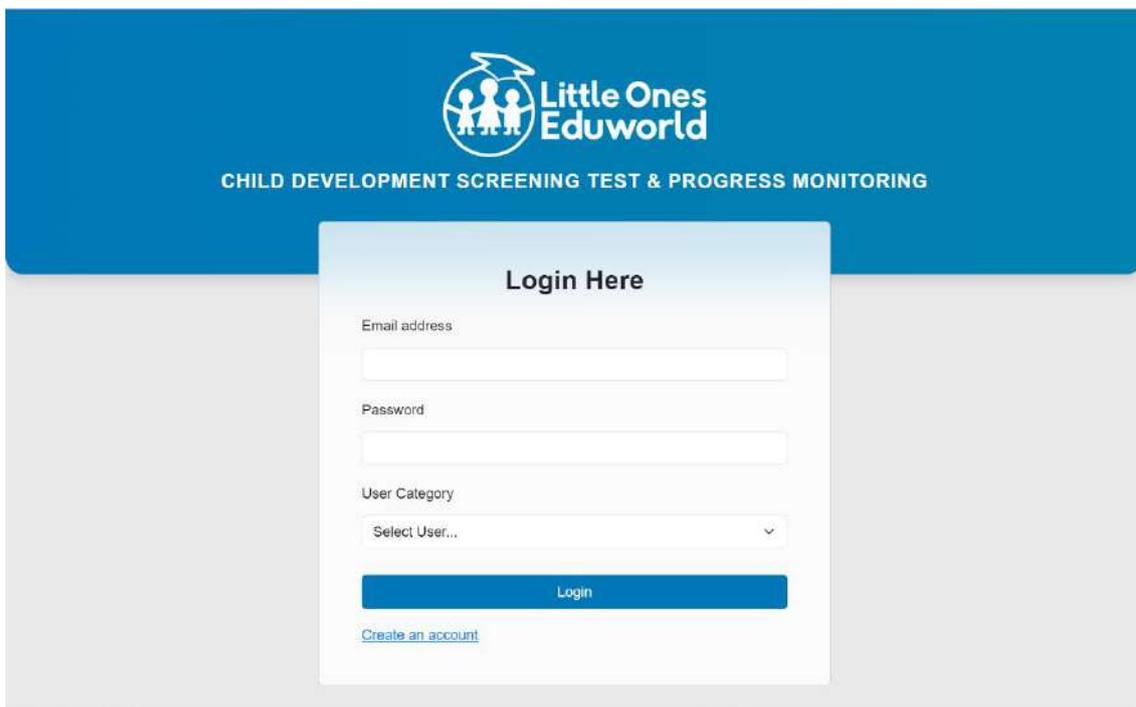


Figure 4.4 CDST Laravel Project Environment

## 4.2.3 System Interface and Functionality Development

### 4.2.3.1 Login Interface

Figure 4.5 below shows the login page of the CDST system. Users need to insert the registered credentials stored in the CDST database which are email address, password and user category which are LOE administrator or occupational therapist and click the “Login” button to able login to the system and redirect to the dashboard page. Occupational therapist users can click the “Create an account” link button if they do not have any account and wanted to login to the system.



The image shows a web interface for 'Little Ones Eduworld'. The header is blue with the logo on the left and the text 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING' on the right. Below the header is a white login form titled 'Login Here'. The form contains three input fields: 'Email address', 'Password', and 'User Category' (a dropdown menu with 'Select User...' as the placeholder). Below the fields is a blue 'Login' button and a blue link that says 'Create an account'.

Figure 4.5 Login Page

### 4.2.3.2 User Registration Interface

Figure 4.6 below shows the user registration page of the CDST system where occupational therapist users are able to register an account in the system to be able to login and use the provided features in the CDST system. The information needed to be registered and stored in the CDST’s database are full name, gender, email address,

qualification as the occupational therapist, phone number, user category, password, confirm password and address and click the “Sign Up” button to save the registered account in the system’s database and will redirect to login page of Figure 4.5.

The screenshot shows a web interface for user registration. At the top, there is a blue header with the logo 'Little Ones Eduworld' on the left, the title 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM' in the center, and a 'Login' link on the right. The main content area is a white box titled 'Register New Account'. It contains several input fields: 'Full Name' (text input), 'Gender' (dropdown menu), 'Email' (text input), 'Qualification' (file upload area with 'Choose Files' and 'No file chosen' buttons), 'Phone Number' (text input), 'User Category' (dropdown menu), 'Password' (text input), 'Confirm Password' (text input), and 'Address' (text area). A large blue 'Sign Up' button is positioned below the fields. At the bottom left of the form, there is a link: 'Already have an account? [Login here](#)'.

Figure 4.6 User Registration Page

#### 4.2.3.3 Dashboard Interface

Figure 4.7 below shows the dashboard page for LOE administrator user that is redirect to after user login to the CDST system using the stored credentials in the system database. The dashboard page consists with a bar chart that represent the comparison data values of total registered children, total screening test and total consultation data retrieved from the system’s database. The LOE administrator user only able to manage the child information and report for screening test and consultation page sections in the CDST system that can be access by clicking the provided menu section in the left side navigation

bar. The logout button is provided for the user to end the login session and logout from the CDST system.

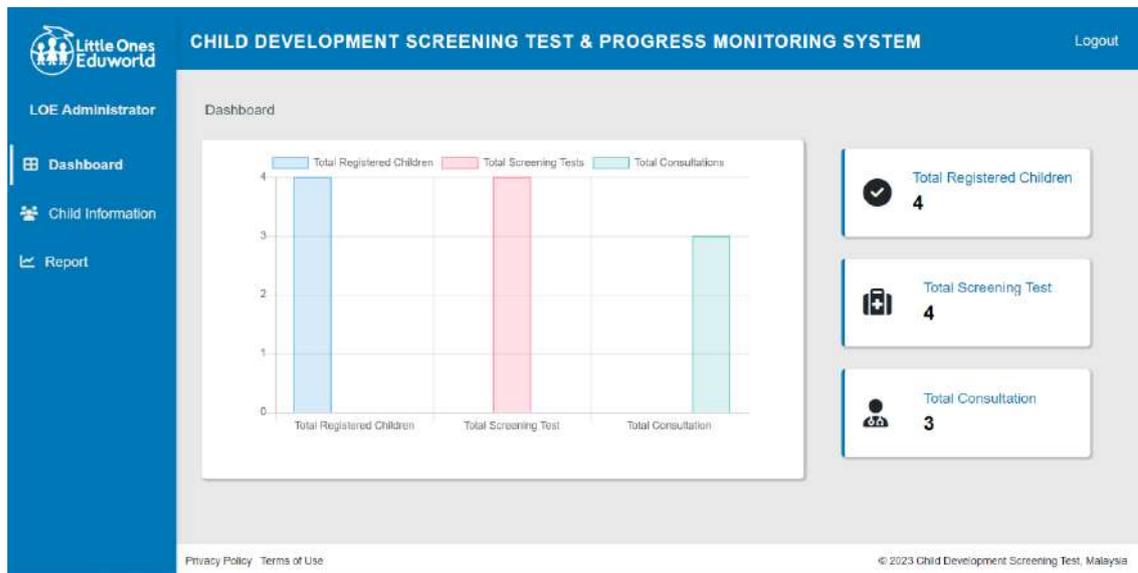


Figure 4.7 LOE Admin Dashboard Page

Figure 4.8 below shows the dashboard page for occupational therapist users that is redirect to after user login to the system using the registered and stored credentials in the system database. The dashboard page consists with a bar chart that represent the comparison data values of total registered children, total screening test and total consultation data retrieved from the system's database. The occupational therapist users able to manage different page sections in the CDST system which are screening test, consultation and report for screening test and consultation that can be access by clicking the provided menu section in the left side navigation bar. The logout button is provided for the user to end the login session and logout from the CDST system.

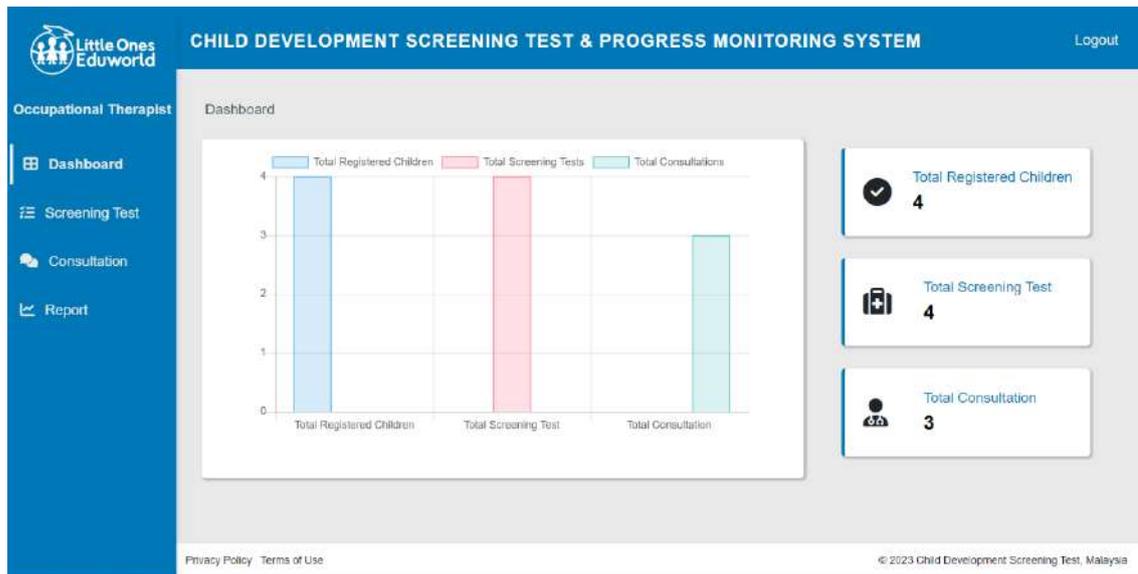


Figure 4.8 OT Dashboard Page

#### 4.2.3.4 Child Information Interface

Figure 4.9 below shows the list of child information page that used by the LOE administrator to view the registered children in the CDST system retrieve from the system database. This page displays the list of registered child information which are child name, child birth date, parent name and phone number. LOE administrator user can click the “View Details” link button to view more details information of the child that redirect to the child information details page of Figure 4.10 and can search specific child in the list by using the search input based on the child’s name keyword. The list of registered children displayed in the table is maximum with 5 list information only and have pagination for the next list in the next page where users can click the “Next” button to view next registered child list or “Previous” button to return to the previous list of the registered child to be viewed.

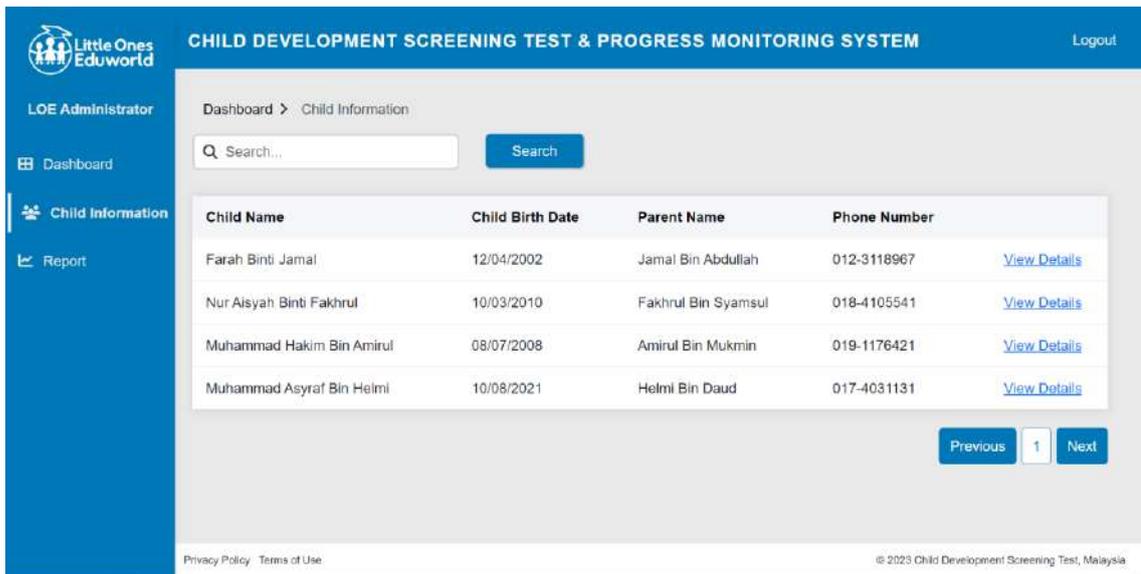


Figure 4.9 Child Information Page

Figure 4.10 below shows the child information details page to be viewed by the LOE administrator user that consists with the child information of child name, child birth date, parent name, phone number and address. LOE administrator can click the “Back” button to return to the list of child information page of Figure 4.9.

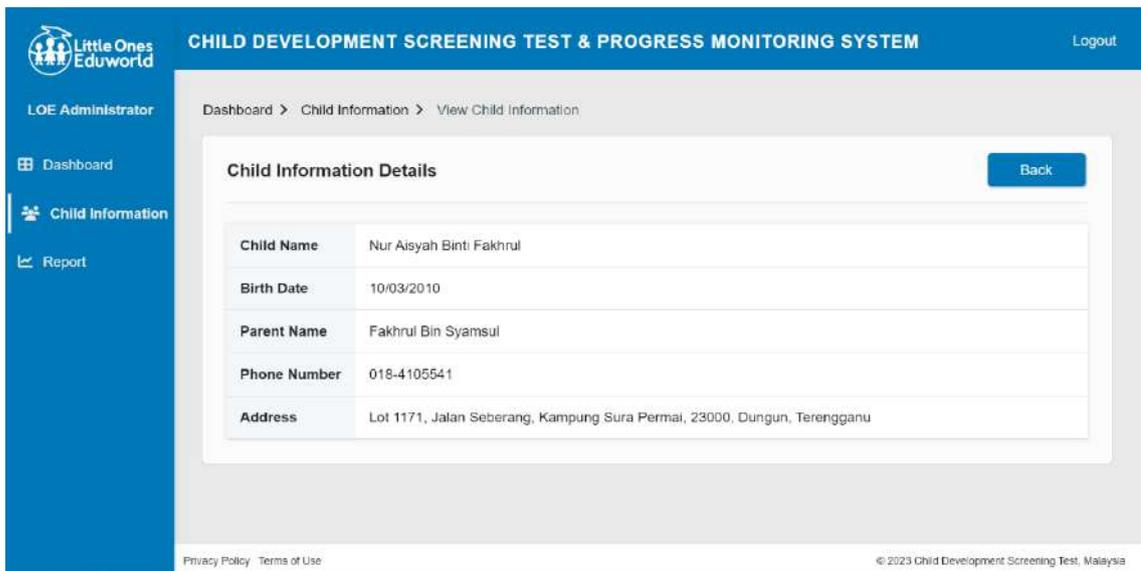


Figure 4.10 Details Child Information Page

#### 4.2.3.5 Screening Test Interface

Figure 4.11 below shows the screening test page used for occupational therapist users to view the list of child that have done the screening test and stored the screening test information in the CDST system. The list of screening test information is retrieved from the system database which are child name, child birth date, child age, parent name and screening test date display in the table list. Users can click the “View Details” button to view the more detail information of the child screening test and also can search specific child screening test by inserting the screening test date keyword in the search input. OT users can click the “Add New Screening Test” button to redirect to add screening test page to add and do the screening test for the children in Figure 4.12. The list of child screening test displayed in the table is maximum with 5 list information only and have pagination for the next list in the next page where users can click the “Next” button to view next child screening test list or “Previous” button to return to the previous list of the child screening test to be viewed.

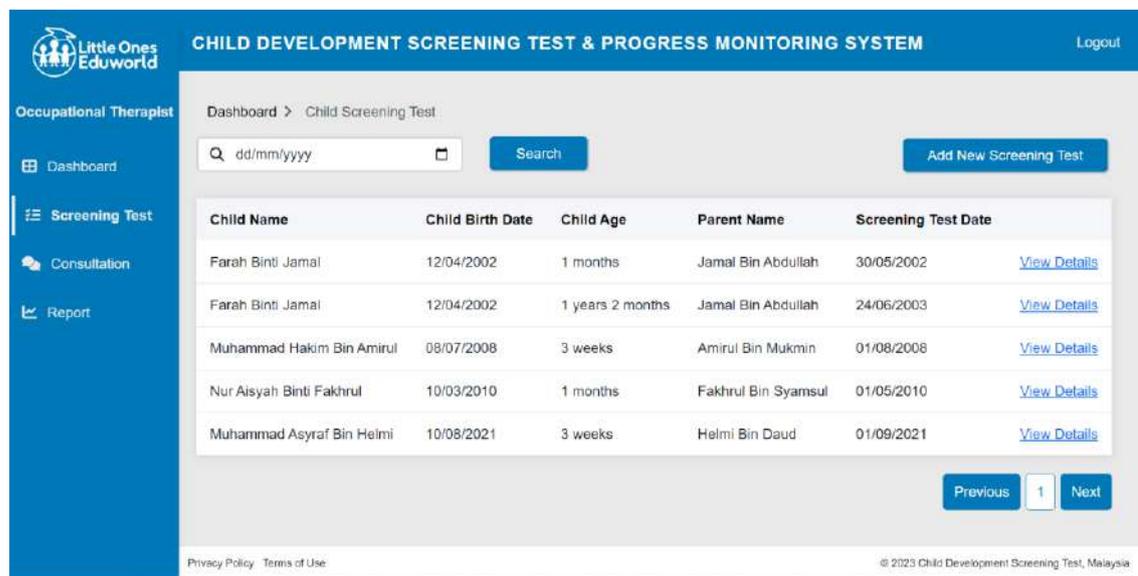


Figure 4.11 Screening Test Page

Figure 4.12 below shows the page of add child information for the screening test used by the occupational therapist users consists with a form to fill in the child information required to do the screening test which are child name, parent name, child birth date, screening test date, examiner name and child age that will be calculate automatically

when OT users click the “Calculate” button. The parents name and birth date will automatically retrieved the data when the child name is selected from the dropdown button. OT users can click the “Add Screening Test” to continue to next step add the new screening test of the child that will redirect to Figure 4.13.

The screenshot shows a web interface for an Occupational Therapist. The header includes the logo for 'Little Ones Eduworld' and the system title 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM'. A navigation menu on the left lists 'Dashboard', 'Screening Test', 'Consultation', and 'Report'. The main content area is titled 'Add Child Screening Test' and contains a form for 'Child Information'. The form fields are: 'Child Name' (Muhammad Asyraf Bin Helmi), 'Parents Name' (Helmi Bin Daud), 'Birth Date' (10/08/2021), 'Screening Test Date' (01/09/2021), 'Examiner Name' (Adriana Binti Ahmad), and 'Child Age' (3 weeks). At the bottom of the form are three buttons: 'Cancel', 'Calculate', and 'Add Screening Test'. The footer contains 'Privacy Policy Terms of Use' and '© 2023 Child Development Screening Test, Malaysia'.

Figure 4.12 Add Child Info Screening Test Page

Figure 4.13 below shows the page of child screening test area category for the occupational therapist to continue do the screening test to the currently added child information. This page displays the information of inserted child information which are child name, parents name, birth date, screening test date, examiner name and child age along with the screening area category information with active button upon the screening area category to be done for the child by the occupational therapist users which are personal social, fine motor adaptive, language and gross motor. Each of the screening area buttons will be disabled after occupational therapist users done the screening test of the area with the child. The “Done” button is disabled when the screening test is not complete for all four screening area category and will be enabled when all the four screening area category is completed.

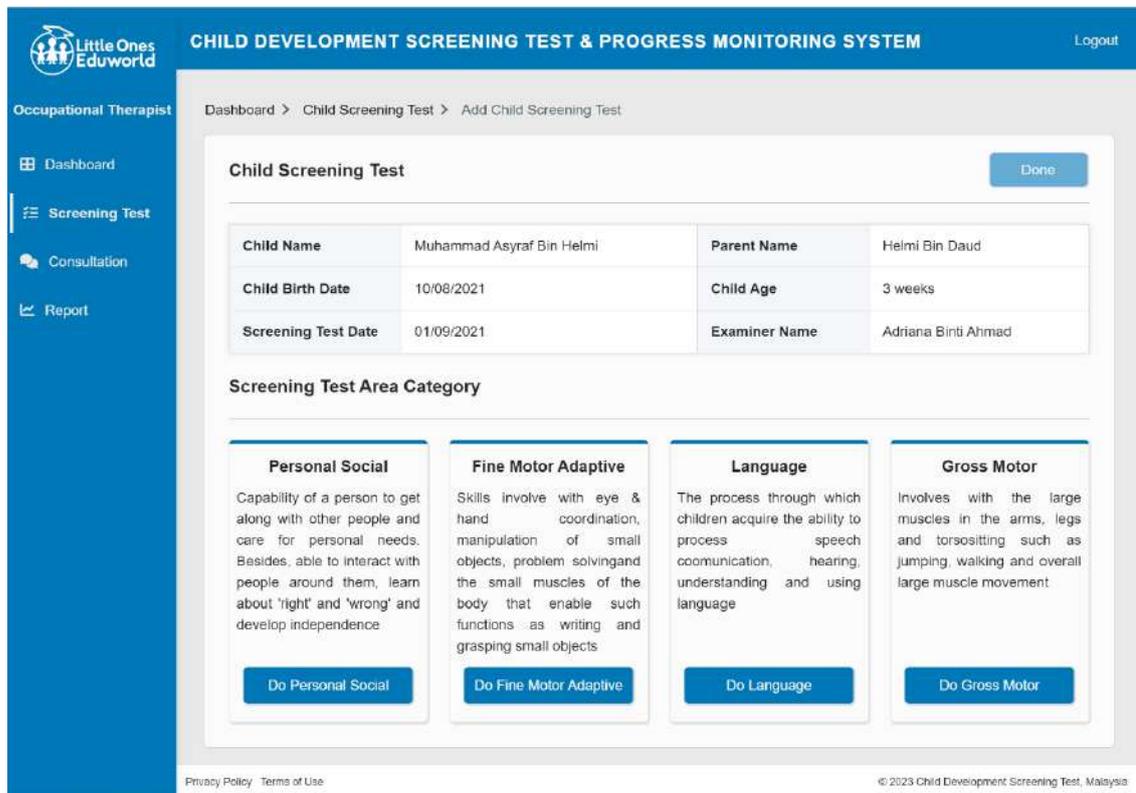


Figure 4.13 Screening Area Category Page

Figure 4.14 below shows the page of child screening test for the screening area category of personal social that is displayed when occupational therapist users click the “Do Personal Social” button from Figure 4.13. This page displays all the tasks and questions for the personal social screening area category based on child age with answer options of pass, fail, refusal (child refuse to do the tasks) and no opportunity along with the current inserted child information which are child name, parent name, child birth date, child age, examiner name and screening test date. After all the tasks or questions of the personal social area category is answered and done with the child, occupational therapist clicks the “Finish” button to add and stored the child screening test for personal social area category in the system database.

**CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM** Logout

Occupational Therapist Dashboard > Child Screening Test > Screening Test Area Category

**Child Screening Test**

|                            |                           |                      |                     |
|----------------------------|---------------------------|----------------------|---------------------|
| <b>Child Name</b>          | Muhammad Asyraf Bin Helmi | <b>Parent Name</b>   | Helmi Bin Daud      |
| <b>Child Birth Date</b>    | 10/08/2021                | <b>Child Age</b>     | 3 weeks             |
| <b>Screening Test Date</b> | 01/09/2021                | <b>Examiner Name</b> | Adriana Binti Ahmad |

**Personal Social Skills**

**1. Regard Face**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is 90%

**2. Smile Responsively**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is between 50%-75%

**3. Smile Spontaneously**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is between 50%-75%

**4. Regard Own Hand**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is 25%

[Finish](#)

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Figure 4.14 Add Personal Social Screening Test Page

Figure 4.15 below shows the page of child screening test for the screening area category fine motor adaptive that is displayed when occupational therapist users click the “Do Fine Motor Adaptive” button from Figure 4.13. This page displays all the tasks and questions for the fine motor adaptive screening area category based on child age with answer options of pass, fail, refusal (child refuse to do the tasks) and no opportunity along with the current inserted child information which are child name, parent name, child birth date, child age, examiner name and screening test date. After all the tasks or questions of the

fine motor adaptive area category is answered and done with the child, occupational therapist clicks the “Finish” button to add and stored the child screening test for fine motor adaptive area category in the system database.

**CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM**

Occupational Therapist | Dashboard > Child Screening Test > Screening Test:Area Category

**Child Screening Test**

|                     |                           |               |                     |
|---------------------|---------------------------|---------------|---------------------|
| Child Name          | Muhammad Asyraf Bin Helmi | Parent Name   | Helmi Bin Daud      |
| Child Birth Date    | 10/08/2021                | Child Age     | 3 weeks             |
| Screening Test Date | 01/09/2021                | Examiner Name | Adriana Binti Ahmad |

**Fine Motor Adaptive Skills**

**1. Follow To Midline**

Pass                       No opportunity  
 Fail                               Refusal                      Clear choice

Percentage children passing is between 25%-75%

**2. Follow Past Midline**

Pass                       No opportunity  
 Fail                               Refusal                      Clear choice

Percentage children passing is between 25%-50%

**Finish**

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Figure 4.15 Add Fine Motor Adaptive Screening Test Page

Figure 4.16 below shows the page of child screening test for the screening area category language that is displayed when occupational therapist users click the “Do Language” button from Figure 4.13. This page displays all the tasks and questions for the language screening area category based on child age with answer options of pass, fail, refusal (child refuse to do the tasks) and no opportunity along with the current inserted child information which are child name, parent name, child birth date, child age, examiner name and screening test date. After all the tasks or questions of the language area category is answered and done with the child, occupational therapist clicks the “Finish” button to add and stored the child screening test for language area category in the system database.

**CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM** Logout

Occupational Therapist | Dashboard > Child Screening Test > Screening Test Area Category

### Child Screening Test

|                     |                           |               |                     |
|---------------------|---------------------------|---------------|---------------------|
| Child Name          | Muhammad Asyraf Bin Helmi | Parent Name   | Helmi Bin Daud      |
| Child Birth Date    | 10/08/2021                | Child Age     | 3 weeks             |
| Screening Test Date | 01/09/2021                | Examiner Name | Adriana Binti Ahmad |

### Language Skills

**1. Respond To Bell**

Pass       No opportunity  
 Fail       Refusal      [Clear choice](#)

Percentage children passing is 90% in age 24 weeks old

**2. Vocalizes**

Pass       No opportunity  
 Fail       Refusal      [Clear choice](#)

Percentage children passing is 90%

**3. Make sound "OOH/AAH"**

Pass       No opportunity  
 Fail       Refusal      [Clear choice](#)

Percentage children passing is between 25%-50%

[Finish](#)

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Figure 4.16 Add Language Screening Test Page

Figure 4.17 below shows the page of child screening test for the screening area category gross motor that is displayed when occupational therapist users click the “Do Gross Motor” button from Figure 4.13. This page displays all the tasks and questions for the gross motor screening area category based on child age with answer options of pass, fail, refusal (child refuse to do the tasks) and no opportunity along with the current inserted child information which are child name, parent name, child birth date, child age, examiner name and screening test date. After all the tasks or questions of the gross motor area category is answered and done with the child, occupational therapist clicks the “Finish” button to add and stored the child screening test for gross motor area category in the system database.

**CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM** Logout

Occupational Therapist Dashboard > Child Screening Test > Screening Test Area Category

**Child Screening Test**

|                     |                           |               |                     |
|---------------------|---------------------------|---------------|---------------------|
| Child Name          | Muhammad Asyraf Bin Helmi | Parent Name   | Helmi Bin Daud      |
| Child Birth Date    | 10/08/2021                | Child Age     | 3 weeks             |
| Screening Test Date | 01/09/2021                | Examiner Name | Adriana Binti Ahmad |

**Gross Motor Skills**

**1. Equal Movements**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is between 75%-90% in age 12 weeks old

**2. Lift Head**

Pass                       No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is between 75%-90% in age 12 weeks old

**3. Head Up 45°**

Pass                               No opportunity  
 Fail                               Refusal                      [Clear choice](#)

Percentage children passing is between 25%-50% in age between 0 month to 1 month

[Finish](#)

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Figure 4.17 Add Gross Motor Screening Test Page

Figure 4.18 below shows the child screening test details information after occupational therapist users complete the screening test for the child by clicking the “Done” button from Figure 4.13 or “View Details” link button from the list of child screening test in Figure 4.11. This page consists of the details information of child screening test which are child name, child birth date, child age, parent name, examiner name and screening test date along with the screening test information for personal social, fine motor adaptive, language and gross motor area category which are tasks name and result score.

Little Ones Eduworld CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

Occupational Therapist Dashboard > Child Screening Test > View Child Screening Test Information

### Child Screening Test Information Details Back

|                     |                     |
|---------------------|---------------------|
| Child Name          | Farah Binti Jamal   |
| Child Birth Date    | 12/04/2002          |
| Child Age           | 1 months            |
| Parent Name         | Jamal Bin Abdullah  |
| Examiner Name       | Adriana Binti Ahmad |
| Screening Test Date | 30/05/2002          |

#### Personal Social Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Regard Face         | Pass         |
| 2  | Smile Responsively  | Pass         |
| 3  | Smile Spontaneously | Pass         |
| 4  | Regard Own Hand     | Pass         |

#### Fine Motor Adaptive Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Follow To Midline   | Pass         |
| 2  | Follow Past Midline | Pass         |
| 3  | Hands Together      | Pass         |

#### Language Area

| No | List of Tasks         | Result Score |
|----|-----------------------|--------------|
| 1  | Vocalizes             | Pass         |
| 2  | Make sound of OOH/AAH | Pass         |
| 3  | Laughs                | Pass         |
| 4  | Squeals               | Pass         |

#### Gross Motor Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Lift Head           | Pass         |
| 2  | Head Up 45°         | Pass         |
| 3  | Head Up 90°         | Pass         |
| 4  | Sit-Head Steady     | Pass         |
| 5  | Bear Weight On Legs | Pass         |

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Figure 4.18 Details Child Screening Test Page

#### 4.2.3.6 Consultation Interface

Figure 4.19 below shows the consultation page used for occupational therapist users to view the list of consultation that is done based on complete child screening test and stored the consultation information in the CDST system. The list of consultation information is retrieved from the system database which are child name, child birth date, child age, and screening test date display in the table list. Users can click the “View Details” button to view the more detail information of the consultation for the child screening test and also can search specific consultation by inserting the screening test date keyword in the search input. OT users can click the “Add Consultation” link button from any list displayed in the table to redirect to add consultation page to add the consultation for the children in Figure 4.20. The list of consultation displayed in the table is maximum with 5 list information only and have pagination for the next list in the next page where users can click the “Next” button to view next consultation list or “Previous” button to return to the previous list of the consultation to be viewed.

The screenshot displays the 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM' interface for an Occupational Therapist. The page title is 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM' and the user is logged in as 'Occupational Therapist'. The breadcrumb trail is 'Dashboard > Screening Test Consultation'. A search bar is located at the top with the placeholder text 'dd/mm/yyyy' and a 'Search' button. The main content area contains a table with the following data:

| Child Name                | Child Birth Date | Child Age        | Screening Test Date |                                  |
|---------------------------|------------------|------------------|---------------------|----------------------------------|
| Farah Binti Jamal         | 12/04/2002       | 1 months         | 30/05/2002          | <a href="#">View Details</a>     |
| Farah Binti Jamal         | 12/04/2002       | 1 years 2 months | 24/06/2003          | <a href="#">View Details</a>     |
| Muhammad Hakim Bin Amirul | 08/07/2008       | 3 weeks          | 01/08/2008          | <a href="#">Add Consultation</a> |
| Nur Aisyah Binti Fakhrol  | 10/03/2010       | 1 months         | 01/05/2010          | <a href="#">View Details</a>     |
| Muhammad Asyraf Bin Helmi | 10/08/2021       | 3 weeks          | 01/09/2021          | <a href="#">Add Consultation</a> |

At the bottom right of the table, there are pagination controls: 'Previous', '1', and 'Next' buttons. The footer contains 'Privacy Policy Terms of Use' and '© 2023 Child Development Screening Test, Malaysia'.

Figure 4.19 Consultation Page

Figure 4.20 below shows the add consultation page for the occupational therapist users to add consultation for the selected child screening test from Figure 4.19. This add consultation page consist with the child screening test information which are child name, parent name, child birth date, child age, screening test date and examiner name. A dynamic input form for consultation is provided that consists with consultation date, screening area category and history description. To add more consultation information, users can click the “Add Row” button that will display additional row for the screening area category and history description to be filled in. If users want to delete any added consultation information in the row list, users can click the “X” icon button to delete the consultation information in row. After users complete the consultation information, clicks the “Add Consultation” button to add and stored the consultation information in the system database.

The screenshot shows the 'Add Consultation Screening Test' page. The page has a blue header with the system name and a 'Logout' link. A left sidebar shows the user role 'Occupational Therapist' and navigation options: Dashboard, Screening Test, Consultation, and Report. The main content area is titled 'Add Consultation Screening Test' and contains a form with the following fields:

|                     |                           |               |                     |
|---------------------|---------------------------|---------------|---------------------|
| Child Name          | Muhammad Hakim Bin Amirul | Parent Name   | Amirul Bin Mukmin   |
| Child Birth Date    | 08/07/2008                | Child Age     | 3 weeks             |
| Screening Test Date | 01/08/2008                | Examiner Name | Adriana Binti Ahmad |

Below the table, there is a 'Consultation Date' field with a date picker (dd/mm/yyyy) and a '+ Add Row' button. Underneath is a table for 'Screening Area Category' and 'History Description':

| Screening Area Category | History Description | Action |
|-------------------------|---------------------|--------|
| Choose Screening Area   |                     | X      |

At the bottom of the form are 'Cancel' and 'Add Consultation' buttons. The footer contains 'Privacy Policy Terms of Use' and '© 2023 Child Development Screening Test, Malaysia'.

Figure 4.20 Add Consultation Page

Figure 4.21 below shows the consultation details information that is displayed after occupational therapist users add the consultation information for the child by clicking the “Add Consultation” button from Figure 4.20 or “View Details” link button from the list

of consultation in Figure 4.19. This page consists of the details information of consultation which are child name, child birth date, child age, parent name, examiner name and screening test date along with the consultation information for consultation date, list of screening development area with its history description.

The screenshot shows a web interface for an Occupational Therapist. The header includes the logo 'Little Ones Eduworld' and the system name 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM'. A navigation menu on the left lists 'Dashboard', 'Screening Test', 'Consultation', and 'Report'. The main content area is titled 'View Consultation Details' and contains two tables. The first table lists child and parent information, and the second table lists screening development areas and their descriptions.

| Child Name          | Farah Binti Jamal | Parent Name   | Jamal Bin Abdullah  |
|---------------------|-------------------|---------------|---------------------|
| Child Birth Date    | 12/04/2002        | Child Age     | 1 months            |
| Screening Test Date | 30/05/2002        | Examiner Name | Adriana Binti Ahmad |

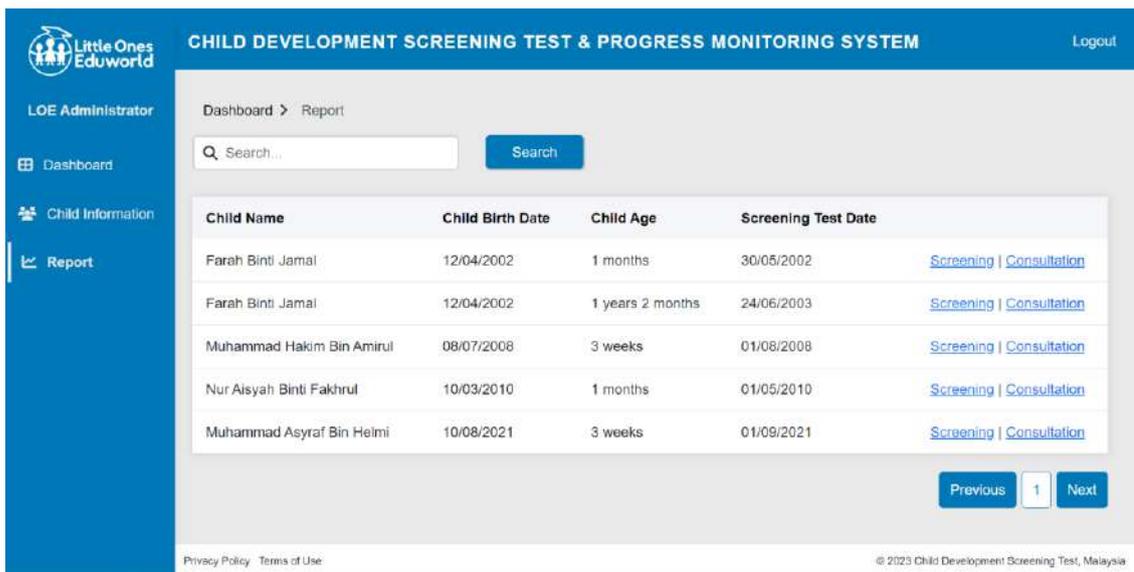
  

| Consultation Date          | 18/01/2003                  |
|----------------------------|-----------------------------|
| Screening Development Area | Description                 |
| Personal Social Area       | Testing personal social     |
| Fine Motor-Adaptive Area   | Testing fine motor adaptive |

Figure 4.21 Details Consultation Information Page

#### 4.2.3.7 Report Interface

Figure 4.22 and Figure 4.23 below shows the screening test page used for LOE administrator and occupational therapist users to view the list of screening and consultation reports of children in the CDST system. The list of screening and consultation reports are retrieved from the system database which are child name, child birth date, child age and screening test date display in the table list. Users can choose the actions to view the details information of child screening report by clicking the “Screening” link button that will redirect to the screening report details of xx or view the details information of child consultation report by clicking the “Consultation” link button that will redirect to the consultation report details of xx. Besides, users also can search specific screening and consultation report of children by inserting the child’s name keyword in the search input and click the “Search” button to retrieve the specific screening and consultation report of searched child. The list of reports displayed in the table is maximum with 5 list information only and have pagination for the next list in the next page where users can click the “Next” button to view next reports list or “Previous” button to return to the previous list of the reports to be viewed.



The screenshot displays the 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM' interface. The user is logged in as 'LOE Administrator'. The page title is 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM' with a 'Logout' link. The breadcrumb is 'Dashboard > Report'. There is a search bar with the text 'Search...' and a 'Search' button. Below the search bar is a table with the following data:

| Child Name                | Child Birth Date | Child Age        | Screening Test Date |  |
|---------------------------|------------------|------------------|---------------------|--|
| Farah Binti Jamal         | 12/04/2002       | 1 months         | 30/05/2002          | <a href="#">Screening</a>   <a href="#">Consultation</a> |
| Farah Binti Jamal         | 12/04/2002       | 1 years 2 months | 24/06/2003          | <a href="#">Screening</a>   <a href="#">Consultation</a> |
| Muhammad Hakim Bin Amirul | 08/07/2008       | 3 weeks          | 01/08/2008          | <a href="#">Screening</a>   <a href="#">Consultation</a> |
| Nur Aisyah Binti Fakhrol  | 10/03/2010       | 1 months         | 01/05/2010          | <a href="#">Screening</a>   <a href="#">Consultation</a> |
| Muhammad Asyraf Bin Helmi | 10/08/2021       | 3 weeks          | 01/09/2021          | <a href="#">Screening</a>   <a href="#">Consultation</a> |

At the bottom right of the table area, there are pagination buttons: 'Previous', '1', and 'Next'. At the bottom left, there are links for 'Privacy Policy' and 'Terms of Use'. At the bottom right, there is a copyright notice: '© 2023 Child Development Screening Test, Malaysia'.

Figure 4.22 Report Page – LOE Admin

Occupational Therapist

Dashboard > Report

Search...

| Child Name                | Child Birth Date | Child Age        | Screening Test Date |
|---------------------------|------------------|------------------|---------------------|
| Farah Binti Jamal         | 12/04/2002       | 1 months         | 30/05/2002          |
| Farah Binti Jamal         | 12/04/2002       | 1 years 2 months | 24/06/2003          |
| Muhammad Hakim Bin Amirul | 08/07/2008       | 3 weeks          | 01/08/2008          |
| Nur Aisyah Binti Fakhrol  | 10/03/2010       | 1 months         | 01/05/2010          |
| Muhammad Asyraf Bin Helmi | 10/08/2021       | 3 weeks          | 01/09/2021          |

Previous 1 Next

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Figure 4.23 Report Page – OT

Figure 4.24 below shows the child screening report details page to be viewed by the LOE administrator and occupational therapist users that consists with the child information of child name, child birth date, child age, parent name, examiner name and screening test date along with the details information of screening test and result score for each screening area category which are personal social area, fine motor adaptive area, language area and gross motor area. LOE administrator and occupational therapist users can click the “Back” button to return to the list report page of Figure 4.22 or Figure 4.23 and also can click the “Export to PDF” button to export and download the screening report details in PDF file as in Figure 4.26.

Little Ones Eduworld CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM Logout

LOE Administrator Dashboard > Report > Screening Test Report

Dashboard Child Information Report

### Child Information Details

Back Export to PDF

|                     |                     |
|---------------------|---------------------|
| Child Name          | Farah Binti Jamal   |
| Child Birth Date    | 12/04/2002          |
| Child Age           | 1 months            |
| Parent Name         | Jamal Bin Abdullah  |
| Examiner Name       | Adriana Binti Ahmad |
| Screening Test Date | 30/05/2002          |

### Personal Social Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Regard Face         | Pass         |
| 2  | Smile Responsively  | Pass         |
| 3  | Smile Spontaneously | Pass         |
| 4  | Regard Own Hand     | Pass         |

### Fine Motor Adaptive Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Follow To Midline   | Pass         |
| 2  | Follow Past Midline | Pass         |
| 3  | Hands Together      | Pass         |

### Language Area

| No | List of Tasks         | Result Score |
|----|-----------------------|--------------|
| 1  | Vocalizes             | Pass         |
| 2  | Make sound of OOH/AAH | Pass         |
| 3  | Laughs                | Pass         |
| 4  | Squeals               | Pass         |

### Gross Motor Area

| No | List of Tasks       | Result Score |
|----|---------------------|--------------|
| 1  | Lift Head           | Pass         |
| 2  | Head Up 45°         | Pass         |
| 3  | Head Up 90°         | Pass         |
| 4  | Sit-Head Steady     | Pass         |
| 5  | Bear Weight On Legs | Pass         |

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Figure 4.24 Details Screening Report Page

Figure 4.25 below shows the child consultation report details page to be viewed by the LOE administrator and occupational therapist users that consists with the child information of child name, child birth date, child age, parent name, examiner name and screening test date along with the details information of consultation which are consultation date, screening development area and each of the history description. LOE administrator and occupational therapist users can click the “Back” button to return to the report page of Figure 4.22 or Figure 4.23 and also can click the “Export to PDF” button to export and download the consultation report details in PDF file as in Figure 4.27.

The screenshot shows the 'View Consultation Details' page. At the top, there is a blue header with the logo 'Little Ones Eduworld' and the text 'CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM'. Below the header, there is a breadcrumb trail: 'Dashboard > Report > Consultation Report'. The main content area is titled 'View Consultation Details' and includes two buttons: 'Back' and 'Export to PDF'. The data is presented in two tables.

|                     |                   |               |                     |
|---------------------|-------------------|---------------|---------------------|
| Child Name          | Farah Binti Jamal | Parent Name   | Jamal Bin Abdullah  |
| Child Birth Date    | 12/04/2002        | Child Age     | 1 months            |
| Screening Test Date | 30/05/2002        | Examiner Name | Adriana Binti Ahmad |

| Consultation Date          | 18/01/2003                  |
|----------------------------|-----------------------------|
| Screening Development Area | Description                 |
| Personal Social Area       | Testing personal social     |
| Fine Motor-Adaptive Area   | Testing fine motor adaptive |

At the bottom of the page, there is a footer with 'Privacy Policy Terms of Use' on the left and '© 2023 Child Development Screening Test, Malaysia' on the right.

Figure 4.25 Details Consultation Report Page

Figure 4.26 below shows the child screening report details in PDF view after LOE administrator or occupational therapist users click the “Export to PDF” button from xx. The child screening report details in PDF consist with the child information of child name, child birth date, child age, parent name, examiner name and screening test date along with the details information of screening test and result score for each screening area category which are personal social area, fine motor adaptive area, language area and gross motor area.

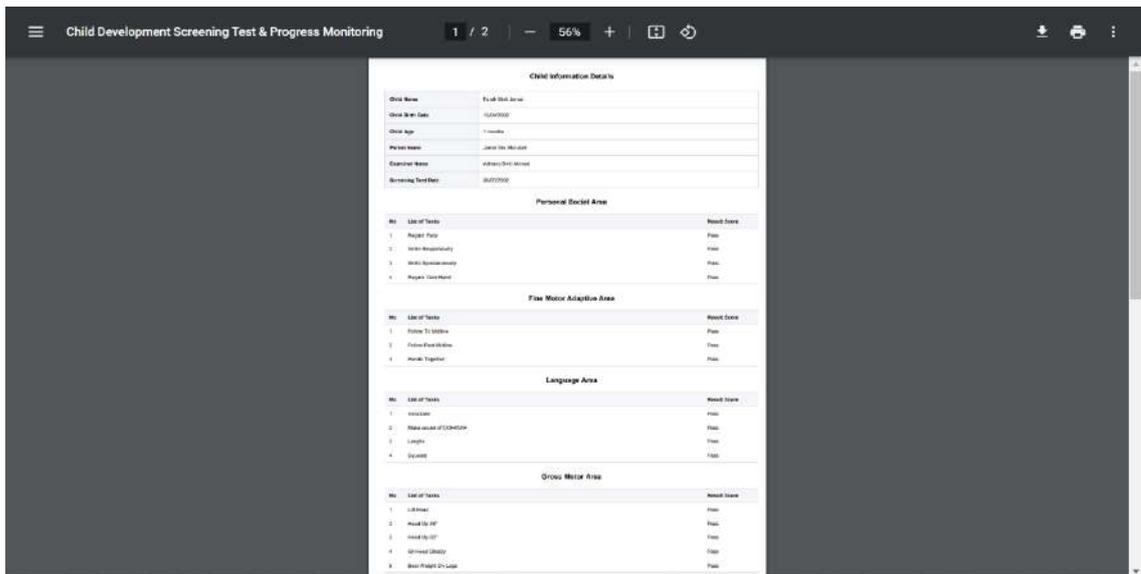


Figure 4.26 PDF Screening Report Page

Figure 4.27 below shows the child consultation report details in PDF view after LOE administrator or occupational therapist users click the “Export to PDF” button from xx. The child consultation report details in PDF consist with the child information of child name, child birth date, child age, parent name, examiner name and screening test date along with the details information of consultation which are consultation date, screening development area and each of the history description.

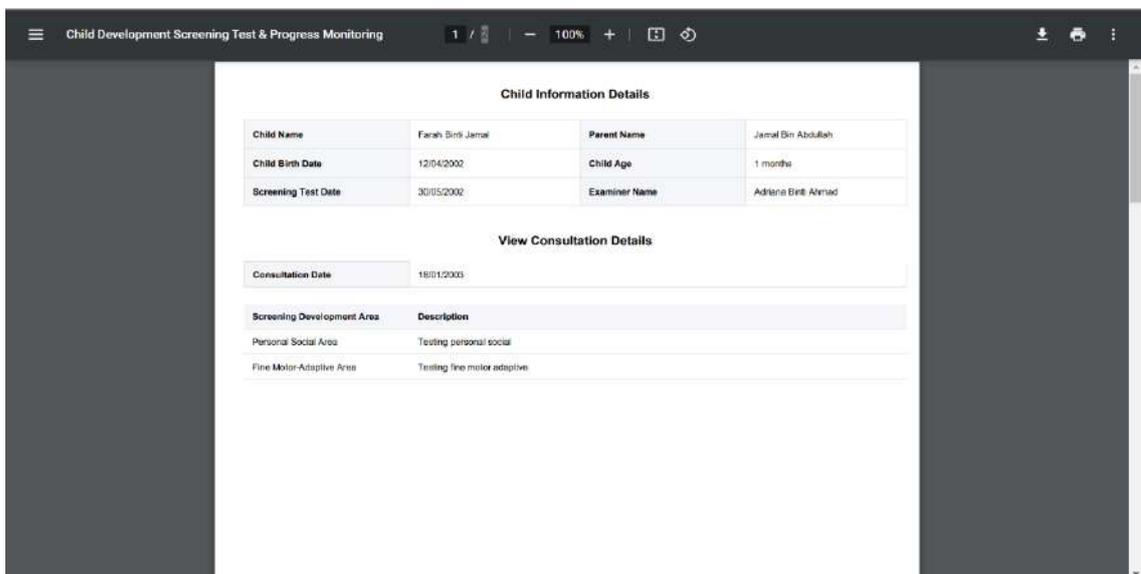


Figure 4.27 PDF Consultation Report Page



```

OccupationalTherapist.php - cdst-app - Visual Studio Code
...
namespace App\Models;
use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;

class OccupationalTherapist extends Model
{
    use HasFactory;

    protected $table = 'occupational_therapist_users';
    protected $primaryKey = 'oc_id';

    protected $fillable = [
        'full_name',
        'email',
        'phone_number',
        'gender',
        'address',
        'password',
        'qualifications',
        'user_category',
    ];

    protected $hidden = [
        'password',
        'remember_token',
    ];

    public function user_login()
    {
        return $this->hasManyThrough('user_logins');
    }

    public function getRoleAttributes()
    {
        return $this->getAttributes()['user_category'];
    }
}

```

Figure 4.29 OccupationalTherapist Model Code

The LoeAdministrator model in Figure 4.30 below is used for the interaction of LOE administrator user with the CDST database. It connected with the table of `loe_administrator_users` and `user_logins` in the system database and involves with necessary loe administrator’s attributes which are `loadadmin_id`, `email`, `password` and `user_category`.

```

LoeAdministrator.php - cdst-app - Visual Studio Code
...
namespace App\Models;
use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;

class LoeAdministrator extends Model
{
    use HasFactory;

    protected $table = 'loe_administrator_users';
    protected $primaryKey = 'loadadmin_id';

    protected $fillable = [
        'email',
        'password',
        'user_category',
    ];

    protected $hidden = [
        'password',
        'remember_token',
    ];

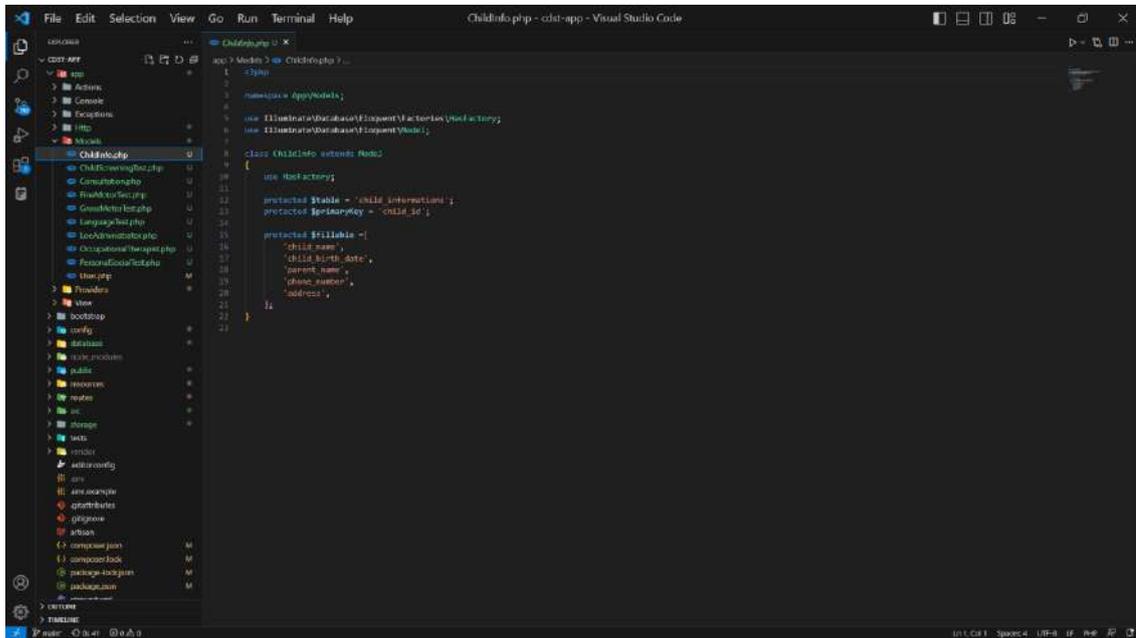
    public function user_login()
    {
        return $this->hasManyThrough('user_logins');
    }

    public function getRoleAttributes()
    {
        return $this->getAttributes()['user_category'];
    }
}

```

Figure 4.30 LoeAdministrator Model Code

The ChildInfo model in Figure 4.31 below is used for the interaction of registered child information with the CDST database. It connected with the table of child\_informations in the system database and involves with necessary child information's attributes which are child\_id, child name, child\_birth\_date, parent\_name, phone\_number and address.



```
1 <?php
2
3 namespace App\Models;
4
5 use Illuminate\Database\Eloquent\Factories\HasFactory;
6 use Illuminate\Database\Eloquent\Model;
7
8 class ChildInfo extends Model
9 {
10     use HasFactory;
11
12     protected $table = 'child_informations';
13     protected $primaryKey = 'child_id';
14
15     protected $fillable = [
16         'child_name',
17         'child_birth_date',
18         'parent_name',
19         'phone_number',
20         'address',
21     ];
22 }
23
```

Figure 4.31 ChildInfo Model Code

The ChildScreeningTest model in Figure 4.32 below is used for the interaction of child screening test with the CDST database. It connected with the table of child\_screening\_tests in the system database and involves with necessary child screening test's attributes which are child\_screening\_id, child\_name, child\_birth\_date, parent\_name, screening\_test\_date, child\_age and examiner name. This model only can be used by occupational therapist users and have one-to-one relationship with screening area category model which are PersonalSocial, FineMotor, Language and GrossMotor models and also have one-to-one relationship with Consultation model.

```

1 <?php
2 namespace App\Models;
3
4 use Illuminate\Database\Eloquent\Factories\HasFactory;
5 use Illuminate\Database\Eloquent\Model;
6
7 class ChildScreeningTest extends Model
8 {
9     use HasFactory;
10
11     protected static $table = 'child_screening_tests';
12     protected $primaryKey = 'child_screening_id';
13
14     protected $fillable = [
15         'child_name',
16         'parent_name',
17         'child_birth_date',
18         'screening_test_date',
19         'child_age',
20         'number_name',
21         'personal_social_id',
22         'first_name_id',
23         'language_id',
24         'gross_motor_id',
25         'consultation_id',
26     ];
27
28     public function personalSocialTest()
29     {
30         return $this->hasMany(PersonalSocialSkill::class);
31     }
32
33     public function firstMotorTest()
34     {
35         return $this->hasMany(FirstMotorSkill::class);
36     }
37
38     public function languageTest()
39     {
40         return $this->hasMany(LanguageSkill::class);
41     }
42
43     public function grossMotorTest()
44     {
45         return $this->hasMany(GrossMotorSkill::class);
46     }
47 }

```

Figure 4.32 ChildScreeningTest Model Code

The PersonalSocial model in Figure 4.33 below is used for the interaction of screening area category of personal social with the CDST database. It connected with the table of child\_screening\_tests and personal\_social\_skills in the system database and involves with necessary personal social area's attributes which are personal\_social\_id, personal\_social\_question\_id, personal\_social\_question, personal\_social\_answer. This model has one-to-one relationship with ChildScreeningTest model.

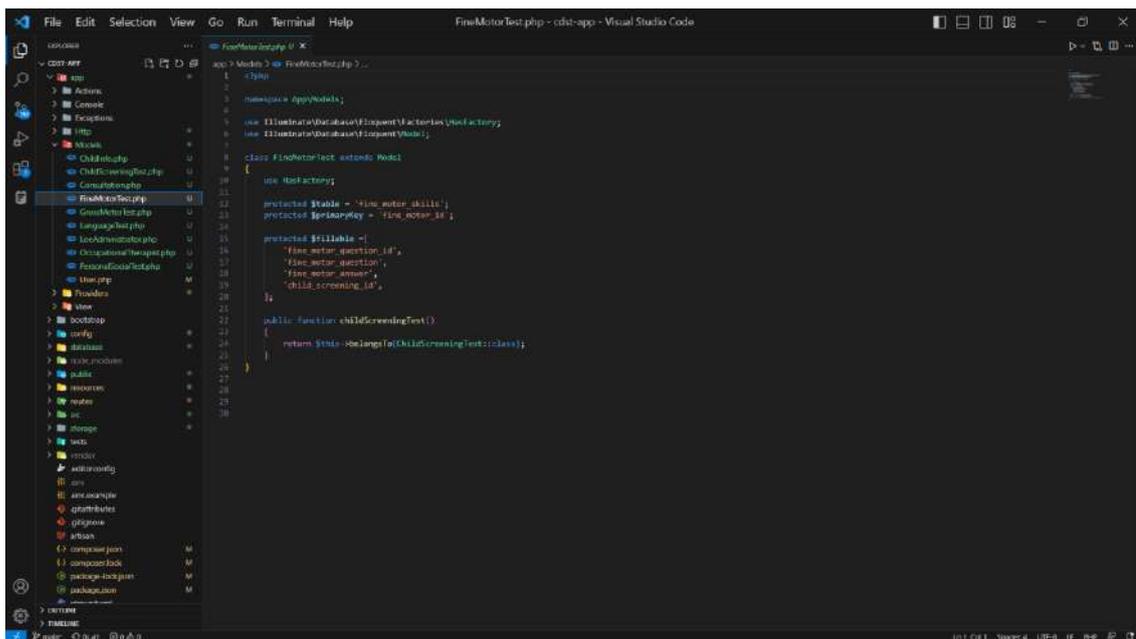
```

1 <?php
2 namespace App\Models;
3
4 use Illuminate\Database\Eloquent\Factories\HasFactory;
5 use Illuminate\Database\Eloquent\Model;
6
7 class PersonalSocialTest extends Model
8 {
9     use HasFactory;
10
11     protected static $table = 'personal_social_skills';
12     protected $primaryKey = 'personal_social_id';
13
14     protected $fillable = [
15         'personal_social_question_id',
16         'personal_social_question',
17         'personal_social_answer',
18         'child_screening_id',
19     ];
20
21     public function childScreeningTest()
22     {
23         return $this->hasOne(ChildScreeningTest::class);
24     }
25 }

```

Figure 4.33 PersonalSocial Model Code

The FineMotor model in Figure 4.34 below is used for the interaction of screening area category of fine motor adaptive with the CDST database. It connected with the table of child\_screening\_tests and fine\_motor\_skills in the system database and involves with necessary fine motor adaptive area's attributes which are fine\_motor\_id, fine\_motor\_question\_id, fine\_motor\_question, fine\_motor\_answer. This model has one-to-one relationship with ChildScreeningTest model.



```
File Edit Selection View Go Run Terminal Help
FineMotorTest.php - cdst-app - Visual Studio Code
app > Models > FineMotorTest.php
namespace App\Models;

use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;

class FineMotorTest extends Model
{
    use HasFactory;

    protected $table = 'fine_motor_skills';
    protected $primaryKey = 'fine_motor_id';

    protected $fillable = [
        'fine_motor_question_id',
        'fine_motor_question',
        'fine_motor_answer',
        'child_screening_id',
    ];

    public function childScreeningTest()
    {
        return $this->hasOne(ChildScreeningTest::class);
    }
}
```

Figure 4.34 FineMotor Model Code

The Language model in Figure 4.35 below is used for the interaction of screening area category of language with the CDST database. It connected with the table of child\_screening\_tests and language\_skills in the system database and involves with necessary language area's attributes which are language\_id, language\_question\_id, language\_question, language\_answer. This model has one-to-one relationship with ChildScreeningTest model.

```

1 <?php
2 namespace App\Models;
3
4 use Illuminate\Database\Eloquent\Factories\HasFactory;
5 use Illuminate\Database\Eloquent\Model;
6
7 class LanguageTest extends Model
8 {
9     use HasFactory;
10
11     protected $table = 'language_skills';
12     protected $primaryKey = 'language_id';
13
14     protected $fillable = [
15         'language_question_id',
16         'language_question',
17         'language_answer',
18         'child_screening_id',
19     ];
20
21     public function childScreeningTest()
22     {
23         return $this->hasMany(ChildScreeningTest::class);
24     }
25 }

```

Figure 4.35 Language Model Code

The GrossMotor model in Figure 4.36 below is used for the interaction of screening area category of gross motor with the CDST database. It connected with the table of child\_screening\_tests and gross\_motor\_skills in the system database and involves with necessary gross motor area's attributes which are gross\_motor\_id, gross\_motor\_question\_id, gross\_motor\_question, gross\_motor\_answer. This model has one-to-one relationship with ChildScreeningTest model.

```

1 <?php
2 namespace App\Models;
3
4 use Illuminate\Database\Eloquent\Factories\HasFactory;
5 use Illuminate\Database\Eloquent\Model;
6
7 class GrossMotorTest extends Model
8 {
9     use HasFactory;
10
11     protected $table = 'gross_motor_skills';
12     protected $primaryKey = 'gross_motor_id';
13
14     protected $fillable = [
15         'gross_motor_question_id',
16         'gross_motor_question',
17         'gross_motor_answer',
18         'child_screening_id',
19     ];
20
21     public function childScreeningTest()
22     {
23         return $this->hasMany(ChildScreeningTest::class);
24     }
25 }

```





Figure 4.39 User Registration Page View Code

```
dashboard.blade.php - cdst-app - Visual Studio Code  
...  
<div class="row">  
  <div class="col">  
    <div class="card">  
      <div class="card-body">  
        <h4>Dashboard Info</h4>  
        <div class="row">  
          <div class="col">  
            <div class="card">  
              <div class="card-body">  
                <h4>Total Registered Children</h4>  
                <div class="row">  
                  <div class="col">  
                    <div class="card">  
                      <div class="card-body">  
                        <h4>Total Screening Tests</h4>  
                        <div class="row">  
                          <div class="col">  
                            <div class="card">  
                              <div class="card-body">  
                                <h4>Total Consultations</h4>  
                                <div class="row">  
                                  <div class="col">  
                ...
```

Figure 4.40 LOE Admin Dashboard Page View Code

```
dashboard.blade.php - cdst-app - Visual Studio Code  
...  
<div class="row">  
  <div class="col">  
    <div class="card">  
      <div class="card-body">  
        <h4>Dashboard Info</h4>  
        <div class="row">  
          <div class="col">  
            <div class="card">  
              <div class="card-body">  
                <h4>Total Registered Children</h4>  
                <div class="row">  
                  <div class="col">  
                    <div class="card">  
                      <div class="card-body">  
                        <h4>Total Screening Tests</h4>  
                        <div class="row">  
                          <div class="col">  
                            <div class="card">  
                              <div class="card-body">  
                                <h4>Total Consultations</h4>  
                                <div class="row">  
                                  <div class="col">  
                ...
```

Figure 4.41 OT Dashboard Page View Code

```

File Edit Selection View Go Run Terminal Help
main-child.blade.php - crst-app - Visual Studio Code

<!-- Start Search Input Bar -->
<div class="row">

    <form action="{{ route('dashboard.index-children') }}" method="GET">
        <div class="search-bar">

            <input type="text" name="child_name" class="form-control" placeholder="Search Child Name" />
            <button class="btn search-btn btn-primary" type="submit">Search</button>

        </div>

    </form>

    <!-- End Search Input Bar -->

    <!-- Start Table -->
    <table class="display-table">

        <thead>

            <tr>

                <th>Child Name</th>
                <th>Child Birth Date</th>
                <th>Parent Name</th>
                <th>Phone Number</th>
            </tr>

        </thead>

        <tbody>

            <!-- Else (If $child as $child) -->
            <tr>

                <td><input type="text" name="child_id" value="{{ $child->id }}" class="form-control" /></td>
                <td>{{ date('d/m/Y', strtotime($child->child_birth_date)) }}</td>
                <td>{{ $child->parent_name }}</td>
                <td>{{ $child->phone_number }}</td>
                <td style="text-align:center"><a href="{{ route('dashboard.show-children', ['child_id' => $child->id]) }}">View Details</a>
            </tr>

        </tbody>

    </table>

    <!-- End Table -->
    </div>

```

Figure 4.42 List Child Information Page View Code

```

File Edit Selection View Go Run Terminal Help
child-info.blade.php - crst-app - Visual Studio Code

<div class="card no-auto-shade border">
    <div class="card-body py-6 px-4">
        <div class="row d-flex justify-content-center">
            <div class="col-lg-12">
                <div class="border-bottom p-0 Child Information Details">
                    <a href="{{ route('dashboard.index-children') }}">
                        <button class="btn btn-back btn-primary" type="button">Back</button>
                    </a>

                    <hr style="border: 0.5px solid #ccc; margin: 5px 0;" />

                    <table class="table">
                        <thead>
                            <tr>
                                <th style="text-align:left">Child Name</th>
                                <th style="text-align:left">Child Birth Date</th>
                                <th style="text-align:left">Parent Name</th>
                                <th style="text-align:left">Phone Number</th>
                            </tr>
                        </thead>
                        <tbody>
                            <tr>
                                <td>{{ $child->child_name }}</td>
                                <td>{{ date('d/m/Y', strtotime($child->child_birth_date)) }}</td>
                                <td>{{ $child->parent_name }}</td>
                                <td>{{ $child->phone_number }}</td>
                            </tr>
                        </tbody>
                    </table>
                </div>
            </div>
        </div>
    </div>

```

Figure 4.43 Details Child Information Page View Code









```

main-report.blade.php - cdst-app - Visual Studio Code
...
<table class="display-table">
  <thead>
    <tr>
      <th>Child Name</th>
      <th>Child Birth Date</th>
      <th>Child Age</th>
      <th>Screening Test Date</th>
      <th></th>
    </tr>
  </thead>
  <tbody>
    @foreach ($ChildReports as $ChildReport)
      <tr>
        <td><input type="hidden" name="child_screening_id" value="{{ $ChildReport->child_screening_id }}" />
          <td>{{ data('d/m/Y', strtotime($ChildReport->child_birth_date)) }}</td>
          <td>{{ $ChildReport->child_age }}</td>
          <td>{{ data('d/m/Y', strtotime($ChildReport->screening_test_date)) }}</td>
          <td style="text-align:center"><a href="{{ route('show-screening-report', ['child_screening_id' => $ChildReport->child_screening_id]) }}">
            <input type="button" value="report available"/>
          </td>
        </tr>
      @endforeach
    </tbody>
  </table>
  <div class="text-align:right">
    <div class="pagination">
      <a href="{{ $ChildReports->previousPage() }}" class="page-link({ $ChildReports->currentPage() + 1 ? '' : 'disabled' })">Previous</a>
      @for ($i = 1; $i <= $ChildReports->lastPage(); $i++)
        <a href="{{ $ChildReports->url($i) }}" class="page-link({ $ChildReports->currentPage() == $i ? 'active' : '' })"{{ $ChildReports->currentPage() == $i ? '' : 'disabled' }}>{{ $i }}</a>
      @endfor
      <a href="{{ $ChildReports->nextPage() }}" class="page-link({ $ChildReports->currentPage() < $ChildReports->lastPage() ? '' : 'disabled' })">Next</a>
    </div>
  </div>

```

Figure 4.52 List Report Page View Code

```

screening-report.blade.php - cdst-app - Visual Studio Code
...
<table class="screening-report-table">
  <tbody>
    @if ($ScreeningReports->isEmpty())
      <tr>
        <td colspan="6"><input type="hidden" name="child_screening_id" value="{{ $ScreeningReport->child_screening_id }}" />
      </td>
    @endif
    <tr>
      <td><input type="text" value="{{ $ScreeningReport->child_name }}" />
    </td>
    <tr>
      <td><input type="text" value="{{ data('d/m/Y', strtotime($ScreeningReport->child_birth_date)) }}" />
    </td>
    <tr>
      <td><input type="text" value="{{ $ScreeningReport->child_age }}" />
    </td>
    <tr>
      <td><input type="text" value="{{ $ScreeningReport->parent_name }}" />
    </td>
    <tr>
      <td><input type="text" value="{{ $ScreeningReport->examiner_name }}" />
    </td>
    <tr>
      <td><input type="text" value="{{ data('d/m/Y', strtotime($ScreeningReport->screening_test_date)) }}" />
    </td>
    <tr>
      <td colspan="6" style="text-align:right"><input type="button" value="Back" />
    </td>
  </tbody>
</table>

```

Figure 4.53 Details Screening Report Page View Code



```

<div class="card-body py-6 px-4">
  <div class="row g-4 justify-content-center">
    <div class="col-12">
      <h2 class="fw-bold mb-6">Child Information Details</h2>
      <!-- Start Table -->
      <table class="consultation-report-table" style="width: 100%; border-collapse: collapse;">
        <tbody>
          <tr>
            <td colspan="2" <!-- If ($consultationreports->isNotEmpty()) -->
              <!-- foreach ($consultationreports as $consultationreport) -->
                <tr>
                  <td style="width: 15%; font-weight: bold;">Child Name</td>
                  <td>{{ $consultationreport->child_name }}</td>
                </tr>
                <tr>
                  <td style="font-weight: bold;">Parent Name</td>
                  <td>{{ $consultationreport->parent_name }}</td>
                </tr>
                <tr>
                  <td style="font-weight: bold;">Child Birth Date</td>
                  <td>{{ date("d/m/Y", strtotime($consultationreport->child_birth_date)) }}</td>
                </tr>
                <tr>
                  <td style="font-weight: bold;">Child Age</td>
                  <td>{{ $consultationreport->child_age }}</td>
                </tr>
                <tr>
                  <td style="font-weight: bold;">Screening Test Date</td>
                  <td>{{ date("d/m/Y", strtotime($consultationreport->screening_test_date)) }}</td>
                </tr>
                <tr>
                  <td style="font-weight: bold;">Examiner Name</td>
                  <td>{{ $consultationreport->examiner_name }}</td>
                </tr>
              </tbody>
            </tr>
          </tbody>
        </table>
      </div>
    </div>
  </div>
</div>

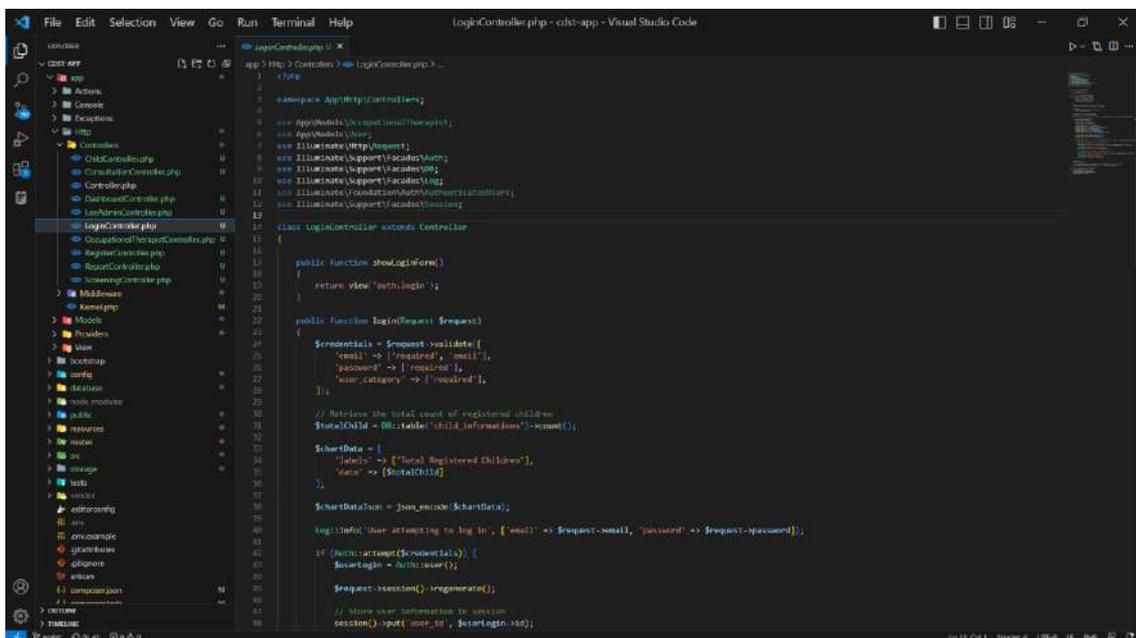
```

Figure 4.56 PDF Consultation Report Page View Code

### 4.2.4.3 Controller – MVC Architecture

Controller in the Laravel project's MVC architecture in the CDST system is used as connection between the Model and View. The controller receives the user input and interact with the Model to retrieve or modify CDST data from database and send the CDST data to View to be displayed.

Login controller in Figure 4.57 below is used to handle login and logout user requests that retrieve data from the database table of user\_logins through the connection with User model. It has method of showLoginForm() to display the system login page, login() that used to handle and receives user inputs of login credentials from login form in Login page and interact with User model to retrieve user login data from user\_logins database table and send the data to give response by providing login session and redirect to Dashboard Page and also logout() for users to end the login session within the system.



```
File Edit Selection View Go Run Terminal Help
LoginController.php - cdst-app - Visual Studio Code
...
app > Http > Controllers > LoginController.php
1 <?php
2
3 namespace App\Http\Controllers;
4
5 use Illuminate\Http\Request;
6 use App\Models\User;
7 use Illuminate\Http\Request;
8 use Illuminate\Support\Facades\Auth;
9 use Illuminate\Support\Facades\Log;
10 use Illuminate\Support\Facades\Hash;
11 use Illuminate\Foundation\Auth\AuthenticatesUsers;
12 use Illuminate\Support\Facades\Redis;
13
14 class LoginController extends Controller
15 {
16     public function showLoginForm()
17     {
18         return view('auth.login');
19     }
20
21     public function login(Request $request)
22     {
23         $credentials = $request->validate([
24             'email' => ['required', 'email'],
25             'password' => ['required'],
26             'captcha' => ['required'],
27         ]);
28
29         // Retrieve the total count of registered children
30         $totalChild = DB::table('child_informations')->count();
31
32         $chartData = [
33             'total' => ['Total Registered Children'],
34             'data' => [$totalChild]
35         ];
36
37         $chartDataSum = json_encode($chartData);
38
39         Log::info('User attempting to log in.', ['email' => $request->email, 'password' => $request->password]);
40
41         if (Auth::attempt($credentials)) {
42             $userLogin = Auth::user();
43
44             $request->session()->regenerate();
45
46             // Store user information in session
47             session()->put('user_id', $userLogin->id);
48         }
49     }
50
51     public function logout()
52     {
53         Auth::logout();
54         session()->flush();
55         return redirect('login');
56     }
57 }
```

Figure 4.57 Login Controller

Register controller in Figure 4.58 below is used to handle requests of occupational therapist users registration that used User model and Occupational Therapist model as connection with the system database to store the user registration information. It consists with a few methods which are showRegisterForm() to display the user registration page and store() that is used to receive user inputs of occupational therapist registration information from user registration form in User Registration page and store user registration data in user\_logins and occupational\_therapist\_users database tables and send the data to give response by redirecting to the Login Page.

```

1 <?php
2 namespace App\Http\Controllers;
3 use App\Models\OccupationalTherapist;
4 use App\Models\User;
5 use Illuminate\Http\Request;
6 use Illuminate\Support\Facades\View;
7 use Illuminate\Support\Facades\Validator;
8
9 class RegisterController extends Controller
10 {
11     public function showRegisterForm()
12     {
13         return view('auth.register');
14     }
15
16     public function store(Request $request)
17     {
18         // Validate the inserted registration information from register form
19         $this->validate($request, [
20             'full_name' => ['required', 'string', 'regex:/[a-zA-Zs]{4,}/', 'max:255'],
21             'password' => ['required', 'string', 'min:8'],
22             'email' => ['required', 'string', 'email', 'max:255', 'unique:users,login'],
23             'qualification' => ['required', 'file', 'mimes:pdf,jpg,jpeg,svg,gif', 'max:3000'],
24             'phone_number' => ['required', 'regex:/[0-9]{11}[0-9]{7}/'],
25             'user_category' => ['required', 'in:Occupational Therapist'],
26             'password_confirmation' => ['required', 'string', 'min:8'],
27             'address' => ['required', 'string', 'max:255'],
28         ]);
29
30         // Save the user's qualification file
31         if ($request->hasFile('qualification')) {
32             $file = $request->file('qualification');
33             $filename = $file->getClientOriginalName();
34             $file->storeAs('public/qualification', $filename);
35         }
36
37         // Add and store the new occupational therapist registration in the occupational_therapist_users table
38         $login = new OccupationalTherapist();
39         $login->full_name = $request->input('full_name');
40         $login->email = $request->input('email');
41         $login->phone_number = $request->input('phone_number');
42         $login->password = $request->input('password');
43         $login->address = $request->input('address');
44         $login->qualification = $file->store('public/qualification');
45         $login->user_category = $request->input('user_category');
46         $login->save();
47     }
48 }

```

Figure 4.58 Register Controller

Dashboard controller in Figure 4.59 below is used to handle requests and retrieves data from database tables of child\_informations, screening\_tests and consultations through the connection of ChildInfo, ChildScreeningTest and Consultation model and send the data to give response by displaying all the data in bar graph representation in Dashboard page of LOE admin and OT users. The methods involved in this controller is two which are loadadmin() for retrieving and displaying bar graph to LOE administrator users and ot() for retrieving and displaying bar graph to occupational therapist users.

```

1 <?php
2 namespace App\Http\Controllers;
3
4 use App\Models\ChildInfo;
5 use App\Models\ChildScreeningTest;
6 use App\Models\Consultation;
7 use Illuminate\Http\Request;
8 use Illuminate\Support\Facades\DB;
9
10 class DashboardController extends Controller
11 {
12     //
13     public function loadadmin(Request $request)
14     // Retrieve the total count of registered children
15     $totalChild = ChildInfo::count();
16
17     // Retrieve the total count of screening test
18     $totalScreening = ChildScreeningTest::count();
19
20     // Retrieve the total count of consultation
21     $totalConsultation = Consultation::count();
22
23     // Prepare the chart data label & data
24     $chartData = [
25         'total' => ['Total Registered Children', 'Total Screening Test', 'Total Consultation'],
26         'totalChild' => $totalChild,
27         'totalScreening' => $totalScreening,
28         'totalConsultation' => $totalConsultation
29     ];
30
31     $chartDataJson = json_encode($chartData);
32
33     // Store the chartDataJson value in the session
34     session()->put('chartDataJson', $chartDataJson);
35
36     return view('dashboard.dashboard', ['with' => ['chartDataJson', $chartDataJson]]);
37 }
38
39 public function ot(Request $request)
40 // Retrieve the total count of registered children
41 $totalChild = ChildInfo::count();
42
43 // Retrieve the total count of screening test
44 $totalScreening = ChildScreeningTest::count();
45
46 // Retrieve the total count of consultation
47 $totalConsultation = Consultation::count();
48

```

Figure 4.59 Dashboard Controller

Child controller in Figure 4.60 below is used to retrieve data from database table of child\_informations through ChildInfo model and send the data to give response by displaying all the registered child information data in the list table in Child Information page and display the details child information of specific child in a table in Details Child Information page for LOE administrator users. The methods involves are indexChild() to retrieve all data from child\_information database table and display in a table and showChild() to handle request of selected child id and retrieves details information of the selected child id to display to the users.

```

ChildController.php - cxdt-app - Visual Studio Code
ChildController.php
1 <?php
2 namespace App\Http\Controllers;
3
4 use App\Models\ChildInfo;
5 use Illuminate\Http\Request;
6
7 class ChildController extends Controller
8 {
9     // Method to retrieve and display all registered child records from database in main child table
10    public function indexChild(Request $request)
11    {
12        // Retrieve child information from the database
13        $listChild = ChildInfo::all();
14
15        $query = $request->input('child_name'); // Search child by name
16        $listChild = ChildInfo::where('child_name', 'LIKE', '%' . $query . '%')->paginate(5);
17
18        return view('homeadmin.main-child', ['listChild' => $listChild]);
19    }
20
21    // Method to show the details of selected registered child information page
22    public function showChild($child_id)
23    {
24        $listChild = ChildInfo::where('child_id', $child_id)->paginate(1);
25        return view('homeadmin.child-info', ['listChild' => $listChild]);
26    }
27
28    public function childInfo(Request $request)
29    {
30        // Validate child info st
31        $validatedData = $request->validate([
32            'child_name' => 'required|string|max:255',
33            'parent_name' => 'required|string|max:255',
34            'child_birth_date' => 'required|date',
35            'screening_test_date' => 'required|date',
36            'examiner_name' => 'required|string|max:255',
37            'child_age' => 'required|string',
38        ]);
39
40        // Store child info st to session variable
41        $child_info_st = [
42            'child_name' => $validatedData['child_name'],
43            'parent_name' => $validatedData['parent_name'],
44            'child_birth_date' => $validatedData['child_birth_date'],
45            'screening_test_date' => $validatedData['screening_test_date'],
46            'examiner_name' => $validatedData['examiner_name'],
47            'child_age' => $validatedData['child_age'],
48        ];
49    }
50 }

```

Figure 4.60 Child Controller

Screening controller in Figure 4.61 below is used to handle request and retrieves data with the database tables of child\_information, occupational\_therapist\_users, child\_screening\_tests, personal\_social\_skills, fine\_motor\_skills, language\_skills and gross\_motor\_skills with the connection of ChildInfo, OccupationalTherapist, ChildScreeningTest, PersonalSocialTest, FineMotorTest, LanguageTest and GrossMotor model. The methods involve in this controller are indexScreening() to retrieve and display all child screening test data from child\_screening\_tests database table, createChildScreening() to retrieve and display the add child screening page along with the data of child name and examiner name from database to the OT users, getChildInfo() to handle request from users when users select child name that will retrieve and display parent name and child birth date based on child id from the child name, storeChildScreening() to handle requests of users and store child information for the screening test in the database, showScreeningCategory() to retrieve and display the screening area category along with the stored child information. Then, this controller also have methods of createScreening() to retrieve and display the questions of each screening area category, storeScreening() to handle requests of the screening test answer to store in the system database and showScreening() to retrieve and display the complete child screening test that is stored in the system database.

```

1 namespace App\Http\Controllers;
2
3 use App\Models\Library;
4 use App\Models\ChildScreeningTest;
5 use App\Models\OccupationalTherapist;
6 use App\Models\PersonalSocialTest;
7 use App\Models\FineMotorTest;
8 use App\Models\LanguageTest;
9 use App\Models\GrossMotorTest;
10 use Illuminate\Support\Facades\Auth;
11 use Illuminate\Support\Facades\DB;
12 use Illuminate\Support\Facades\View;
13
14 class ScreeningController extends Controller
15 {
16     // Method to retrieve and display all child screening test records from database to main screening blade
17     public function indexScreening(Request $request)
18     {
19         // Retrieve all child screening test information from the database
20         // $screeningTests = ChildScreeningTest::all();
21
22         // Paginate the list for 5 data
23         // $screeningTests = ChildScreeningTest::paginate(5);
24
25         // Search child by screening test data
26         $query = ChildScreeningTest::query();
27
28         if ($request->input('screening_test_date')) {
29             $query = $query->where('screening_test_date', $request->input('screening_test_date'));
30         }
31
32         $screeningTests = $query->paginate(5);
33
34         return view('ot.main-screening', ['screeningTests' => $screeningTests]);
35     }
36
37     // Method to show child information row for screening test and retrieve child_name, parent_name and child_birth_date from database
38     public function getChildInfo($request)
39     {
40         $childInfo = ChildInfo::all(['child_id', 'child_name']);
41         $examName = OccupationalTherapist::all(['full_name']);
42
43         return view('ot.add-child-screening', ['childInfo' => $childInfo, 'examName' => $examName]);
44     }
45 }

```

Figure 4.61 Screening Controller

Consultation controller in Figure 4.62 below is used to handle request and retrieve data with the database tables of `child_screening_tests` and `consultations` that is used through the model of `ChildScreeningTest` and `Consultation`. The methods involve are `indexConsultation()` used to retrieve data of child screening test for consultation from `child_screening_tests` database, `createConsultation()` to retrieve and display data of child screening test along with consultation form, `storeConsultation()` to handle user requests to store the consultation information in the system database and `showConsultation()` to retrieve and display the details of consultation that is done and stored in the consultations database.

```

<code>
</code>

```

Figure 4.62 Consultation Controller

Report controller in Figure 4.63 below is used to handle user requests and retrieve data from the database tables of `child_screening_tests` and consultations by using `ChildScreeningTest` and `Consultation` model. The methods involve are `indexReport()` to retrieve and display list of screening and consultation report from system database of `child_screening_tests` and consultations, `showScreeningReport()` to retrieve and display details of child screening report, `showConsultationReport()` to retrieve and display details of consultation report, `exportScreeningPDF()` to handle request from user to export child screening report to PDF file and `exportConsultationReport()` to handle request from user to export consultation report to PDF file.

```

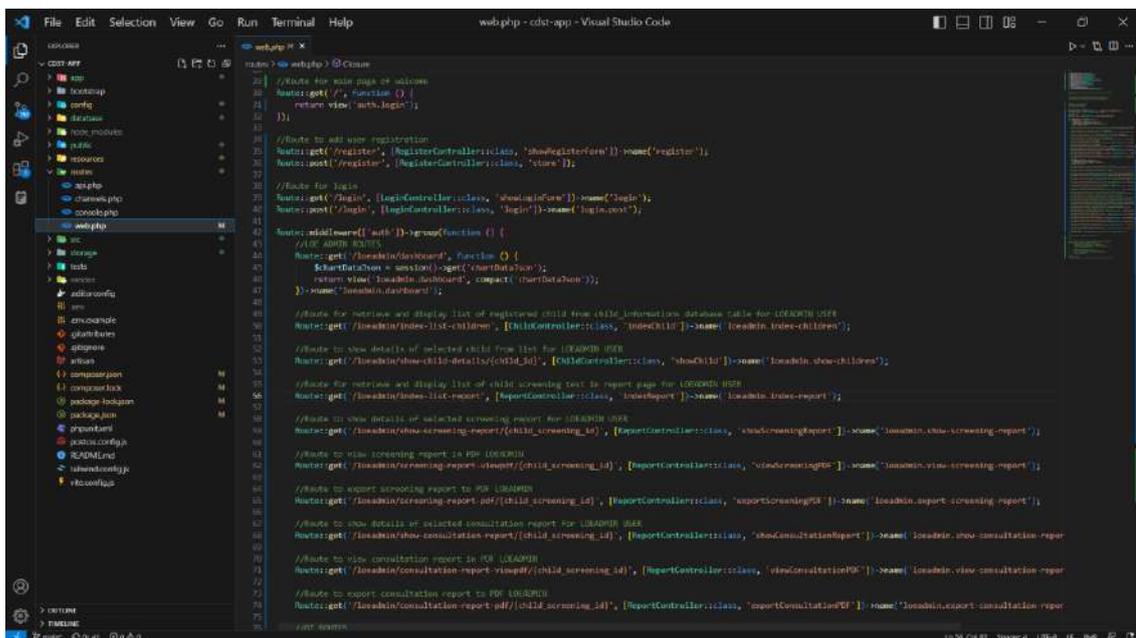
1  namespace App\Http\Controllers;
2  use Illuminate\Support\Facades\DB;
3  use Barryvdh\Snappy\Facades\Snappy;
4  use Barryvdh\Snappy\PDF;
5  use Barryvdh\Snappy\PDF as PdfGenerator;
6
7  class ReportController extends Controller
8  {
9      // Method to retrieve and display all child screening that records report from database in main report slide
10     public function indexReport(Request $request)
11     {
12         if (auth()->user()->user_category == 'Lee Administrator') {
13             // $dataReports = ChildScreeningTest::all();
14
15             // Retrieve child screening and consultation report from the database
16             $dataReports = ChildScreeningTest::all();
17
18             $query = $request->input('child_name'); // Search child by name
19             $dataReports = ChildScreeningTest::where('child_name', 'LIKE', '%' . $query . '%')->paginate(5);
20
21             $view = 'main.main-report';
22
23             if (auth()->user()->user_category == 'Occupational Therapist') {
24                 // $dataReports = ChildScreeningTest::query()
25                 // ->select('user_id', auth()->user()->id)
26                 // ->get();
27
28                 // Retrieve child screening and consultation report from the database
29                 $dataReports = ChildScreeningTest::all();
30
31                 $query = $request->input('child_name'); // Search child by name
32                 $dataReports = ChildScreeningTest::where('child_name', 'LIKE', '%' . $query . '%')->paginate(5);
33
34                 $view = 'ot.main-report';
35             }
36
37             return view($view, ['dataReports' => $dataReports]);
38         }
39     }
40
41     // Method to show details form of selected screening report
42     public function showScreeningReport(Request $request)
43     {
44         if (auth()->user()->user_category == 'Lee Administrator') {
45             $child_screening_id = $request->route('child_screening_id');
46
47             $screeningReports = DB::table('child_screening_tests')
48                 ->select('child_screening_tests.*', 'personal_social_skills.personal_social_emotion', 'personal_social_skills.personal_social_muscle', 'file_mother_id')
49                 ->join('personal_social_skills', 'child_screening_tests.personal_social_id', '=', 'personal_social_skills.personal_social_id')
50         }
51     }
52 }

```

Figure 4.63 Report Controller

#### 4.2.4.4 Route

Route is used to define the available URLs in the CDST system that maps to the specific controller to provide interaction between user and the CDST system on the desired system functionality. The route involve in the CDST system is connected with the necessary controller and view to be able on providing URL for users to interact with the web pages involved in the CDST system along with the functionality.

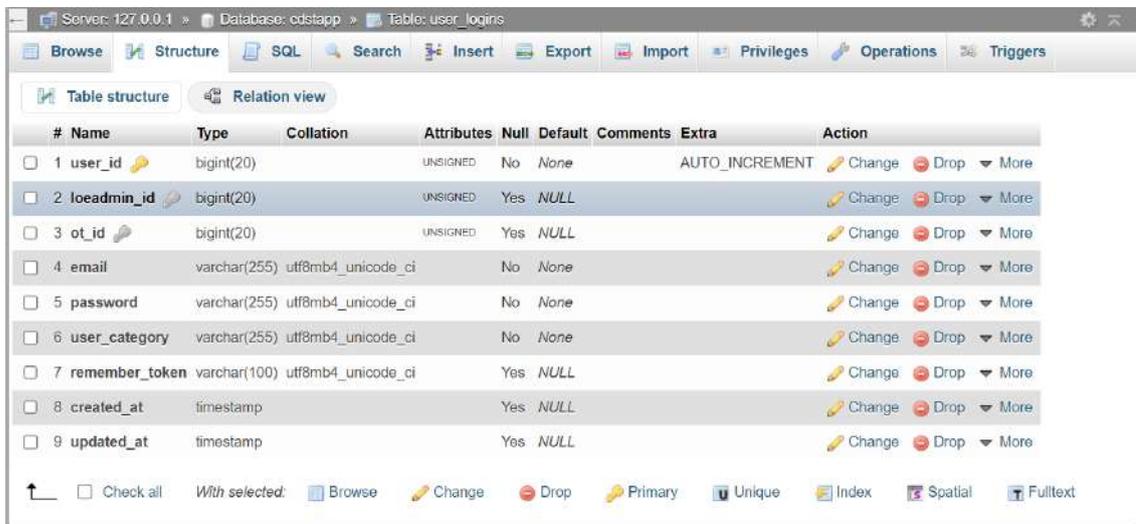


```
File Edit Selection View Go Run Terminal Help
web.php - cdst-app - Visual Studio Code

routes.php
1 //Route for main page of website
2 Route::get('/', function () {
3     return view('auth.login');
4 });
5
6 //Route to set user registration
7 Route::get('/register', [RegisterController::class, 'showRegisterForm'])->name('register');
8 Route::post('/register', [RegisterController::class, 'store']);
9
10 //Route for login
11 Route::get('/login', [LoginController::class, 'showLoginForm'])->name('login');
12 Route::post('/login', [LoginController::class, 'login'])->name('login.post');
13
14 Route::middleware(['auth'])->group(function () {
15     //OF ADMIN USERS
16     Route::get('/loadadmin/dashboard', function () {
17         $authentication = session()->get('authentication');
18         return view('loadadmin.dashboard', compact('authentication'));
19     })->name('loadadmin.dashboard');
20
21 //Route for retrieve and display list of registered child from child information database table for LOADADMIN USER
22 Route::get('/loadadmin/index-list-children', [ChildController::class, 'indexChild'])->name('loadadmin.index-children');
23
24 //Route to show details of selected child from list for LOADADMIN USER
25 Route::get('/loadadmin/show-child-details/{child_id}', [ChildController::class, 'showChild'])->name('loadadmin.show-children');
26
27 //Route for retrieve and display list of child screening test in report page for LOADADMIN USER
28 Route::get('/loadadmin/index-list-report', [ReportController::class, 'indexReport'])->name('loadadmin.index-report');
29
30 //Route to view details of selected screening report for LOADADMIN USER
31 Route::get('/loadadmin/show-screening-report/{child_screening_id}', [ReportController::class, 'showScreeningReport'])->name('loadadmin.show-screening-report');
32
33 //Route to view screening report in PDF LOADADMIN
34 Route::get('/loadadmin/screening-report-viewpdf/{child_screening_id}', [ReportController::class, 'viewScreeningPDF'])->name('loadadmin.view-screening-report');
35
36 //Route to export screening report to PDF LOADADMIN
37 Route::get('/loadadmin/screening-report-pdf/{child_screening_id}', [ReportController::class, 'exportScreeningPDF'])->name('loadadmin.export-screening-report');
38
39 //Route to show details of selected consultation report for LOADADMIN USER
40 Route::get('/loadadmin/show-consultation-report/{child_screening_id}', [ReportController::class, 'showConsultationReport'])->name('loadadmin.show-consultation-report');
41
42 //Route to view consultation report in PDF LOADADMIN
43 Route::get('/loadadmin/consultation-report-viewpdf/{child_screening_id}', [ReportController::class, 'viewConsultationPDF'])->name('loadadmin.view-consultation-report');
44
45 //Route to export consultation report to PDF LOADADMIN
46 Route::get('/loadadmin/consultation-report-pdf/{child_screening_id}', [ReportController::class, 'exportConsultationPDF'])->name('loadadmin.export-consultation-report');
47
48 //Route to
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## 4.2.5 Database Implementation

### 4.2.5.1 Login Table

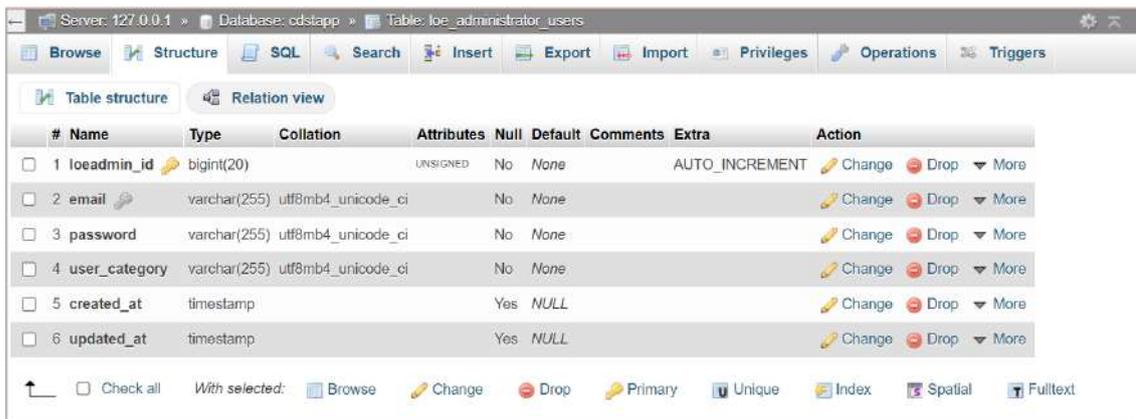


The screenshot shows a database management interface for a table named 'user\_logins' in the 'cdstapp' database. The table structure is displayed in a table format with columns for #, Name, Type, Collation, Attributes, Null, Default, Comments, Extra, and Action. The table has 9 columns: user\_id (bigint(20), UNSIGNED, No, None, AUTO\_INCREMENT), loadmin\_id (bigint(20), UNSIGNED, Yes, NULL), ot\_id (bigint(20), UNSIGNED, Yes, NULL), email (varchar(255), utf8mb4\_unicode\_ci, No, None), password (varchar(255), utf8mb4\_unicode\_ci, No, None), user\_category (varchar(255), utf8mb4\_unicode\_ci, No, None), remember\_token (varchar(100), utf8mb4\_unicode\_ci, Yes, NULL), created\_at (timestamp, Yes, NULL), and updated\_at (timestamp, Yes, NULL). The interface includes a toolbar with options like Browse, Structure, SQL, Search, Insert, Export, Import, Privileges, Operations, and Triggers. Below the table structure, there are checkboxes for 'Check all' and 'With selected:', and a row of icons for Browse, Change, Drop, Primary, Unique, Index, Spatial, and Fulltext.

| # | Name           | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|----------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | user_id        | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | loadmin_id     | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 3 | ot_id          | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 4 | email          | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | password       | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 6 | user_category  | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 7 | remember_token | varchar(100) | utf8mb4_unicode_ci |            | Yes  | NULL    |          |                | Change Drop More |
| 8 | created_at     | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 9 | updated_at     | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.65 User Logins Database Table

### 4.2.5.2 LOE Administrator User Table



The screenshot shows a database management interface for a table named 'loe\_administrator\_users' in the 'cdstapp' database. The table structure is displayed in a table format with columns for #, Name, Type, Collation, Attributes, Null, Default, Comments, Extra, and Action. The table has 6 columns: loadmin\_id (bigint(20), UNSIGNED, No, None, AUTO\_INCREMENT), email (varchar(255), utf8mb4\_unicode\_ci, No, None), password (varchar(255), utf8mb4\_unicode\_ci, No, None), user\_category (varchar(255), utf8mb4\_unicode\_ci, No, None), created\_at (timestamp, Yes, NULL), and updated\_at (timestamp, Yes, NULL). The interface includes a toolbar with options like Browse, Structure, SQL, Search, Insert, Export, Import, Privileges, Operations, and Triggers. Below the table structure, there are checkboxes for 'Check all' and 'With selected:', and a row of icons for Browse, Change, Drop, Primary, Unique, Index, Spatial, and Fulltext.

| # | Name          | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|---------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | loadmin_id    | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | email         | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | password      | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | user_category | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | created_at    | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 6 | updated_at    | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.66 LOE Administrator Users Database Table

### 4.2.5.3 Occupational Therapist User Table

The screenshot shows a database management interface with the following table structure:

| #  | Name          | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|----|---------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1  | ot_id         | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2  | full_name     | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3  | email         | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4  | phone_number  | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5  | gender        | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 6  | address       | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 7  | password      | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 8  | qualification | blob         |                    |            | No   | None    |          |                | Change Drop More |
| 9  | user_category | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 10 | created_at    | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 11 | updated_at    | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.67 Occupational Therapist Users Database Table

### 4.2.5.4 Child Information Table

The screenshot shows a database management interface with the following table structure:

| # | Name             | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | child_id         | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | child_name       | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | child_birth_date | date         |                    |            | No   | None    |          |                | Change Drop More |
| 4 | parent_name      | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | phone_number     | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 6 | address          | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |

Figure 4.68 Child Informations Database Table

#### 4.2.5.5 Child Screening Tests Table

The screenshot shows a database management interface with the following table structure:

| #  | Name                | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|----|---------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1  | child_screening_id  | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2  | child_name          | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3  | parent_name         | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4  | child_birth_date    | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5  | screening_test_date | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 6  | child_age           | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 7  | examiner_name       | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 8  | personal_social_id  | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 9  | fine_motor_id       | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 10 | language_id         | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 11 | gross_motor_id      | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 12 | consultation_id     | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 13 | created_at          | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 14 | updated_at          | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.69 Child Screening Tests Database Table

#### 4.2.5.6 Personal Social Skills Table

The screenshot shows a database management interface with the following table structure:

| # | Name                        | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|-----------------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | personal_social_id          | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | personal_social_question_id | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | personal_social_question    | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | personal_social_answer      | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | child_screening_id          | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 6 | created_at                  | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 7 | updated_at                  | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.70 Personal Social Skills Database Table

#### 4.2.5.7 Fine Motor Skills Table

The screenshot shows a database management interface for a table named 'fine\_motor\_skills'. The table structure is as follows:

| # | Name                   | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|------------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | fine_motor_id          | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | fine_motor_question_id | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | fine_motor_question    | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | fine_motor_answer      | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | child_screening_id     | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 6 | created_at             | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 7 | updated_at             | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.71 Fine Motor Skills Database Table

#### 4.2.5.8 Language Skills Table

The screenshot shows a database management interface for a table named 'language\_skills'. The table structure is as follows:

| # | Name                 | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|----------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | language_id          | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | language_question_id | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | language_question    | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | language_answer      | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | child_screening_id   | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 6 | created_at           | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 7 | updated_at           | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.72 Language Skills Database Table

#### 4.2.5.9 Gross Motor Skills Table

The screenshot shows a database management interface for a table named 'gross\_motor\_skills'. The table structure is as follows:

| # | Name                    | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|-------------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | gross_motor_id          | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | gross_motor_question_id | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | gross_motor_question    | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | gross_motor_answer      | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | child_screening_id      | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 6 | created_at              | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 7 | updated_at              | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.73 Gross Motor Skills Database Table

#### 4.2.5.10 Consultations Table

The screenshot shows a database management interface for a table named 'consultations'. The table structure is as follows:

| # | Name                               | Type         | Collation          | Attributes | Null | Default | Comments | Extra          | Action           |
|---|------------------------------------|--------------|--------------------|------------|------|---------|----------|----------------|------------------|
| 1 | consultation_id                    | bigint(20)   |                    | UNSIGNED   | No   | None    |          | AUTO_INCREMENT | Change Drop More |
| 2 | consultation_date                  | varchar(255) | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 3 | screening_area_category            | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 4 | screening_area_history_description | text         | utf8mb4_unicode_ci |            | No   | None    |          |                | Change Drop More |
| 5 | child_screening_id                 | bigint(20)   |                    | UNSIGNED   | Yes  | NULL    |          |                | Change Drop More |
| 6 | created_at                         | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |
| 7 | updated_at                         | timestamp    |                    |            | Yes  | NULL    |          |                | Change Drop More |

Figure 4.74 Consultations Database Table

### 4.3 Testing and Result Discussion

#### 4.3.1 User Acceptance Testing

The testing that is conducted to the CDST system is user acceptance testing with the purpose on testing and finding any defects or errors in the system that lead to the system failure before the system deployment. Apart from that, the testing also conducted to test the functionality of the system is functions with the expected result along with the validation process included ensuring that the system is developed aligned with requirements from client side and functions as intended. The testing is conducted for all modules involved in the CDST system for the potential users. As for CDST system project testing and validation, it conducted through online meeting with client which is MZR Sdn Bhd company. The testing is conducted as details in Table 4.2.

Table 4.2 CDST System Testing Details

|                      |   |             |                   |
|----------------------|---|-------------|-------------------|
| <b>Meeting Title</b> | IIP UMP: FYP Review by MZR (Software)   |             |                   |
| <b>Location</b>      | Google Meet's Virtual Meeting Room  |             |                   |
| <b>Date</b>          | 9 June 2023, Friday   | <b>Time</b> | 3.00 pm – 5.00 pm |
| <b>Purpose</b>       | Conduct CDST system testing with MZR for functionality, usability and effectiveness validation and verification and discussion on system's feedback and future improvement. |             |                   |

meet.google.com/fhq-hxgk-fgv

Aina Safia Bt Jeffree is presenting

**Little Ones Eduworld**  
CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM

Occupational Therapist

Dashboard

| Category                  | Value |
|---------------------------|-------|
| Total Registered Children | 4     |
| Total Consultations       | 3     |

Summary Cards:

- Total Registered Children: 4
- Total Screening Test: 4
- Total Consultation: 3

Nor Faleza Zainuren

Muhammad Firdaus Irfan

ZAFRIL RIZAL BIN MAZMI

Aina Safia Bt Jeffree

Zahira

DANAKORN NINCA...

Aina Safia Bt Jeffree has joined

16:24 | IP UMP: FYP Review by MZR (Software)

https://meet.google.com/fhq-hxgk-fgv

You have extensions installed that may affect the quality of your call

Aina Safia Bt Jeffree is presenting

**Little Ones Eduworld**  
CHILD DEVELOPMENT SCREENING TEST & PROGRESS MONITORING

Login Here

Email address

Password

User Category

Select user

Log In

Aina Safia Bt Jeffree

5 others

You

Search for people

In call

- DANAKORN NINCA... (You)
- Aina Safia Bt Jeffree
- Aina Safia Bt Jeffree (Presentation)
- Muhammad Firdaus Irfan
- Nor Faleza Zainuren
- Nurul Iman Azmi
- ZAFRIL RIZAL BIN MAZMI
- Zahira

3:05 PM | fhq-hxgk-fgv

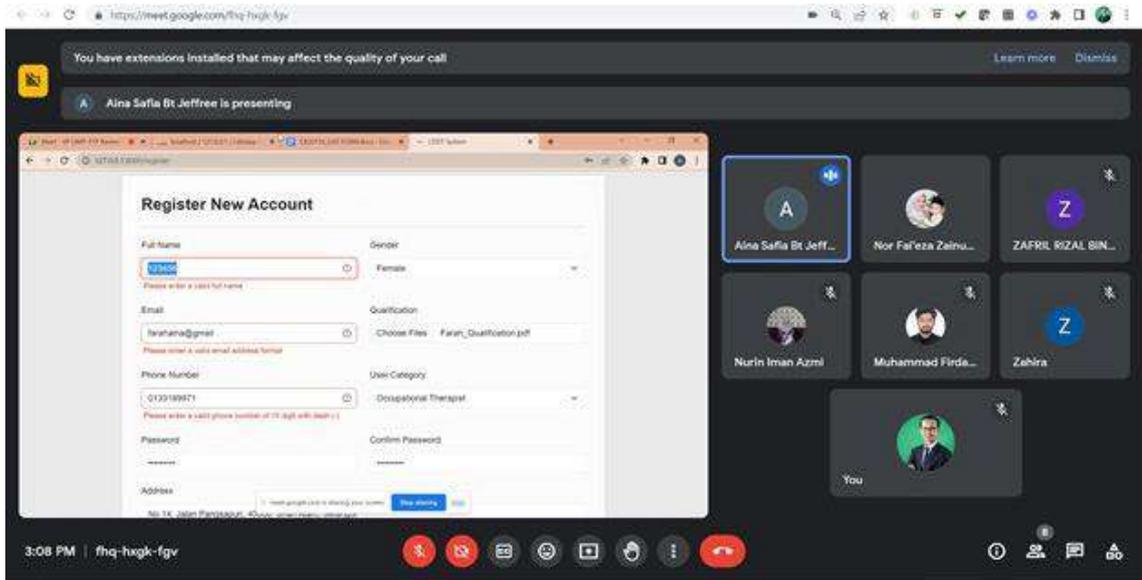


Figure 4.75 CDST System Review with MZR Client

### 4.3.2 Summary of Findings

The result outcome of the testing process is shown in Table 4.3. The feedback and improvements suggestion of given from client's side which is from MZR company.

Table 4.3 User Acceptance Test Output

| Activities   | Input  | Expected Result   | Actual Result   | Pass/Fail | Comments              |
|--|--|---|---|-----------|-----------------------|
| <b>Login</b>   |  |   |   |           |                       |
| Login with valid email address, password and user category | <b>LOE Administrator User</b><br>Email: loeadmin@gmail.com<br>Password: loeeAdmin-00 | <b>LOE Administrator User</b><br>Redirect to the LOE administrator dashboard page.<br><b>Occupational Therapist Users</b> | <b>LOE Administrator User</b><br>Redirect to the LOE administrator dashboard page.<br><b>Occupational Therapist Users</b> | Pass      | Ok. No comments added |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  | <p>User Category: Loe Administrator</p> <p>Click the “Login” button.</p> <p><b>Occupational Therapist Users</b></p> <p>Email: farahaina@gmail.com</p> <p>Password: 123456789</p> <p>User Category: Occupational Therapist</p> <p>Click the “Login” button.</p> | <p>Redirect to the occupational therapist user dashboard page.</p> | <p>Redirect to the occupational therapist user dashboard page.</p> |  |  |
|--|--|--|--|--|--|

|   |   |   |   |             |                              |
|---|---|---|---|-------------|------------------------------|
| <p>Login with invalid email address, password and user category</p> | <p><b>LOE Administrator User</b></p> <p>Email: loe@gmail.com</p> <p>Password: 12345678</p> <p>User Category: Loe Administrator</p> <p>Click the “Login” button.</p> <p><b>Occupational Therapist Users</b></p> <p>Email: farahaina@gmail.com</p> <p>Password: 123456</p> <p>User Category: Occupational Therapist</p> | <p>System displays an error message of “Invalid login credentials.”</p> | <p>System displays an error message of “Invalid login credentials.”</p> | <p>Pass</p> | <p>Ok. No comments added</p> |
|---|---|---|---|-------------|------------------------------|

|  |   |   |   |      |  |
|--|---|---|---|------|--|
|  | Click the “Login” button.   |   |   |      |  |
| Login with empty fields                          | Empty all login input fields and click the “Login” button.                          | System displays a validation message for each input field “Please fill out this field.”   | System displays a validation message for each input field “Please fill out this field.”   | Pass | Ok. No comments added  |
| <b>User Registration</b>                         |   |   |   |      |  |
| Sign up with valid user registration information | Name: Farah Aina Binti Mohd<br><br>Gender: Female<br><br>Email: farahaina@gmail.com | System displays a confirmation message of “Are you sure want to register new account?”, then and will redirect to the login page with a successful message of “New user account successfully registered!” | System displays a confirmation message of “Are you sure want to register new account?”, then and will redirect to the login page with a successful message of “New user account successfully registered!” | Pass | - Add “Asterisk (*)” for required input fields<br><br>- Add placeholder or information icon for user to know how the |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  | <p>Qualification:<br/>Farah_Qualification</p> <p>Phone Number: 013-3189971</p> <p>User Category:<br/>Occupational Therapist</p> <p>Password: 123456789</p> <p>Confirm Password:<br/>123456789</p> <p>Address: No 14, Jalan Pangsapuri, 40000, Shah Alam, Selangor</p> <p>Click the “Sign Up” button.</p> |  |  |  | <p>required field<br/>format to fill out</p> |
|--|--|--|--|--|--|

|                                  |   |   |   |      |                       |
|----------------------------------|---|---|---|------|-----------------------|
| Sign up with invalid information | Name: 123456<br>Gender: Female<br><br>Email:<br>farahaina@gmail<br><br>Qualification:<br>Farah_Qualification<br><br>Phone        Number:<br>0133189971<br><br>User        Category:<br>Occupational Therapist<br><br>Password: 123456789<br><br>Confirm    Password:<br>123456789 | System displays error validation for the invalid information. | System displays error validation for the invalid information. | Pass | Ok. No comments added |
|----------------------------------|---|---|---|------|-----------------------|

|  |  |  |  |      |                       |
|--|--|--|--|------|-----------------------|
|  | Address: No 14, Jalan Pangsapuri, 40000, Shah Alam, Selangor<br><br>Click “Sign Up” button.  |  |  |      |                       |
| Sign up with different confirmation password | Name: Farah Aina Binti Mohd<br><br>Gender: Female<br><br>Email:<br>farahaina@gmail.com<br><br>Qualification:<br>Farah_Qualification<br><br>Phone Number: 013-3189971 | System displays error validation of “Password is not match”. | System displays error validation of “Password is not match”. | Pass | Ok. No comments added |

|   |   |   |   |      |                       |
|---|---|---|---|------|-----------------------|
|   | <p>User Category:<br/>Occupational Therapist</p> <p>Password: 123456789</p> <p>Confirm Password:<br/>123456</p> <p>Address: No 14, Jalan<br/>Pangsapuri, 40000,<br/>Shah Alam, Selangor</p> <p>Click “Sign Up” button</p> |   |   |      |                       |
| Sign up without inserting any information | Empty registration form input fields and click “Sign Up” button   | System displays error validation of “Please fill out this field”. | System displays error validation of “Please fill out this field”. | Pass | Ok. No comments added |
| Sign up with the same email address       | Name: Farah Aina Binti Mohd   | System displays an error message of “The email                    | System displays an error message of “The email                    | Pass |                       |

|  |   |   |   |  |  |
|--|---|---|---|--|--|
|  | <p>Gender: Female</p> <p>Email:<br/>testing@gmail.com</p> <p>Qualification:<br/>Farah_Qualification</p> <p>Phone Number: 013-3189971</p> <p>User Category:<br/>Occupational Therapist</p> <p>Password: 123456789</p> <p>Confirm Password:<br/>123456789</p> | <p>address already<br/>registered”.</p> | <p>address already<br/>registered”.</p> |  |  |
|--|---|---|---|--|--|

|   |   |  |  |      |                       |
|---|---|--|--|------|-----------------------|
|   | <p>Address: No 14, Jalan Pangsapuri, 40000, Shah Alam, Selangor</p> <p>Click the “Sign Up” button.</p>  |  |  |      |                       |
| Sign up with invalid format for email address | <p>Name: Farah Aina Binti Mohd</p> <p>Gender: Female</p> <p>Email: farahaina@gmail</p> <p>Qualification: Farah_Qualification</p> <p>Phone Number: 013-3189971</p> | System displays error validation of “Please enter a valid email address format”. | System displays error validation of “Please enter a valid email address format”. | Pass | Ok. No comments added |

|                                      |   |  |  |      |                       |
|--------------------------------------|---|--|--|------|-----------------------|
|                                      | <p>User Category:<br/>Occupational Therapist</p> <p>Password: 123456789</p> <p>Confirm Password:<br/>123456789</p> <p>Address: No 14, Jalan<br/>Pangsapuri, 40000,<br/>Shah Alam, Selangor</p> <p>Click the “Sign Up”<br/>button.</p> |  |  |      |                       |
| Sign up with invalid password format | <p>Name: Farah Aina Binti<br/>Mohd</p> <p>Gender: Female</p>  | System display error validation of “Please enter a password with at least 8 characters”. | System display error validation of “Please enter a password with at least 8 characters”. | Pass | Ok. No comments added |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  | <p>Email:<br/>farahaina@gmail.com</p> <p>Qualification:<br/>Farah_Qualification</p> <p>Phone Number: 013-<br/>3189971</p> <p>User Category:<br/>Occupational Therapist</p> <p>Password: 123456</p> <p>Confirm Password:<br/>123456</p> <p>Address: No 14, Jalan<br/>Pangsapuri, 40000,<br/>Shah Alam, Selangor</p> |  |  |  |  |
|--|--|--|--|--|--|

|  |   |  |  |      |                       |
|--|---|--|--|------|-----------------------|
|  | Click the "Sign Up" button.   |  |  |      |                       |
| Sign up with invalid format for phone number | Name: Farah Aina Binti Mohd<br>Gender: Female<br><br>Email:<br>farahaina@gmail.com<br><br>Qualification:<br>Farah_Qualification<br><br>Phone Number:<br>0133189971<br><br>User Category:<br>Occupational Therapist<br><br>Password: 123456789 | System displays error validation of "Please enter a valid phone number of 10 digit with dash (-)". | System displays error validation of "Please enter a valid phone number of 10 digit with dash (-)". | Pass | Ok. No comments added |

|  |   |   |   |      |                       |
|--|---|---|---|------|-----------------------|
|  | <p>Confirm Password:<br/>123456789</p> <p>Address: No 14, Jalan<br/>Pangsapuri, 40000,<br/>Shah Alam, Selangor</p> <p>Click the “Sign Up”<br/>button.</p> |   |   |      |                       |
| <b>View Children Information</b>                 |   |   |   |      |                       |
| View the list of registered children information | Click “Child Information” menu from left-side navigation menu   | System displays the list of registered children information in a table that include child name, child birth date, parent name and phone number. | System displays the list of registered children information in a table that include child name, child birth date, parent name and phone number. | Pass | Ok. No comments added |

|  |                         |  |  |      |                              |
|--|-------------------------|--|--|------|------------------------------|
| Search with no inserted keyword of child name                    | Search keyword: ""      | System displays a message of "No registered child available".  | System displays a message of "No registered child available".  | Pass | Ok. No comments added        |
| Search for not available child name keyword of child information | Search keyword: testing | System displays a message of "No registered child available".  | System displays a message of "No registered child available".  | Pass | Ok. No comments added        |
| Search with invalid keyword                                      | Search keyword: 1234    | System displays a message of "No registered child available".  | System displays a message of "No registered child available".  | Pass | Ok. No comments added        |
| Search with valid keyword of child name                          | Search keyword: Farah   | System displays list of screening test with child name "Farah" | System displays list of screening test with child name "Farah" | Pass | Improve to change the search |

|  |   |   |   |      |                                 |
|--|---|---|---|------|---------------------------------|
|  |   |   |   |      | keyword not for child name only |
| View selected child information details      | Choose any available registered child in the list and click “View Details” button | System displays detailed information of the selected registered child.            | System displays detailed information of the selected registered child.            | Pass | Ok. No comments added           |
| <b>Do Children Screening Test</b>            |   |   |   |      |                                 |
| No child screening test available            | Click “Screening Test” menu from left-side navigation menu                        | System displays a text field of “No child screening test available”.              | System displays a text field of “No child screening test available”.              | Pass | Ok. No comments added           |
| Add new child information for screening test | Click “Add New Screening Test” button   | System displays next page with input form of child information for screening test | System displays next page with input form of child information for screening test | Pass | Ok. No comments added           |

|  |   |   |   |      |                       |
|--|---|---|---|------|-----------------------|
| Cancel add child screening test  | Click “Cancel” button   | System displays confirmation message of “Are you sure want to cancel add child screening test?”, then system redirect to main screening test page | System displays confirmation message of “Are you sure want to cancel add child screening test?”, then system redirect to main screening test page | Pass | Ok. No comments added |
| Add child information for screening test with blank input fields           | Child Name: Not selected<br><br>Screening Test Date: Not selected                     | System displays error validation of “Please fill out this field”.   | System displays error validation of “Please fill out this field”.   | Pass | Ok. No comments added |
| Calculate child age with inserted child birth date and screening test date | Child Name: Select “Muhammad Asyraf Bin Helmi”<br><br>Screening Test Date: 01/11/2021 | System displays the output value of child age in the child age text field.  | System displays the output value of child age in the child age text field.  | Pass | Ok. No comments added |

|  |  |  |  |      |  |
|--|--|--|--|------|--|
|  | Click “Calculate” button   |  |  |      |  |
| Add child information for screening test without child age calculation | Child Name: Select “Muhammad Asyraf Bin Helmi”<br>Screening Test Date: 01/11/2021<br><br>Click “Add Screening Test” button | System displays error validation message of “Please calculate child age”   | System displays error validation message of “Please calculate child age”   | Pass | Ok. No comments added                        |
| Add valid child information for screening test                         | Child Name: Select “Muhammad Asyraf Bin Helmi”<br>Screening Test Date: 01/11/2021<br><br>Click “Calculate” button          | System displays confirmation message of “Are you sure want to add child screening test?”, then system redirect to next page of screening test of screening area category | System displays confirmation message of “Are you sure want to add child screening test?”, then system redirect to next page of screening | Pass | Add “Asterisk (*)” for required input fields |

|   |  |   |   |      |                       |
|---|--|---|---|------|-----------------------|
|   | Click “Add Screening Test” button                      |   | test of screening area category   |      |                       |
| Add child screening test for personal social screening area         | Click “Do Personal Social” button                      | System redirect and displays next page of personal social screening area with required tasks  | System redirect and displays next page of personal social screening area with required tasks  | Pass | Ok. No comments added |
| Cancel add screening test of personal social area                   | Click “Cancel” button                                  | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | Pass | Ok. No comments added |
| Empty personal social screening area tasks for child screening test | Empty all answer options of the personal social tasks. | System displays error message of “Please select   | System displays error message of “Please select   | Pass | Ok. No comments added |

|  |   |  |  |      |  |
|--|---|--|--|------|--|
|  | Click “Finish” button   | screening test answer for each question”   | screening test answer for each question”   |      |  |
| Incomplete personal social screening area tasks for child screening test | Empty some answer options of the personal social tasks.<br><br>Click “Finish” button        | System displays error message of “Please select screening test answer for each question”   | System displays error message of “Please select screening test answer for each question”   | Pass | Ok. No comments added  |
| Complete personal social screening area tasks for child screening test   | Select answer options for all available personal social tasks.<br><br>Click “Finish” button | System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”<br><br>System redirects to screening area category | System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”<br><br>System redirects to screening area category | Pass | Future improvement to able edit before finalizes and add the screening test submission |

|   |  |   |   |      |                       |
|---|--|---|---|------|-----------------------|
|   |  | page with disabled “Do Personal Social” button  | page with disabled “Do Personal Social” button  |      |                       |
| Add child screening test for fine motor adaptive screening area | Click “Do Fine Motor Adaptive” button                      | System redirect and displays next page of fine motor adaptive screening area with required tasks  | System redirect and displays next page of fine motor adaptive screening area with required tasks  | Pass | Ok. No comments added |
| Cancel add screening test of fine motor adaptive area           | Click “Cancel” button                                      | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | Pass | Ok. No comments added |
| Empty fine motor adaptive screening area                        | Empty all answer options of the fine motor adaptive tasks. | System displays error message of “Please select   | System displays error message of “Please select   | Pass | Ok. No comments added |

|  |   |  |  |      |  |
|--|---|--|--|------|--|
| tasks for child screening test   | Click “Finish” button   | screening test answer for each question”   | screening test answer for each question”   |      |  |
| Incomplete fine motor adaptive screening area tasks for child screening test | Empty some answer options of the fine motor adaptive tasks.<br>Click “Finish” button        | System displays error message of “Please select screening test answer for each question”   | System displays error message of “Please select screening test answer for each question”   | Pass | Ok. No comments added  |
| Complete fine motor adaptive screening area tasks for child screening test   | Select answer options for all available fine motor adaptive tasks.<br>Click “Finish” button | System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”<br><br>System redirects to screening area category | System displays a confirmation message of “Are you sure want to add screening test?”, then the system displays a successful message of “Screening test successfully added!”<br><br>System redirects to screening area category | Pass | Future improvement to able edit before finalizes and add the screening test submission |

|   |                            |   |   |      |                       |
|---|----------------------------|---|---|------|-----------------------|
|   |                            | page with disabled “Do Fine Motor Adaptive” button  | page with disabled “Do Fine Motor Adaptive” button  |      |                       |
| Add child screening test for language adaptive screening area | Click “Do Language” button | System redirect and displays next page of language screening area with required tasks   | System redirect and displays next page of language screening area with required tasks   | Pass | Ok. No comments added |
| Cancel add screening test of language area                    | Click “Cancel” button      | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect to screening area category page | Pass | Ok. No comments added |

|   |  |  |  |      |  |
|---|--|--|--|------|--|
| Empty language screening area tasks for child screening test      | Empty all answer options of the language tasks.<br><br>Click "Finish" button         | System displays error message of "Please select screening test answer for each question"   | System displays error message of "Please select screening test answer for each question"   | Pass | Ok. No comments added  |
| Incomplete language screening area tasks for child screening test | Empty some answer options of the language tasks.<br><br>Click "Finish" button        | System displays error message of "Please select screening test answer for each question"   | System displays error message of "Please select screening test answer for each question"   | Pass | Ok. No comments added  |
| Complete language screening area tasks for child screening test   | Select answer options for all available language tasks.<br><br>Click "Finish" button | System displays a confirmation message of "Are you sure want to add screening test?", then the system displays a successful message of | System displays a confirmation message of "Are you sure want to add screening test?", then the system displays a successful message of | Pass | Future improvement to able edit before finalizes and add the screening test submission |

|  |                               |  |  |      |                       |
|--|-------------------------------|--|--|------|-----------------------|
|  |                               | <p>“Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Language” button</p> | <p>“Screening test successfully added!”</p> <p>System redirects to screening area category page with disabled “Do Language” button</p> |      |                       |
| Add child screening test for gross motor adaptive screening area | Click “Do Gross Motor” button | System redirect and displays next page of gross motor screening area with required tasks   | System redirect and displays next page of gross motor screening area with required tasks   | Pass | Ok. No comments added |
| Cancel add screening test of gross motor area                    | Click “Cancel” button         | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system redirect                        | System displays confirmation message of “Are you sure want to cancel add screening test?”, then system                                 | Pass | Ok. No comments added |

|  |   |  |  |      |  |
|--|---|--|--|------|--|
|  |   | to screening area category page  | redirect to screening area category page   |      |  |
| Empty gross motor screening area tasks for child screening test      | Empty all answer options of the gross motor tasks.<br><br>Click "Finish" button         | System displays error message of "Please select screening test answer for each question"                         | System displays error message of "Please select screening test answer for each question"                         | Pass | Ok. No comments added                                    |
| Incomplete gross motor screening area tasks for child screening test | Empty some answer options of the gross motor tasks.<br><br>Click "Finish" button        | System displays error message of "Please select screening test answer for each question"                         | System displays error message of "Please select screening test answer for each question"                         | Pass | Ok. No comments added                                    |
| Complete gross motor screening area tasks for child screening test   | Select answer options for all available gross motor tasks.<br><br>Click "Finish" button | System displays a confirmation message of "Are you sure want to add screening test?", then the system displays a | System displays a confirmation message of "Are you sure want to add screening test?", then the system displays a | Pass | Future improvement to able edit before finalizes and add |

|   |  |  |  |      |                               |
|---|--|--|--|------|-------------------------------|
|   |  | successful message of “Screening test successfully added!”<br><br>System redirects to screening area category page with disabled “Do Gross Motor” button | successful message of “Screening test successfully added!”<br><br>System redirects to screening area category page with disabled “Do Gross Motor” button |      | the screening test submission |
| Complete add child screening test for all screening area category | Click “Done” button  | System redirects to child screening test details page  | System redirects to child screening test details page  | Pass | Ok. No comments added         |
| View the list of child screening test                             | Click “Back” button from child screening test details page or “Screening Test” menu from left-side navigation menu | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent                     | System displays the list of child screening test information in a table that include child name, child birth date, child age,                            | Pass | Ok. No comments added         |

|   |                            | name and screening test date.  | parent name and screening test date.   |      |   |
|---|----------------------------|--|--|------|---|
| Search with no inserted screening test date inputs            | Search keyword: ""         | System displays a message of "No child screening tests available".           | System displays a message of "No child screening tests available".           | Pass | Ok. No comments added   |
| Search for not available date keyword of child screening test | Search keyword: 01/01/2024 | System displays a message of "No child screening tests available".           | System displays a message of "No child screening tests available".           | Pass | Ok. No comments added   |
| Search with invalid keyword                                   | Search keyword: 01/01/2024 | System displays a message of "No child screening tests available".           | System displays a message of "No child screening tests available".           | Pass | Ok. No comments added   |
| Search with valid keyword of screening test date              | Search keyword: 01/11/2021 | System displays list of screening test with screening test date "01/11/2021" | System displays list of screening test with screening test date "01/11/2021" | Pass | Improve to change the search keyword available for screening test |

|  |  |  |   |      |                       |
|--|--|--|---|------|-----------------------|
|  |  |  |   |      | date and child name   |
| View the details of child screening test information | Choose and click “View Details” button                   | System displays the detailed information of the child screening test.  | System displays the detailed information of the child screening test.   | Pass | Ok. No comments added |
| <b>Manage Consultation</b>                           |  |  |   |      |                       |
| No child screening test available                    | Click “Consultation” menu from left-side navigation menu | System displays a text field of “No screening consultations available”.  | System displays a text field of “No screening consultations available”.   | Pass | Ok. No comments added |
| View the list of child screening test                | Click “Consultation” menu from left-side navigation menu | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent | System displays the list of child screening test information in a table that include child name, child birth date, child age, |      | Ok. No comments added |

|   |                            | name and screening test date.  | parent name and screening test date.   |      |   |
|---|----------------------------|--|--|------|---|
| Search with no inserted screening test date inputs            | Search keyword: ""         | System displays a message of "No screening consultations available".         | System displays a message of "No screening consultations available".         | Pass | Ok. No comments added   |
| Search for not available date keyword of child screening test | Search keyword: 01/01/2024 | System displays a message of "No screening consultations available".         | System displays a message of "No screening consultations available".         | Pass | Ok. No comments added   |
| Search with invalid keyword                                   | Search keyword: 01/01/2024 | System displays a message of "No screening consultations available".         | System displays a message of "No screening consultations available".         | Pass | Ok. No comments added   |
| Search with valid keyword of screening test date              | Search keyword: 01/11/2021 | System displays list of screening test with screening test date "01/11/2021" | System displays list of screening test with screening test date "01/11/2021" | Pass | Improve to change the search keyword available for screening test |

|  |  |   |   |      | date and child name   |
|--|--|---|---|------|-----------------------|
| Add consultation for child screening test                    | Choose and click “Add Consultation” link button from the child screening test list | System redirect and displays add consultation page with consultation form   | System redirect and displays add consultation page with consultation form   | Pass | Ok. No comments added |
| Cancel add consultation                                      | Click “Cancel” button  | System displays confirmation message of “Are you sure want to cancel add consultation?”, then system redirect to main consultation page | System displays confirmation message of “Are you sure want to cancel add consultation?”, then system redirect to main consultation page | Pass | Ok. No comments added |
| Add consultation information with empty required information | Consultation Date: “”  | System displays an error validation message of  | System displays an error validation message of “Please fill out this field”   | Pass | Ok. No comments added |

|   |  |  |  |             |                              |
|---|--|--|--|-------------|------------------------------|
|   | <p>Screening Area<br/>Category: ""</p> <p>History Description: ""</p> <p>Click "Add Consultation" button</p> | <p>"Please fill out this field" for the required input field.</p>  | <p>for the required input field.</p>   |             |                              |
| <p>Add row for consultation information</p>   | <p>Click "+ Add Row" button</p>  | <p>System add row for screening area category and history description</p>  | <p>System add row for screening area category and history description</p>  | <p>Pass</p> | <p>Ok. No comments added</p> |
| <p>Delete row of consultation information</p> | <p>Click "X" icon button</p>   | <p>System displays confirmation message of "Are you sure want to delete consultation row?", then system delete the selected consultation row</p> | <p>System displays confirmation message of "Are you sure want to delete consultation row?", then system delete the selected consultation row</p> | <p>Pass</p> | <p>Ok. No comments added</p> |

|  |  |   |   |             |   |
|--|--|---|---|-------------|---|
| <p>Add consultation information for child screening test with required information</p> | <p>Consultation Date: 09/06/2023</p> <p>Screening Area<br/>Category: Fine Motor Adaptive Area</p> <p>History Description:<br/>Child still struggle to hold cube or anything in the hand</p> <p>Screening Area<br/>Category: Gross Motor Area</p> <p>History Description:<br/>Child refuse to sit even when try to pull</p> | <p>System displays a confirmation message of “Are you sure want to add consultation?”, then the system displays a successful message of “Consultation successfully added!” and redirect to main consultation page</p> | <p>System displays a confirmation message of “Are you sure want to add consultation?”, then the system displays a successful message of “Consultation successfully added!” and redirect to main consultation page</p> | <p>Pass</p> | <p>Add “Asterisk (*)” for required input fields</p> |
|--|--|---|---|-------------|---|

|  |   |  |  |      |  |
|--|---|--|--|------|--|
|  | Click “Add Consultation” button   |  |  |      |  |
| View the details information of consultation interview | Choose and click the “View Details” link button from list of child screening test | System displays detailed information of the consultation interview.  | System displays detailed information of the consultation interview.  | Pass | Ok. No comments added  |
| <b>Generate Report</b>                                 |   |  |  |      |  |
| View the list of child screening test                  | Click “Report” menu from left-side navigation menu                                | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent name and screening test date. | System displays the list of child screening test information in a table that include child name, child birth date, child age, parent name and screening test date. | Pass | - Improve and add on report listing by month/year to view<br><br>- Add more query to the report listing and converting |

|   |                            |  |  |      |   |
|---|----------------------------|--|--|------|---|
| Search with no inserted screening test date inputs            | Search keyword: ""         | System displays a message of "No screening consultations available". | System displays a message of "No screening consultations available". | Pass | Ok. No comments added   |
| Search for not available date keyword of child screening test | Search keyword: 01/01/2024 | System displays a message of "No screening consultations available". | System displays a message of "No screening consultations available". | Pass | Ok. No comments added   |
| Search with invalid keyword                                   | Search keyword: 01/01/2024 | System displays a message of "No screening consultations available". | System displays a message of "No screening consultations available". | Pass | Improve to change the search keyword available for screening test date and child name |
| Search with valid keyword of screening test date              | Search keyword: 01/11/2021 | System displays list of screening test with                          | System displays list of screening test with                          | Pass | Ok. No comments added   |

|   |   |  |  |      |                       |
|---|---|--|--|------|-----------------------|
|   |   | screening test date<br>"01/11/2021"                                    | screening test date<br>"01/11/2021"                                    |      |                       |
| View the details information of screening test report | Choose and click "Screening" link button from the list    | System displays the detailed information of the screening test report. | System displays the detailed information of the screening test report. | Pass | Ok. No comments added |
| Export screening test report                          | Click the "Export to PDF" button                          | System redirects download the screening test report                    | System redirects download the screening test report                    | Pass | Ok. No comments added |
| View the details information of consultation report   | Choose and click "Consultation" link button from the list | System displays the detailed information of the consultation report.   | System displays the detailed information of the consultation report.   | Pass | Ok. No comments added |
| Export consultation report                            | Click the "Export to PDF" button                          | System redirects download the consultation report                      | System redirects download the consultation report                      | Pass | Ok. No comments added |

Based on the above Table 4.3, several comments for CDST system improvements to be changed and applied are requested throughout the system testing with MZR Sdn Bhd. The comments are voice out from MZR Sdn Bhd throughout the CDST testing session is important to be taken action to ensure achieve satisfaction and expectations from client side and to develop more quality system to meet with end-user’s needs. All the comments and improvement suggestions are summarized in Table 4.4 along with the improvements and changes that is achieved and made for the CDST system based on MZR’s comments and feedback.

Table 4.4 Overall Testing Comments & Status

| No | Client’s Comments/ Feedback   | Improvements/Changes Status   |
|----|---|---|
| 1  | Add “asterisk (*)” symbol in the label of required input fields to be fill-in by users. Enhance user experience to provide clear indications for end-users to identify the required fields to be filled in before further actions taken and improve efficiency. | Improvements/changes status is implemented.<br>The required input fields in the CDST system have been added with “asterisk (*)” symbol.                           |
| 2  | Add “information icon” or placeholder to the input fields that have specific format to be filled in. Enhance usability and improve user experience by providing clear format guidance to reduce chance of errors made by end-users.                             | Improvements/changes status is implemented.<br>The placeholder is changed with the specific format of each input fields required for users to follow and fill in. |
| 3  | Change search field to multi-category search input fields allowing users to search with multiple keyword that provide more flexibility to find needed information in more effectively and efficiently.  | Improvements/changes status is implemented.<br>The search input fields changed that allow users to search the child screening test, consultation and              |

|   |   |  |
|---|---|--|
|   |   | report either with screening test date or child name.  |
| 4 | <p>Improve screening test module to able to edit the added screening area tasks for each category before submitting the final child screening test of each screening category to the system database.</p> <p>Improve accuracy and flexibility of child screening test data to check and avoid any misinformation on the screening test.</p> | Improvements/changes status is not yet implemented.  |
| 5 | <p>Improve the functions of report for end-users to able to filter report data by month/year and export to pdf/excel file.</p> <p>Provide more query function to the report module.</p>   | <p>Improvements/changes status is implemented.</p> <p>The report module has additional functions to filter report by month or year and covert to pdf file.</p> |
| 6 | <p>The current screening test question for each screening area category is using hardcoded. For future improvement, client suggest using config that allow to modify and store question in database without modify the code itself for more flexibility by using configuration file.</p>  | Improvements/changes status is not yet implemented.  |

Figure 4.76 below display the approval form of user acceptance test (UAT) that has been approved, acceptance and signed by the client from MZR company.

**USER ACCEPTANCE TESTING (UAT) APPROVAL**

| <b>UAT APPROVAL FORM</b>   |   |             |
|--|---|-------------|
| <b>Project Name</b>  | Child Developmental Screening Test & Progress Monitoring System For Little Ones Eduworld Therapy Centre |             |
| <b>Testing Time Taken</b>  | 30 minutes (3.00 p.m – 3.30 p.m)  |             |
| <b>Client Name</b>   | Nor Fai'eza Binti Zainuren  |             |
| <b>Client Company</b>  | MZR Global Sdn Bhd  |             |
| <b>Overall Comment</b>   | Satisfied   |             |
| <b>Application Name</b>  | CDST System   |             |
| <b>Signature &amp; Official Stamp</b>  | <b>Name</b>   | <b>Date</b> |
| <b>Verified By:</b><br><br>Developer  | AINA SAFIA BINTI<br>JEFFREE   | 09/06/2023  |
| <b>Acceptance &amp; Approved</b><br><b>By:</b><br><br><br>Client | Nor Fai'eza Binti Zainuren  | 09/06/2023  |

Figure 4.76 User Acceptance Test Acceptance Form

## **CHAPTER 5**

### **CONSLUSION**

#### **5.1 Introduction**

In the last chapter of Chapter 5 will discuss on the summarization of finding on the CDST system development to achieve the goal and purpose of the system development to overcome on problems in monitoring child development and growth. This system is designed and develop for the purpose on providing more organize system to monitor child development and growth by performing screening test by using more efficient and effective system. The system also allows to keep and stored the development and growth for each month safely to be monitored from time to time by the OT users. The end product of CDST web-based system is designed and developed with Visual Studio Code using Laravel framework architecture along with PHP, CSS, JavaScript and MySQL for database. In addition, the CDST system is implemented to be evaluated by the stakeholder (MZR) in order to test the functionality, usability and effectiveness of the system and has gained positive feedback from the stakeholders. In nutshell, the system's development objective is to provide more easiness and effectiveness for OT users to perform screening test and monitor child development by month in more organize and save more time.

#### **5.2 Objective Revisited**

As for the finalize project of CDST system development, some objective is achieved as mentioned in the first chapter to fulfil the goals of the end project development.

- Defined clear requirements needed for the Child Development Screening Test & Progress Monitoring system with client's engagement.
- Designed and developed minimalized, visual appealing and user-friendly web-based system of Child Developmental Screening Test & Progress Monitoring system.

- Evaluated functionality of Child Developmental Screening Test & Progress Monitoring system to validate and verify on the correctness functionality implement, effectiveness and usability of the system.
- Convert manual screening test to digital system.

### **5.3 Limitations and Constraints**

Throughout the development of CDST system, there are some limitations and constraints faced for the CDST project completion.

- i. Time Constraints
  - Limitation of time to implement CDST system with more attractive screening test module and more accurate functions for screening test and consultation modules within the project timeline.
- ii. Complex code scripting
  - CDST system is developed using Laravel framework that needs more skills, familiarity and understanding on the framework architecture and code structure that is using MVC architecture.
  - With limitation of knowledge and familiarity on Laravel framework cause some challenges to understand code structure and how to handle the error within the project timeline.
- iii. Client engagement
  - The involvement and engagement with clients impacts to develop the CDST system with the changes and modifications on the functions and requirements requested and impact on the project timeline.

#### **5.4 Recommendation Future Work**

As for the CDST system, there are still lacking in terms of functionality, validation, design interface and more that do enhancements and improvements for future works.

- i. Add images or videos for the screening area tasks as references or tutorials before do the child screening tests.
- ii. Add report module for children milestone percentage reached by month.
- iii. Provide email notification for the screening and consultation progress to the parents.
- iv. Provide forgot password function for users to easily recovered their registered password.
- v. Add informative information suggestion for each consultation of screening test to be viewed by Occupational Therapist users.
- vi. More informative graph chart with percentage of fail and pass or child in different age.

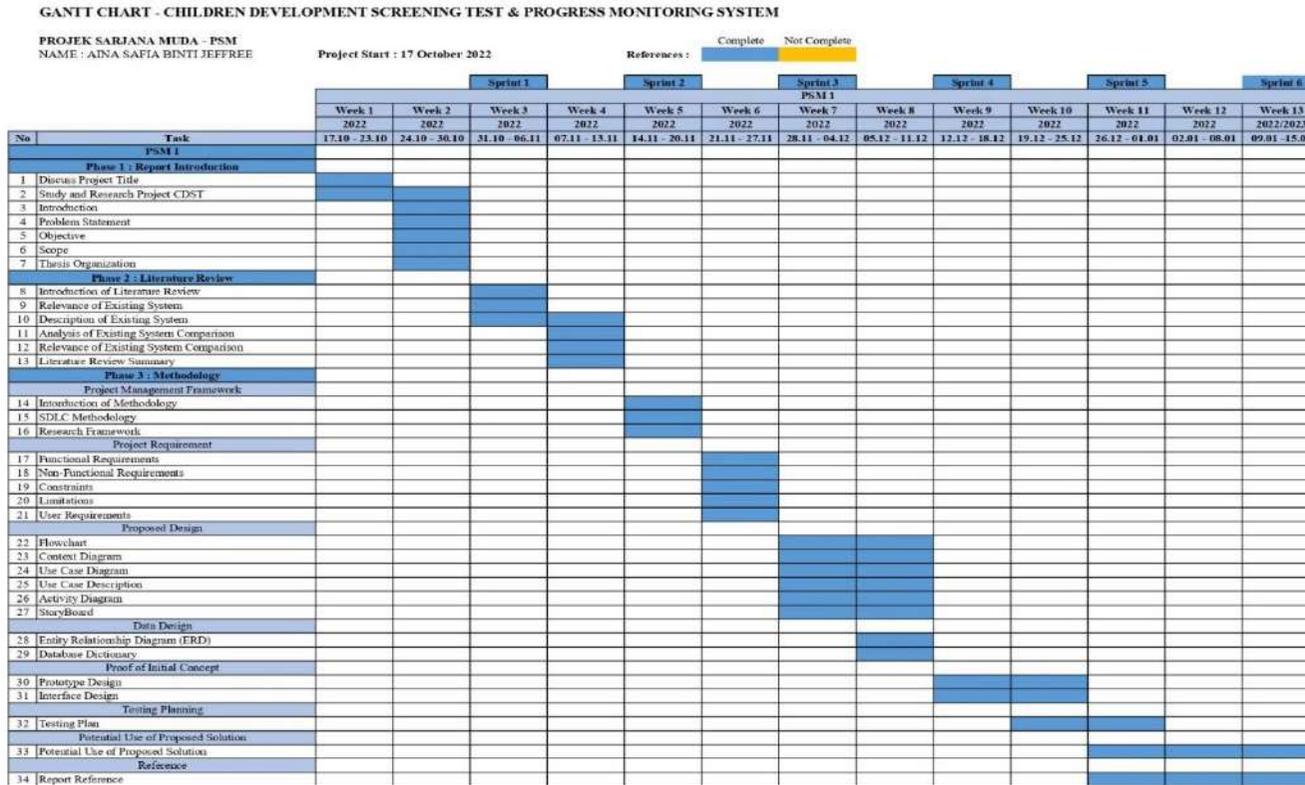
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## APPENDIX A

### GANTT CHART PLANNING



Appendix 1 Timeline Planning PSM I

**GANTT CHART - CHILDREN DEVELOPMENT SCREENING TEST & PROGRESS MONITORING SYSTEM**

**PROJEK SARJANA MUDA - PSM**  
 NAME : ADINA SAFIA BINTI JEFFREE

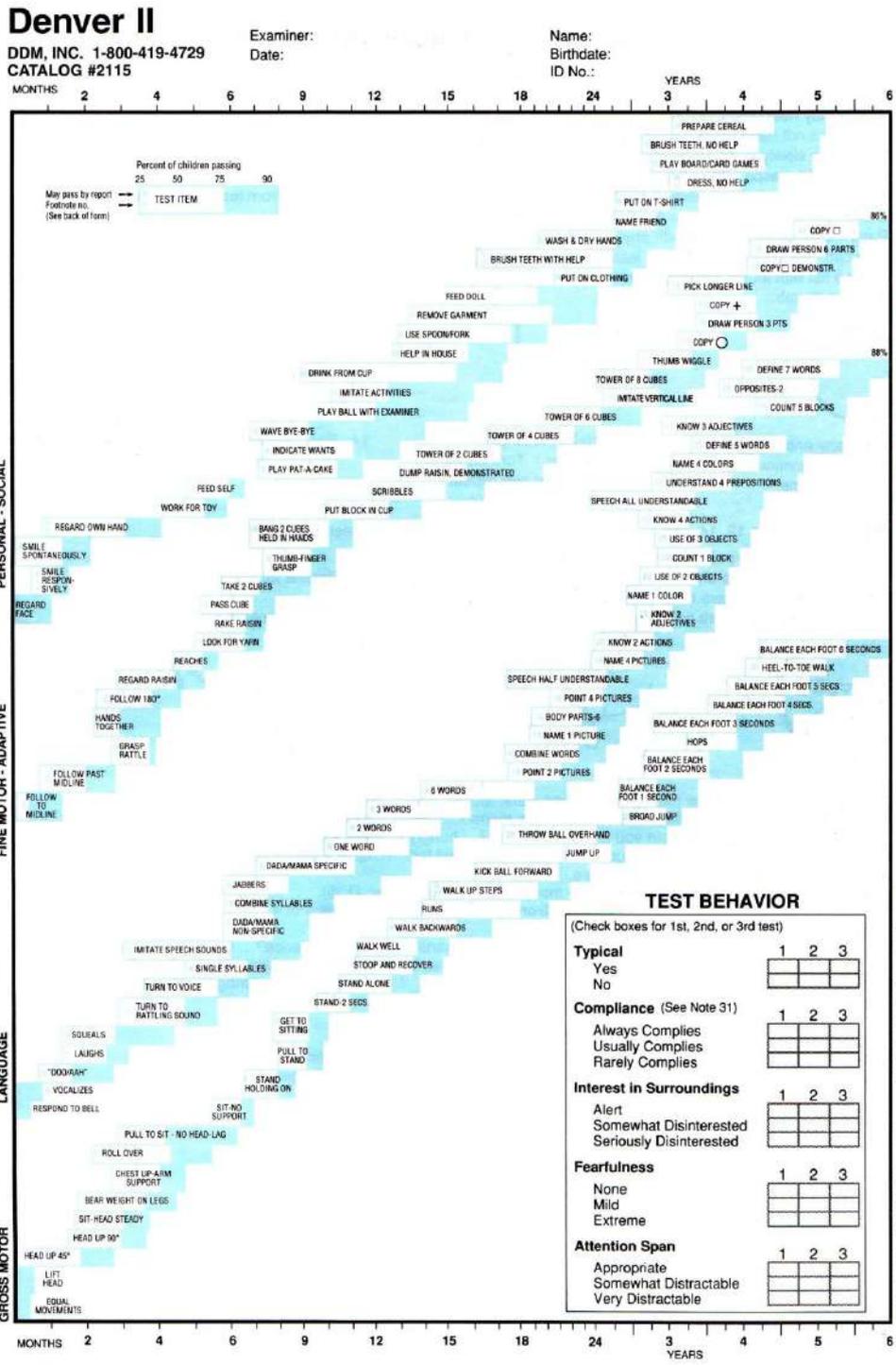
References :  Complete  Not Complete

| No | Task  | PSM 2          |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|----|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|    |   | Sprint 7       |                |                |                | Sprint 8       |                |                |                | Sprint 9       |                 |                 |                 | Sprint 10       |                 |
|    |   | Week 1<br>2023 | Week 2<br>2023 | Week 3<br>2023 | Week 4<br>2023 | Week 5<br>2023 | Week 6<br>2023 | Week 7<br>2023 | Week 8<br>2023 | Week 9<br>2023 | Week 10<br>2023 | Week 11<br>2023 | Week 12<br>2023 | Week 13<br>2023 | Week 14<br>2023 |
|    |   | 13.03 - 19.03  | 20.03 - 26.03  | 27.03 - 02.04  | 03.04 - 09.04  | 10.04 - 16.04  | 17.04 - 23.04  | 24.04 - 30.04  | 01.05 - 07.05  | 08.05 - 14.05  | 15.05 - 21.05   | 22.05 - 28.05   | 29.05 - 04.06   | 05.06 - 11.06   | 12.06 - 18.06   |
|    | <b>PSM 2</b>  |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Phase 4 : Development and Testing Implementation</b> |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 35 | Setup Development Environment Tools                     |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 1: User Registration</b>                      |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 36 | Add OT User   |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 2: Login</b>                                  |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 37 | Login   |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 38 | Logout  |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 3: View Children Information</b>              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 39 | List Registered Children                                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 40 | Search Registered Children                              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 42 | View Details Registered Children                        |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 4: Do Screening Test</b>                      |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 43 | Add Child Screening Test                                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 44 | Screening Area Category                                 |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 45 | Add Screening Test                                      |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 46 | List Child Screening Test                               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 47 | Search Child Screening Test                             |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 48 | View Details Child Screening Test                       |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 5: Manage Consultation</b>                    |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 49 | List Child Screening Consultation                       |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 50 | Search Child Screening Consultation                     |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 51 | Add Consultation Information                            |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 52 | Delete Row Consultation Information                     |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 53 | View Details Child Screening Consultation               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Module 6: Manage Report</b>                          |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 54 | List Screening & Consultation Report                    |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 55 | Search Child Screening Consultation Report              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 56 | View Details Screening Report                           |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 57 | Export Screening Report PDF                             |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 58 | View Details Consultation Report                        |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 59 | Export Consultation Report                              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Results / Findings</b>                               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 60 | User Acceptance Test (UAT)                              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Discussions</b>                                      |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 61 | Summary of Findings                                     |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Phase 5 : Conclusion</b>                             |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
|    | <b>Conclusion</b>                                       |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 62 | Introduction  |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 63 | Objective Revisited                                     |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 64 | Limitations   |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |
| 65 | Reccomandation/Future Work                              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |

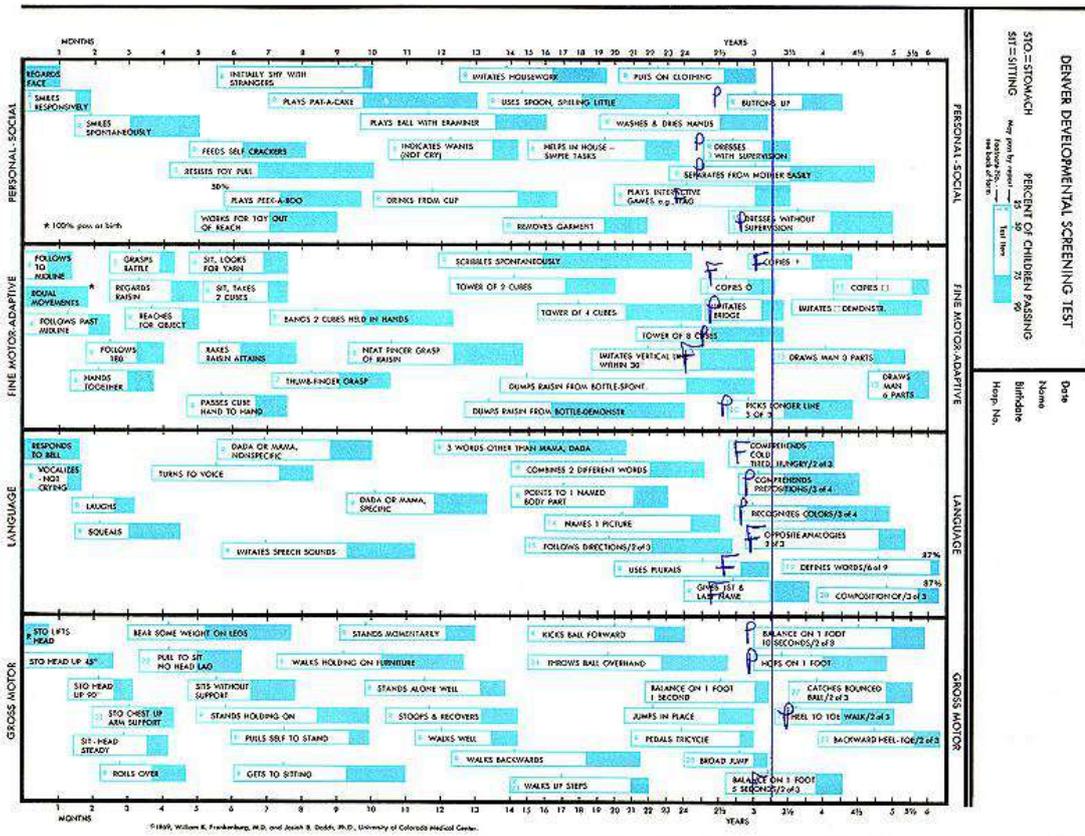
Appendix 2 Timeline Planning PSM II

# APPENDIX C

## DENVER II ASSESSMENTS SCALE



Appendix 3 Denver II Assessment Scale



Appendix 4 Denver II Assessment Scale Score

## APPENDIX D

### DEVELOPMENTAL MILESTONES – BIRTH TO FIVE YEARS OLD

Child Development Chart - first five years Harold Iretton, PhD

|                        | Social   | Self-Help   | Gross Motor   | Fine Motor  | Language   |
|------------------------|--|---|---|---|--|
| Birth to 6 Months      | Distinguishes mother from others.<br>Social smile.   | Comforts self with thumb or pacifier.<br>Reacts to sight of bottle or breast.                                       | Turns around when lying on stomach.<br>Lifts head and chest when lying on stomach.  | Picks up toy with one hand.<br>Looks and reaches for faces and toys.  | Vocalizes spontaneously, social.<br>Reacts to voices.<br>Vocalizes, coos, chuckles.  |
| 6 Months to 9 Months   | Pushes things away he/she does not want.<br>Reaches for familiar persons.  | Feeds cracker to self.  | Sits alone... steady, without support.<br>Rolls over from back to stomach.  | Picks up objects with thumb and finger grasp.<br>Transfers toy from one hand to other.  | Wide range of vocalizations (vowel, consonant -vowel sound combinations).<br>Responds to name - turns and looks.   |
| 9 Months to 12 Months  | Plays patty-cake.<br>Plays social games: peek-a-boo, bye-bye.  | Picks up spoon by handle.   | Walks around furniture or crib while holding on.<br>Crawls around on hands and knees.   | Picks up small object - precise thumb and finger grasp.   | Understands words like "No," "Stop," or "All gone."<br>Word sounds: says "Ma-ma" or "Da-da."   |
| 12 Months to 18 Months | Greets people with "Hi" or similar.<br>Gives hugs or kisses.<br>Wants stuffed animal, doll or blanket in bed.                                  | Insists on doing things by self such as feeding.<br>Feeds self with spoon.<br>Lifts cup to mouth and drinks.        | Runs.<br>Walks without help.<br>Stands without support.   | Scribbles with crayon.<br>Picks up two small toys in one hand.<br>Stacks two or more blocks.                                      | Asks for food or drink with words.<br>Talks in single words.<br>Follows simple instructions.   |
| 18 Months to 2 Years   | Usually responds to correction-stops.<br>Shows sympathy to other children, tries to comfort them.<br>Sometimes says "No" when interfered with. | Takes off open coat or shirt without help.<br>Eats with spoon, spilling little.<br>Eats with fork.                  | Walks up and down stairs alone.<br>Runs well, seldom falls.<br>Kicks a ball forward.  | Turns pages of picture books, one at a time.<br>Builds tower of four or more blocks.  | Follows two-part instructions.<br>Uses at least ten words.<br>Follows simple instructions.   |
| 2 Years to 3 Years     | Plays a role in "pretend" games.<br>Plays with other children - cars, dolls, building.<br>"Helps" with simple household tasks.                 | Dresses self with help.<br>Washes and dries hands.<br>Opens door by turning knob.                                   | Walks up and down stairs - one foot per step.<br>Stands on one foot without support.<br>Climbs on play equipment - ladders, slides. | Cuts with small scissors.<br>Draws or copies vertical lines.<br>Scribbles with circular motion.                                   | Understands four prepositions - in, on, under, beside.<br>Talks clearly - is understandable most of the time.<br>Talks in two-three word phrases or sentences.                                     |
| 3 Years to 4 Years     | Protective towards younger children.<br>Plays cooperatively, with minimum conflict and supervision.<br>Gives direction to other children.      | Dresses and undresses without help, except for tying shoelaces.<br>Washes face without help.<br>Toilet trained.     | Hops on one foot, without support.<br>Rides around on a tricycle, using pedals.   | Cuts across paper with small scissors.<br>Draws or copies a complete circle.  | Understands concepts - size, number, shape.<br>Counts five or more objects when asked "how many?"<br>Identifies four colors correctly.<br>Combines sentences with the words "and," "or," or "but." |
| 4 Years to 5 Years     | Shows leadership among children.<br>Follows simple game rules in board games or card games.  | Goes to the toilet without help.<br>Usually looks both ways before crossing street.<br>Buttons one or more buttons. | Swings on swing, pumping by self.<br>Skips or makes running "broad jumps."<br>Hops around on one foot without support.              | Prints first name.<br>Draws a person that has at least three parts: head, eyes, nose, mouth, etc.<br>Draws recognizable pictures. | Tells meaning of familiar words.<br>Reads a few letters (five +)<br>Follows a series of three simple instructions.   |

Remember that children develop at different rates and this is only a general guide. If you have concerns about your child's development contact a professional.

### Appendix 5 Developmental Milestones