

Academic Advisory System Design to Ease Academic Guidance in Malaysian Institute of Higher Learning

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Abstract: Most higher learning institutions are dealing with teenagers as their students. Being young generation, advise is important to keeps them motivated. In Universiti Selangor (UNISEL), academic advisory is one of the process in academic management where it provides advisory services between Academic Advisors (academician) and dedicated students under their supervision in term of academic matters. Besides the academic advisor, each faculty have assistant counselors that serve and assist students who need consultation on any areas of academic achievement, career and social/emotional development. However, currently there is no automated system that could help the Advisory and Counselling Unit at the university to manage the academic advisory process in UNISEL. Furthermore, it is difficult for the faculty to track the information of the students advisory details who were referred by their Academic Advisors to Advisory and Counselling Unit. Hence, the objectives of this research are to describe the academic advisory process and the design of a web-based academic advisory system. The participatory design was selected by the development team to achieve the above objectives. With the development of the web-based academic advisory system, the faculty now can manage the record on academic advisory activities and to keep track all consultation records of counselling activities.

Keywords: Academic advisory system, Academic guidance, Mentor, Mentee, Prototyping, Participatory design

1. Introduction

Academic advising is a collaborative relationship between a student and an academic advisor. This collaboration main intention among others is to assist students in the developing meaningful educational goals that are consistent with their personal interests, values and abilities. Academic advising is an integral part of a student's educational experience. Generally, academic advisory has already been practiced in many local universities with a computer system to support the related advisory activities. Having the ICT to support the advisory system will help both students and universities to keep updated with students' academic achievements. The system also help the ease of communication between the students and other related departments in the university as the information stored and can be accessed from a centralized repository. It also helps the stakeholders to monitor students' performance through selections of menu available in just a click away. Therefore, the automation process of this process is crucial in preparing students for success in the academic setting. The purpose of this paper is to detail out the design of Academic Advisory System (AcAd) also known as mentor mentee system. AcAD supports the management of academic guidance between the mentor (the academic advisor or lecturer) and their mentees (the students) on academic matters and other related issues.

2. Academic Advisory

A close relationship with a faculty member can reduce feelings of isolation, open new vistas, enhance learning, and help ease the transitions that occur in the classroom (Macaulay et al, 2012) and higher education institution settings. An academic advisor is a type of counselor who works with students usually at the higher education institution level. Advisors are expected to share their knowledge of major and degree requirements, help students schedule their courses and generally facilitate progress to degree in a timely manner" (Baker, 2010). For example, academic advisor responsible for helping students choose a major and minor and ensuring that they meet all the requirements to graduate with a major in that field. Apart, academic advisor also responsible to make sure that the students aware of every opportunity available. Academic advising has the advantage of providing students with repeated one-on-one interactions across multiple years" (Pizzolato, 2008). In addition, the student-faculty relationship should be one where both the student and the advisor know personal information about the other. This relationship can provide many benefits to the student. The relationship between a student and their advisor can increase student development and increase academic success for the student.

The ultimate goal of an advisor and for the higher institution is to see students graduate. However, there is a long road that must be travelled in order to reach that goal. The goal in advising is not to increase or decrease a particular rate, such as decreasing the dropout rate and increasing graduation rate; rather, the goal in advising is to create a relationship with the student so that student is getting most out of their education.

Currently, Faculty of Communication, Visual Art and Computing, UNISEL, Malaysia (FCVAC) still using manual approach in handling academic advisory processes that leads to poor data sharing and time consuming. In addition, according to study by Daramola et al, (2014), the rules for guiding students may change from time to time due to curriculum reviews, changes in course structure, or the circumstances of specific students. FCVAC having difficulties on identifying and assigning of Academic Advisor especially for new students; this happen for each of early semester after registration of new students. The Counsellor and mentor including the faculty management find difficulties in identifying who is the mentor of problematic students. Report generating is also time consuming based on current manual approach of managing Academic Advisory process.

FCVAC Academic advisory programs for students vary in their official names, scope, structures and effectiveness. Mentor's role is not only limited to the academic side of the students; it covers a vast area including emotional, spiritual, career, psychology, and other related sides (Arshad et al, 2015). The main goals of this program are:

- Ongoing support and guidance for students:
Students need to consult with their Academic Advisor in order to properly manage their study plan based on their programme structures throughout their studies. Besides, Academic Advisor is also a person who will assist students when they face any problems including academic or non-academic issues. If Academic Advisor cannot handle the problem faced by his/her student, the case will be forwarded to FCVAC Assistant Counselor. In addition, academicians are also encouraged to inform or report any problematic students directly to Assistant Counselor for any further

actions. The quality of academic advising received by a student is crucial to the overall performance of the student. Good advising yields a good outcome while bad advising will be frustrating, and have a damaging effect on students' progress (Daramola et al, 2014)

- Career counselling:
Providing students with earlier and more effective career counselling.
- Student-faculty connection:
Cultivating a much-needed link between the faculty and students such as group activities or programs organized by the faculty to encourage positive relationship between the student and their academic advisor.

Most students do not take the time and effort to consult their Academic Advisors to plan their course taken before registration, resulting in many registration issues and long queues for advising at registration time. At the same time, the Academic Advisors have difficulties obtaining accurate and detailed academic information of their students to assess their situation. This then lead to difficulties to plan ahead for the courses to be offered for the coming semester, and to determine the number of groups for each course. As a result, a delay in producing the course timetable by the faculty academic administrator.

The system (AcAd) described in this paper was primarily motivated by FCVAC's need to optimize academic advising, and help to determine which course should be offered, and to utilize existing information available in the university registration system. Effective and accurate advising is an imperative factor for student's successful progress in FCVAC.

3. Methodology

3.1 Software Development Method

Prototype was adopted as method to develop AcAd because this model was best utilized when desired system (in this case is AcAd) have a lot of interaction with its end users. Using this method, the users gain better understand the requirement of academic advisory system that being developed. The users are actively participated during the development phase and its refinement.

3.2 Participatory Design Process

Participatory design method was used to design the academic advisory system. It involves the development team and users into the design process in order to help ensure that the system meets the needs of users. The three stages involve were discussed below.

3.2.1 Stage 1: Initial exploration of work

In this stage, the developers team met the users and familiarized themselves with the ways in which the users work together. This exploration includes the technologies used, workflow and work procedures, routines, teamwork, and other aspects of the academic advisory.

3.2.2 Discovery Processes

During this stage, developer team and users engaged various techniques to understand and prioritize work organization and envision the future workplace. This stage allows the developer team and users to clarify the users' goals and values and to agree on how to automate the academic advisory. This stage was conducted in a meeting room, and involved five users.

3.2.3 Prototyping

Finally, this stage involved a variety of techniques for iteratively shaping artifacts. These techniques include paper prototyping where the team create blank versions of different device screens and the users draw out the user interface. Paper prototyping can be extremely helpful during the early-stage conceptualizing. It helps when a team needs to explore a variety of different concepts and choose the one that will be used. The paper prototype allows quickly visualize and test various ideas. This activity involved the whole participatory design team.

3.3 The Design Team

Eight people representing the stakeholder of AcAd involved in the user requirement and system design stage. This design team is a collaboration of the system developer and the users as shown in Table 1. Interview sessions were conducted during the discovery process and they later participated in a half day workshop to construct the initial prototype using participatory design technique.

Table 1. The design team and their characteristics

Age	Gender	Education Domain	ICT Literate	Experience in IS Development	Category
45	F	Computing	Yes	Yes	Developer
26	M	Computing	Yes	Yes	Developer
34	F	Computing	Yes	Yes	Developer cum User
34	M	Arts	No	No	User
31	F	Management	Yes	No	User
23	M	Computing	Yes	No	User
22	F	Education	No	No	User
22	F	Social Science	No	No	User

4. Design Artifacts

Artifacts are products of human activity that essentially involve mental components. The following discussion explain related artifacts from this research.

4.1 Architecture Design

The architecture design represents the elements involve in the AcAd. Figure 1 shows the system architecture. It consists of user interfaces, a Web server and back-end data. Tier one is the user interface, which is supported by the Web browser. Users directly interact with the GUIs whose functionally is to collect user's input data for processing. Tier two is the processing logic part, which resides on the Web server. The Web server will interpret the information it receives from the browser, execute the commands and send the results back to the browser. Tier three is backend data, which are stored in the tables in the database. The Web-based advising is composed of three subsystems: Assign Mentor/ Mentee subsystem, the Course subsystem and the Advising subsystem. Each subsystem has its own set of functions and they are three-tier systems too. All the three subsystems can be accessed from the main page, and from every other page of the system. Each subsystem consists of standardized GUI, control programs and accessing a centralized database. The system structure is shown in Figure 1.

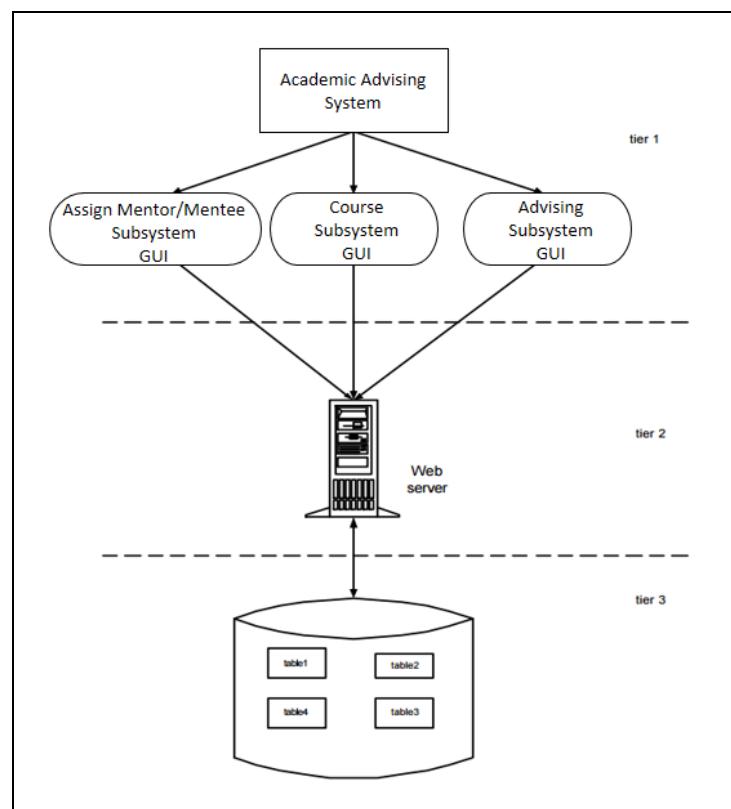


Figure 1. Architecture of Academic Advisory System

4.2 Architecture Design

Use case diagram is basically used for high level requirement analysis of a system (Khurana et al, 2016). It expresses what a system should do but does not address any realization details such as data structures, algorithm, etc (Seidl et al, 2015). Figure 2 shows the use case diagram of Academic Advisory System while Table 3 describes the main use case description that portray the features of the system.

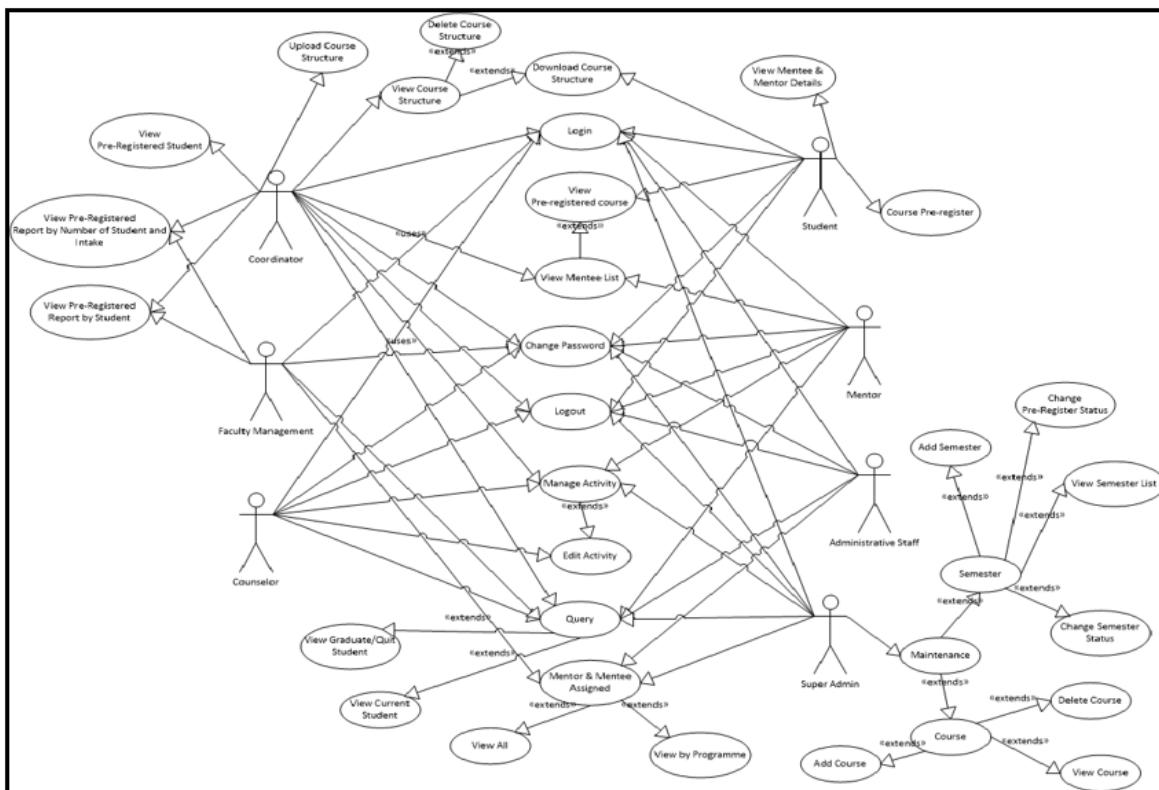


Figure 2. Academic Advisory System Use Case Diagram

Table 2. Use Case Description

Use Case	Use Case Description
Login	User logs in into AcAd. The user enters user id and password. The system validates the entered ID and password and logs the user into the system.
Manage Mentor-Mentee	Super Admin and Administrative Staff are allowed to register the new mentor and mentee personal details such as name, ID, department, faculty, programme name, contact number, guardian details, and others.
Mentor-mentee Assign / Re-Assign	Each student (mentee) will be assigned to one lecturer (mentor) for the purpose of academic guidance. This use case records the details of the mentor-mentee assigned. It also allows the faculty management to re-assign new mentor to the mentee when necessary.

Course Pre-register	This use case allows students (mentee) to pre-register courses for a forthcoming semester after consulting with their Mentor. The system will provide the list of available courses in the forthcoming semester. Students identifies and selects the course(s). The confirmed selection will be recorded. This course pre-registration helps students who could not follow the course structure provided earlier due to failure or any inconvenience situation.
Manage Activity	This use case allows the Mentor to record the academic guidance activities among the mentor and his/her mentee. Activities include student's or mentee's consultation on any areas of academic achievement, career and social/emotional development, group activity such as recreational activity or a simple get together activity.
Report Case	Mentor or other lecturer can log a report to the Counselor including student academic issues and discipline for further consultation and action by Advisory and Counselling Unit.
Query and Reporting	<p>Student is able to view his/her mentor details, mentor re-assign (if any) and his/her course pre-registration only.</p> <p>Mentors are able to view all students (mentees) details, mentor-mentee re-assignment, course pre-registration and all activities from the system. Mentor can only view reported cases of their mentees and the case that he/she reported.</p> <p>Coordinator are able to view all mentor-mentee details, all mentor-mentee re-assignment, all activities details, and course pre-registration details for their programme only.</p> <p>Counselor / Faculty Management are able to view all mentor-mentee details, all mentor-mentee re-assignment, all activities details, all course pre-registration details and all cases reported.</p>

The use case consists the seven actors (the users) which are: super admin; administrative staff; coordinator; faculty management; counselor; mentor; and mentee who will access the system. The description of actor is explained in Table 3.

Table 3. Academic Advisory Actors

Actor	Description
Super Admin	Person who will manage and administer the whole system.
Administrative Staff	Administrative staff has authorities of several Super Admin functions in order to help Super Admin.
Coordinator	Coordinator will manage the activity of course pre-registration. They also need to report on the number of courses registered by the student for the particular semester. From the report the faculty will forecast courses that will be offered for the next semester.
Faculty Management	The faculty management consists of top management of faculty. They are able to monitor and generate report of mentor mentee assigned, pre-registration and etc.

Counselor	Counselor will assist and records students who needs consultation on any areas of academic achievement, career and social/emotional development.
Mentor	Mentor will manage students (mentees) under their responsibility, including student course structure and consult them on academic and discipline.
Mentee	Each student has their own mentor to guide them during their study in University. Students are able to view their mentor details in system. Besides that, they also can pre-registration on every course that he/she will enroll for the next semester.

4.3 User Interface Design

Figure 3 shows an example of the interface design. This example is related to Mentor/Mentee Assigned Module. It shows number of mentees assigned to each mentor and list of mentees under the particular mentor. This interface will assist coordinator on mentor mentee assignment.

ID No	Staff Name	Faculty	Department	Mentee Assigned	Action
121349	Mohd Khalil Sreedaran Bin Abdullah	Faculty of Communication, Visual Art and Computing	Communication	24	View
141432	Azira Azlin Binti Shaharuddin	Faculty of Communication, Visual Art and Computing	Communication	25	View
060538	Marliza Binti Abdul Malik	Faculty of Communication, Visual Art and Computing	Computing	26	View
070728	Siti Fatimah Binti Omar	Faculty of Communication, Visual Art and Computing	Computing	26	View
070730	Hema A/P Subramaniam	Faculty of Communication, Visual Art and Computing	Computing	26	View
101112	Ismail Bin Hashim	Faculty of Communication, Visual Art and Computing	Communication	26	View
101114	Norhaida Hanim Binti Ahmad Tajudin	Faculty of Communication, Visual Art and Computing	Communication	26	View
151494	Kamarudzaman Isa @ Md Isa	Faculty of Communication, Visual Art and Computing	Communication	27	View
111235	Mohammad Shahid Laghari	Faculty of Communication, Visual Art and Computing	Communication	28	View
131388	Shyamala A/P Ratha Khrisnan	Faculty of Communication, Visual Art and Computing	Communication	30	View

Figure 3. User Interface Design (Mentor/Mentee Assigned)

5. Conclusion

One of the basic building blocks of academic administration for higher learning institution is to have a complete automation system that could cater the administrative part of academic management. Academic Advisory automation initiative helps the management of mentor-mentee details and the transparent of data sharing. It enables multi-dimensional reporting of academic advisory management. Another main contribution of this research is a

standardized process flow for academic advisory across all departments at FCVAC. Based on this research, user involvement in co-designing of academic advisory system has proved that participatory design is a powerful tool to drive long term engagement during the development. In addition, it reduces the risk of not meeting the user requirement that lead to project failure.

Currently, AcAd is at it's early implementation stage. A working prototype and two documents: Software Requirement Specifications; and Software Design Documentation were delivered to the system owner. For future enhancement, it is suggested that the next phase of this research is to include a centralized data sharing among all faculties at UNISEL.

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