

UNDERGRADUATE PROJECT PROPOSAL

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| **Project Title:** | **CDUT Sino-British Student Information**  **Management System Based on WeChat Mini Program** |
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# Introduction

## Background

Under the background of the constantly developing information technology, the information management technology used in the student management system has been constantly applied and promoted [1]. On the other hand, although mobile applications have been driving the development of digital business models. However, smartphone users are increasingly reluctant to download traditional mobile applications [2]. The WeChat mini program is an application that can be used without downloading and installing and does not use the phone memory [3]. On this premise, the project aims to design a CDUT Sino-British student information management system based on WeChat mini program, which has the functions of querying basic personal information, current information, grades, words, and school maps and other additional functions, to achieve simple, conventional, and systematic management of student information purposes and promotions.

## Aim

The project is developed in the form of WeChat mini program, so that students who use the system do not need to log in the browser or download mobile applications separately but use the mini program that does not need to be downloaded to query the information belonging to the student website, to achieve simple and convenient purposes.

## Objectives

The project will be divided into five objectives to achieve my goals, and the contents are shown below.

(1)Objective 1: Complete the background review of the existing WeChat mini

program development and student information management system.

(2)Objective 2: Complete Requirements gathering.

(3)Objective 3: Use the correct technology and framework to develop pages.

(4)Objective 4: Evaluate the project using appropriate testing techniques.

(5)Objective 5: Show the works to different audiences.

## Project Overview

### Scope

The user can scan the QR code provided or search the corresponding name of the WeChat mini program to use all the functions of the relevant application on the WeChat interface without downloading and installing [3]. After successfully entering the WeChat mini program, the applet will provide you with various query functions of user information.

### Audience

The audience of this project is students from CDUT Sino-British. Using this WeChat mini program, they can more easily obtain personal information and learning information and improve their learning efficiency.

# Background Review

For the management of student information, the most traditional mode is mainly to manually input and maintain student information by the branch of the academic administration department of each major of the college [4]. However, because the unified management is not carried out through the system, the management personnel spend a lot on data processing, the workload of data processing is high, the overall management speed is slow, and even there are problems such as data loss and statistical errors [4]. Therefore, many student information management systems based on Web development have appeared on the market. Chu [4] mentioned the development of student information management system based on browser/server mode, and realized the basic functions of managing personal information, teacher management, curriculum information management, etc. And its security system uses the classification of students, teachers, and managers to control. However, for this system, the information in the database may not be secure, and the database may be subject to SQL injection attacks, leading to data leakage or database crash. The same problem also exists in the research of Gomathy et al. [5]. In the research and design of Wu et al. [1], it was mentioned that on the premise of browser/server mode, the Client/Server mode was added, and on the premise of using QT quick to develop clients, WeChat mini program was used to solve the problem that different clients in the Client/Server mode need to develop different platforms. However, using QML to develop applications has high learning costs, lack of relevant online materials, and larger memory space than other languages in the development process. If it is used in WeChat small mini development, it may become more difficult to subcontract programs at the end.

For WeChat mini program development, it is the development method selected for this project. In 2017, WeChat mini program was officially launched. Its main feature is that users can access the system by scanning QR code or searching the name of the mini program from WeChat applications without downloading and registering in advance and use all the functions of relevant applications without occupying the memory of the phone, fully demonstrating its "micro, light, and small" features [1] [2] [3] [6] [7] [8]. When developing WeChat mini program, MINA is its framework, as shown in figure 1. It divides the whole system into two parts: the view layer and the logic layer (App Service). The View layer is all .wxml (WeiXin Markup language) file and a collection of .wxss (WeiXin Style Sheet) files, similar to HTML and CSS. In addition, .wxml is used to describe the page structure and .wxss is used to describe page styles, while the logic layer (App Service) is written by JavaScript. Using MINA, developers can easily modify data in the logical layer to keep data synchronized with views [6] [9]. Wu et al. [6] also mentioned the use of Tencent Elastic Compute Service to communicate with mini program, so that mini program does not need to connect to the database through interfaces and use a complete authentication session management service to ensure account security and improve the efficiency of applet development.

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Fig. 1. WeChat Mini Program Framework Diagram. Adapted from [6]

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Fig. 2. Summary of Software Features

As for the research on system's features, it can be seen from figure 2 that the functions involved in some student information management systems investigated are mainly personal information management, course management, score management, logistics management, etc. Compared with other systems, the system of Zhang[8] and qingflow[10] includes learning modules, which can help students learn efficiently. Li's[7] system even includes daily assessment management and communication area, which can facilitate students to upload their own homework and exchange learning experience. This project is developed for students of CDUT Sino-British. After analysis and comparison, the project will focus on personal information management, course management, and score management. On this basis, word query, map query, and communication area will be added to help students learn more efficiently.

# Methodology

## Approach

Approach will be divided into the following four aspects:

(1)Software development model: As shown in figure 3, this project will be developed and maintained in a waterfall model.

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Fig. 3. Schematic Diagram of Waterfall Development Model

(2)requirements gathering method: this project will use the form of questionnaire to collect and sort out the demand for students of CDUT Sino British.

(3)Test method: execute unit test, integration test and system test according to the rules of waterfall model.

(4)Evaluation process: on the premise of waterfall model, upload the corresponding deliverables of each completed section to the tutor for review and show all the contents to the final tutor during the final assessment.

## Technology

The technology used in the project is divided into three aspects: front-end, back-end and testing. The main contents are as follows:

(1)Front-end: "uni-app" is a front-end framework based on WeChat mini program development (its main method is Vue.js).

(2)Back-end (server side): "uniCloud" is a cloud development platform based on Serverless mode and JavaScript programming.

(3)Test: "Minimum" is WeChat mini program automation test framework.

## Version management plan

Use Git repository to save my project source code and other deliverables, push them to remote branches by creating local branches, and finally save them to Github repository.

# Project Management

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Fig. 4. Product (technology) roadmap

As shown in figure 4, it shows the product roadmap for the completion of this project.

## Activities

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Fig. 5. Schematic Figure of Detailed Activities Corresponding to Each Objective

As shown in figure 5, to ensure that the task objectives can be completed, all objectives are subdivided into many activities to make the objectives more specific.

## Schedule

日程表

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Fig. 6. Project Gantt Chart

The Gantt chart of the project can be seen from Figure 6, and the planned time of each activity can be seen from it.

## Data management plan

As mentioned in 3.3, the source code of the project and other deliverables, including documents and reports, will be uploaded to the Github repository for storage to facilitate subsequent preview and acceptance.

## Project Deliverables

The deliverables of the project will consist of the following parts and will be delivered within the specified time:

(1)Project proposal

(2)Progress report

(3)Final report

(4)Project source code

(5)The questionnaire is to sort out the data

(6)Software demonstration video

(7)Poster

(8)PowerPoint of project

# References

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