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The Development of Course Selection Guidance System

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Abstract: Choosing a career pathway is a significant challenge for students and the current approach used in the course selection counselling sessions with a school counsellor is inefficient. In response, a web-based system called the Course Selection Guidance System (CSGS) was developed. It assists Form 5 students in identifying diploma courses offered by two public universities: Universiti Tun Hussein Onn Malaysia (UTHM) and Universiti Putra Malaysia (UPM), based on their personality types and examination results. The CSGS utilizes Holland's Theory to determine students' dominant personality type. Developed using HTML, JavaScript, PHP, and SQL languages, the CSGS follows a structured approach and employs the prototyping model, allowing for iterative development and adaptation to changing requirements. Comprehensive testing and evaluation, including alpha and beta testing, have been conducted to enhance the user experience. The CSGS has the potential to become an essential tool for students in their course selection journey.

Keywords: Course Selection Guidance System, Holland's Theory, Prototyping Model, Counselling Session, Diploma Course

1. Introduction

Completing the Sijil Pelajaran Malaysian (SPM) is one of the biggest achievements as a secondary school student. SPM leavers who are mostly at the age of 17 or 18 years old, cannot decide accurately what pathway to choose, neither they are knowledgeable enough about the prerequisite of a specific field nor about the courses which will correspond with their passion and potential [1]. There are plenty of information and opinions regarding tertiary education from family, friends and Internet to be absorbed. This situation demands an opinion from an expert such as a school counsellor. However, nowadays some limited students obtain guidance from the right source such as school counsellors [2]. It is risky if students do not get a proper guidance as it might affect their future. It was reported that only 170,000 of the SPM leavers were interested to continue their studies. These statements were revealed by the Department of Statistics Malaysia (DOSM) in 2019 [3]. It shows that many students are unaware of the importance of continuing studies in higher education for a brighter future.

In Sultan Abu Bakar Girls' School Muar (SABGS Muar), two school counsellors are Puan Madziah binti Mohamad and Puan Yuniza binti Ab Jusoh. Basically, in this school, course selection after SPM

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guidance counselling session is not compulsory for every Form 5 student. During that session, students can ask any questions regarding the pathway to be chosen. Usually, the counsellor will answer and give suggestions based on their experience or knowledge and sometimes she will search the information on Google. The process of gaining information is quite inefficient as counsellor needs to search the Internet and browse the brochures one by one.

This project is aimed to design and develop a web-based Course Selection Guidance System (CSGS) that will be aiding students in choosing their diploma courses from two public universities in Malaysia after completing SPM. The public universities that are included in CSGS are Universiti Tun Hussein Onn Malaysia (UTHM) and Universiti Putra Malaysia (UPM). Counsellor can use this system during the pathway after SPM counselling sessions to provide information regarding tertiary education institutions. This system could minimize the time to search manually from the Internet about institutions and courses available that match the student's interest.

2. Related Work

2.1 Recommender System

Recommender systems is a software tool and approach that provides suggestions for items that users may find applicable. The recommendations intend to assist its users in decision-making processes, such as what things to buy, what music to listen to, or what news to read [4]. Recommender system is able to recommend choices of interest or personalized content to users depending on various kinds of factors. Features for users' interests should be figured out by recommender systems and each element need to be collected in a group of similar features [5]. This statement shows that the recommender system was developed to generate meaningful recommendations based on users' interest. For this kind of system, a rule-based can be implemented to generate suggestions. Rule-based classifiers categorise the data by implementing the "if... then..." rules. A phrase made up of attribute conjunctions is the rule antecedent or condition [4]. The classifiers are considered inclusive rules if every conceivable combination of attribute values is included.

2.2 John Holland's Theory

Over the course of three decades, Holland's theory has evolved to describe six personality types and their interactions with the environment. This empirical framework comprises three components: individuals, their surroundings, and the interactions between them [6]. In the context of higher education, Holland's framework focuses on students, academic majors, and the compatibility between students and their chosen fields of study. According to Holland, people are drawn to specific careers based on their personality and various background factors [7]. Holland's theory provides a straightforward and easily understandable framework for understanding career interests and environments, making it valuable for career counselling and guidance. According to Holland, vocational interests reflect an individual's personality and can be categorized into six types: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) [8]. This approach leads to various forms of vocational assistance, ranging from brief self-guided interventions to more intensive interactions with counsellors or structured classes that facilitate the career exploration process. Holland's theory had a significant impact on the development of interest inventories, career assessments, job information classification, and career counselling [9]. Overall, this theory is very useful in the career guidance counselling sessions in school to identify students' personality types and the corresponding diploma courses to pursue in tertiary education.

2.3 Comparison of Existing System

A study is made based on three existing systems to analyse and compare with the proposed system in various aspects. The three systems are Course Interest Test (CIT) [10], EduQuest (EQ) Personality Test

[11], YourFreeCareerTest [12] and lastly, the proposed system, Course Selection Guidance System (CSGS). Table 1 shows the results of comparisons are tabulated.

Table 1: Comparison between the existing system and proposed system

Features/System	CIT	EQ Personality Test	YourFreeCareerTest	Proposed system
Platform	Web-based	Web-based	Web-based	Web-based
Login	X	X	X	√
Registration	√	X	X	√
Admin module	X	X	X	√
Student information	√	X	X	√
Examination result	X	√	X	√
Course category	X	X	X	√
Institution category	X	X	√	√
Field of study	√	√	√	√
Assessment	√	√	√	√
Result module	√	√	√	√

From Table 1, it can be concluded that CSGS consists more specific features and modules. Login module is important to differentiate the access for admin and users. Admin module is crucial so that school counsellor can execute create, read, update and delete (CRUD) operations. In result module, most existing systems only provide general fields of study. CSGS is aimed to provide more specific diploma courses available in public universities such as UTHM and UPM. The result can be retrieved by student and admin from the database anytime.

3. Methodology

Prototyping model is chosen as the development model for this project. The prototyping model is iterative and has a trial-and-error process taking place between the developer and users [13]. Prototyping model is implemented because it enables an iterative development approach and allows for flexibility in requirement changes. The iterative nature of the prototyping model enables rapid development cycles, as changes and adjustments can be made quickly based on users' feedback. This approach facilitates a collaborative environment between developer and users, fostering effective communication and a shared understanding of the software requirements. Table 2 shows the system development activities and its deliverables. Each phase has its tasks and outputs that need to be produced during the entire project development. Besides that, the output must be completed within the specific days that have been assigned.

Table 2: Software development activities and their task

Phase	Activities	Deliverables
Planning	• Proposed the project • Determine the project schedule, activities and output	• Project proposal • Gantt chart

Phase	Activities	Deliverables
Analysis	• Gather information • Analyse requirements	• Functional and non-functional requirements • Context diagram (CD), data flow diagram level 0 (DFD0), data flow diagram level 1 (DFD1) and entity relationship diagram (ERD)
Design	• Design database for the system • Design users interface	• Database schema • User interface design
Implementation	• Produce executable codes based on requirements and user interfaces. • Establish a connection to a database	• Executable files that can perform CRUD processes
System prototype	• Develop prototypes based on modules • Execute alpha and beta testing • Validate the prototypes with supervisor and end user • Document result of testing	• System prototypes • User acceptance • Test cases
Implementation	• Produce and implement improved source codes based on the final prototype • Fix any changes required from user	• Completed system
System	• Installation and deployment of the final version of the completed system.	• Final version of the system that is ready to be used by users

3.1 Planning Phase

This phase is the initial phase where the information related to the project is gathered. The overview structure of the system is determined. At this stage, problem statements, scope of the project and project planning are made.

3.2 Analysis Phase

During this phase, requirements and specification activities are conducted. Additionally, functional and non-functional requirements are determined. All specified requirements were converted into conceptual models.

3.2.1 Context Diagram (CD)

The Context Diagram (CD) offers a comprehensive overview of the system, including its different components. It describes the connections between individuals within the system and the environment in which the system operates, highlighting dependencies and interactions [14]. Figure 1 shows the CD of CSGS. CD can be defined as the project or system's boundaries and distinguishes between

elements that are within and those that are outside [15]. In other words, CD illustrates the interaction of a system with its environment and describes the movement of the data.

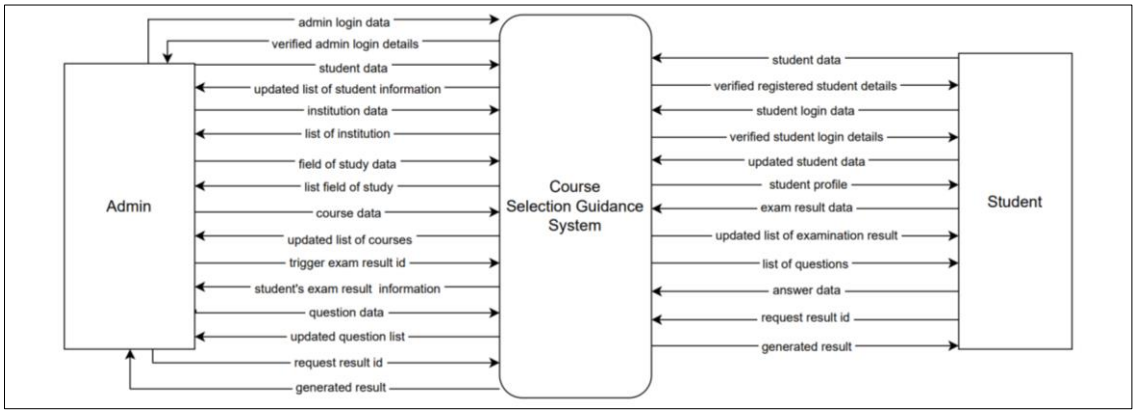

Figure 1: Context diagram (CD) of CSGS

In CSGS, there are two external entities that interact with the system. The external entities are admin and student. There are 16 data flows between external entity admin and the CSGC. Other than that, there are 12 data flows between external entity student and the CSGS. These show how the external entities interact with CSGS.

3.2.2 Data Flow Diagram Level 0

The Data Flow Diagram (DFD) illustrates how data moves within a system and provides details about the inputs of each entity and the processes involved [16]. Hence, the data flow diagram level 0 (DFD 0) shows the graphical representation of data flow in CSGS. The processes are decomposed from the CD. Refer Appendix A for the DFD 0 of CSGS. Other than that, the specification process is also created in the analysis phase. Refer Appendix A for the example of specification process created for Process 8.0.

3.2.3 Entity Relationship Diagram (ERD)

An Entity Relationship Diagram (ERD) is a visual representation of the data requirements for a system's database, providing the highest level of abstraction in the data model. It uses diagrams and symbols to depict the data store components within the system and showcases the relationships and communication between them [17]. ERD in Figure 2 shows the graphical representation of the relationship of the entity sets in the database of CSGS.

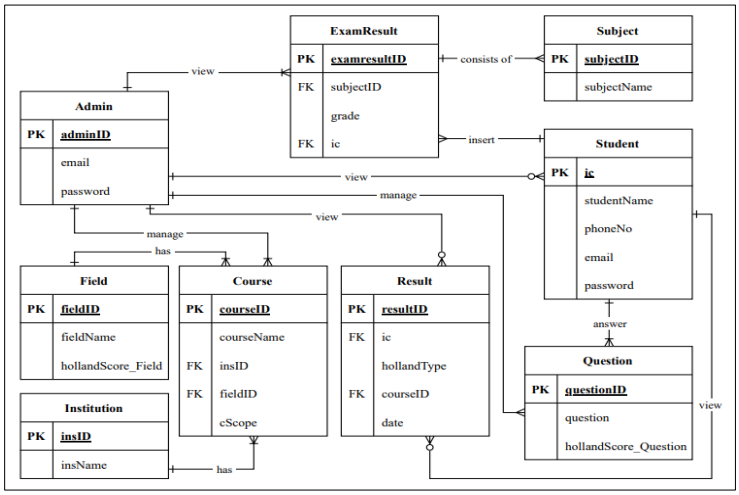

Figure 2: Entity relationship diagram (ERD) of CSGS

3.2.4 Flowchart

A flowchart is a diagram that represents the flow of work or processes. Other than that, it is a graphical representation of an algorithm, a step-by-step approach to solving a task [18]. The purpose of the flowchart is to illustrate the flow of the system from start to end. Two flowcharts have been provided to illustrate the process flow in CSGS. The first flowchart represents the flow of processes within the admin module, which can be referred from Appendix A. The flow initiates when the admin successfully enters the correct combination of email and password to log into the system. Upon validation, the system grants access to the admin, who is then presented with the admin's dashboard. From the dashboard, the admin has the option to manage all system functions and execute CRUD processes such as manage institution, manage field of study, manage course, manage assessment and manage students' information.

In addition, the second flowchart represents the flow of processes within the students' module. The students' module flowchart can be referred from Appendix A. The flow begins when students enter the accurate email and password combination for system login. If students do not possess an account, they are required to register and provide the necessary registration information. Upon successful registration, students can log in and access the system. After that, students can manage their profiles and examination results. The primary process within this system revolves around students answering assessments, with the system generating corresponding results. These results are stored in the database and can be retrieved at any given time.

3.3 Design Phase

When the conceptual modelling has been reviewed and understood, the design phase is initiated. The activities included in this phase are designing a database for the system as well as designing user interfaces for admin and student.

3.3.1 Database Design

The database design including the database schema is needed in detailed design. A great understanding of the system's requirements is essential to design a good relational schema such as tables, fields, and keys [19]. The database schema proposed for CSGS is as follow:

i. admin (adminID, email, password)
ii. student (ic, studentName, phoneNo, class, email, password)
iii. institution (insID, insName)
iv. field (fieldID, fieldname, hollandScore_Field)
v. courses (courseID, courseName, insID, fieldID, cScope)
vi. subject (subjectID, subjectName)
vii. examresult (examresultID, subjectID, grade, ic)
viii. question (questionID, question, hollandScore_Question)
ix. result (resultID, ic, hollandType, courseID, date)

3.3.2 Interface Design

User interface design should support human interaction with the system [20]. Figure 3(a) to Figure 3(d) show some of the user interfaces that have been designed and illustrated based on processes in the CSGS. The graphical user interface of the system should be user-friendly. In addition, the graphical user interface is a centre of interaction and allows communication between humans and computers so it plays a vital in system development. The most important thing is, the interfaces should follow all the requirements gathered in the previous phase so that the system will satisfy users' needs.

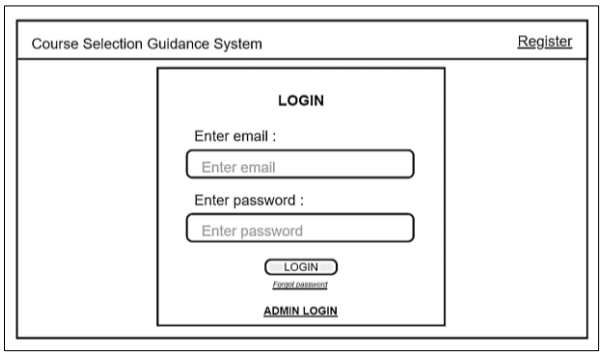

Figure 3(a): Login form

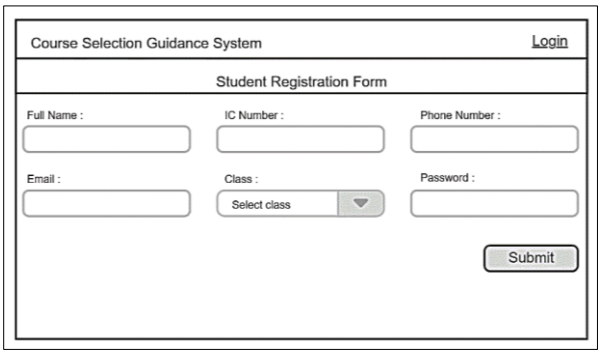

Figure 3(b): Student registration form

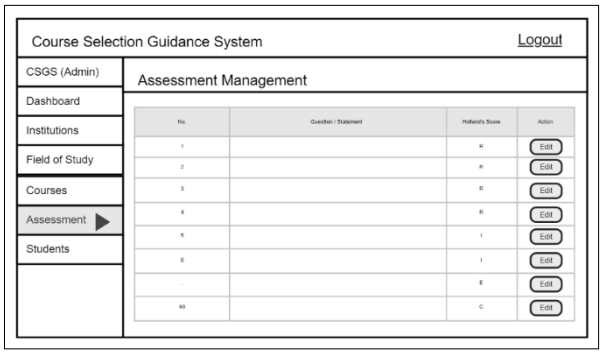

Figure 3(c): Admin assessment management module

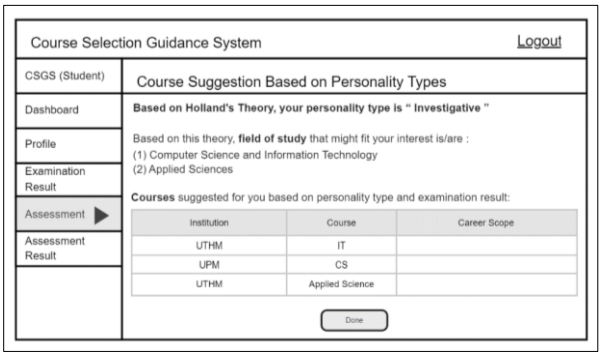

Figure 3(d): Student assessment result

3.4 Implementation Phase

CSGS is developed by implementing Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), JavaScript and Hypertext Preprocessor (PHP) language.

3.4.1 Registration and Login Module

This module allows users who are students and admin to login into the CSGS. Users enter the correct combination of email address and password that have been registered in the database. The login page for CSGS is shown in Figure 4. Students can click on Forgot Password to reset their password.

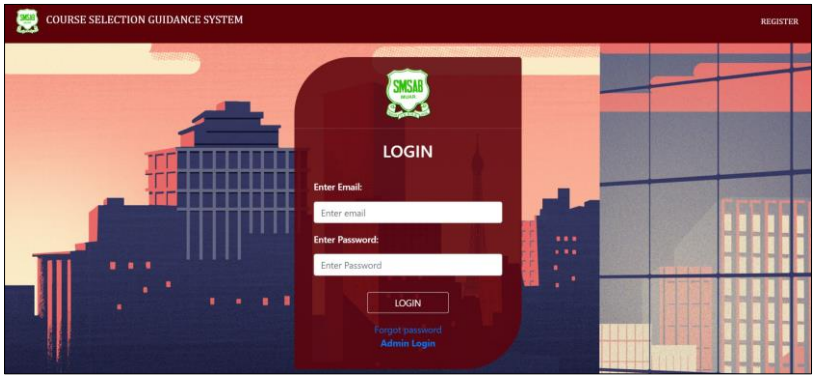

Figure 4: Login interface for student

In addition, this module allows new users to create their accounts. Users click on the Register link and a registration form appear as shown in Figure 5. This registration form consists of several field validations such as a valid email address, phone number, IC number and password.

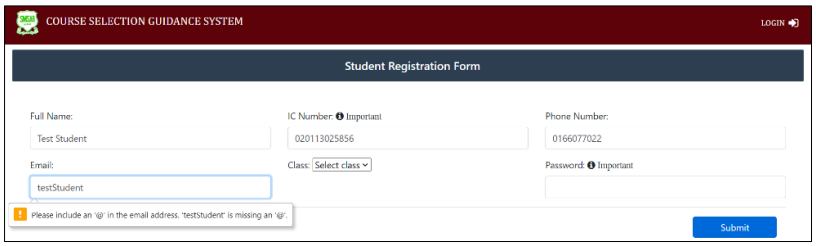

Figure 5: Registration form

3.4.2 Manage Student Information Module

This module allows students to view their profile once they registered and successfully login into the CSGS as shown in Figure 6. Students can edit their profile and they can change their password.

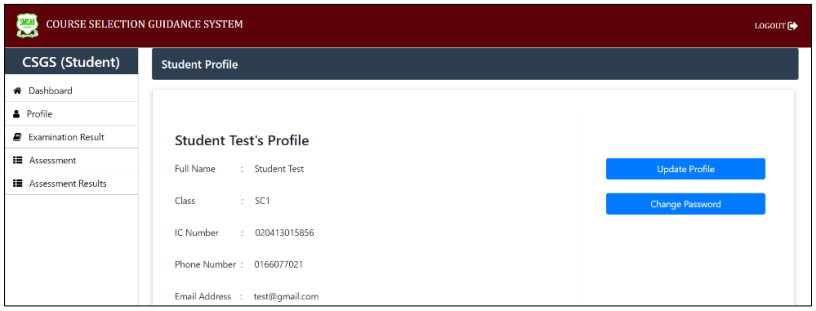

Figure 6: Student's profile

Admin can view a list of students who have registered and can edit their profile. Admin can delete student account only if the student has not answered the assessment. Figure 7 shows the interface of student's information for admin.

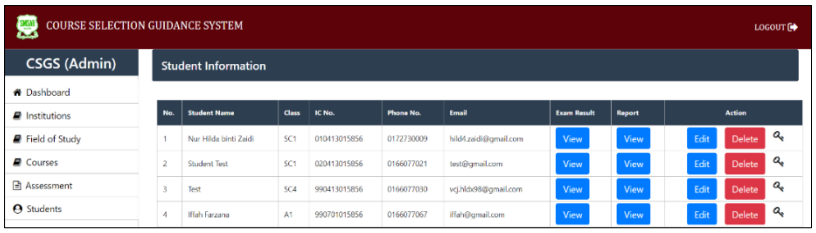

Figure 7: Students' information interface for admin

3.4.3 Manage Institution, Field of Study and Course Module

These three modules allow the admin to manage the institution, the field of study and the courses. Since the CSGS has been personalized for UTHM and UPM, and the courses available in these universities so, the admin does not need to input any data for these modules. Admin can edit the information if there are any updates for the course information. Figure 8 shows the edit course form in the course management module.

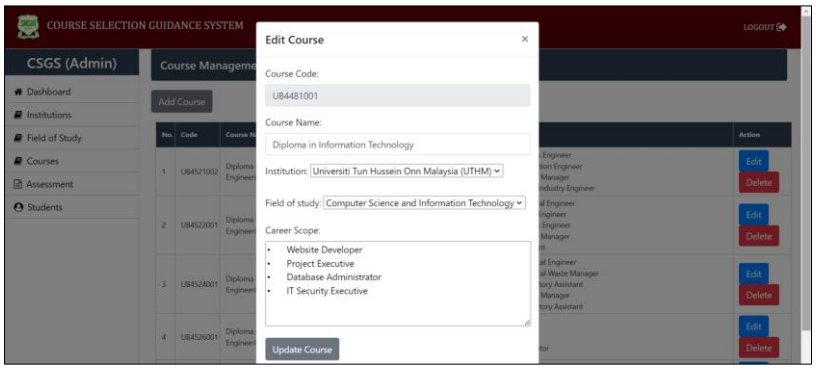

Figure 8: Edit course form for admin

3.4.4 Manage Examination Result Module

This module allows students to enter their examination results. Students can add subjects and grades, edit the information and delete the subject from the list. Figure 9 shows the examination results interface for students. This module is very crucial because the examination results entered are considered during the assessment process for course suggestions later.

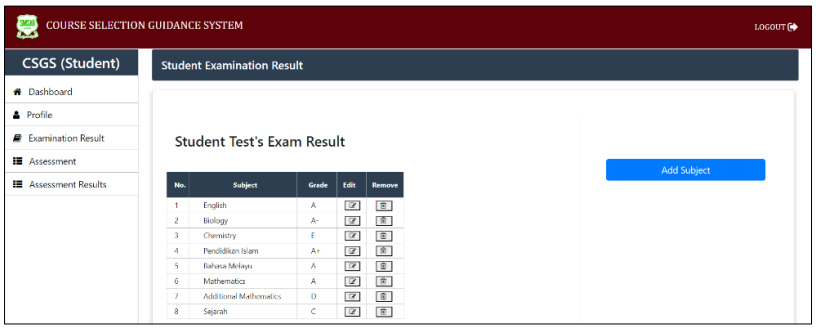

Figure 9: Examination result interface for student

On the other hand, the admin can view students' examination results as shown in Figure 10. Admin click the View button to view a specific student's result.

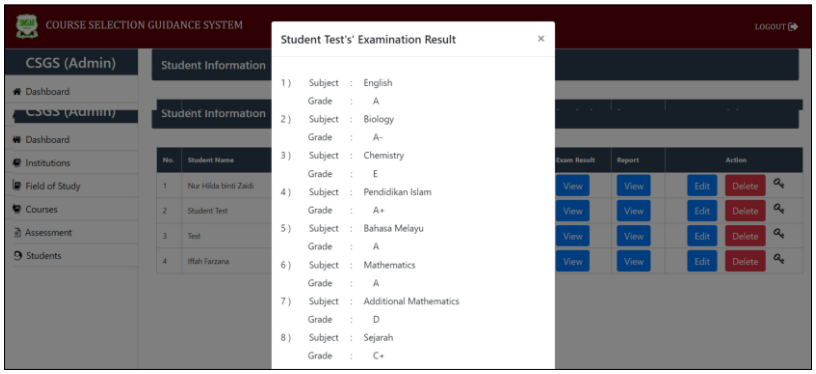

Figure 10: View student's examination result for admin

3.4.5 Manage Assessment Module

This module allows the admin to edit the assessment questions or statements. The Holland score or personality type was assigned to each question. Other than that, Figure 11 shows the assessment interface for students. Students are required to check at least one checkbox or else, there will be an error

message displayed when students click on Proceed button. This module calculated the most dominant personality type based on Holland's theory and display the result when students click on Proceed button.

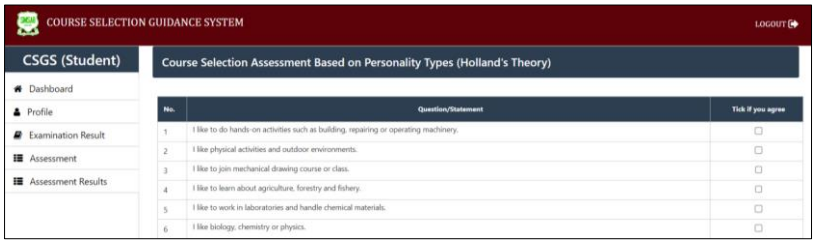

Figure 11: Assessment interface for student

3.4.6 Result Module

This module allows both admin and students to retrieve the results from the assessment. Admin can view every student's results by clicking on the View button. After that, a list of results are displayed based on the date as shown in Figure 12.

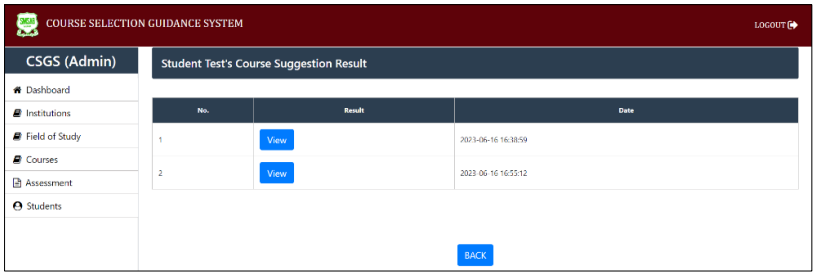

Figure 12: View student's assessment result list for admin

For students, the list of results are displayed almost the same as in Figure 12. When students click the View button, the result is displayed as shown in Figure 13. Every time the students answer the assessment, this system generated the result and save it into the database. This module is important because, once students have updated their examination results, the result of the assessment will be different too. The records of the results are displayed in the list. Other than that, students are allowed to delete the result from the list by clicking the Delete button.

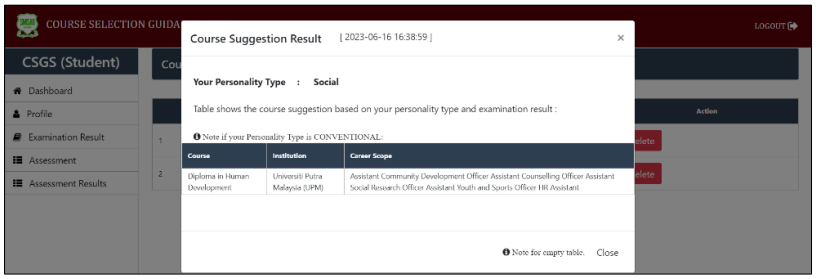

Figure 13: View assessment result for student module

3.5 Testing Phase

All modules in CSGS were tested. Testing activities were executed and test results were documented during this phase. There were two testing methods which are alpha testing and beta testing. The alpha testing was executed first. Table 3 shows the overall results of the test cases. The passed test cases and the rate are recorded. Other than that, Table 4 shows the list of test cases for every module in CSGS.

Table 3: Overall results test case

Test Case Module		Passed Test Case	Rate (%)
Registration	(TEST_REQ_100)	6/6	100
Login	(TEST_REQ_200)	3/3	100
Manage student information	(TEST_REQ_300)	9/9	100
Manage institution	(TEST_REQ_400)	7/7	100
Manage field of study	(TEST_REQ_500)	7/7	100
Manage courses	(TEST_REQ_600)	7/7	100
Manage examination result	(TEST_REQ_700)	7/7	100
Manage assessment	(TEST_REQ_800)	6/6	100
Generate result	(TEST_REQ_900)	6/6	100
Total		58/58	100

Table 4: List of test case

Test Case	Software Requirement	Descriptions	Result
TEST_REQ_100	SRS_REQ_100	Registration	
TEST_REQ_101	SRS_REQ_101	The system should allow student to register student information.	PASS
TEST_REQ_102	SRS_REQ_102	The system should validate IC number and email address.	PASS
TEST_REQ_103	SRS_REQ_103	The system should display an error message if the IC number or email already exists in the database.	PASS
TEST_REQ_104	SRS_REQ_104	The system should allow student to enter a valid password pattern.	PASS
TEST_REQ_105	SRS_REQ_105	The system should display an error message if the password entered is invalid.	PASS
TEST_REQ_106	SRS_REQ_106	The system should display a success message for successful registration.	PASS
TEST_REQ_200	SRS_REQ_200	Login	
TEST_REQ_201	SRS_REQ_201	The system should allow users to login into the system using a combination of valid email and password.	PASS
TEST_REQ_202	SRS_REQ_202	The system should display an error message to the admin and student if the combination of email address and password is incorrect.	PASS

Test Case	Software Requirement	Descriptions	Result
TEST_REQ_203	SRS_REQ_203	The system should allow admin and student redirect to dashboard respectively when login is successful.	PASS
TEST_REQ_300	SRS_REQ_300	Manage Student Information	
TEST_REQ_301	SRS_REQ_301	The system should allow admin to view the list of students' information.	PASS
TEST_REQ_302	SRS_REQ_302	The system should allow admin to delete student information if student has not answered the assessment.	PASS
TEST_REQ_303	SRS_REQ_303	The system should display an error message if student information cannot be deleted.	PASS
TEST_REQ_304	SRS_REQ_304	The system should display a success message for successful deletion of student information.	PASS
TEST_REQ_305	SRS_REQ_305	The system should allow students to view their profile.	PASS
TEST_REQ_306	SRS_REQ_306	The system should allow students to update profile.	PASS
TEST_REQ_307	SRS_REQ_307	The system should display a success message for successful profile update.	PASS
TEST_REQ_308	SRS_REQ_308	The system should allow students to change password.	PASS
TEST_REQ_309	SRS_REQ_309	The system should display a success message for successful password change and an error message for unsuccessful password change.	PASS
TEST_REQ_400	SRS_REQ_400	Manage Institution	
TEST_REQ_401	SRS_REQ_401	The system should allow admin to view the list of institution.	PASS
TEST_REQ_402	SRS_REQ_402	The system should allow admin to add new institution.	PASS
TEST_REQ_403	SRS_REQ_403	The system should allow admin to update the institution information.	PASS
TEST_REQ_404	SRS_REQ_404	The system should display a success message for successful update of institution information.	PASS
TEST_REQ_405	SRS_REQ_405	The system should allow admin to delete institution.	PASS
TEST_REQ_406	SRS_REQ_406	The system should display an error message if the institution has been assigned to a course.	PASS

Test Case	Software Requirement	Descriptions	Result
TEST_REQ_407	SRS_REQ_407	The system should display a success message for successful deletion of institution.	PASS
TEST_REQ_500	SRS_REQ_500	Manage Field of Study	
TEST_REQ_501	SRS_REQ_501	The system should allow admin to view the list of fields of study.	PASS
TEST_REQ_502	SRS_REQ_502	The system should allow admin to add new field of study.	PASS
TEST_REQ_503	SRS_REQ_503	The system should allow admin to update the field of study information.	PASS
TEST_REQ_504	SRS_REQ_504	The system should display a success message for successful update of field of study information.	PASS
TEST_REQ_505	SRS_REQ_505	The system should allow admin to delete field of study.	PASS
TEST_REQ_506	SRS_REQ_506	The system should display an error message if the field of study has been assigned to a course.	PASS
TEST_REQ_507	SRS_REQ_507	The system should display a success message for successful deletion of field of study.	PASS
TEST_REQ_600	SRS_REQ_600	Manage Course	
TEST_REQ_601	SRS_REQ_601	The system should allow admin to view the list of courses.	PASS
TEST_REQ_602	SRS_REQ_602	The system should allow admin to add new course information.	PASS
TEST_REQ_603	SRS_REQ_603	The system should allow admin to update the course information.	PASS
TEST_REQ_604	SRS_REQ_604	The system should display a success message for successful update of course information.	PASS
TEST_REQ_605	SRS_REQ_605	The system should allow admin to delete course.	PASS
TEST_REQ_606	SRS_REQ_606	The system should display an error message if the course cannot be deleted.	PASS
TEST_REQ_607	SRS_REQ_607	The system should display a success message for successful deletion of course.	PASS
TEST_REQ_700	SRS_REQ_700	Manage Examination Result	
TEST_REQ_701	SRS_REQ_701	The system should allow student to add examination result.	PASS

Test Case	Software Requirement	Descriptions	Result
TEST_REQ_702	SRS_REQ_702	The system should prevent the student from entering the same subject twice.	PASS
TEST_REQ_703	SRS_REQ_703	The system should allow student to update the examination result.	PASS
TEST_REQ_704	SRS_REQ_704	The system should display a success message for successful update of examination result.	PASS
TEST_REQ_705	SRS_REQ_705	The system should allow student to view the updated examination result.	PASS
TEST_REQ_706	SRS_REQ_706	The system should allow student to delete a particular subject from the examination result list.	PASS
TEST_REQ_707	SRS_REQ_707	The system should allow admin to view the list of students' examination results.	PASS
TEST_REQ_800	SRS_REQ_800	Manage Assessment	
TEST_REQ_801	SRS_REQ_801	The system should allow admin and student to view the list of assessment questions.	PASS
TEST_REQ_802	SRS_REQ_802	The system should allow admin to edit details of questions.	PASS
TEST_REQ_803	SRS_REQ_803	The system should display a success message for successful update of assessment questions.	PASS
TEST_REQ_804	SRS_REQ_804	The system should allow student to answer the assessment questions.	PASS
TEST_REQ_805	SRS_REQ_805	The system should display a required input if the student did not checked at least one checkbox in the assessment form.	PASS
TEST_REQ_806	SRS_REQ_806	The system should redirect student to the result page after clicking on the Proceed button.	PASS
TEST_REQ_900	SRS_REQ_900	Generate Result	
TEST_REQ_901	SRS_REQ_901	The system should allow admin to view all students' assessment results.	PASS
TEST_REQ_902	SRS_REQ_902	The system should display the date and time when the result is generated.	PASS
TEST_REQ_903	SRS_REQ_903	The system should display the result based on student's personality type and examination result.	PASS

Test Case	Software Requirement	Descriptions	Result
TEST_REQ_904	SRS_REQ_904	The system should allow student to view all assessment results list based on time and date.	PASS
TEST_REQ_905	SRS_REQ_905	The system should allow student to delete a particular assessment result from the result list.	PASS
TEST_REQ_906	SRS_REQ_906	The system should display a success message for successful deletion of assessment result.	PASS

From Table 3 and Table 4, all test cases were executed successfully without encountering any pending issues. All the 9 modules performed as expected. The user interface demonstrated smooth navigation without any major errors. The test results indicate that the CSGS functions well and provides accurate recommendations based on students' personality types and their examination results. No critical bugs or major issues were identified during the testing phase. These findings assure that the CSGS has undergone comprehensive testing and evaluation, resulting in a system that enhances the overall user experience.

4. Results and Discussion

The results and discussion section presents the results of beta testing. Beta testing is known as user acceptance testing (UAT). This testing involves feedback from the target users. A set of questionnaires in Google Form were distributed to the target users. The target users involved were the school counsellor and three Form 5 students from different classes. There are 8 questions for counsellor's modules functionalities, 8 questions for students' modules functionalities and 4 questions for the users' interface elements. The questionnaires were answered with the Linkert scale measurement.

Figure 14 shows the evaluation result for the functionalities of admin modules. All modules had been evaluated and the user is required to give a score between 1 (poor) to 5 (excellent). From the bar graph, it shows that manage the field of study and manage course modules received a score of 4. While the other modules are given a score of 5. The overall functionalities are rated as excellent.

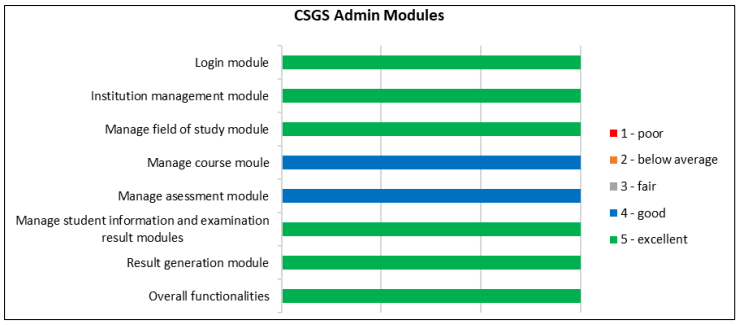

Figure 14: User evaluation for admin modules

Figure 15 shows the evaluation result for the functionalities of student modules. All modules had been evaluated and users are required to give a score between 1 (poor) to 5 (excellent). From the bar graph, it shows login, student's profile and list of assessment pages received a score of 5 which is excellent. While the other modules are given a combination of 4 and 5. 66.7% rated excellent for the overall functionalities of student modules.

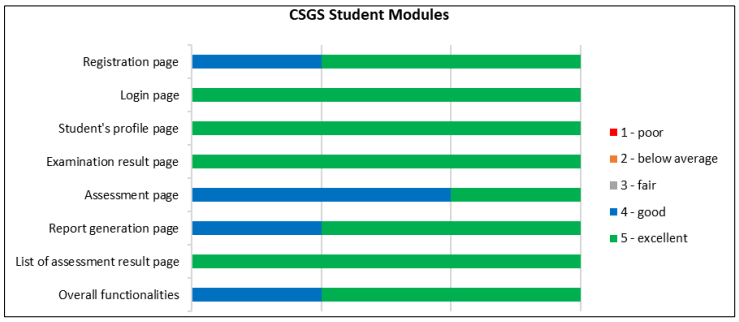

Figure 15: User evaluation for student modules

Lastly, Figure 16 shows the users' satisfaction with the user interface for CSGS. From the bar graph, it can be concluded that users are satisfied with the user interfaces. 100% of the users are strongly agree that CSGS is simple and easy to use and the navigation is easy and clear.

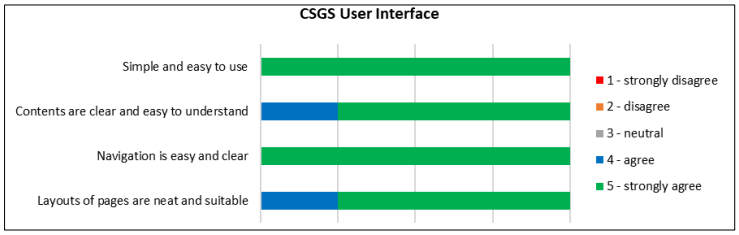

Figure 16: User evaluation for CSGS user interfaces

5. Conclusion

In conclusion, the Course Selection Guidance System (CSGS) offers a more efficient and effective approach than the traditional method of manually researching and browsing through brochures or relying on general advice from counsellors. The CSGS is a web-based system that provides personalized recommendations from two reputable universities, Universiti Tun Hussein Onn Malaysia (UTHM) and Universiti Putra Malaysia (UPM), ensuring students receive suitable options tailored to their interests and qualifications. This personalized approach enhances the decision-making processes and increases the likelihood of students selecting the most suitable diploma courses. The CSGS has successfully developed by implementing the prototyping model, which allows for iterative development and flexibility in adapting to changing requirements. On top of that, the completion of both alpha and beta testing signifies that CSGS has undergone comprehensive testing and evaluation. The valuable insights gained from these testing phases facilitated issues identification and resolution of the issues that arose, resulting in an enhanced overall user experience.

While the CSGS is a huge step forward in supporting students with course selection, there are various areas for ongoing growth and enhancement. To begin with, increasing the system's database to include a broader choice of institutions and diploma courses would present students with more complete alternatives. Furthermore, ensuring compatibility with mobile operating systems such as Android and iOS will significantly improve the accessibility of CSGS. Users would enjoy the flexibility of accessing the system from their smartphones or tablets, regardless of location. Furthermore, ongoing system upgrades and maintenance are required to assure the accuracy and validity of the information given. By implementing these recommendations, the CSGS can evolve into a comprehensive and indispensable tool for students navigating the course selection process.

Acknowledgment

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Appendix A

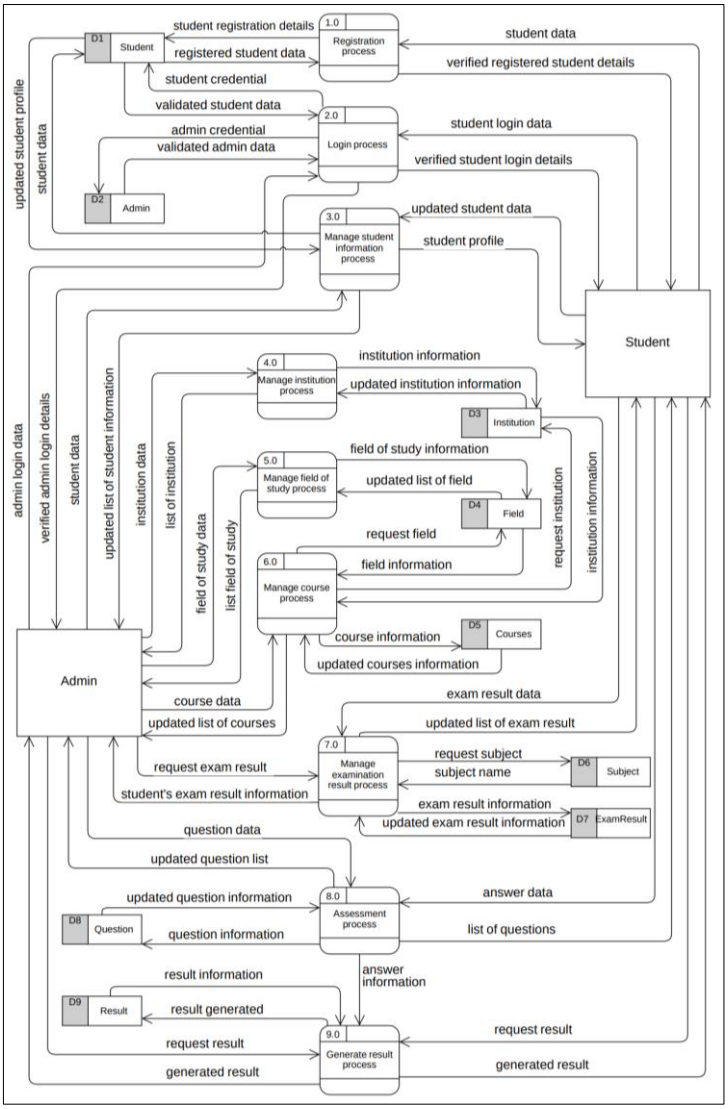

Figure 17: DFD level 0 of CSGS

Number	8.0
Process Name	Manage assessment
Process Description	This process describes admin manages assessment questions and student can answer the assessment.
Input Data Flow	Question data and holland Type checkbox.
Output Data Flow	Updated questions and result of assessment information.
Process Type	Online

Logic Process	IF user is admin
	IF view assessment page
	THEN display list of assessment questions
	IF click on Edit button THEN
	Insert updated question
	Display success message
	END IF
	Display updated list of assessment questions
	END IF
	ELSE
	IF click on start assessment button THEN
	Check on the checkboxes on assessment form
	IF no checkbox is checked THEN
	Display required input message
	END IF
	Click on Proceed button
	Result of assessment will be displayed
	END IF
	END IF

Refer	Structured English

Figure 18: Specification Process 8.0

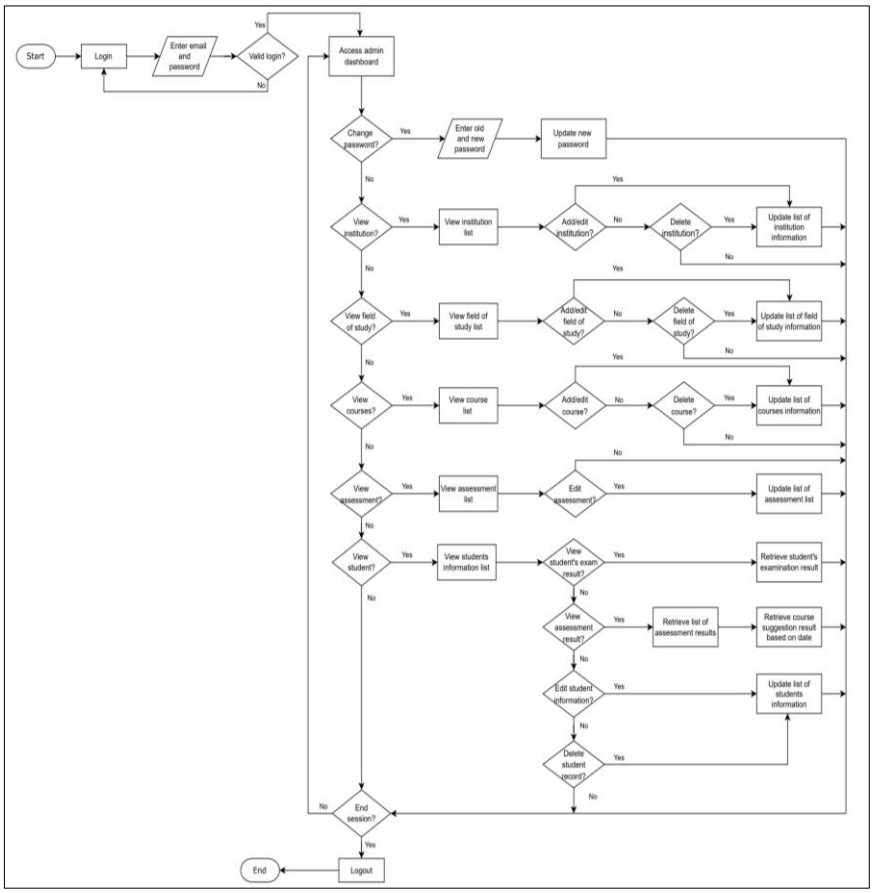

Figure 19: Flowchart of CSGS for admin

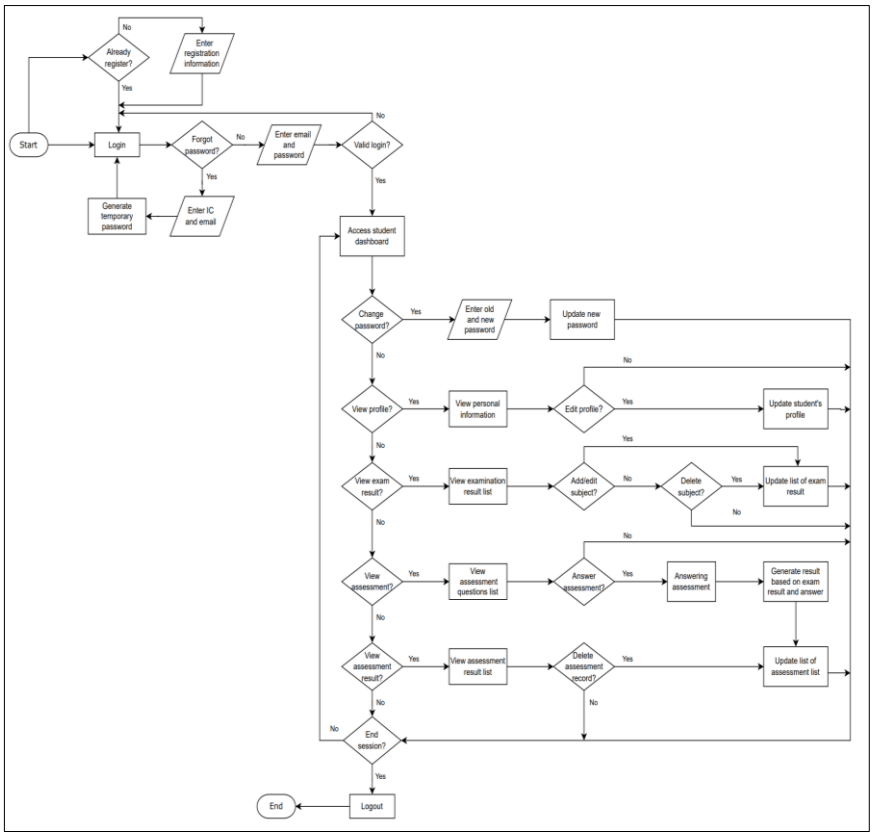

Figure 20: Flowchart of CSGS for student

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