DEVELOPMENT OF ONLINE PROJECT REGISTRATION AND MANAGEMENT SYSTEM (ePRM) FOR MASTERS BY COURSEWORK

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Abstract

Research Methodology and Project are compulsory courses in the master's programme by coursework mode at the Faculty of Engineering and Built Environment (FKAB), UKM. Currently, project registration and management for those courses has been carried out manually. This method imposes difficulty and not effective in the registration and monitoring process due to the nature of the courses that involves time critical events and deliveries. Therefore, a better project registration and management system needs to be developed. This paper presents the development of a coursework project registration and management system for the postgraduate students at the Department of Electrical, Electronic and Systems Engineering (JKEES), FKAB. An online system named ePRM was built and can be accessed by postgraduate students, supervisors, examiners and programme coordinators. With this system, important processes such as selection of supervisors, project titles, assignments and reports submission can be carried out online. Assessment by several parties can also be carried out more effectively. Subsequently, project monitoring especially by the programme coordinators can be performed effortlessly. The effectiveness of this system will be tested with the students of the upcoming session and improvements will be made from time to time. This system can also be expanded to other undergraduate and postgraduate programmes in FKAB.

Keywords: Management system, Assessment system, Online system, Master's project, MQF.

Abbreviations	
BJK	Quality Assurance Division
ePRM	electronic Project Registration and Management
FKAB	Faculty of Engineering and Built Environment
iFolio	UKM integrated Portfolio Management System
JKEES	Department of Electrical, Electronic and Systems Engineering
KPT	Ministry of Higher Education
LAN	National Accreditation Board
MQF	Malaysian Qualifications Framework
SMK	University Staff Information System
SMP	University Student Information System
UKM	Universiti Kebangsaan Malaysia

1. Introduction

The Master of Science (Microelectronics) and Master of Engineering (Communication & Computer) Programme by coursework mode are offered at the Department of Electrical, Electronic and Systems Engineering (JKEES), FKAB. In these programmes, students are required to take two courses related to research, namely, Research Methodology and Project which are offered in Semester I and Semester II, respectively.

The Malaysian Qualifications Framework (MQF), which was introduced in Malaysia in 2005, requires that each programme offered at institutions of higher learning take into account the elements of project planning and management as one of the programme outcomes. MQF is a new entity which is a combination between the National Accreditation Board (LAN) and the Quality Assurance Division, Ministry of Higher Education (BJK, KPT), which has been made responsible for assuring the quality of the country's higher education for the public and private sector [1, 2]. Thus, the element of project planning and management has been introduced into and assessed in the Research Methodology and Project courses [3, 4].

Starting from the 2011/2012 academic session, project management has been taken into account as one of the assessment components for the two courses. Assessment also takes into account the input from various parties such as the supervisors, examiners and course/programme coordinators. At present, the monitoring and management of research project has been done manually. This is a daunting task for any coordinators and this method is found to be quite difficult and less effective and prone to a lot of errors [5]. For example, during the disbursement of project titles, programme coordinators need to get titles from the lecturers manually. Titles will be disbursed on first come first serve basis and supervisors do not have the freedom to choose students. If the need to change title and supervisor arises, the current method is very tedious where students need to fill up a form and get signature from both previous and newly proposed supervisors manually with the approval from the programme coordinators. Project assessment process as well as report generation for teaching file and auditing purposes suffers from inefficiency. This is because collecting marks from all supervisors and examiners for the grade coordination meeting is very time consuming.

To overcome these problems, an online system has been built as an initiative for improvement. This paper describes the development of the online project coursework registration and management system known as electronic Project Registration and Management (ePRM). The management system includes registration, project selection, appointment of supervisors and examiners and also the work schedule. The assessment system includes the mechanisms for extraction of marks that leads to scoring and course report generation.

2. Course Structure

Research Methodology and Project are two courses in the master's programme by coursework mode at the Faculty of Engineering and Built Environment (FKAB), UKM where the element of project planning and management are incorporated. Research Methodology is the pre-requisite for Project; therefore, students are required to register for the Research Methodology prior to taking the Project. In Research Methodology, students will be introduced to the methodology in conducting research. Lectures on related topics such as research philosophy, library search, writing research proposal and effective oral presentation were given. While in Project, students are required to work independently with their supervisors whom are selected among the academic faculty members. Students will be evaluated on their ability to apply technical knowledge and demonstrate generic competencies such as presentation skill, communication skill and project management. Figure 1 shows the courses management process flow for both Research Methodology and Project. The remainder of this section will describe the process flow in more detail.
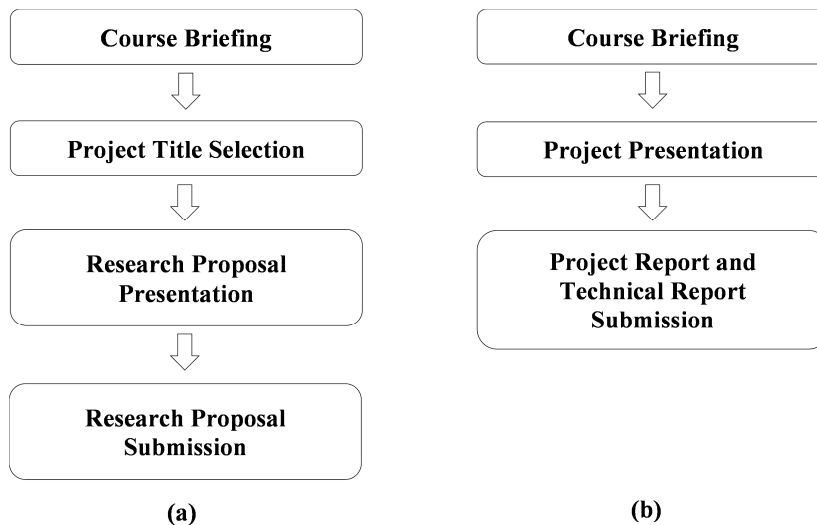

(a)   **(b)**

**Fig. 1. Course management process flow
for (a) Research methodology (b) Project.**

2.1. Research project title selection and allocation

The first stage starts with research project title preparation by all the lecturers involved in the programme. The number of titles depends on the lecturer-student ratio and will be decided prior to the selection process. Student is required to discuss with the potential supervisors and select one research project based on their interests that is related and suited to the programme. Currently, the project title selection process is being done manually. The list of titles will be published in the UKM integrated Portfolio Management System (iFolio) by the programme coordinators in the second week of the semester and the notification will be sent by the online system to the students by email. Students are given 1- 2 weeks to discuss the topics of their interest with the potential supervisors and upon mutual agreement, students need to fill up a manual form and get a signature from the supervisors as a confirmation. The form will then be submitted to the programme coordinators for data gathering and report for the teaching file submitted at the end of the semester.

2.2. Research proposal presentation

Prior to submitting the research proposal, students are required to present their proposal orally. The oral presentation typically held at the end of the semester between week 12 and 13 of a 14 week semester system. The oral presentation schedule is prepared by the programme coordinator. Each student is given a total of 15 minutes to present that includes 10 minutes presentation and 5 minutes question and answer (Q&A) session. Students must present their proposal in a slide form such as PowerPoint format and the presentation is assessed by the programme coordinator and the supervisor (if required). Programme coordinators will give their comments at the end of the presentation session in order for students to improve their research proposal

2.3. Research proposal submission

Students registered in Research Methodology are required to submit their research proposal at the end of the semester. In order to avoid/minimize plagiarism, students need to submit their proposal through a software called Turnitin for similarity checking. Only proposal with less than 30% similarities will be allowed to be submitted to the programme coordinators for final assessment. The submission is done through iFolio before the given dateline. The date stamped on the final Turnitin report is taken as the date of the proposal submission. Failure to submit before the dateline will affect their project management marks. The template/format for the research proposal is given and discussed during lecture.

2.4. Project presentation

Each student registered in Project is required to present their findings at the end of the semester. Examiners will be appointed by the supervisor with the consent of the programme coordinator. Since the project usually will be multidisciplinary in nature, the examiners need not necessarily appointed from the academic staff in the same department. They can be appointed from other faculties or research

institutes in UKM as long the field is relevant to the students' project. The same examiner will evaluate the research project and technical reports as well.

2.5. Project report and technical report submission

Apart from the project oral presentation, students are also required to submit a project report and a technical report by a given dateline. The research project report demonstrates the project achievements while the technical report is the summary of the project report. The research project report typically contains chapters such as research background, objectives, literature review, research methodology, results and discussion, conclusion, future work and references in a dissertation/thesis format. The research project report needs to be checked by the supervisor before submitted to the course coordinator. In addition to the research project report, students are also required to submit a technical report in a format of conference proceeding or a journal paper. This is a concerted effort by the department to encourage students to publish their research project results. Examiners for project report and technical report are the same examiners appointed for the project presentation to ensure the consistency in the assessment.

3. Online Project Registration and Management System (ePRM)

Due to the various management and assessments stages in the Research Methodology and Project courses, there is a need for a better project registration and management system. Even though there is possible templates-ready project management system available online, none can address and integrate all of the features needed for our purposes. The UKM integrated Portfolio Management System (iFolio) offers the capability of managing courses portfolio by allowing lecturers to upload course materials online, assigning tasks and discussions but there is no means for project registration and assessments to be done online. Therefore, an online project registration and management system (ePRM) was developed to address the missing link that the iFolio unable to provide and is targeted at the project title selection and allocation and assessments stages.

3.1. System development

An online system, ePRM for project registration and management has been developed for the postgraduate programme students in JKEES. The system can be accessed by postgraduate students, supervisors, examiners and coordinators. The ePRM consisted of two main components, namely the project management module and the project assessment module as shown in Fig. 2. The project management module of the system comprised of log in for registration, project selection, appointment of supervisors and examiners as well as the work schedule. The project assessment module of the system comprised of scoring and course report generation. The detailed flow chart of the whole system development can be referred to in Bais et al. [6].
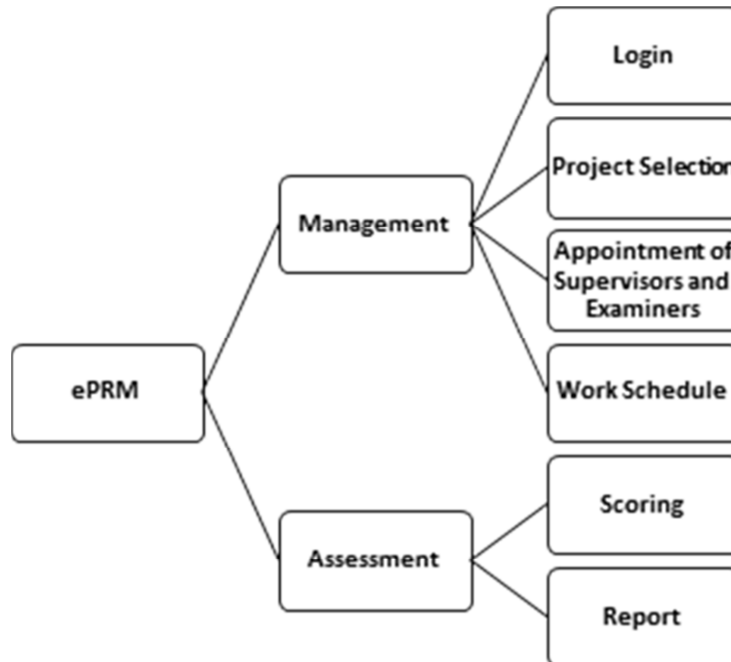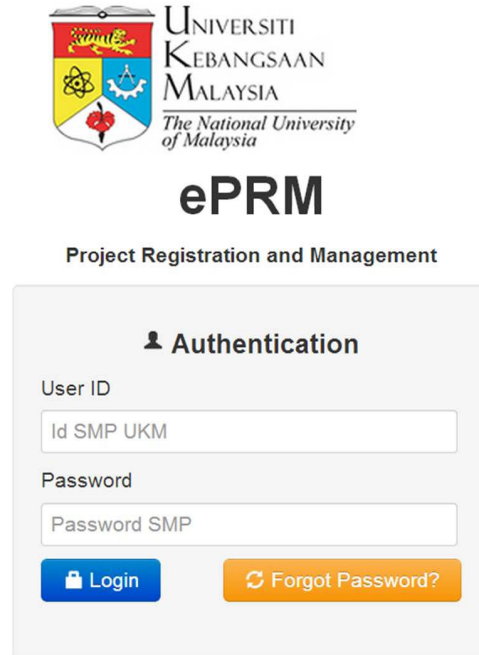
**Fig. 2. Main components of the online
project registration and management system.**

3.2. Project management module

The management system consists of several processes as shown in Fig. 2, which are login, project selection, appointment of supervisors and examiners as well as the work schedule. This system can be accessed by students, supervisors as well as programme coordinators. The login screen is shown in Fig. 3. Student and lecturer information are automatically downloaded from the existing UKM central system namely University Student Information System (SMP) and University Staff Information System (SMK). This is done by synchronizing ePRM with the database of SMK and SMP for the current semester. Through this way, only students who are registered under the Research Methodology and Project course can log-in into this system. With this feature, any changes in the database of the UKM central system will be reflected in ePRM. Confirmation of login is made by entering the matric number or staff ID number and password will display their personal profile containing the current course information.

Next, research project title selection can be carried out through two methods, namely, either by the students choosing topics proposed by the supervisors or topics suggested by the students themselves. Research topics along with its description proposed by the supervisors are submitted through the online at the beginning of the semester. After a student has chosen a topic, supervisors can view the display of the applications made by the students. Since the system allows a maximum of three potential students for each research topics, supervisors have

the option to select students who they think are more suited for the project title based on the students' background. Figure 4 shows the project title selection screen. The students are also given the opportunity to suggest his or her topics to the supervisors whom they think have the same interest. Then the supervisor will approve or reject the proposed topics by the students. A confirmation email will be sent to the supervisors and students once project topic is approved.

Fig. 3. Login screen.

Fig. 4. Project title selection screen.

Reminders will also be sent to supervisors if they have not responded to the project title selection by the due date. For the purpose of course assessment, one internal examiner for each project will be appointed by the programme coordinator with the recommendation of the project supervisors. Internal examiners from relevant institutes in UKM can also be appointed apart from the examiners from the department. The last component of this management system is the work schedule. It is built into the system to facilitate the supervisors in monitoring the project activities. Students may refer to the work schedule for the purpose of obtaining information relating to the submission date of research proposal, presentations and reports related to the project.

3.3. Project assessment module
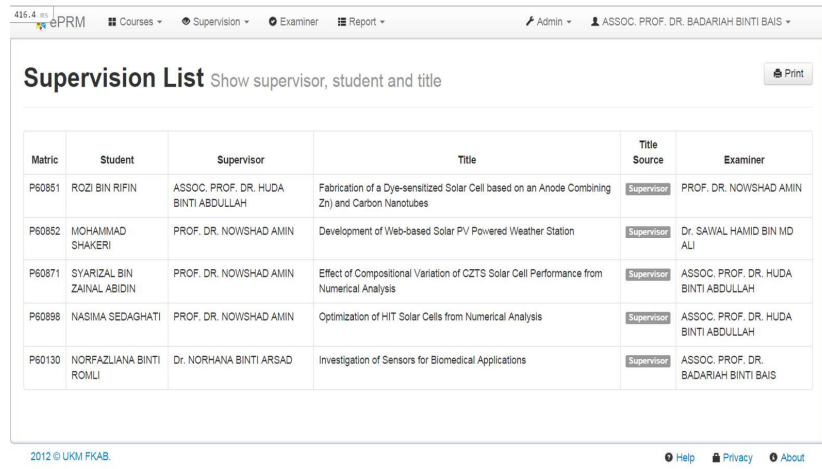
The project assessment module of ePRM consists of the scoring and report generation process (Fig. 2). This system can only be accessed by the supervisors, examiners and programme coordinators. To facilitate the assessment process, a scoring template is provided as shown in Fig. 5. Supervisors, examiners and programme coordinators only need to select the appropriate marks on the given scale and scores will be generated automatically. Examiners can only edit their own score and not those given by the other examiners. The system will then update the total scores automatically with each score entry by any of the examiners. Therefore, supervisors will be able to know their students' final score and grade before the grade submission to the department. Hence, the problem of overgrading or undergrading as often associated with manual assessment can be avoided. This data can then be transferred to the faculty grading template for the purpose of grade coordination and will also be used in the report generation process.

Fig. 5. Sample of online assessment form.

In the process of generating the report, two types of reports are prepared. The first report contains details of the supervisor, examiner and the title of the project as

shown in Fig. 6. The second report displays the student's full mark as shown in Fig. 7. On top of that, these two reports may be used for the purpose of teaching file preparation.
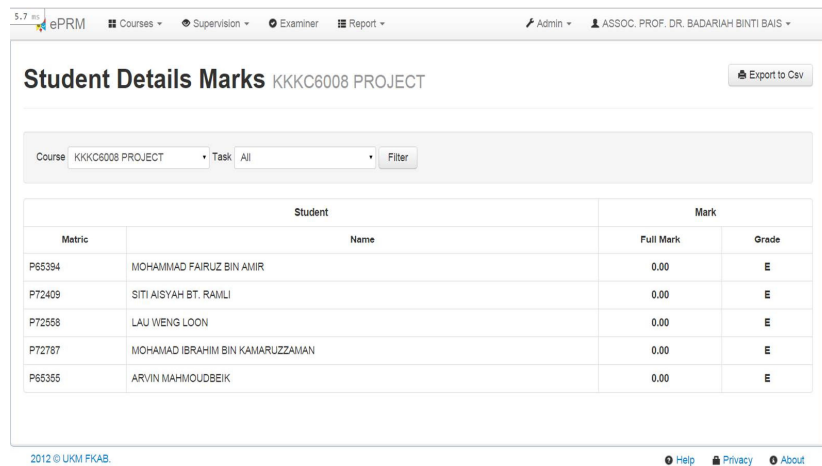

Fig. 6. Report generated containing details of supervisor, examiner and project title.

Fig. 7. Template report generated containing details of the students' marks.

The online project registration and management system (ePRM) has been fully developed and is currently under beta testing stage. Some of the key features of the systems are its integration and synchronization with UKM's online system, namely SMP and SMK. With the synchronization, list of courses, list of students, and list of lecturers are readily imported into the system and can be easily extended to other postgraduate programmes, undergraduates and faculties. Security issues also addressed since only students registered with the course can have access to the system. Hence, no approval is needed which can alleviate the

burden of programme coordinators. The system has an interface that is similar to the current course portfolio system (iFolio). This similarity makes the system user-friendly since students are already familiar with the interface. System also offers flexibility for supervisors to choose students if more than one student chose the same project topics. It also offers flexibility to students since students are able to suggest their own project topics to a specific supervisor. The online assessment system can further simplify the grading process and less time consuming compared to the manual system. Notification through emails can be further extended to other current technology/apps such as WhatsApp.

4. Conclusions

An online system (ePRM) has been built to replace the existing manual system for the Research Methodology and Project courses. The ePRM system takes into account the components of project planning and management required by MQF. It can also develop an effective project planning and management system that involves various stakeholders. Improvements will be carried out from time to time after the testing of the system is carried out in the upcoming session. The existence of this system is expected to enable project registration and management to be carried out easily and effectively and its usage can be extended to the undergraduate level.

Acknowledgements

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