IPMS: A Web Portal for Industry Project Team Management

Hao Shi

School of Computer Science and Mathematics
Victoria University, Melbourne, Australia

Summary
Industry Projects have been a major component for final-year Computer Science students at Victoria University. It aims to exposure students to real-world ICT (Information and Communications Technology) industry to understand the skill requirements and industry demands. It is a capstone activity because previously learned theories are applied to real-life practice. Project students are organised into teams of four members and have to choose a relevant ICT industry project. As well as having an academic supervisor each team has an external sponsor. However, it is a very time consuming task for the project coordinator to manage students, allocate projects, coordinate supervisors and liaise with external sponsors. In order to automate the process and allow the stakeholders to focus more on their key tasks, IPMS - a web-based Industry Project Management System is proposed specifically tailored to the needs of Industry Projects. In this paper, user requirements and functionality of IPMS are first described. Then the prototype is presented and the results of usability test are also given. It has demonstrated that the developed IPMS web portal has met the user requirements, reduced administrative load, and provided benefits to all the stakeholders beyond the initial design.

Key words:
Project Management Systems, e-Management, Industry Projects, Groupware, Web Portal

1. Introduction

Many tertiary computing degree programs offer students industry projects in final-year undergraduate computing curriculum [1]. Project students are worked in a team to complete real-life projects required by external clients under supervision of academic staff. However, managing software project teams is a complex task [2]. It should have occupied 20% time of the project coordinator but in the end it is taking more than 80% [3]. In order to cope with ever increased administrative load, project management tools have been produced for many years. Some tools monitor full cycles of software engineering projects while others emphasis more on aspects of the management projects [2].

WIER, for example, is dynamic web-based tool integrated Web-based learning environment for users including client, student, supervisor and coordinator [1]. It provided six functional areas for students: (i) repository (ii) a search facility, (iii) help via task and time logging, (iv) a list of resources, (v) a discussion forum and, (vi) file sharing and backup.

On the other hand, DSPMtool is a distributed software project management tool [4]. It comprises of task and team management following software engineering lifecycle principle. It includes self monitoring system which ensures the team task completed on time. This feature provides a formal organisation of members and the ability to set deadlines on a task, and setting checkpoints to accumulatively complete the task. However, DSPMtool is a closed system which cannot be accessed via the web.

DrProject is a multi-functional web-based software project management portal that integrates revision control, issue tracking, mailing lists, a wiki, mailing lists and account management. DrProject encourages its users to communicate through a searchable mailing list and to keep track of individual responsibility. It helps students to learn how to tackle large projects systematically. It aims to make students better prepared for careers in both research and in industry, where coordination tools of this kind have become the norm [5].

More and more project teams in industry, academia, and the open source community are increasingly reliant on web-based project management portals [6]. SourceForge is the best known web portal, currently hosts over one hundred thousand projects and over a million users [7]. Even WebCT or Blackboard, a dedicated eLearning tool [8] has incorporated group management tool which allows the course designer to create groups and manage group activities besides course contents.

There is no surprise that many higher education institutions continue to build their own project management tools as they provide significant benefits to teaching and learning. Unfortunately there is NO “one

Manuscript received April 5, 2007
Manuscript revised April 25, 2007

size fits all" solution in project management [9]. Quite often these tools focus mainly on project management for teaching and learning rather than full support for administrative tasks such as student registration, team formation, project confirmation, supervisor allocation and document management. In this paper, the goal is to create IPMS - Industry Project Management System to automate and streamline the time consuming and complex administrative tasks for all the stakeholders such as students, project sponsors, supervisors and most importantly, the project coordinator.

2. Background

The School of Computer Science and Mathematics requires all the students in Bachelor of Science in Computer Science degree to undertake Industry Projects during their final year. Students are organized into teams in consultation with industry sponsors. Supervisors act as facilitators and mentors to assist with the completion of the project, however, they do not control the project. This responsibility is placed firmly within each student team. Teams are required to visit sponsors at least five times during the project cycle of one academic year and to work in situ if required. Industry Projects give students the opportunity to apply discipline content in a real world application, and concurrently strengthen their collaboration and teamwork skills.

Students apply software engineering and database methodologies to design and implement a complete project and to tackle the issues developers face on a daily basis. These include client liaison, working in a team, and project documentation. These units aim to improve oral and written communication abilities, develop interpersonal, teamwork and time management skills and to prepare students to find a meaningful career in the IT industry. The major task for a project coordinator at the beginning of the projects is to find projects and allocate supervisors for the project students. The students are then sent to their project supervisors once their projects are allocated. Due to the complexity of the subject structure and heavy load of administrative demand, few staff is willing to take on the project coordinator role so that it remains the most challenging to work in the School. In 2003, a new recruited staff was appointed as the project coordinator [9]. Consequently many changes have been made to Industry Projects. For example, the subject length is unified, and subject assessments are standardized and subject contents are fully online at webCT [9]. Given limited resources available, there is urgent need to develop a project management tool to automate the endless administrative tasks so that the project coordinator can focus more on core tasks to help students successful complete the projects in the scheduled timeframe.

3. System Requirements

IPMS is a dynamic web based application which provides the following functions at homepage as shown in Fig. 1. It supports six different user access levels and can perform many system functions.

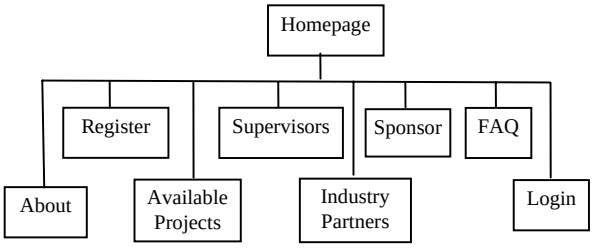

Fig. 1 IPMS web portal homepage

3.1 User Requirements

There are many stakeholders involved in Industry Projects namely coordinator, student, supervisor, sponsor, and industry partners. It is required to support the following user access with different roles in Industry Projects.

3.1.1 System Administrator

The System Administrator is a university staff member who has full management control to administrate user accounts, teams and projects. They can also allocate supervisors and projects to teams.

3.1.2 Project Supervisor

The supervisor is a university staff member whose role is to supervise and mentor student teams undertaking Industry Projects. They can update their own contact details and get an overview of teams allocated to them. They can also generate personalised oral and demo presentation assessment sheets.

3.1.3 Project Sponsor

A sponsor refers to a company liaison or representative of an organisation that requires software to be developed for a real world problem. A sponsor is able to register their contact and company details and can submit a project proposal via IPMS to be verified by the project coordinator.

3.1.4 Current Project Student

A project student refers to students that are actively undertaking final-year projects. Project students can register and keep their contact details up to date. They can also create, join and move to other project teams.

3.1.5 Past Graduate/Industry Partner

A past graduate or industry partner describes a person that has graduated or a person that is currently working in the IT industry. Both can register their contact details and keep them up to date with IPMS. They can contact the project coordinator, supervisors or project students with

potential projects or provide updates of current happenings in the IT industry.

3.1.6 Public User

A web user refers to a project student, past graduate, industry partner or sponsor that is yet to register or login. Generally they can be anyone that has an interest in the Industry Project subject or anyone from the general public.

3.1.7 Team

A team refers to an entity, a group of project students who have formed a project team. Each project student can be a member of only one team at a time. Each team is restricted to a maximum of 4 members. Once in a team, project students can propose or register Industry Projects.

3.2 Functionality

The major features of IPMS web portal consist of User Administration, Project Administration, Team Administration, Reporting, Content Management, Student Registration and Login.

3.2.1 User Admin

It allows a System Administrator namely the project coordinator to perform user and database management tasks such as account creation, allocating project students to teams and defining the access rights for the users in IPMS.

3.2.2 Project Admin

It allows a System Administrator perform project administrative tasks such as setting project deadlines, managing proposed projects, creating new projects, updating project details, update the listing status of a project and disabling old projects from the database.

3.2.3 Team Admin

It allows a System Administrator to perform administrative tasks on project teams such as allocating a supervisor, assigning a leader for the team and allocating a project to a team.

3.2.4 Student Registration

It allows project students to register with Industry Project and to access the relevant materials at IPMS.

3.2.5 Login

The login allows registered users to authenticate themselves to IPMS by providing their username and password.

3.2.6 My Details

It allows registered users to update their contact details.

3.2.7 My Team

It allows a registered project student to create a project team, join/leave a team and view their current team's details.

3.2.8 My Project Proposal

It allows a project team, past graduate, industry partner or sponsor to submit a project proposal to IPMS for approval from the project coordinator.

3.2.9 Project Registration

Once a project team is formed, the team is allows to register their interest on a particular project which can be either from a list of available projects or a proposed project by the team. It is on a "first come first served" basis.

3.2.10 Reporting

It allows a supervisor or System Administrator to generate reports customised for each project team providing information such as weekly checklist forms, oral presentation assessment sheets and demo assessment sheet.

3.2.11 Content Management

It allows a system administrator to edit web content.

4. IPMS Prototype

IPMS prototype is developed using PHP (Hypertext Preprocessor) as the program language which generates dynamic web GUI (graphic user interface). Apache is employed as a web server running under Linux operating system while MySQL is database management system for IPMS web pages and supports CMS (Contents Management System). LDAP (Lightweight Directory Access Protocol) is used for the user authentication.

The prototype is developed mainly based on the requirements stated in the last section. Examples of screen snapshots are presented in the following subsections.

4.1 IPMS Homepage

Web user can access IPMS homepage as shown in Fig. 2 where About, Register, Available Projects and FAQs and Login are present.

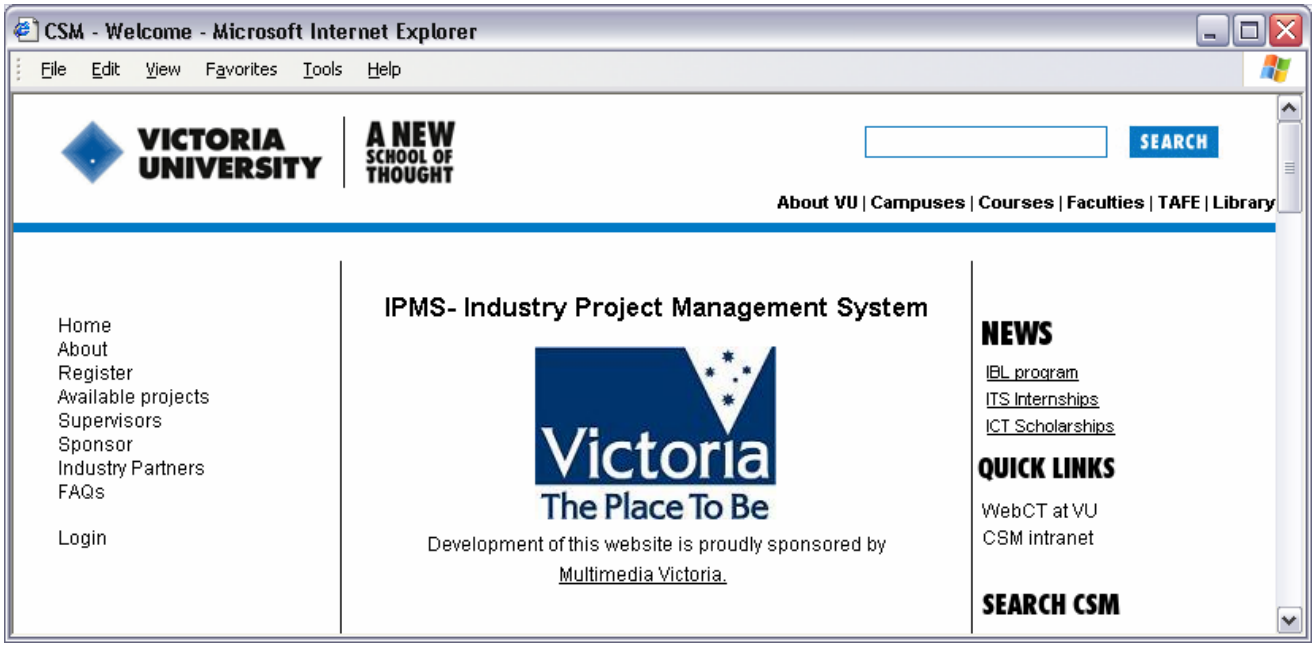

Fig. 2 IPMS homepage

4.2 Student Registration page

Project students can register with IPMS which is validated against VU Student Record system as shown in Fig, 3.

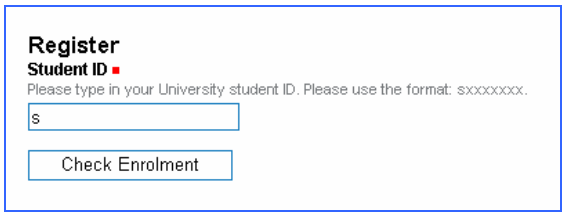

Fig. 3 Student Registration page

4.3 Login

The registered users can be authenticated against via the University LDAP via login page as illustrated in Fig. 4.

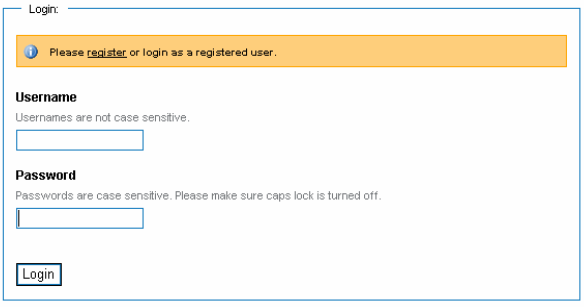

Fig. 4 Login Window

4.4 Admin menu

A System Administrator can performance many actions as shown below in Fig .5.

Fig. 5 Admin Menu

4.5 Student menu

Once students login, they can propose projects, edit their detail, check team detail as shown in Fig. 6. Once a team is formed, they can also find out the team skill distribution as shown in Fig. 7, which provides the important information if a team has balance skills set to complete the project.

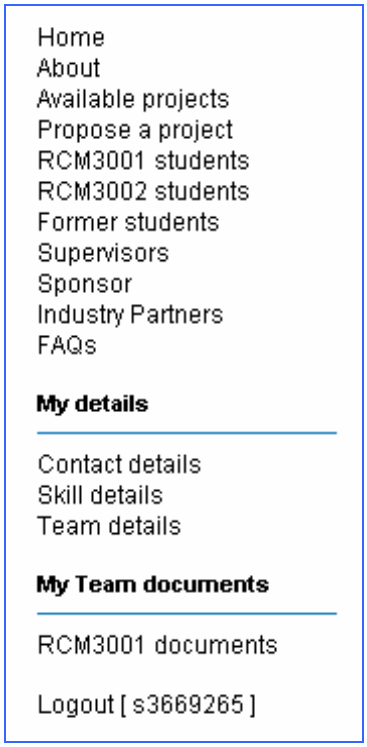

Fig. 6 Student menu

5. Usability Test

Usability test is conduced to gain user feedback from students in the form of a user experience survey. It allows the system developer to improve the application's usability. Students are required to go through the process such as online registration, logging in. completing the survey forms and forming teams. Then they can submit their ratings by comparing their experiences with the previous paper-based system to the IPMS prototype. The results of the usability test are collected and shown in Fig. 8. It is clearly demonstrated that students are in favour of the adoption of the new web port.

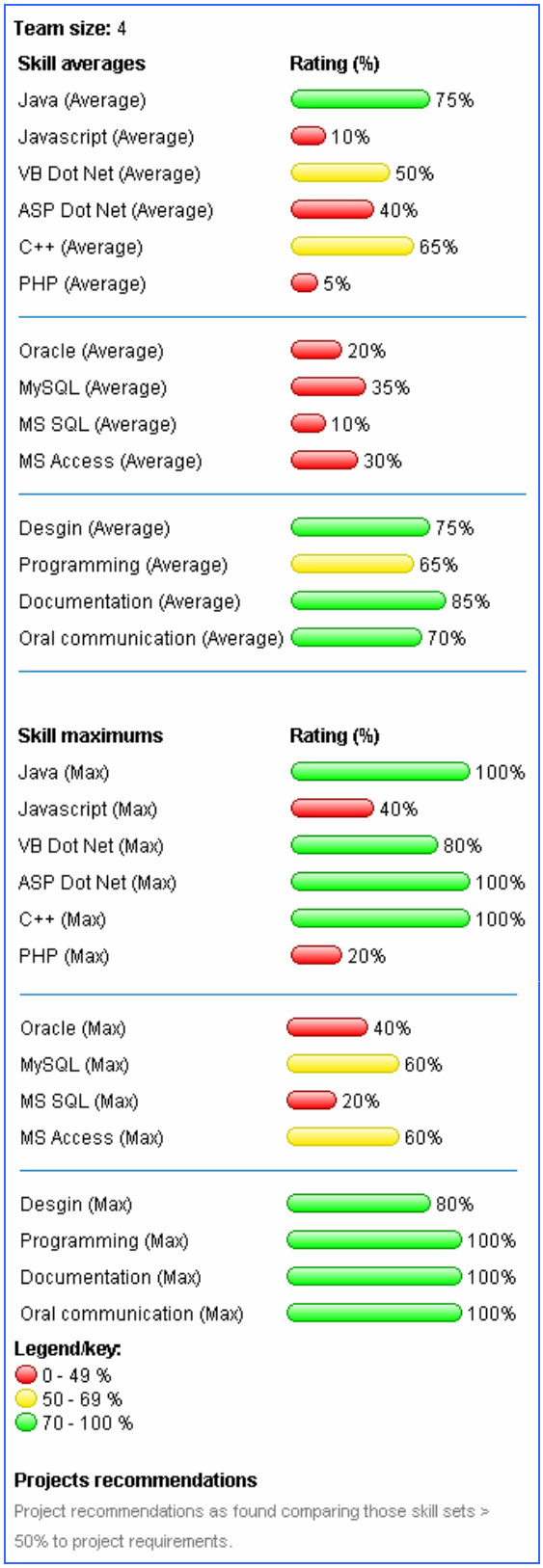

Fig.7 Team Skills

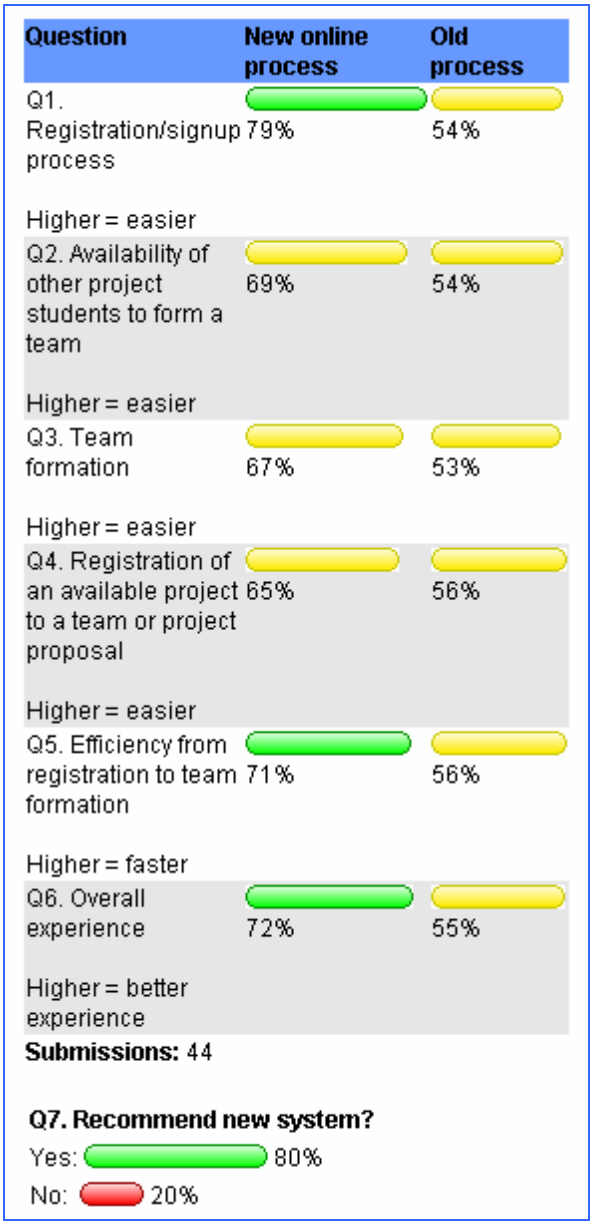

Fig. 8 Student experience survey results

6. Conclusions

IPMS is a very useful project manage tool to manage students, allocate projects, coordinate supervisors and liaise with industry sponsors. It speeds up the process and allows the stakeholders to focus on their key tasks. The usability test has indicated that the developed IPMS has met the user requirements and provided more functionality than initial planned such as track of the past gradates and distribution of team skills.

Acknowledgements

The author would like to thank Multimedia Victoria (Department of Infrastructure, Victorian Government, Australia) for their financial support in development of IPMS via Industry and University Collaboration Pilot Program. The author would also like to thank Mr. Reece Martin for providing Software Requirements Specification document and developing the IPMS prototype.

References

[1] Ceddia J. andSheard J. “Evaluation of WIER – A Capstone Project Management Tool”, Proceedings of the International Conference on Computers in Education (ICCE’02), December 3 – 6, 2002, Auckland, New Zealand, pp. 777-781.

[2] Smith J. L. Bohner, S. A. McCrickard, D. S. “Project Management for the 21st Century: Supporting Collaborative Design through Risk Analysis”, 43rd ACM Southeast Conference, March 18-20, 2005, Kennesaw, GA, USA, pp. 2-300- 2-305.

[3] Jones G., “One Solution for Project Management”, SIGUCCS ’01, October 17-20, 2001, Portland, Oregon, USA. pp. 65-69.

[4] Reid K. L. and Wilson, G. V. “DrProject: A Software Project Management Portal to Meet”, Educational Needs, SIGCSE’07, March 7–10, 2007, Covington, Kentucky, USA, pp. 317-321.

[5] Lam H. E. and Maheshwari P. “Task and Team Management in the Distributed Software Project Management Tool”, Proceedings of COMPSAC'01, 8-12 October 2001, Chicago, IL, USA, pp. 401-408.

[6] Karl Foge, Producing Open Source Software, O’Reilly, 2005.

[7] Source-Forge, http://sourceforge.net/

[8] Blackboard, http://blackboard.com

[9] Shi H, "Reshaping ICT Industry Projects - My Three-Year Experience", Proceedings of AusWIT06 Australian Women in IT Conference, 4-5 December 2006, Adelaide, Australia, pp.36-46.

[10] Norita Ahmad N. and Laplante P. A. “ Software Project Management Tools: Making a Practical Decision Using AHP”, Proceedings of the 30th Annual IEEE/NASA Software Engineering Workshop, 24-28 April 2006, Columbia, Maryland, USA, pp. 76-84.

Dr. Hao Shi obtained her BE in Electronics Engineering from Shanghai Jiao Tong University, China in 1986 and her PhD at University of Wollongong in 1992. She is a Senior Lecturer and ICT Industry Project coordinator at School of Computer Science and Mathematics, Victoria University. She is not only actively engaged in R&D and external consultancy activities but also has a strong leadership in teaching and learning. Recently she has established Industry-Based Learning program at the School and won a number of Teaching and Leaning grants and awards. She is currently managing more than a dozen of ICT industry placements with local industry partners via her grants from Victorian Government, Australia.