ENHANCING TECHNOPRENEURSHIP PROJECT MANAGEMENT SYSTEM WITH COACHING AND MENTORING FEATURES

Stephanus Eko Wahyudi[1] and Kartika Gianina Tileng[2]

[1,2] Teknik Informatika, Faculty of Creative Industries, Universitas Ciputra
UC Town, Citraland CBD Boulevard, Surabaya 60219, Indonesia
[1]stephanus.eko@ciputra.ac.id; [2]kargia@ciputra.ac.id

Received: 3rd November 2017/ **Revised:** 13th November 2017/ **Accepted:** 23th November 2017

Abstract **-** This research aimed to find the system features for remote, synchronous, and asynchronous communication and collaboration among the students. The research design was through an exploratory case study. The data collection method was in-depth interview with experienced supervisors and the subject coordinators. The result of the research is the necessary features to be included in the updated version of the information systems. The various coaching and mentoring features can support subject coordinators, supervisors, and students and allow them to complete the subject on time and in accordance with the standards.

Keywords: mentoring, project management system, final project, learning management system, e-learning

I. INTRODUCTION

During their final years, undergraduate students usually undertake final projects or thesis. This is also the case at the Universitas Ciputra, a private university in Surabaya, Indonesia. There are many problems experienced by the students as the visit to the campus becomes less frequent. The final project supervisors are busy with many tasks and responsibilities. Hence, there is limited mentoring and coaching time provided to the students. Face-to-face meetings are difficult to do on the frequent basis.

Information and Communication Technology (ICT) may be the solution as it allows the students to communicate and collaborate remotely, synchronously, and asynchronously. A web-based information system is built to enhance the experience at Universitas Ciputra. It is called Technopreneurship Project Management System (TPMS). Although the system helps, there are elements of traditional coaching and mentoring processes missing in this kind of communication. Thus, the traditional face-to-face meetings are still necessary.

Academic coaching is not only a matter of monitoring students' progress or completed tasks. It is a partnership that should be established and maintained between the supervisors and the students. Both should agree on the goals and achievements targeted (Webberman, 2011). The flexible learning outcomes and decisions making processes made by the students allow them to feel that they control their progress, whereas the supervisors act more as a facilitator (Silva & Yarlagadda, 2013).

An important academic coaching skill that should be acquired by supervisors or facilitators is the ability to question and challenge their students to understand their interests and passions. Sometimes, this may also include personal or private matters. The skill of supervisors or facilitators in looking for the students' abilities will have the advantage to maximize the student potentials (Webberman, 2011). It can be in the aspects of knowledge, resources, or opportunities (Silva & Yarlagadda, 2013).

There are three main ways to use coaching techniques in teaching and learning processes or students supervision processes (Webberman, 2011). First, the supervisors or facilitators can use powerful questions. Second, they can ask the student for a commitment. Third, they can ask the student to self-assess their progress or achievements and share about what they do, how they do it, what results in they get, and how they may improve it in the future.

Similar to a coach, the main task of a mentor is to direct or encourage someone to succeed (Frei & Buddeberg-Fischer, 2010). As the skills of mentors and coach are overlapping, the terms sometimes are mixed up. The main focus of coaching is specific skills improvements, whereas mentoring is to acknowledge and build mentees personal attributes.

According to Frei, Stamm, and Buddeberg-Fischer (2010), mentoring can be implemented on individual or one-on-one as well as one-to-many or in the form of group mentoring. Mentoring involves two-way communications and requires both mentors and mentee to learn from each other and have mutual respect (Hudson *et al.*, 2013). Moreover, mentoring should be done continuously and needs to be reflected and renewed. Based on research, students need a personalized message that supports them. The students' ranking also increases student's motivation to participate actively (Lonchamp, 2010).

How to use mentors time in an efficient way is the key that has to be considered (Hudson *et al.*, 2013). The other issue is some mentees feels that they are being motivated, some others feel that they are being watched (Lonchamp, 2010).

ICT applications are widely used for various purposes. Today, ICT has penetrated the world of education as well. The advance of Multimedia technologies also allows the use of ICT to deliver content using engaging materials such as using animation, audio, and video. There is software that is commonly used in education. Those include Learning Management System (LMS), E-Learning, E-Mentoring, and many others that have been widely known to the public. Moreover, the use of ICT as knowledge sharing tools is another way to complement the face-to-face meetings.

LMS is an example of the use of ICT in education. It provides the features that allow students to study on their pace and have engaging multimedia presentations. Lecturers can monitor students' activities, progress, achievement,

and conduct exam through the system (Olsson, 2017). Modern LMS not only focuses on the institution but also considers about the students. The system should include the collaboration of learning activities and focus more on the students' personal and social side (Stone & Zheng, 2014). Thus, the discussion forum is also an important feature on LMS (Santoso *et al.,* 2014). Popular LMS such as Edmodo, Moodle, Google Classroom, WebCT, or Blackboard may be useful to support course notes distribution and messaging. The availability of mobile apps version for those LMS is also a big advantage as the number of mobile devices are growing rapidly (Mtebe, 2015). LMS is changing rapidly along with technological developments. Universities or other forms of higher education institutions need to be aware of these trends and update their LMS to remain relevant (McLain, 2017).

There are many strategies that can be introduced to improve the success of LMS implementation (Mtebe, 2015). It can improve the LMS usability by providing high-quality materials, excellent support services, relevant strategies promote the existence of the LMS to increase the user awareness, mobile versions, and social media support. The validation of technology adoption should be conducted over time instead of just a snapshot at a specific time. It is to make sure that it works mainly for the lecturers and students, instead of the institution only (McLain, 2017).

In terms of mentoring, a system called E-Mentoring has been around for some time. By introducing this system in an organization, it can be as an alternative for traditional mentoring. Although there are many advantages of using E-Mentoring, there are many problems that should be considered. The level of technology mastery for each of organization members is one of the major factors that decide the successful rate for the adoption of E-Mentoring (Rowland, 2012).

Emails, video-conferencing, knowledge-based system, and many other technologies can be utilized as the means of communication synchronously and asynchronously. An example of asynchronous mentoring in education is in online chat sessions. Through chat sessions, the supervisors maintain communication with their students from time to time. However, there are some cases where miscommunication occurs. It is during text-based communication as many users tend to use abbreviation or symbols such as emoticon. Then, group chat also introduces new problems as chat from different people may be different topics posted at the same time (Freiermuth, 2015).

The curriculum of the most universities requires undergraduate students to pursue final project or thesis during their final year of study. It requires the students to work and study independently on or off campus with the supervision of one or more professors or lecturers. In Universitas Ciputra, the students are required to complete a series of entrepreneurship subjects from semester one until semester five. The subjects are interdisciplinary, where students are encouraged to build a team of maximum five students from the same or different study programs. Upon completing Entrepreneurship 5, there are another series of entrepreneurship-related subjects conducted by each study programs. In Informatics study program, these subjects are called Technopreneurship 1-3 (T3). During this period, the students visit the campus less frequently compared to their previous semesters. Supervisors also usually very busy with their work, as they are required to research, teach, and conduct outreach programs. Face-to-face meetings are difficult to be organized on a frequent basis.

Even though some students focus on completing their final projects, the others are not. Some students need more attention compare to others. In addition, supervisors have to monitor their progress frequently to make sure that the students are on the right track. The students are expected to complete the thesis on time.

To help supervisors to monitor students' progress, Informatics study program develops a web-based information system called TPMS. TPMS is expected to not only help subject coordinators to manage subject implementations but also allow supervisors to monitor their student achievement or progress as coach or mentor to the students.

On previous research, Tileng and Wahyudi (2016) found that features which enabled students to get notification and supported them to communicate with supervisors in an easier way. It was considered as the most important feature by the students. They needed to be reminded about deadlines such as registration deadlines, progress reports submission dates, and similar deadlines. Access to the announcements related to the subjects remotely through online system was advantageous. Students chose popular social media such as Facebook and chat application like Line as favorite communication tools. Moreover, Edmodo was chosen as favorite LMS to submit progress reports (Tanamal, 2015). Other features such as content related and general information were nice to have but it is not considered as essentials (Tileng & Wahyudi, 2016).

The purpose of this research is to study the user requirements of a course management system. It is to support coaching mentoring process on Technopreneurship courses at Universitas Ciputra. The research will focus on the perspective of the subject coordinators and supervisors at the university.

II. METHODS

The research is conducted through an exploratory case study. It aims to explore the problems occurring on the implementation of Technopreneurship 1-3 at Universitas Ciputra. It is based on the perspective of subject coordinators and lecturers/supervisors. Moreover, the methods used to collect data are through in depth-interviews and focus group discussions.

In depth-interviews are conducted with T1, T2, and T3 subject coordinators. The purpose of the interviews is to find the procedures and milestones on each of the subject. Other discussion topics include the subject coordinators difficulties while managing those subjects. Additionally, the interviews also are to find students' difficulties and obstacles on each of the subjects based on the subject coordinators' perspective.

To gather data from supervisors, a focus group discussion is conducted. The topic for the discussion is on the supervisors' difficulties on supervising students, especially on Technopreneurship 3 or Final Project. Additionally, the supervisors are asked regarding their perspective on students' difficulties they have experienced.

III. RESULTS AND DISCUSSIONS

Technopreneurship 1 (T1) is the first stage of the series. On this subject, the students are required to explore the problems they find in their environment. Based on the problems, they try to find ICT solutions. Later, they are required to start computer technology startups that produce

the solutions. They are expected to find a company for an internship on Technopreneurship 2 (T2) that relates to the projects they work on during T1. Finally, on Technopreneurship 3 (T3), the students will be involved in a project with all the ideas, knowledge and skills, the experience that they gain during T1 and T2, and the other subjects that they have learned during their study.

Students try to develop innovative ideas and elaborate strategies to start their technology startups at T1. Under the supervision of mentors, they develop a business idea, try to promote it, and look for funding from investors. They are required to submit their proposals, project plans, and reports on this subject. A number of key performance indicators of their achievements are agreed on the first stage of this subject. Finally, students have to present their reports upon completing this subject.

In T1, subject coordinators in the interview suggest that best practices, success or failure stories, and inspirational experiences may be able to boost students motivation and courage to execute their ideas. Somehow, many students are not confident enough in their capabilities and abilities. Lecturers should motivate the students and set the target high enough yet achievable.

During the T2 subject, students undergo an internship for two full months in a company. Students are expected to find a suitable company that provides them with the experience and knowledge to develop their business. The skills or knowledge should also contribute to the completion of their final project. During this stage, subject coordinators should monitor the students' performance through the reports from the students or the company supervisors.

For T2, subject coordinators mention that students are hard in finding suitable companies that offer an internship. Moreover, the position should match with the skill or knowledge they need. This is due to the variety of students in T1 or T2 topics, and limited list of the company that offers the internship. The communication between the coordinators with students during internship period is maintained through group chats using popular chat platforms, and emails. In some cases, students miss important emails as some of them do not check their emails regularly.

During T3 or the final project, the students are required to complete several stages. In the first stage, the students are required to write a proposal for the final projects. The proposal is presented and discussed with supervisors and future examiners. Upon the acceptance of their proposals, students should work on the project independently under a supervisor. The finished project is then defended through oral presentations in front of several examiners.

To support the projects, the Informatics study program at Universitas Ciputra develops an online system that enables the subject coordinators to track students' progress and provide the students with announcements and important documents. Supervisors can also monitor the students' progress to check if the students are already on the right track and schedule. Using this system, students can send a message to lecturers if they want to discuss outside the consultation sessions.

TPMS is still in its early stages with limited basic features as seen in Figure 1. The decision to develop the system instead of using open source or commercially available systems is based on the specific requirements of the subjects. The web-based information system includes a database of students' projects, supervisors' expertise, and proposals workflow.

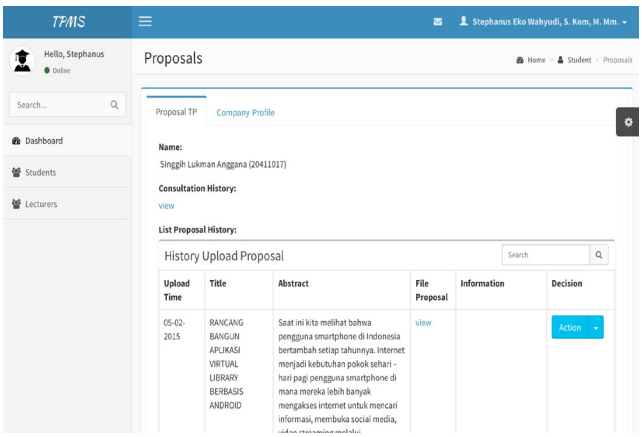

Figure 1 Current TPMS

Based on the group discussion, there many different issues found. Students' motivation and maturity are the aspects in addition to student's writing capabilities. Peer support is also one of the most important aspects to promote the students' success (Broadbent & Poon, 2015). Additionally, some similar features are found on popular social media that can enhance the process.

Most of the supervisors agree that university students are considered as an adult. It is because most of them enter the university at the age of 17-18. As an adult, students are supposed to have their awareness of their future. Thus, they are expected to know how to be responsible for their future, behave, study, prioritize, and plan (Bettinger & Baker 2011). Unfortunately, this is not the case for everyone. Although some students display the ability to work independently, the rest requires more guidance and encouragement from supervisors as well as from their peers. For example, a simple 'Like' button is a symbol of encouragement that can motivate students.

Supervisors believe that peer-support can help them to be motivated. The possibility to create groups of students that have the same interest or thesis theme allows the students to help or encourage each other. Some students may have useful information that can be shared with their peers (DeAndrea *et al.,* 2012). Therefore, the group features in popular social media such as Facebook can be implemented in TPMS. It can be group messaging, document sharing, and expression buttons.

Some students find it is difficult to determine the next step they have to do, and they are dependent on the direction given by the supervisors. Rather than the substance of the work, sometimes students' difficulties are not directly related to the substance of the thesis. For example, it is the format of writing that they should use. Supervisors also complain about students' writing skill. They suggest that the department should provide a detail writing guide, online accessible writing template or format, how to make citations and references, and other useful documents. Thus, to solve this issue, TPMS should provide basic features to allow the subject coordinators or supervisors to upload various forms of documents such as templates, rules of writing, and various other documents.

In many cases, some students have a very tight schedule to work on their project, as they should finish their project within approximately four months. Students have to show their weekly progress according to the schedule

provided by subject coordinators. A great number of students do not take other subjects during semester 7 and 8. Many of them also do not visit the campus very often. These factors make it more difficult for supervisors to check on the students' progress. Additionally, the project supervisors also do not have time to check on every student progress on a daily basis. Hence, TMPS should provide a feature that allows the student to upload or post their progress. It can allow supervisors to check the progress anytime. As both the supervisors and students are busy, an appointment booking and reminder or notifications can be a feature to be considered.

The suggested TPMS features are depicted in Figure 2. It has three main features for Technopreneurship subjects. Additionally, there are general features that are applied to all three subjects.

Technopreneurship 1 menu contains three sub-menus. It includes Proposal, Timeline/Schedule, and Final Report. Students can upload proposal files through Proposal sub-menu on the specified date and time. They can also check the subject timelines and milestones through Timeline/Schedule menu. Finally, on Final Report menu, they can upload their subject final report.

Technopreneurship 2 menu consists of five sub-menus. Those are Company Database, Proposal, Diary/ Logbook, Documentation, and Final Reports. Using the Company Database sub-menu, students can find the list companies that provide internship opportunities. Then, students will be able to upload Technopreneurship 2 proposal through Proposal sub-menu. Student's journal or diary can be recorded on Diary/Logbook feature. The photos, videos, or other multimedia files can be uploaded to Documentation feature. Before the completion of the subject, students submit their report on Final Report feature.

There are six sub menus on Technopreneurship 3. It consists of Proposal, Proposal Defense, Diary/Logbook, Consultation, Timeline/Schedule, and Final Reports. After the submission of proposal, students have to face Proposal Defense stage. The Proposal Defense sub-menu will record the notes from the committee members and supervisor. During the semester, all consultation notes can be recorded on Consultation sub-menu. Other sub-menus are similar to the menu found on Technopreneurship 1 or 2.

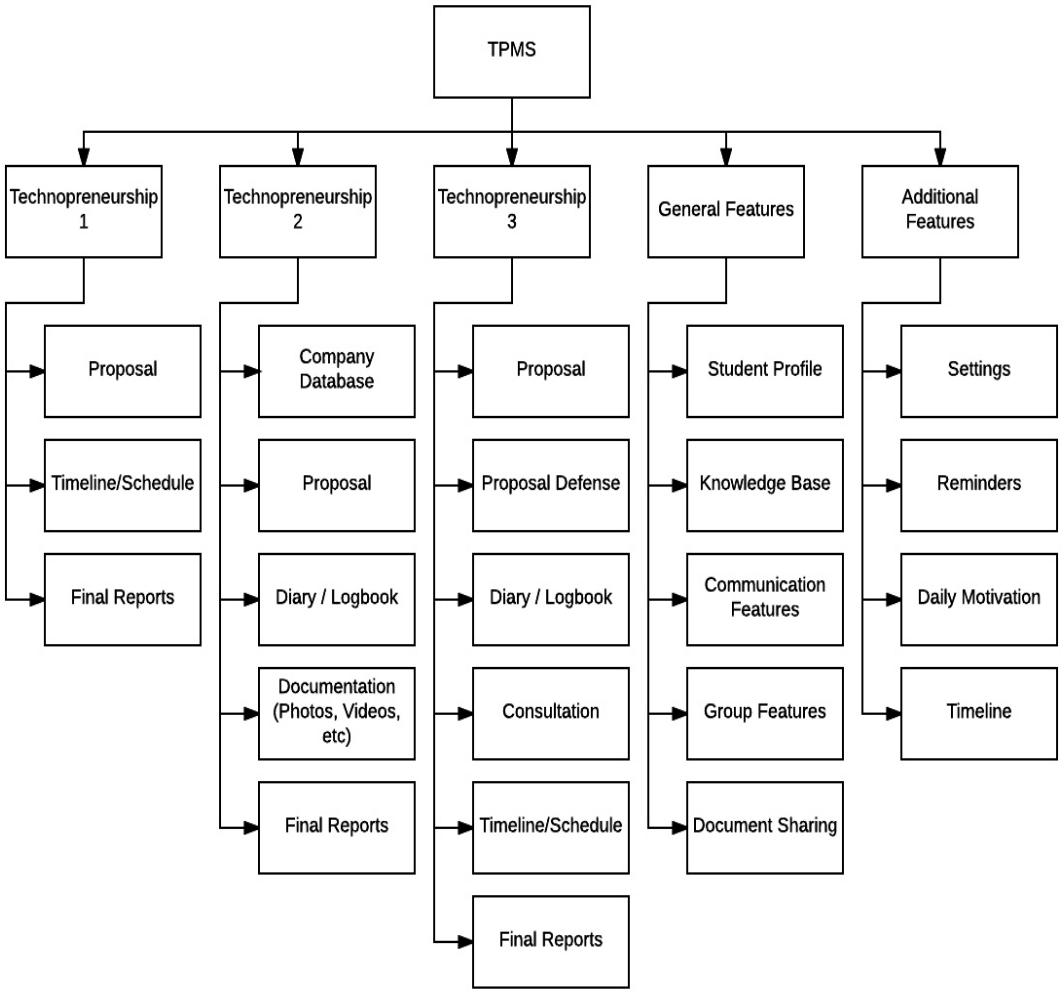

Figure 2 Suggested TPMS Features

The sub-menus on the General Features are Students Profile, Knowledge Base, Communication Features, Group Features, and Document Sharing Features. These features enable supervisors or subject coordinators to play their role as mentors. The communication features such as chatting (synchronous) or messaging (asynchronous) are provided in the system. The system does not include video or audio chat as it requires many resources. It will be replaced by using more mature technologies outside the system such as Google Hangouts, Skype, and others.

Moreover, timeline feature which is similar to social media allows students to share links, documents, websites, and other files. Other students can comment or like the posts. Then, the supervisors, as well as the subject coordinator, can also post useful information related to the student's project. Other useful feature that allows group mentoring is group feature. Students will be able to create groups of friends or students with the similar profiles or thesis topics. Using this feature, students can support each other.

On the last menu, there are some additional Features. It includes Settings, Reminders, Daily Motivation, and Timeline. User can set their preferences through Setting sub-menu. Reminder displays all current and previous reminders from timeline or milestones, actions have to be taken, and similar information. Moreover, Daily Motivation sub-menu lists and displays some motivational or inspirational message. It may be able to boost students' motivation whenever the students face difficulties at any stage of the subjects.

The web based user interface should follow the latest trends of web design as shown in Figure 3. Responsive design will benefit both desktop device users and mobile device such as smartphones, tablet, and PC users. Fresh look by using material design developed by Google will also make applications in accordance with technological developments.

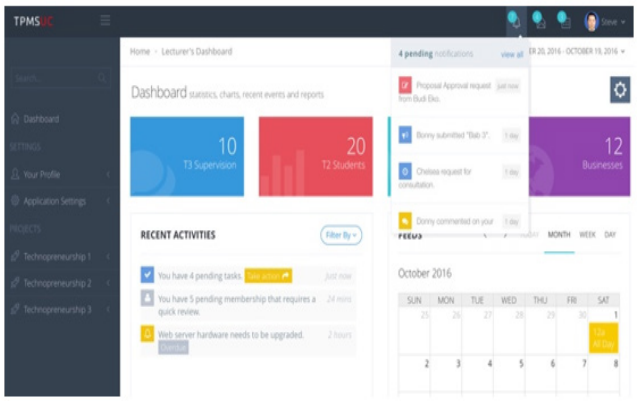

Figure 3 Suggested TPMS Design

After login, there will a dashboard screen displayed. Form the dashboard, the important information and data are displayed according to user type. Lecturers/supervisors, head of department, and subject coordinators can see the statistics, data, or recent updates of all the subjects. From the same screen, students can view the latest information or dateline to remind them about actions that they have to take on each subject.

IV. CONCLUSIONS

The rapid development of ICT plays a significant role in education. The technology does not only support the administrative process but can also be used for a variety of other things. The availability of LMS is very useful to support teaching and learning processes in a university.

TPMS developed at Universitas Ciputra is expected to support the students to complete the Technopreneurship series subjects on time and according to the standards. The system not only records students' project profiles and progress report but also tries to incorporate traditional coaching and mentoring features on its platform.

From T1 to T3 subject coordinators and lecturers/ supervisors' perspective, the use of TPMS will allow them to implement these subjects easier. It allows them to monitor students' progress and provide necessary attention or motivate the students to complete the subjects on time. They also believe that the features will help the students to reduce and overcome what they have experienced on these subjects.

Further research should also be conducted to find the features needed from students' perspective. The features suggested should be implemented in the enhanced version of this web-based information system. Once these features are implemented, further research can also investigate if the feature can be optimized including on human-computer interaction and user experience aspects.

REFERENCES

Bettinger, E., & Baker, R. (2011). *The effects of student coaching in college: An evaluation of a randomized experiment in student mentoring (No. w16881)*. National Bureau of Economic Research.

Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education, 27*, 1-13.

DeAndrea, D. C., Ellison, N. B., LaRose, R., Steinfield, C., & Fiore, A. (2012). Serious social media: On the use of social media for improving students' adjustment to college. *The Internet and Higher Education, 15*(1), 15-23.

Frei, E., Stamm, M., & Buddeberg-Fischer, B. (2010). Mentoring programs for medical students - A review of the PubMed literature 2000-2008. *BMC Medical Education, 10*(1), 32.

Freiermuth, M. R. (2015). Online chat. In K. Tracy, C. Ilie, & T. Sandel (Eds.), *The international encyclopedia of language and social interaction*. John Wiley & Sons.

Hudson, P., Hudson, S., Gray, B., & Bloxham, R. (2013). Learning about being effective mentors: Professional learning communities and mentoring. *Procedia - Social and Behavioral Sciences, 93*, 1291-1300.

Lonchamp, J. (2010). Customizable computer-based interaction analysis for coaching and self-regulation in synchronous CSCL systems. *Journal of Educational Technology & Society, 13*(2), 193.

McLain, T. R. (2017). Learning management systems adoption conundrums; Technological and

pedagogical dilemmas that arise for higher education. *Journal of Education and Training, 4*(2), 124-130.

Mtebe, J. S. (2015). Learning Management System success: Increasing Learning Management System usage in higher education in sub-Saharan Africa. *International Journal of Education and Development Using Information and Communication Technology, 11*(2), 51.

Rowland, K. N. (2012). E-Mentoring: An innovative twist to traditional mentoring. *Journal of Technology Management & Innovation, 7*(1), 228-237.

Olsson, U. (2017). Lecturers' conception of learning and use of methods in blended learning courses at three Swedish universities. In *Seminar. net* (Vol. 7, No. 1).

Santoso, H. B., Isal, R. Y. K., Basaruddin, T., Sadira, L., & Schrepp, M. (2014). In-progress: User experience evaluation of Student Centered E-Learning Environment for computer science program. In *2014 3rd International Conference on User Science and Engineering (i-USEr)*, (pp. 52-55). IEEE.

Silva, P., & Yarlagadda, P. K. D. V. (2013). Holistic success in higher education in engineering and technology: A coaching approach towards developing complete graduates. *GSTF Journal of Engineering Technology (JET), 2*(1), 80-86.

Stone, D. E., & Zheng, G. (2014). Learning Management Systems in a changing environment. In V. C. X. Wang (Ed), *Handbook of research on education and technology in a changing society* (pp. 756-767). IGI Global.

Tanamal, R. (2015). Penilaian dan pemantauan model magang pada mata kuliah Technopreneurship sebagai bagian dari penelitian tindakan kelas. *Jurnal Eksplorasi Karya Sistem Informasi dan Sains, 8*(2), 59-73.

Tileng, K. G., & Wahyudi, S. E. (2016). Social media application features to support coaching and mentoring process for student final project. In *Proceedings of the 2nd International Conference on Communication and Information Processing* (pp. 162-166). ACM.

Webberman, A. L. (2011). Academic coaching to promote student success: An interview with carol carter. *Journal of Developmental Education, 35*(2), 18-20.