Smart Study Plan Advisor

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ABSTRACT

The Bachelor of Information and Communication Technologies (BICT) programme offered by the Department of Business and Digital Technologies at Ara has a complex program structure. It includes three specialist pathways and selection rules, such as prerequisites for compulsory and elective courses. The BICT students are required to have their study plan. A Smart Study Plan Advisor (SSPA) is devised to guide students in selecting appropriate courses to meet the graduation requirements for their degree. Furthermore, SSPA involves integrating the student's academic history into the different course selection rules, including timetables and BICT program regulations. SSPA prototype is developed by using Python and MySQL.

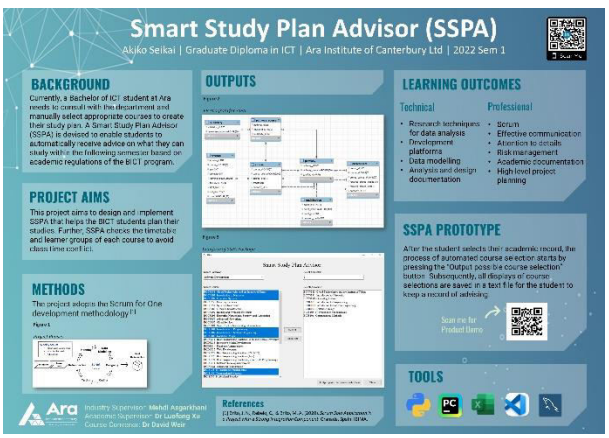
Keywords: automation, advising, software development

1. INTRODUCTION

Currently, a BICT student must consult with the Academic Department before the course enrolment period; however, this consultation is frequently missed or delayed with either department staff too busy or the student too lazy to make an appointment. SSPA will save time and hassle for students and the academic department to guide students in selecting appropriate courses. The application will also provide the services to help future decision-making along the enrolment process. SSPA will assist students, and advisors in avoiding problems such as course enrolment without passing prerequisites, course selection with time conflicts, and missing out on specific courses only offered during alternate semesters. Students can run SSPA at any time in their degree career and create a possible course selection plan for the next semester as an advising saved file. A case study of a typical student has been reported and analysed. The testing for the SSPA performed in every test has resulted in accuracy.

The paper describes the advising software prototype's complete operation. Furthermore, the report includes an approach to the project, including the methodology, risk management, quality assurance, and learning outcomes.

Figure 1



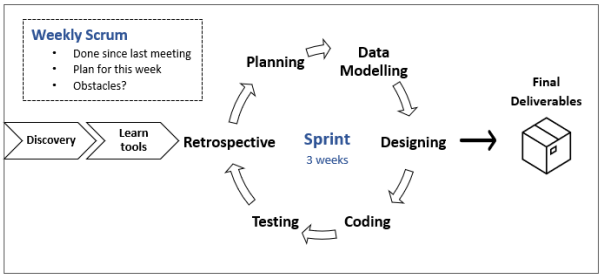
Short Paper Poster

APPROACH

Figure 3 shows phases of prototype development that transform the logic into implementation. We began the project by investigating data and learning about relational database models and development tools. The next step was the sprint duration to develop a prototype of the proposed SSPA. The weekly Scrum was established to track the progress status and share information to clarify the requirements and goals.

Figure 2

Phases of the project



1.1 Scrum for One

The project adopts the Scrum for One development methodology. Scrum is an effective management method for IT deployment projects and becoming more widespread among software development teams. Scrum was established by Jeff Sutherland in 1993, and it aims to become a development and management approach that follows the Agile concepts (Pham, 2011). Scrum projects are organised into short periods (Sprints) in which work is planned, executed, and reviewed. According to Scrum Guide in 2020 (Schwaber & Sutherland), smaller teams generally can efficiently manage Scrum ceremonies, called the Sprint Planning, Daily Scrum, Scrum Review and Sprint Retrospective. Further, it increases effective communication and allows quick decision-making to change software projects constantly (Vered & Ilanit, 2013). Scrum for One is an adaptation of Scrum practice for solo software developers.

1.2 Risk Management

The risk management was performed utilising a Risk Assessment Table based on the Microsoft Risk Assessment template. The table listed risks that may lead to project failures, their probability, and impact.

The tool allowed us to identify essential elements of the risks and evaluate them based on their likelihood and potential impact. I examined and updated it every three weeks to reflect on quickly changing situations.

1.3 Quality Assurance

The Quality Assurance activities were implemented by developing a Quality Assurance Framework based on the model provided by Virginia (Virginia Tech, n.d.). The framework listed all deliverables, the quality standards, the quality assurance activity, frequency, who accepted them, and the date of acceptance. It optimised the SSPA prototype development process and made it as efficient and effective as the quality standards defined for project deliverables. The Quality Assurance Framework was examined and updated every sprint.

2. THE SSPA PROTOTYPE

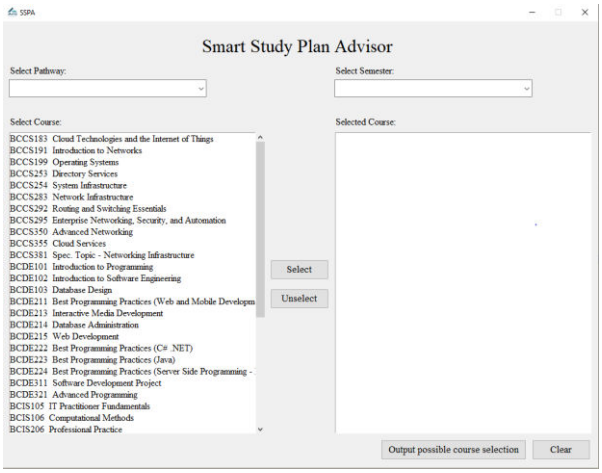
Students from the Department of Business and Digital Technologies at Ara must take 360 credits of course work to fulfil the requirements for the Bachelor of ICT degree. An average course load of 60 credits per semester (comprising four courses) is typical to complete their degree requirements in roughly six semesters. After completing the same eight compulsory courses in the first two semesters, students choose the specialist pathway from Software Development, Networking and Infrastructure or Information Systems. Each course is registered as compulsory or elective depending on the specialist pathways. Everyone must take four elective courses worth fifteen credits. Some course has prerequisite requirements; for example, “BCDE101 Introduction to Programming” is the prerequisite course to “BCDE102 Introduction to Software Engineering”, meaning a student can select BCDE102 only when the student has already been passed BCDE101.

In the advising system, students input all previously passed courses, their pathway and semester. The system is then programmed to find all possible course selections they need and can study for the next semester. Those course selections are created based on the available courses for the student, which apply all the selection rules mentioned above. Moreover, the timetable crash does not exist within the course selection.

The interface of the SSPA prototype is shown in Figure 2. The display consists of two main list boxes, a student information section, and several interactive buttons. The left list box displays all courses of the Bachelor of ICT. A typical advising session starts with a student selecting the specialist pathway and the semester from the dropdown boxes at the top of the window. The “Select” interactive button and the mouse click on the course list in the left list box, create another list of all passed courses displayed in the right list box.

Figure 3

Interface of SSPA package



After this selection procedure, the system is ready for an auto advising session. The student can start the process of automated course selection by pressing the “Output possible course selection” interactive button. Subsequently, all displays of course selections are saved in a text file for the student to keep a record of advising.

3. LEARNING OUTCOMES

The section lists the learning outcomes divided into two categories.

Technical:

- Research techniques for data analysis
- Development platforms
- Data modelling
- Analysis and design documentation

Professional:

- Software methodology – Scrum for One
- Effective communication
- Attention to details
- Risk management
- Academic documentation
- High-level project planning

4. CONCLUSION

This project aimed to design and implement an automated course selection application called Smart Study Plan Advisor (SSPA) that helps BICT students plan their studies. Using SSPA, students could automatically receive recommendations on what courses they need to study for the rest of their BICT program. The outcome of the course selection was saved to record as advising. Future work will expand the automatic procedure to cover other qualifications for the Department of Business and Digital Technologies at Ara.

5. REFERENCES

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