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DCARES: Developmental Assessment & Reporting System for Special Need Children

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Abstract

Due to the challenges with manual, paper-based evaluation methods faced by LittleOnes Eduworld preschool, the Developmental Assessment & Reporting System for Special Need Children has been proposed. This web-based solution system was developed to overcome the challenges such as inefficiencies, data loss, disorganized data, and time-consuming assessment processes, which make it difficult for teachers to track children progress effectively. The system is developed using the Agile scrum methodology, and built with the Laravel framework, a PHP-based framework commonly used for developing large-scale application systems. Furthermore, it is designed to improve efficiency in completing children with inclusive program daily assessments, secured to manage educational data, user's information and reduce administrative workloads. However, limitations such as dependency on internet access, browser compatibility issues, and limited analytics exist, present valuable opportunities for future enhancement. Hence, future enhancement, it is expected to be integrated into a mobile application and applying machine learning for prediction learning progress.

1. Introduction

Preschool is a place for children to get their early education. They will experience the little things around them during this phase [1]. In Malaysia, early childhood education is important to develop and nurture children's potentials in all aspects of their cognitive and developmental growth, especially in developing basic skills and fostering positive attitudes towards learning [2]. Therefore, inclusive programs are introduced for special needs children to help them engage in inclusive teaching and learning alongside their peers [3]. With LittleOnes Eduworld, learning systems are based on comprehensive and hands-on learning, back-to-nature learning, and visual learning. The Research and Development department, led by founder Hajjah Wan Roslina Wan Yusoff, is to learn more about children and design programs and learning skills that suit them. There are four programs offered, such as childcare, preschool, special needs education, and therapy center. This project will focus on SDG 4: Quality Education, specifically in special needs education for children's programs with speech delay, autism, attention deficit hyperactivity disorder (ADHD), and other disabilities. Currently, special needs education faces challenges with daily manual evaluations, which require extensive work and use large amounts of paper, making it difficult to track educational progress and securely manage teachers' and children's information. These issues create inefficiencies in managing the evaluation reports and make it harder to support the children's development.

To address this challenge, this project aims to develop a comprehensive web-based system, with three main objectives. The first objective is to design a web-based reporting system that replaces manual processes, offering

daily educational progress updates by teachers for children with special needs. The second objective is to develop a web-based reporting system that effectively manages data for teachers and children. The third objective is to test the functionality of the system and assess user acceptance. The scope of this project focuses on developing a user-friendly, web-based reporting system for LitleOnes Eduworld inclusive education program. The system will feature five modules involved in the web-based reporting system for user login and authentication, manage children's assessments by syllabus, manage user's information, children's learning statistics and generating reports.

2. Related Work

This section reviews the literature related to the evaluation reporting system and its application in current systems. A lot of resources sources, including articles, journals, theses, and current systems that are comparable to the Developmental Assessment and Reporting System for Special Need Children, were used as references when performing the literature review for this project. Three current systems have been selected to be compared to the proposed system.

2.1 Web Based System

Technology has become a powerful tool for transforming education, making it more effective and accessible for everyone. It has completely changed how teachers and students interact, learn, and assess progress. Technological advancements have allowed educators to address a wide range of learning needs, including those of students with special needs [4]. One of the most impactful innovations is the web-based reporting system. These systems provide a centralized, real-time platform that simplifies tracking student progress and eliminates the inefficiencies of traditional paper-based methods.

Web-based systems are designed to make assessments easier and help teachers keep track of each student's unique learning journey. They provide a more efficient way to evaluate and understand a student's skills, particularly in today's digital age. [5] highlights how such tools can pave the way for new methods of assessment that focus on the actual abilities of students. Instead of relying on outdated or rigid approaches, these systems allow teachers to analyze data more effectively, identifying areas of strength and those needing improvement. These digital technologies have made a paradigm shift in the entire education system. It is not only a knowledge provider but also a co-creator of information, a mentor, and an assessor [6]. By adopting web-based systems, it not only improves the educational experience for students but also creates a more connected and supportive learning environment.

2.2 Academic Staff Teaching and Course Evaluation System (SPARK)

The teaching and course evaluation process is a mandatory process for all students every semester. It serves as a method for the university management to gather feedback from its clients and students regarding the quality of teaching provided by academic staff and the quality of courses offered to them. This process is an essential part of the university's academic programs' Continuous Quality Improvement (CQI) cycle. The evaluation is conducted entirely online through the "Academic Staff Teaching and Course Evaluation System" (SPARK). This system was fully developed by the Information Technology Centre of University Tun Hussein Onn Malaysia. SPARK features a user-friendly interface designed for easy navigation, catering to faculty members, students, and lecturers. By transitioning from traditional paper-based assessments to a fully digital format, the system enhances efficiency, organizes data effectively, and reduces administrative tasks.

2.3 Course Delivery Assessment System (SPPK)

The Course Delivery Assessment System, known as SPPK at University Kebangsaan Malaysia (UKM), is an online platform developed to gather feedback from students about their university, courses, and lecturers' performance in digital form. It is to improve university facilities, teaching quality, and courses by allowing students to provide honest feedback. Once logged in, students are guided through a step-by-step process to evaluate. Evaluations are categorized into general course feedback, faculty-specific questions, and individual lecturer assessments. The system is user-friendly, with clear instructions and it is easy to finish the task. By collecting and analyzing student feedback, the SPPK helps ensure continuous improvement in academic quality and overall student learning experiences.

2.4 The Lecturer Training Assessment System (Survey)

The lecturer teaching assessment system at National Defense University Malaysia (UPNM) for students to evaluate the teaching quality of their courses. Each student is required to evaluate the course at the end of each semester, and the evaluations are done online. This system provides a platform for students to voice their opinions in helping university and academic staff identify strengths and areas for improvement. Once logged in,

students must complete evaluations of all the lecturer courses and submit their response. The system updates the evaluation status to "completed" for each evaluated course, and only when all courses are marked as "completed", examination result slip are available to view. Moreover, the process of evaluation focuses on being thorough and secure. Students can update their password and are required to log out after finishing their evaluation. This helps their data and ensures they take responsibility for their feedback, which shows an important improvement in the quality of teaching at UPNM.

2.5 Comparison Between Existing System

In this section, show a comparison result of the functionality made between the selected existing or similar system and the proposed system. Table 1 below presents the results of the comparison among three selected systems along with the proposed system. From a comparison table between existing and proposed systems, the proposed system has similar assessments features to platforms like academic staff teaching and course evaluation system (SPARK), course delivery assessment system (SPPK) and the lecturer teaching assessment system (Survey), which include login, scale evaluation, dashboard displays, filtering, cumulative reports, generate report and download report. This makes it a system tool for managing academic assessment well.

Table 1 *Comparison Between System*

Featured/System	Academic Staff Teaching and Course Evaluation System (SPARK)	Course Delivery Assessment System (SPPK)	The Leceturer Training Assessment System (Survey)	Developmental Assessment & Reporting System for Special Need children (DCARES)
Login Role Based	Yes	Yes	Yes	Yes
Scale Evaluation	Yes	Yes	Yes	Yes
Dashboard	Yes	Yes	Yes	Yes
Filtering	Yes	Yes	Yes	Yes
Cumulative Report	No	No	No	Yes
Statistic Learning	No	No	No	Yes
Generate Report	Yes	Yes	Yes	Yes
Download Report	Yes	Yes	Yes	Yes

3. Methodology

The Agile Scrum methodology is an iterative and incremental project management approach commonly used in software development as shown in Figure 1. Instead of following a linear sequence of phases, Scrum breaks the project into smaller development cycles called sprints, typically lasting two to four weeks. Each sprint involves planning, development, testing, and review, enabling teams to deliver functional components of the system regularly. It is a conceptual framework for software engineering that starts with the planning stage and progresses through the deployment phase through incremental and iterative interactions over the course of project [7]. Agile scrum can be described as the ability to adapt to and respond to change. It emphasizes adaptability, continuous collaboration with stakeholders, and iterative improvements throughout the project lifecycle.

This methodology involves breaking the project into smaller, more manageable tasks, making it more flexibility by allowing changes and feedback to be incorporated during development. Additionally, it supports improvement of development, collaboration, and testing. Once the work begins, teams cycle through a process of planning, executing, and evaluating. Continuous collaboration is crucial, both among team members and with project stakeholders. Agile scrum methodology is particularly suitable for this project, Developmental Assessment & Reporting System for Special Need Children, supports regular engagement with stakeholders, ensures progress visibility, and allows to make necessary adjustments in each sprint. It enables regular engagement with stakeholders, LittleOne Eduworld Preschool every two weeks to present progress, allowing for adjustments within the sprints.

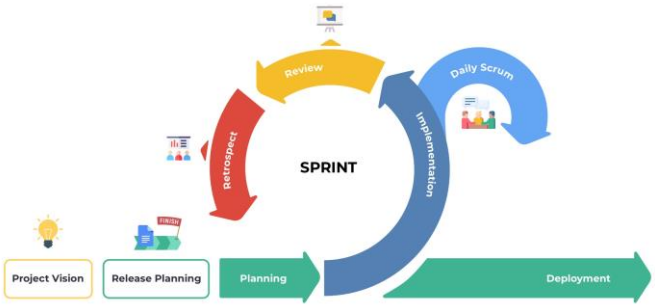

Fig 1 *Agile Scrum Methodology*

3.1 System Development Workflow

Table 2 present the workflow that highlights the task, output and tools used in each phase.

Table 2 *System Development Workflow*

Phases	Task	Output	Tool
Planning	Define project scope and requirement gathering	Requirement Analysis specification for LittleOne Eduworld	Google Meet, WhatsApp
Design	Design system architecture by using wireframe and implemented role-based access control.	System architecture documentation and UI wireframes	Laravel MVC framework
Development	Implement front end and backend functionality, create a database structure and deploy user interface	Working on basic system features and integrated database	VSCode Laravel, PHP, HeideSQL
Testing	Perform functionality testing, security testing and user acceptance	Test bug in system, report and user feedback	UAT tools
Deployment	Setup database, system migration, server configuration and run on client device	System installed to client device and ready to be used	Client devices
Maintenance	Regularly monitor the system, provide technical support, get feedback from users to improve the system features and regularly backup	A well-maintained system that continues to meet the needs of users effectively, ensuring long-term satisfaction	Server maintenance

3.2 System Requirement Gathering

Requirements analysis or known as requirements engineering as stated by [8], is the process or steps of determining user expectations in the developed web-based system for Developmental Assessment & Reporting System for Special Need Children. As part of this analysis, data flow is described in the form of a context diagram, data flow diagram, and entity relationship diagram. A system flow chart to describe the flow that the user will operate in the system is provided. The requirements identified during this process are categorized into two critical parts: functional requirements and non-functional requirements as shown in table 3 and table 4. Functional requirements define the specific functions of a system developed. While non-functional requirements describe the quality attributes, performance, and constraints of the system [9]. They focus on how the system operates rather than what it does for the system. These two types of requirements are important to identify the behavior or specific function and describe the requirements specification through the system.

Table 3 *Functional Requirement*

Requirement	Description	User
User login and authentication	Users login the system based on role-based and system alert for any invalid input.	Human Resource, teacher, student
User registration	Users registered by human resource before fully access into the system.	Human Resource
Manage children assessment	Human resource is responsible for creating the subjects, academic year and preparing the questions for teachers to complete students assessment.	Human Resource, teacher
Manage users' information	Human resources responsible managing all users data and ensuring it is stored securely in a centralized database.	Human Resource
Children learning statistic trends	Teachers need to analyze students academic progress every months.	Teacher
Report Generating	Teachers can generate assessment reports, which are then reviewed and approved by Human resources. Once approved, the reports are accessible to parents for viewing.	Human Resource, teacher, student

Table 4 *Non-Functional Requirement*

Requirement	Description
Operational	The system is available where there is an internet connection. The system can be used on any web server. The system will use a database to store all data.
Security	Using Laravel framework, provides built in authentication services to help manage user login, registration and session
Performance	System available at any time.
Usability	The system is simple, easy to use and user friendly.

3.3 System Analysis and Design

The system design is the process of defining system architecture, components, modules, interfaces, and data to meet specified requirements. As Harp and Smith [10] point out, systems thinking emphasizes the need to address actual human problems through design, aiming to change environments in ways that improve human experience. This approach suggests that system design should not only focus on technical specifications but also prioritize improving the quality of human interaction with the system.

3.3.1 Flow Chart

A flowchart is a diagram that describes the process of the workflow in the system. It uses symbols to illustrate steps, process, decision, input, output and the flow of system in a logical sequence. Appendix A shows admin (human resource), teacher and students flow charts, providing a clear view of how data and actions move through the system. The Human Resource (HR) process is focused on administrative and configuration tasks**.** They can perform actions such as registering new users, and updating their details as needed.

Furthermore, human resources are also responsible for overseeing academic years, which includes adding, deleting, and updating academic years and controlling the opening and closing of their student assessment status. Human resources can create and manage assessment questions for student evaluations. They are responsible for reviewing and approving student assessment reports before making them available to teachers and students. Teachers' roles are required to complete the open student assessment and submit it before the evaluation closes. Teachers are allowed to view learning statistics by applying filters based on specific

academic year and subject. Teachers can generate a student's learning performance report. After completing the activities, teachers can log out to end the session. Finally, students' roles have an option to view the available assessment reports, which can also be downloaded if needed.

3.3.2 Context Diagram

A Context diagrams are high-level visual representations that illustrate how a system under development interacts with its external entities, including users, other systems, and processes. Entities involved are human resources, teachers, and students as shown in figure 2. Users need to log in using an email and password before fully access the system. Human resources create the assessment question, and those responsible for activating the academic year will be evaluated by teachers. Teachers are responsible for completing student assessments when assessments are open; they need to be completed before the end of the month. Besides, the teacher can generate an assessment report after it is submitted to human resources. Human resources will approve the assessment report before can be viewed by students' parents on the student page. The system can generate assessment analysis by subject criteria to monitor students' performance.

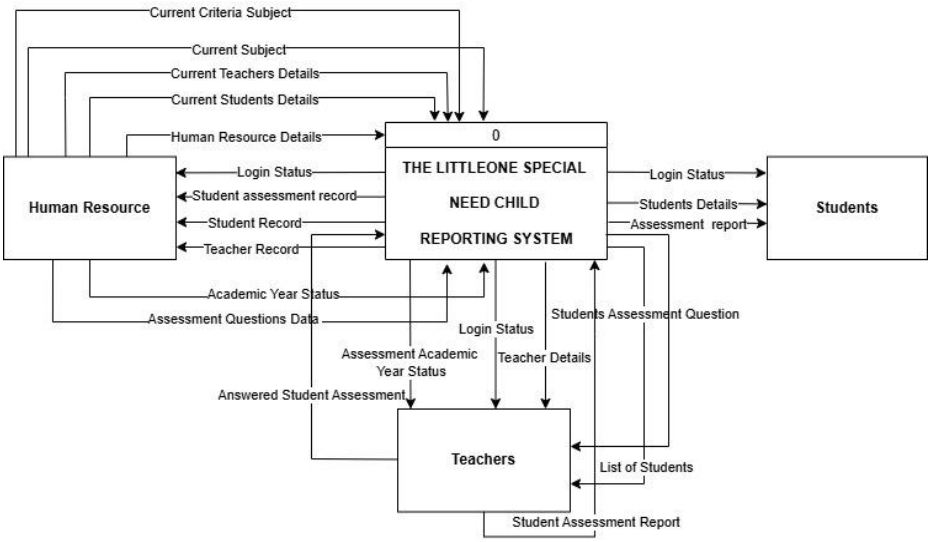

Fig 2 *Context Diagram of Developmental Assessment & Reporting System for Special Need Children*

3.3.3 Data Flow Diagram (DFD)

A Data Flow Diagram (DFD) is designed to provide a clear visualization of a system's implementation, offering an overview of the process before development begins. The process architecture is shown in the context diagram, data flow diagram level zero, and data flow diagram level one. This visualization helps in identifying issues, refining processes, and ensuring that the implementation aligns with user requirements and expectations before actual development starts. Figure 3 shows the DFD level 0 for proposed system with three entities and four process. Meanwhile, the level 1 DFD can be found in appendix B.

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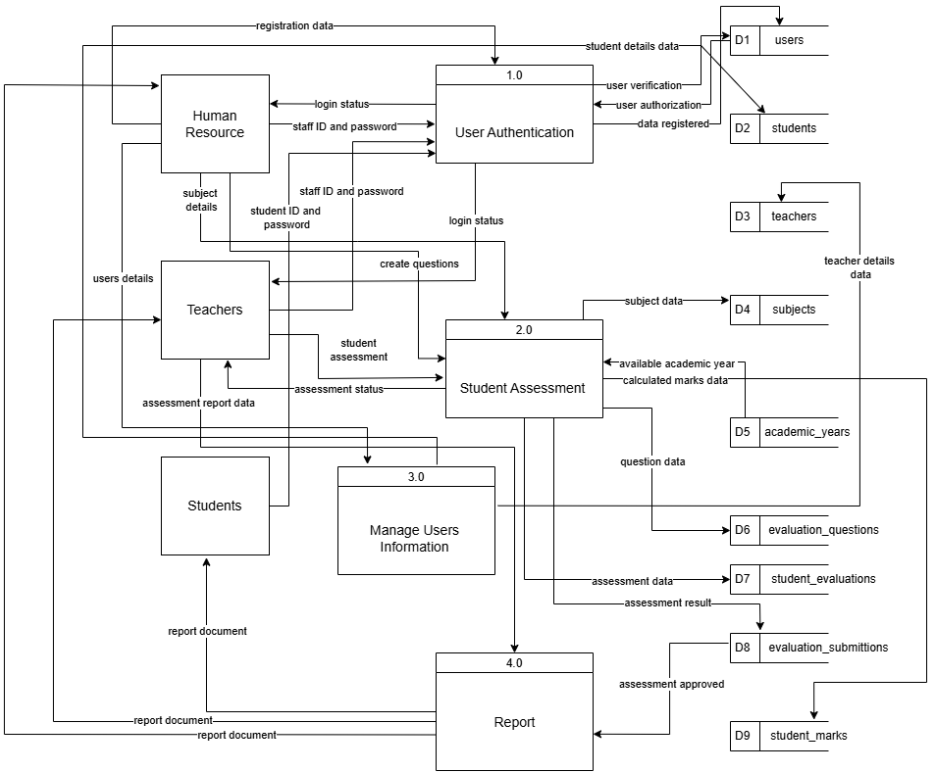


Fig 3 *DFD Level 0*

3.3.4 Entity Relationship Diagram (ERD)

The database design is the process of creating a detailed structure for organizing, storing, and managing data in a database system. Database design is represented through an Entity Relationship Diagram (ERD), which illustrates the entities, their attributes, and the relationships between them. An entity relationship diagram (ERD) was used as a graphical representation to display the relationship among entities of the system within the database created. The ERD of proposed system, Developmental Assessment & Reporting System for Special Need Child were shown in Figure 4 where it will have 16 tables. The tables created were as follows:

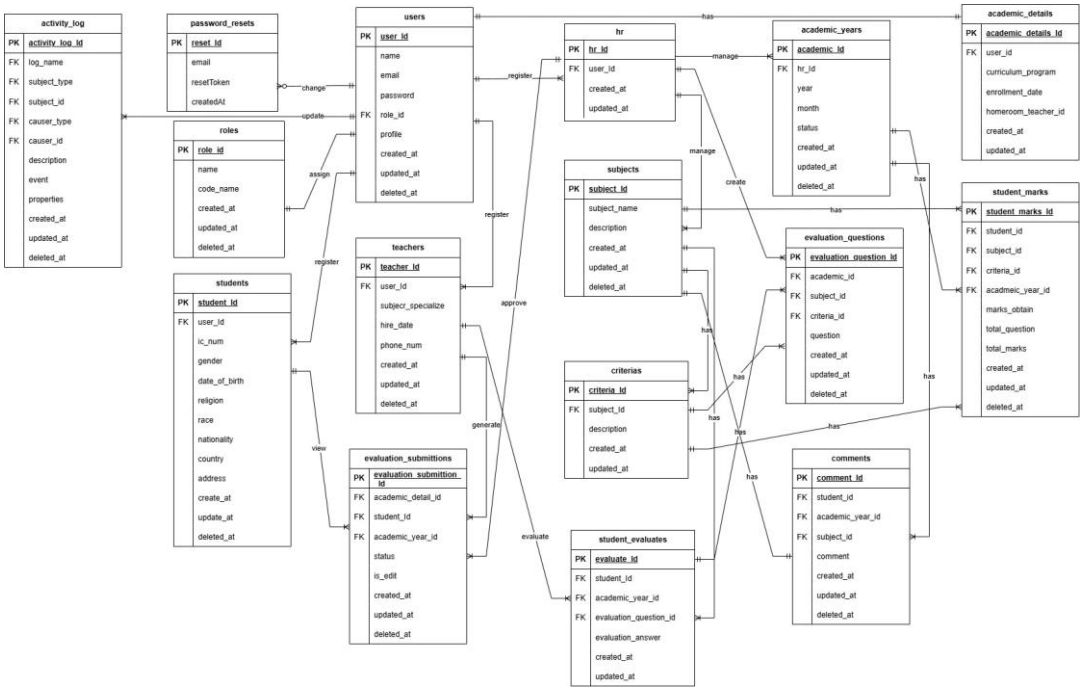


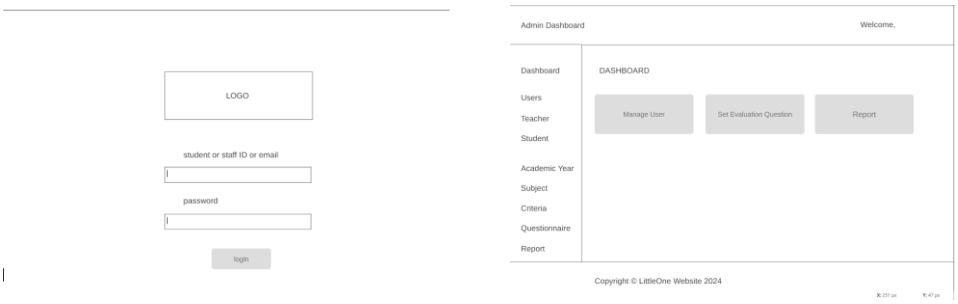
Fig 4 *ERD of Developmental* Assessment & Reporting System for Special Need Children

3.4 System Interface Design

The purpose of an application or website interface is to provide developers with a realistic idea of how the actual application will be developed. To provide a sketch of the locations of all the buttons, tables, and icons that will be utilized in the system, a wireframe will be created. Developmental Assessment and Reporting System for Special Need Children will have three different interfaces suiting the process that is determined by them.

The interface for this proposed system is made differently for human resources, teachers, and students. The login interface as shown in Figure 5 provides fields for users to enter their credentials, which can be either a staff ID, student ID, or email address, and with a password. This ensures that each user can authenticate their identity before fully accessing the system. The system validates the provided credentials against stored records to confirm accuracy and prevent unauthorized access.

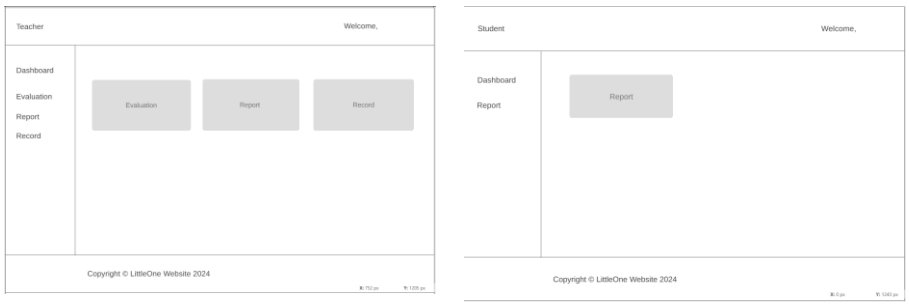
The admin dashboard is an interface for managing various aspects of the system. A left navigation panel with links to eight sections, including users, teachers, students, academic years, subjects, criteria, questionnaires, and reports. The main content area highlights human resources as an admin function, like managing users, setting evaluation questions, and accessing reports. This layout ensures ease of navigation, allowing human resources to quickly move between tasks, as shown in Figure 5.



(a) **(b)**

Fig. 5 *Interface Design (a) Login Page; (b) Admin Dashboard*

The teacher dashboard is a simple and user-friendly interface designed specifically for teachers. It features left navigation for main functions like "Evaluation," "Report," and "Record," giving teachers quick access to perform tasks. The straightforward design makes it easy to navigate, allowing teachers to focus on their tasks efficiently, as shown in Figure 6. The student dashboard is a simple and user-friendly interface designed specifically for students. It features left navigation for functions like "Report," giving students quick access to perform tasks. The straightforward design makes it easy to navigate, allowing students to focus on their tasks efficiently, as shown in Figure 6.



(a) **(b)**

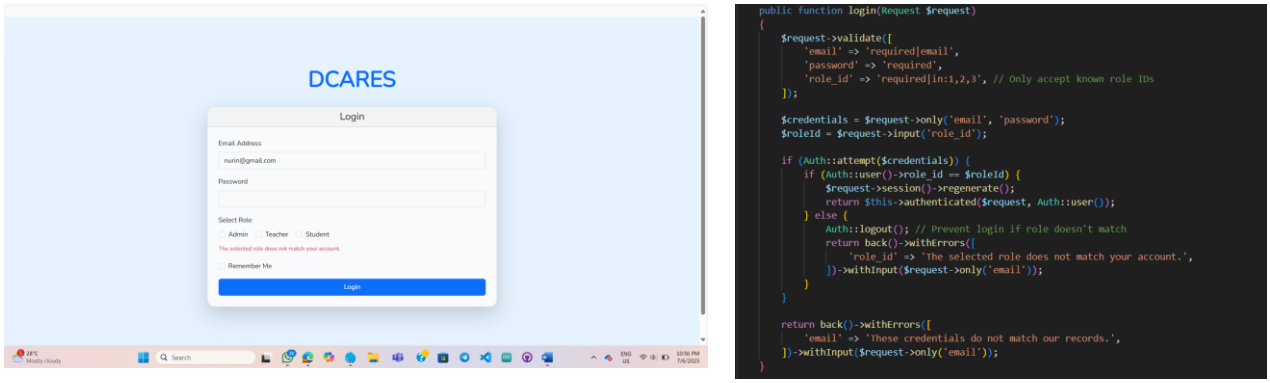
Fig. 6 *Interface Design (a) Teacher Dashboard; (b) Student Dashboard*

4. Result and Discussion

This section discusses the system measures implemented in the proposed system. Five key functional modules for the system's operation. Each module is designed to meet the specific aspect and requirements of the system, to cover all important functions completely. The modules include user login and authentication, managing child assessment, managing user information, child learning statistics and generating reports

4.1 Implementation of User Login and Authentication Module

The image above shows a detailed depiction of the login and authentication module for DCARES, divided into two figures which are Figure 7, illustrates the user interface of login and represents the source code. This form is designed for registered teachers and students by human resources to input their details for fully access to the system. It consists of fields for important information which are email and password. Upon fully accessing user dashboard, users can submit their email and password by clicking the login button. However, if the email or password is incorrect, the system will display an error message. Similarly, if users select the wrong role, the system will also show an error message indicating that the role does not match.

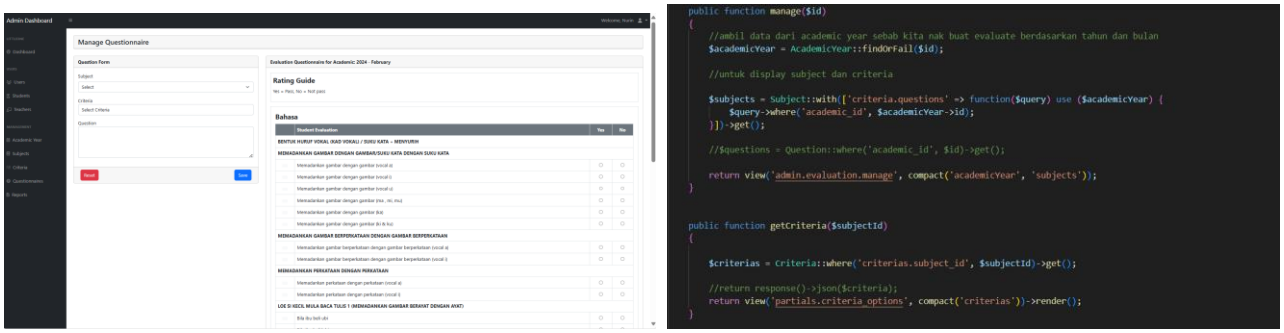


(a) **(b)**

Fig. 7 *Source Code (a) Authentication; (b) Login*

4.2 Implementation of Children Assessment Module

The children assessment module was separated into two roles, admin and teacher. The image above shows a detailed detail of the children's assessment admin module for DCARES, which is in Figure 8. Figure 8 illustrates the managing children's assessments questions. These assessment questions are created by human resources for teachers to complete the student evaluations every month. Teachers are required to complete the evaluation questions. Manage function, and editEvaluate function source code used to create the questions and to able evaluate the assessment questions.

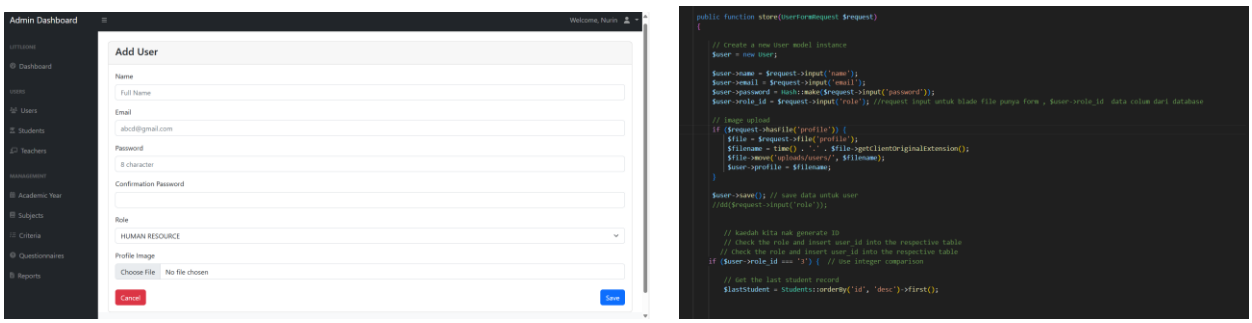


(a) **(b)**

Fig. 8 *Children Assessment (a) Admin Create Question; (b) Source Code*

4.3 Implementation of Manage User's Information Module

The manage user's information module allows only human resources to register new users for teacher and student. The image below, shown in Figure 9, provides a detailed view of the Manage User's Information interface and represents the source used for this module. This module enables the human resource to input essential user details such as name, email, password, and role information during the registration process. Once the user is successfully registered, the system will automatically assign them to the appropriate role-based access page, allowing teachers and students to log in and use the system according to their permissions.

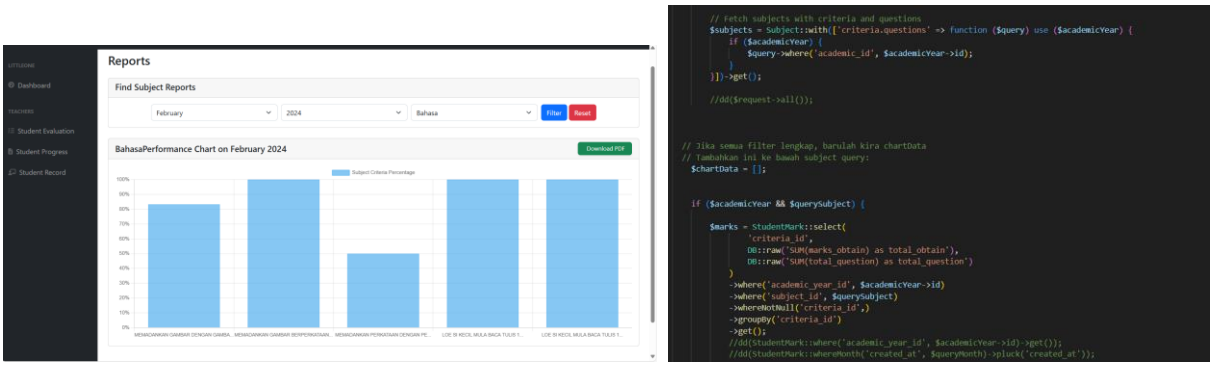


(a) **(b)**

Fig. 9 *Registration(a) List of User Registration; (b) Register New User*

4.4 Implementation of Children Statistic Learning Module

Figure 10 will display the visual representation of bar chart each subject criteria percentage by filtering academic year and subject with a source code. Once filters are applied, the system automatically updates the chart to reflect the performance data, making it easier to identify percentage of subject criteria in different subjects' area. This module enhances the overall evaluation process by allowing users to interpret results more effectively and supports informed decision making for academic improvement.

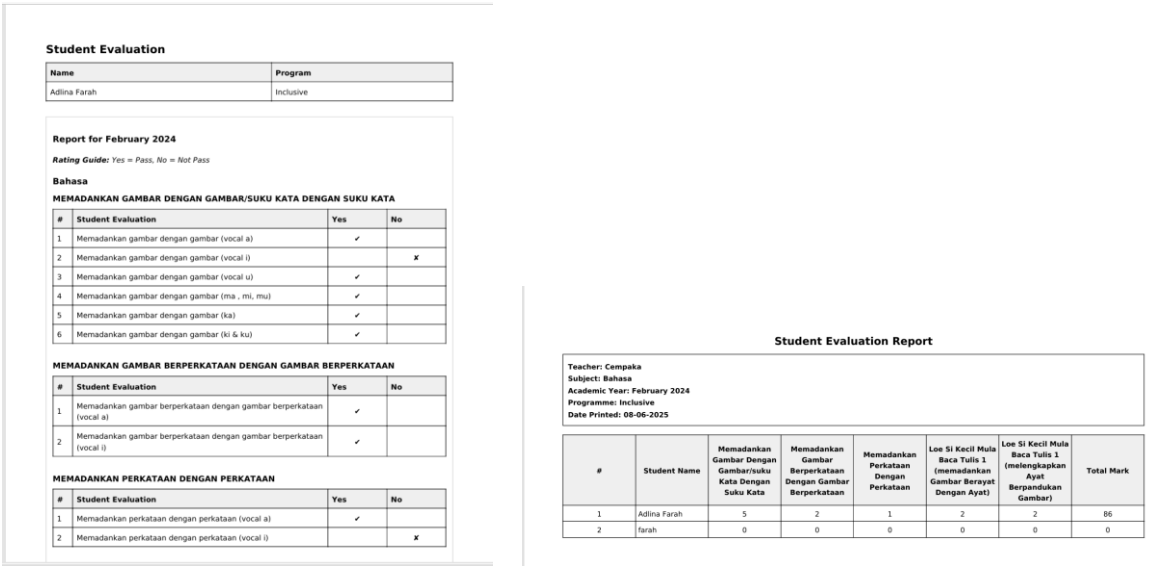


(a) **(b)**

Fig. 10 *Source code (a) Learning Statistic; (b) Learning Statistic*

4.5 Implementation of Generate Report Module

Figure 11 represents the approval reports by the human resource staff, where reports must first be reviewed and approved before they can be accessed by teachers and students. This ensures that only validated and finalized data is shared for viewing or downloading. Fig 12 shows DomPdf source code to generate a report.



Student Evaluation

Name	Program
Adlina Farah	Inclusive

Report for February 2024

Rating Guide: *Yes = Pass, No = Not Pass*

Bahasa

MEMADANKAN GAMBAR DENGAN GAMBAR/SUKU KATA DENGAN SUKU KATA

#	Student Evaluation	Yes	No
1	Memadankan gambar dengan gambar (vocal a)	✔	
2	Memadankan gambar dengan gambar (vocal i)		✘
3	Memadankan gambar dengan gambar (vocal u)	✔	
4	Memadankan gambar dengan gambar (ma , mi, mu)	✔	
5	Memadankan gambar dengan gambar (ka)	✔	
6	Memadankan gambar dengan gambar (ki & ku)	✔	

MEMADANKAN GAMBAR BERPERKATAAN DENGAN GAMBAR BERPERKATAAN

#	Student Evaluation	Yes	No
1	Memadankan gambar berperkataan dengan gambar berperkataan (vocal a)	✔	
2	Memadankan gambar berperkataan dengan gambar berperkataan (vocal i)	✔	

MEMADANKAN PERKATAAN DENGAN PERKATAAN

#	Student Evaluation	Yes	No
1	Memadankan perkataan dengan perkataan (vocal a)	✔	
2	Memadankan perkataan dengan perkataan (vocal i)		✘

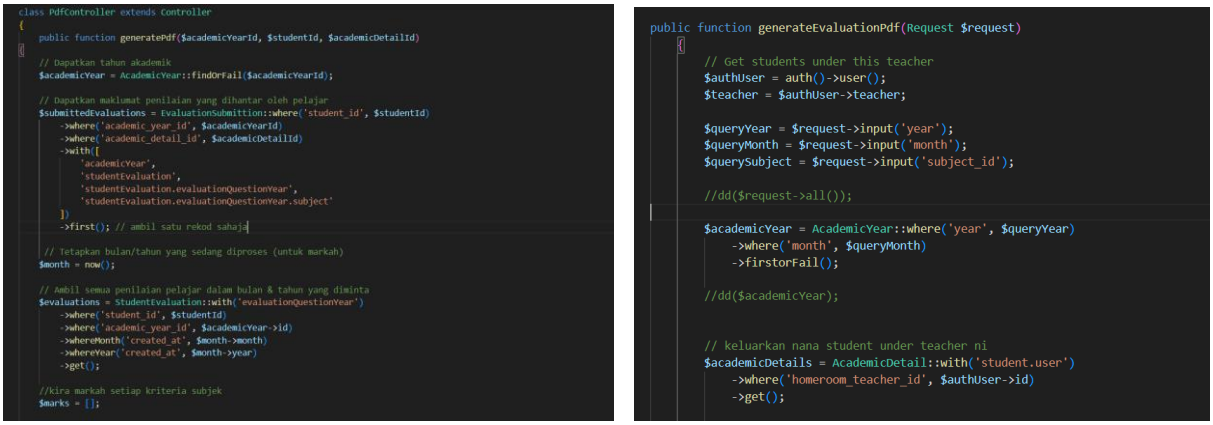
Student Evaluation Report

Teacher: Cempaka
Subject: Bahasa
Academic Year: February 2024
Programme: Inclusive
Date Printed: 08-06-2025

#	Student Name	Memadankan Gambar Dengan Gambar/suku Kata Dengan Suku Kata	Memadankan Gambar Berperkataan Dengan Gambar Berperkataan	Memadankan Perkataan Dengan Perkataan	Loe Si Kecil Mula Baca Tulis 1 (memadankan Gambar Berayat Dengan Ayat)	Loe Si Kecil Mula Baca Tulis 1 (melengkapkan Ayat Berpandukan Gambar)	Total Mark
1	Adlina Farah	5	2	1	2	2	86
2	farah	0	0	0	0	0	0

(a) **(b)**

Fig. 11 *Report (a)Student Assessment Report; (b) Student Performance Report*



```php
class PdfController extends Controller
{
    public function generatePdf($academicYearId, $studentId, $academicDetailId)
{
    // Dapatkan tahun akademik
    $academicYear = AcademicYear::findOrFail($academicYearId);

    // Dapatkan maklumat penilaian yang dihantar oleh pelajar
    $submittedEvaluations = EvaluationSubmittion::where('student_id', $studentId)
        ->where('academic_year_id', $academicYearId)
        ->where('academic_detail_id', $academicDetailId)
        ->with([
            'academicYear',
            'studentEvaluation',
            'studentEvaluation.evaluationQuestionYear',
            'studentEvaluation.evaluationQuestionYear.subject'
        ])
        ->first(); // ambil satu rekod sahaja

    // Tetapkan bulan/tahun yang sedang diproses (untuk markah)
    $month = now();

    // Ambil semua penilaian pelajar dalam bulan & tahun yang diminta
    $evaluations = StudentEvaluation::with('evaluationQuestionYear')
        ->where('student_id', $studentId)
        ->where('academic_year_id', $academicYear->id)
        ->whereMonth('created_at', $month->month)
        ->whereYear('created_at', $month->year)
        ->get();

    //kira markah setiap kriteria subjek
    $marks = [];
```

```php
public function generateEvaluationPdf(Request $request)
    {
        // Get students under this teacher
        $authUser = auth()->user();
        $teacher = $authUser->teacher;

        $queryYear = $request->input('year');
        $queryMonth = $request->input('month');
        $querySubject = $request->input('subject_id');

        //dd($request->all());

        $academicYear = AcademicYear::where('year', $queryYear)
            ->where('month', $queryMonth)
            ->firstOrFail();

        //dd($academicYear);


        // keluarkan nana student under teacher ni
        $academicDetails = AcademicDetail::with('student.user')
            ->where('homeroom_teacher_id', $authUser->id)
            ->get();
```

(a) **(b)**

Fig. 12 *Source code (a) Student assessment report; (b) Student Performance Report*

4.6 Testing

This section focuses on the important testing aspects to ensure reliability, high quality and secure software systems. There were two tests which were test plan and user acceptance testing. There are two methods used in testing phase which are test plan results and User Acceptance Testing (UAT).

4.6.1 Test Plan Result

A test plan is part of the software development process, which describes the technique and strategy for testing. It acts as a guide to ensure that testing is smooth and organized as shown in table 5 and table 6 below.

Table 5 *Functional Test Plan Result*

Check List	Expected Result	Actual Test
Registration(Human Resource register student and teacher in correct fromat)	Register successful and registration details display in role-based page.	Pass
Login (Input correct email, password and role)	Login successfully redirect to the role dashboard.	Pass
Login (Input wrong email or password)	Login fail display message "These credentials do not match our records".	Pass
Login (Select wrong role)	Login fail display message "Role does not match".	Pass
Store and manipulate the academic year (add, edit, view and delete)	Displayed successfully after storing in database and the academic year should be accurately shown in the system.	Pass
Store and manipulate the subject and criteria (add, edit, view and delete)	Displayed successfully message after storing in database and the subject and criteria should be accurately shown in the system.	Pass
Store and manipulate the assessment question (add, edit, view and delete)	Displayed successful message after storing in the database, and the questions should be accurately shown in the system.	Pass
Learning statistic chart	Displayed accurate learning statistic bar chart filtering by academic year and subject.	Pass
Generate Report	Display accurate assessment report details for children and able to download.	Pass

Table 6 *Security Test Plan Result*

No	Actual Result	Actual Test
1	Display error message "These credentials do not match our records"	Pass
2	Enforce the complexity of the password. Which is minimum eight character.	Pass
3	Enforce the password length inside the policy.	Pass
4	Password should be obscured in the textbox.	Pass
5	Passwords are displayed in dots to conceal it.	Pass
6	Display error message "Role does not match" if select wrong role.	Pass

4.6.2 User Acceptance Testing (UAT)

User Acceptance Testing (UAT) is the final testing stage in software development before system production. It's used to get feedback from users who test the software and its user interface (UI). This section is going to discuss the testing form, which is to evaluate the test case inside the proposed system. It also ensures that the application meets the client's needs. It involves a testing scenario that accurately represents the actual usage of the software in the field. The test was conducted for the Developmental Assessment & Reporting System for Special Needs Children to ensure that the developed solution meets the business requirements and client's expectations. The scale readings range from 1 (Very Bad) to 5 (Very Good) indicating whether the functionality meets the user's expectations

Figure 13 displays the bar chart, outcome of User Acceptance Testing based on various acceptance criteria for the Developmental Assessment & Reporting System for Special Need Children from the Human Resources perspective, as one type of user. Human Resources are responsible for managing teacher and student information and creating assessment questions. Both HR users strongly agreed with the system's performance, achieving 100% agreement. The results show that the system meets the requirement effectively.

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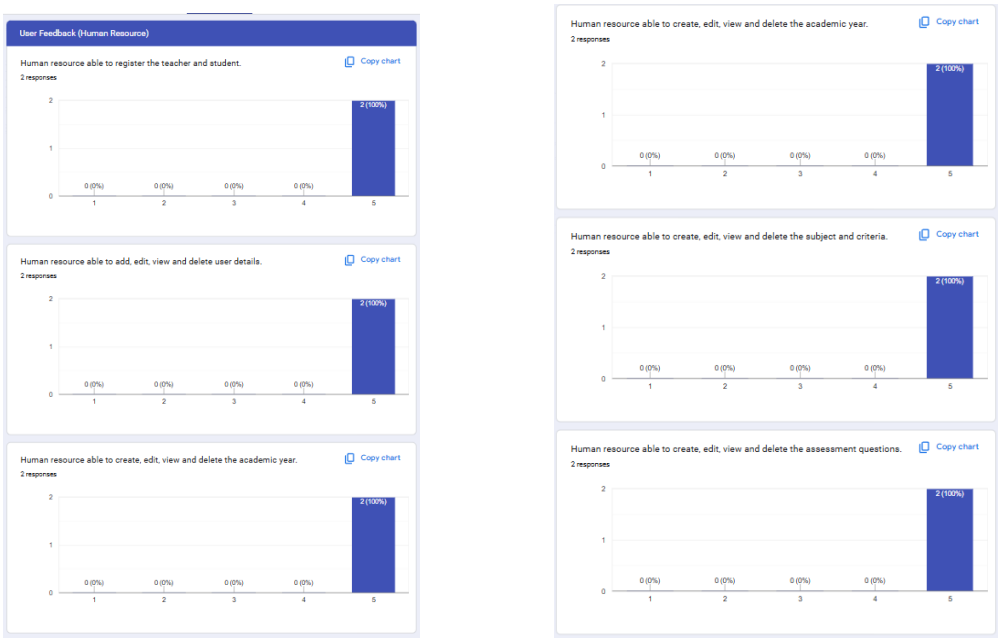

(a) **(b)**

Fig. 13 *Human Resource (a) User Acceptance Testing Feedback; (b) User Acceptance Testing Feedback*

Figure 14 displays the outcome of User Acceptance Testing based on various acceptance criteria for Developmental Assessment & Reporting System for Special Need Children from the Teachers role, as one type of user. Teachers are responsible for completing student evaluation assessments. Respondents strongly agree with the system's performance achieving 100%. This feature is crucial as it enables teachers to manage their evaluation tasks more efficiently, by providing a user-friendly interface to record and submit evaluation for each student.

Fig. 14 *Teacher (a) User Acceptance Testing Feedback; (b) User Acceptance Testing Feedback*

5. Conclusion

In conclusion, the Developmental Assessment & Reporting System for Special Need Children successfully meets its objectives by providing a user-friendly, web-based platform that replaces manual reporting processes and supports teachers in tracking children's daily educational progress more efficiently. The system reduces paperwork, improves data accuracy, and promotes inclusive education using cost-effective and scalable technologies. Although the system has some limitations such as dependency on internet access, browser compatibility issues, and limited analytics exist, they present valuable opportunities for future enhancement.
Enhancing these areas will help ensure the system remains user-friendly, relevant, and useful as user needs continue to evolve. Proposed improvements include integrating machine learning for progress prediction, developing a mobile app, upgrading system performance, and ensuring broader compatibility. Overall, the system lays a strong foundation for continued innovation and long-term impact on special needs education or inclusive program.

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Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Author Nurin Athirah Hamizi, Author Shahreen Kasim; **data collection:** Author Nurin Athirah Hamizi; **analysis and interpretation of results:** Author Nurin Athirah Hamizi, Author Shahreen Kasim; **draft manuscript preparation:** Author Shahreen Kasim. All authors reviewed the results and approved the final version of the manuscript

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Appendix A: Users Flowchart

A.1 Admin (Human Resource) Flowchart

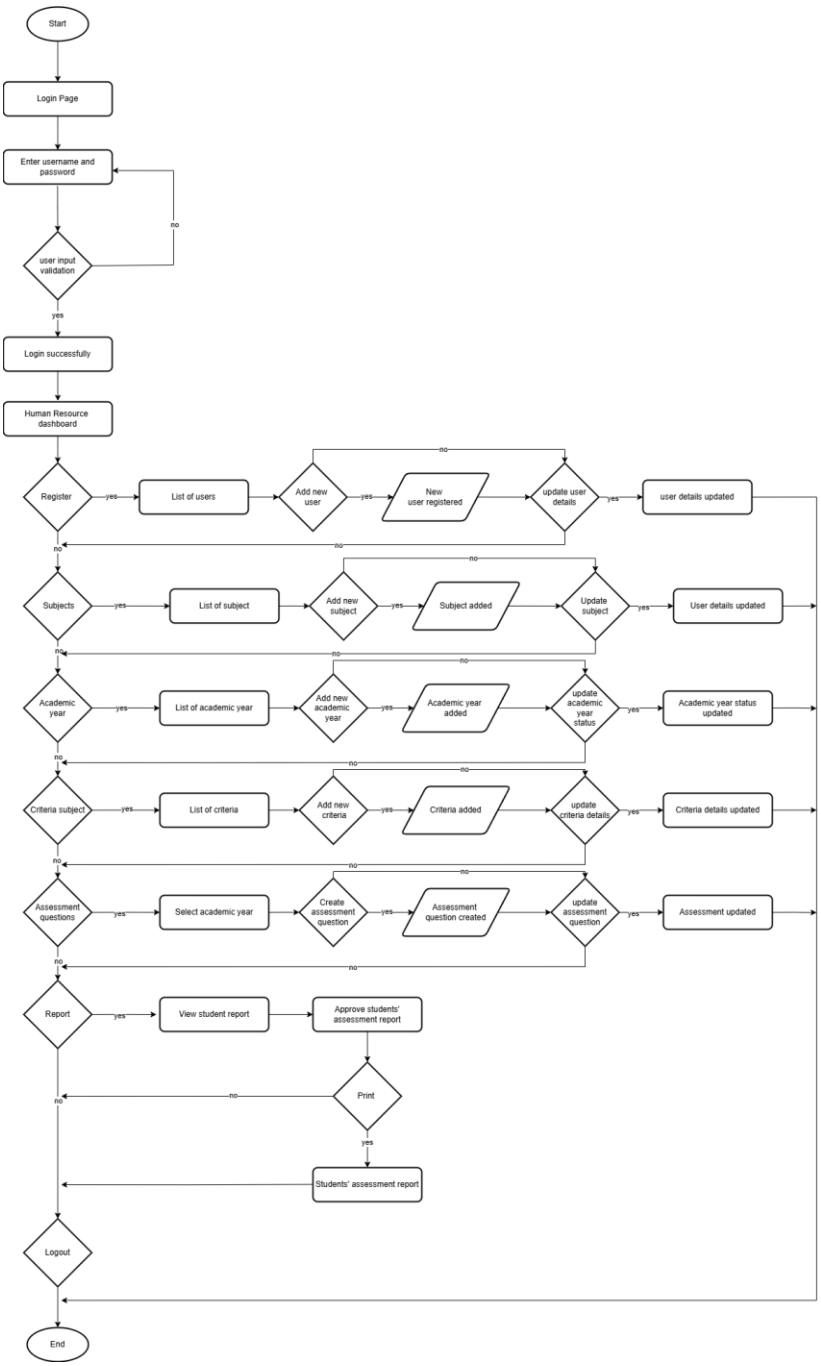

Fig. A1 *Human Resource flowchart*

A.2 Teacher Flowchart

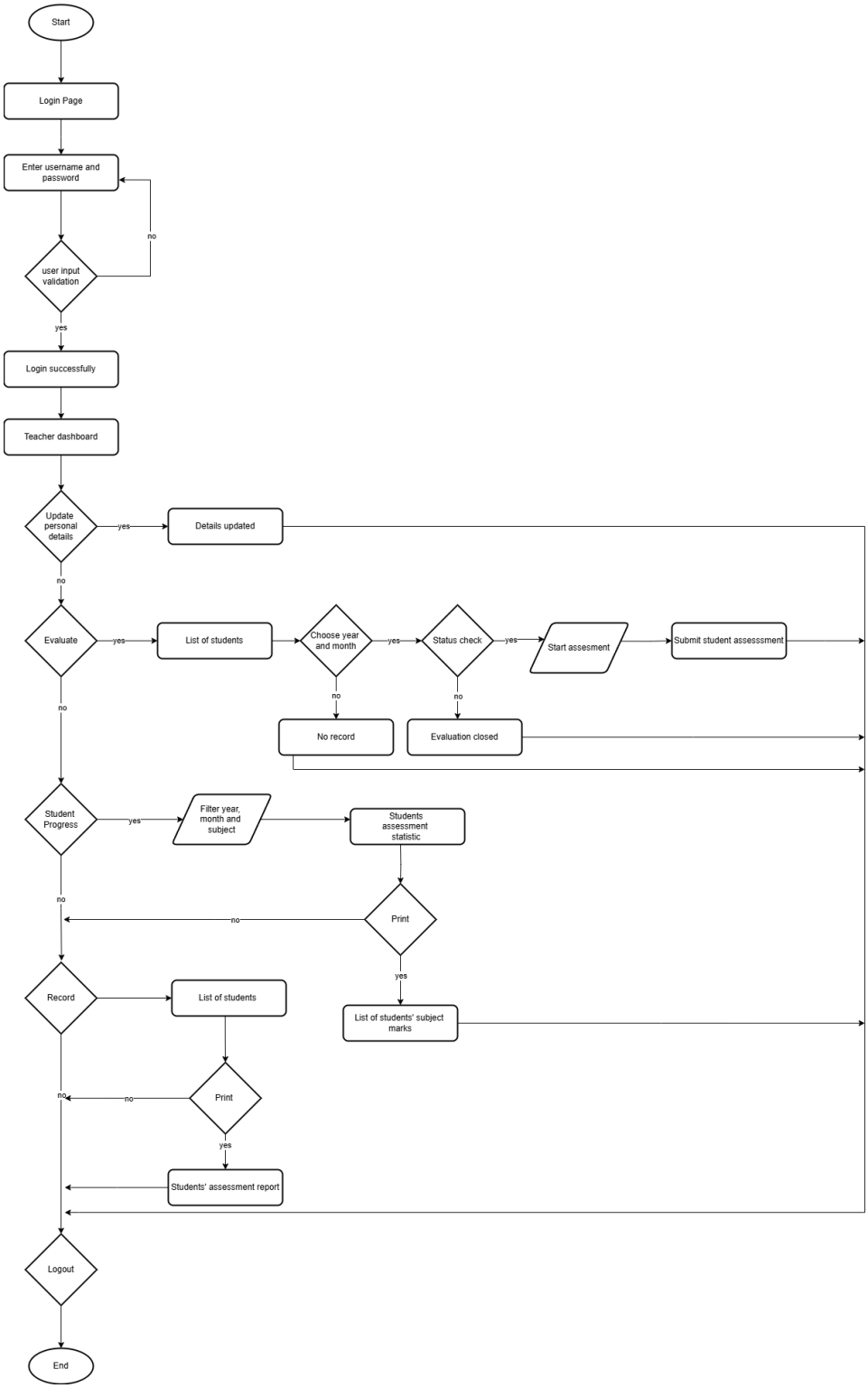

Fig. A2 *Teacher flowchart*

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A.3 Student Flowchart

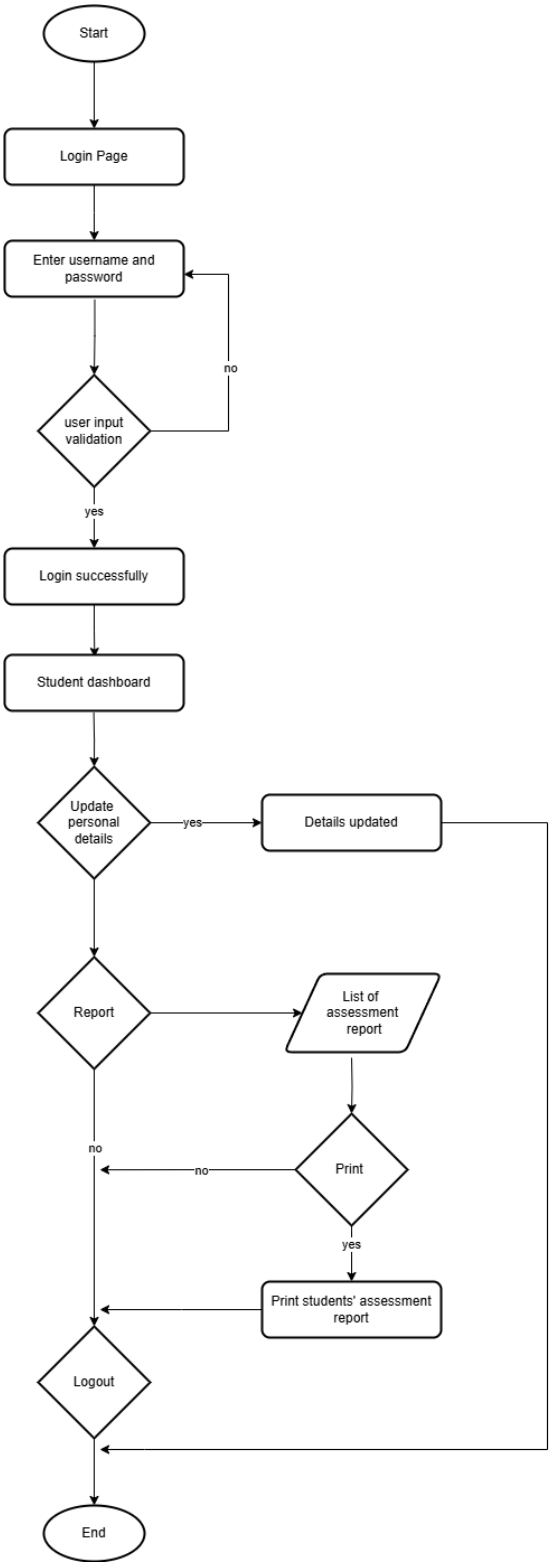

Fig. A3 *Student flowchart*

Appendix B: Data Flow Diagram

B.1 Level 1 Process 1

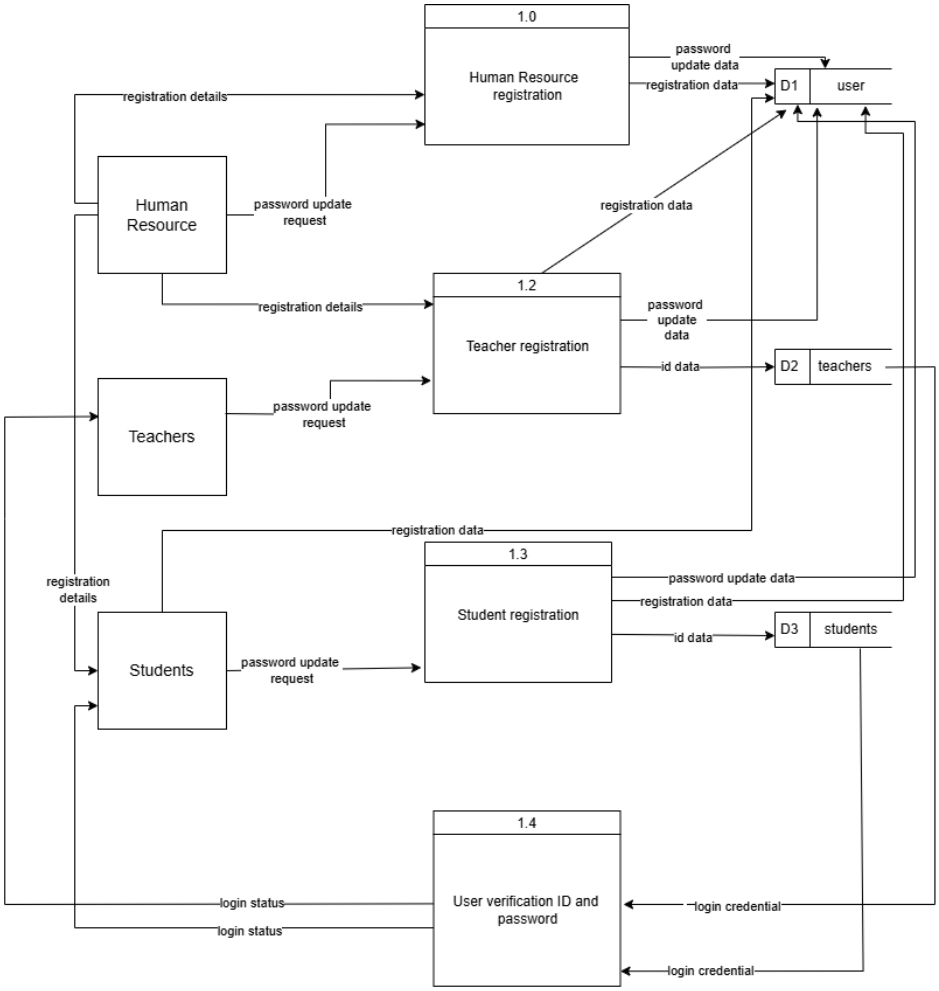

Fig. B1 *Level 1 Process 1*

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Appendix B: Data Flow Diagram

B.2 Level 1 Process 2

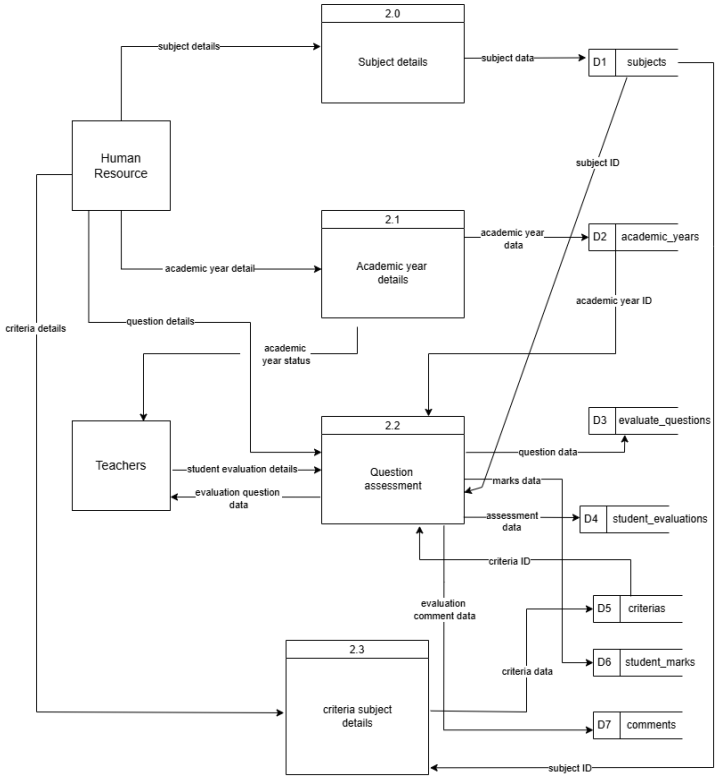

Fig. B2 *Level 1 Process 2*

B.3 Level 1 Process 4

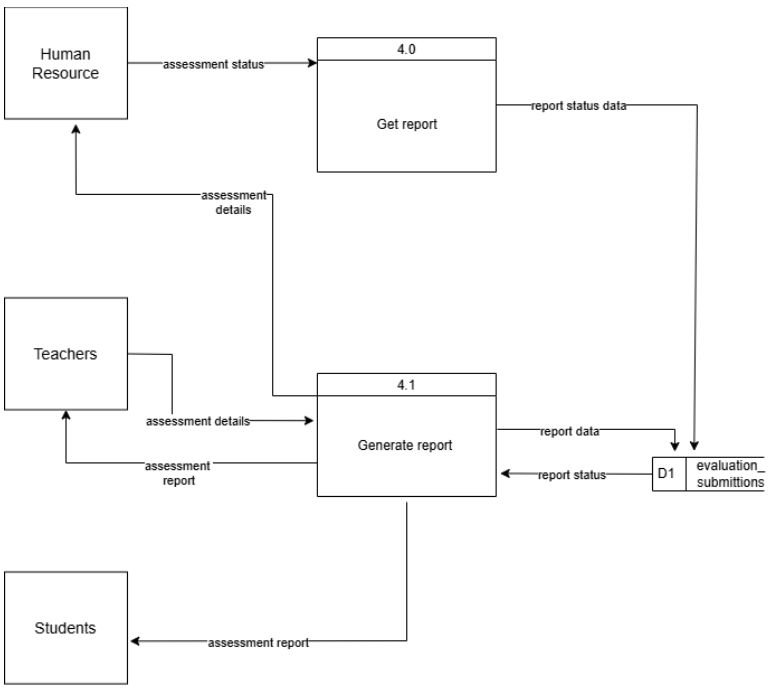

Fig. B3 *Level 1 Process 3*

Appendix C: Gantt Chart

C.1 Level 1

Project Name:	The LittleOne Special Need Child Repoting System
Project Start:	22/7/2024
Current Date:	13/6/2025
Weeks in Progress:	Wk 47

Task	Project Lead	Start Date	End Date	Days	Progress
Sprint 1					
Planning and requirement ghatering	Nurin	22/7/2024	1/8/2024	10	100%
Come out with Business Proses	Nurin	2/8/2024	8/8/2024	5	100%
ERD and configuration	Nurin	2/8/2024	8/8/2024	5	100%
Sprint 2					
Login and authentication Module	Nurin	9/8/2024	15/8/2024	6	100%
Assign Role (parent, teachers and HR)	Nurin	16/8/2024	22/8/2024	6	100%
Databade Connection	Nurin	16/8/2024	22/8/2024	6	100%
Testing	Nurin	16/8/2024	22/8/2024	6	100%
Sprint 3					
Wireframe	Nurin	23/8/2024	29/8/2024	6	100%
HR and Teacher dashboard	Nurin	30/8/2024	5/9/2024	6	100%
Testing	Nurin	30/8/2024	5/9/2024	6	100%
Sprint 4					
Integrated front end and back end	Nurin	6/9/2024	12/9/2024	6	100%
Database Schema	Nurin	13/9/2024	19/9/2024	6	100%
Sprint 5					
Manage user assessment module	Nurin	20/9/2024	26/9/2024	6	100%
Testing	Nurin	27/9/2024	3/10/2024	6	100%
Sprint 6					
Asssessment module	Nurin	4/10/2024	17/10/2024	13	100%
Assessment module testing	Nurin	11/10/2024	17/10/2024	6	100%
Sprint 7					
Report module	Nurin	18/10/2024	31/10/2024	13	100%
Report module testing	Nurin	25/10/2024	31/10/2024	6	100%
Sprint 8					
Testing and debugging	Nurin	12/12/2024	31/1/2025	50	90%
Sprint 9					
Final testing and debugging	Nurin	14/2/2025	28/2/2025	14	90%
Prepare for User Acceptance Testing (UAT)	Nurin	7/3/2025	20/3/2025	13	90%
Phase 10					
Conduct and implement feedback user acceptance	Nurin	21/3/2025	28/3/2025	7	90%
Final adjustment	Nurin	31/3/2025	6/4/2025	6	90%
Phase 11					
Launch the website	Nurin	7/4/2025	25/4/2025	18	80%

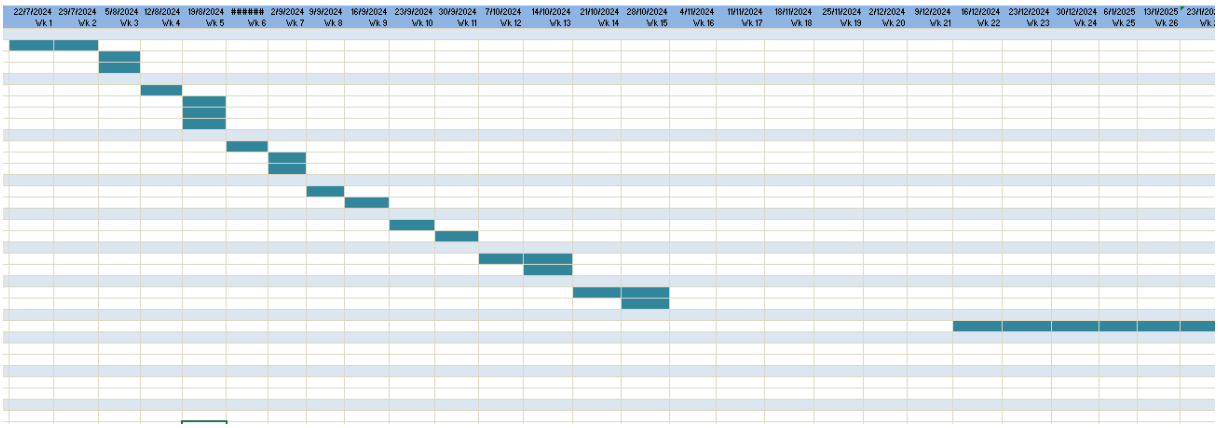

Fig. C1 *Gantt Chart*