

The Student's Perceptions on the Usability of Industrial Training System and its Implication

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Abstract: Industrial training refers to placement of students in the industry or organization for a certain period of time in order for them to apply their theoretical knowledge in the actual career world. Industrial training is one of the main components in the Computer Science curriculum in Universiti Teknologi Malaysia (UTM). Meanwhile, Industrial Training Systems (ITS) is a web based system which is developed to manage the industrial training process in UTM. ITS consist of four major modules for students which are student registration, student placement, student online log book and student assessment. Beside the four modules, ITS also facilitated with communication features like email notification and announcements. Hence, ITS become a solution to improve the current process of managing and monitoring the industrial training which were previously being done manually. Indirectly, ITS gives an opportunity for students to utilize internet technology as part of their effective learning tool during industrial training. The aim of this paper is to analyze the satisfaction rate of students towards ITS from the aspect of usability. Usability is used to measures the usable and functional of IT's functions from the aspect of learnability, efficiency, memorability, errors and satisfaction. A survey has been distributed online to undergraduate students who have used ITS during their industrial training period from year 2012 until 2015. The results are derived from satisfactory Likert scales which indicate that students were satisfied with the functionalities provided by ITS.

Key words: Industrial Training System (ITS), student's perspectives, industrial training, usability, period

INTRODUCTION

The rapid growth of the internet technology has a great impact into recent learning and teaching activities. Adaptive educational hypermedia system, intelligent tutoring system and learning management system are examples of system that utilize the internet technology in order to accelerate the educational activities (Pange and Pange, 2011).

In education institution, many tools and materials being used in daily lives are renewed almost daily. Typically, the tools provide a combination of functions that can be carried out online such as evaluation, communication, content submission, management of student groups, questionnaires, monitoring tools and others.

In relation, the satisfaction rate from the system users is important to assess the performance of those functions in an academic purpose system. Moreover, this performance assessment demonstrates the maturity of the system.

On the other hand, usability is another essential element to assess the performance of system maturity. Usability is one of the key system features under human computer interaction fundamental that focuses on the quality attribute that should be applied in academic purpose system. Basically, usability measures the usable and functional of system modules and functions from the aspect of easy to learn and easy to use (Pranata *et al.*, 2013). According to Morkes and Nielsen (1998), the attributes of usability can be defined as follows:

- Learnability: This indicates how easy user can learn the main system functionality and able to complete the task
- Efficiency: This indicates; how fast users can complete their task after they have learnt
- Memorability: This indicates the learning curve of users on how well they reestablished proficiency with the system functionality after come back a time period gap

- Errors: This indicates how easily users can recover when errors happen
- Satisfaction: This indicates that users are pleasant to use the system or not

This study is carried out to investigate the satisfaction rate of students who undergo their industrial training towards our academic purpose system named Industrial Training System (ITS). Furthermore, their satisfaction rate is further discussed from the aspect of usability.

MATERIALS AND METHODS

In paralleled with the changes of internet technology, Universiti Teknologi Malaysia (UTM) has developed ITS to manage industrial training processes. As illustrated in Fig. 1, ITS consists of four main modules for student. In this study, we focus only on four main functionalities that relate directly to student's perspective, namely registration, placement, online log book writing and communication and messaging.

In the Faculty of Computing, Universiti Teknologi Malaysia (FC, UTM), industrial training refers to the placement of a student for a minimum of 20 week at an external organization and applies his computer science knowledge as a preparation for his future career (Osman *et al.*, 2008). The goal of industrial training is to elevate student's knowledge and skills in a specific profession of their respective skill. It is also intended for the student to gain exposure in the aspects of social, cultural and work conducts in career life. In order to obtain the Bachelor of Computer Science degree, they have to successfully undergo the Industrial training component of the curriculum.

The increasing number of students from years requires a system that can assist in managing the industrial training implementation in FC, UTM. Industrial Training System (ITS) is an on-line system developed in order to ease the management of industrial training activities which including student registration, student placement, log book writing and communication among students, faculty supervisors, organizations and industrial training committee

Registration: The students must meet the registration requirements set by UTM before they can enroll for industrial training. However, there are two kinds of registration on ITS. Firstly, students have to undergo before training phase for pre-registration. In this phase,

students need to update their information such as the student profile and curriculum vitae. It is essential for students to keep all information up to date. ITS also extract the total credit earned by students and the current CGPA from UTM central database. Furthermore, the students can see active company list and vacancies available for placement. Secondly, the during training phase required students to do post-registration. The students need to register for the final briefing that are compulsory for students to attend before they undergo industrial training. It will also permit them to complete the rest of industrial training process.

Placement: Placement functionality in ITS is designed to keep track of student's application for industrial training with various companies. However, students are allowed to apply at only two companies at once as stated in application procedure. After the pre-registration, students are required to apply the chosen potential company on their own manually. On the other hand, the IT committee able to track and monitor the progress of the student's placement. The committee will update placement current status based on the student application progress either as Approved, rejected, pending or accepted. Students can made several applications of placement until being accepted by a company.

Online log book writing: ITS provide facility for students to write and update their training log book online. The logbook writing progress can be accessed and monitored by both organization and faculty supervisors. It is important for faculty supervisors to encourage their students to write properly in their log books and to use that facility efficiently. The updates can be done on daily basis or at least on weekly basis. In order to convey information practically, they also can upload files including picture of workflow, system interface and etc.

Faculty supervisors able to guide and help students in log book writing. Supervisors may give feedback in weekly approval and improvement comments for activity reviews in ITS. The log book generated through ITS also can be extracted and saved in Microsoft Word, so that the students will be able to complete and print their portion in a timely manner. Furthermore, proper log book provides technically important information to analyze the methods and processes as well as to construct the industrial training report based on the system development result. The log book writing skill also is one of the components to be assessed as part of the grading.

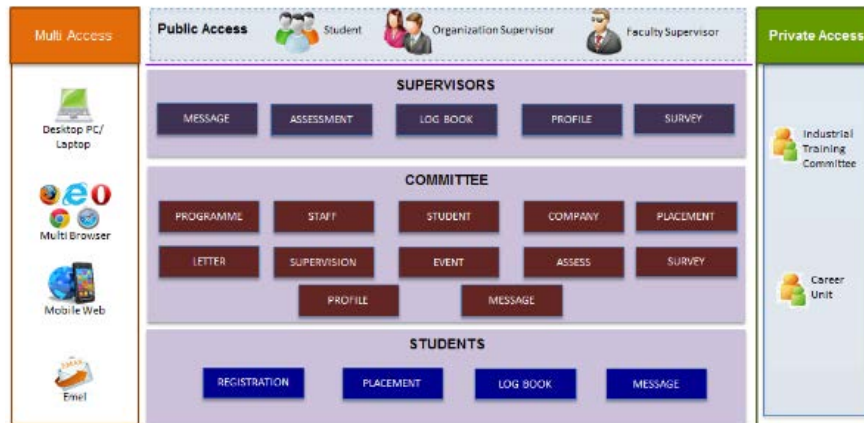


Fig. 1: The enterprise architecture of industrial training system

Communication and messaging: ITS gives students the opportunity to communicate efficiently via email with their faculty supervisor industrial training committee and their friends who were also undergoing the training. Simultaneously, notification message will be sent to the receiver's official mailbox as a reminder for further action. Besides that, the forms, user manual and briefing slides related to industrial training can be downloaded by students from ITS. Meanwhile, news and reminder will be posted on student's wall as announcements from time to time. This survey was conducted to computer science undergraduate students who undergone practical training from year 2012 until 2015. The perceptions of the respondents for each aspect were ranked by 5 point Likert scale (very poor, unsatisfactory, satisfactory, good and excellence). The survey was distributed online in ITS and filled in by the students before they end their industrial training.

RESULTS AND DISCUSSION

The analysis is conducted to evaluate the student's perceptions on the functionality of ITS in registration, placement, online logbook writing and communication and messaging.

Students perception on registration: Figure 2, shows the result of student's perception for registration module of ITS. The percentage of very poor and unsatisfactory perception towards the functionality of registration module in 2012-2015 are consider as very low which is below 9% compare to other perceptions which are satisfactory, good and excellent which is >91%. Among the three levels of satisfaction, satisfactory perception keeps increasing for year to year from 21.05% in 2012 to 37.26% in 2015 while good keep decreasing from year to

year. Despite the fact that the percentage is slightly decrease from year to year which are from 53.95% in 2012-46.84% in 2013, 44.49% in 2014 and 33.96% in 2015, good is still rated as the highest perception for registration module of ITS throughout the years. The student's perception for excellence has its own trend as it slightly decreases in 2013 and increase again in 2014. However, in 2015, the decrement of excellent perception is slightly high which is from 26.87% in 2014-20.28%.

Based on Fig. 3, it clearly shows that the positive perceptions which are satisfactory, good and excellent are outperformed the negative perceptions which are very poor and unsatisfactory. This is a good indication of the acceptance of student towards the functionality of registration module of ITS. However, there is decrement in term of percentage from year to year for the positive perceptions and increment for the negative perceptions.

This can be caused by the difficulties faced by the students in uploading the curriculum vitae and the image in this module. Due to this, the efficiency of this module is affected and need to be improve.

Student's perception on placement: Figure 4 shows the result for the student's perception on ITS placement module for 4 year (2012-2015). The shape of the graph from Fig. 5 appears to be positively skewed which indicates that generally students are satisfied with the placement function in ITS. About 90% of student have rated the function at satisfactory, good and excellent level.

On average, the student satisfaction is at good level for year 2012 until 2015. In 2012, half of respondent rate the placement function as good. However, in 3 year

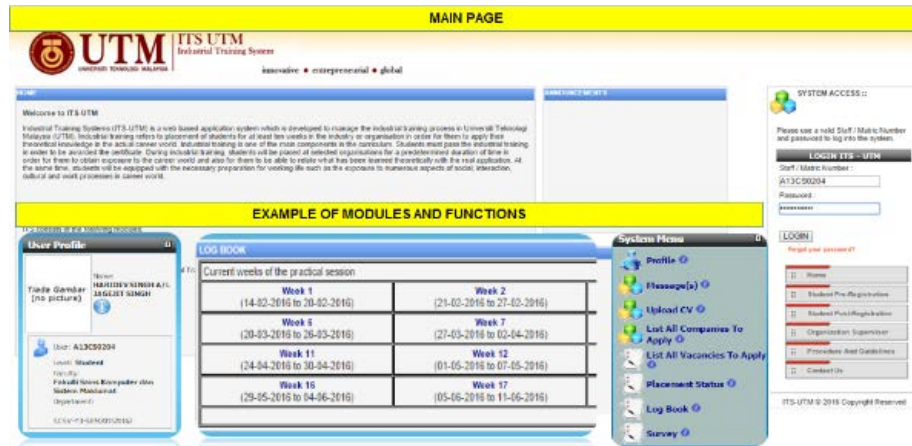
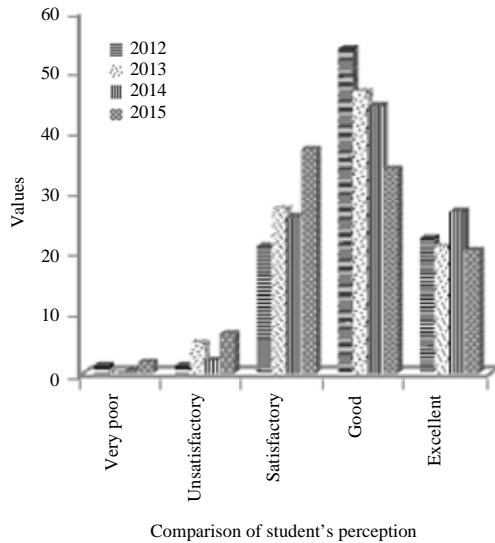
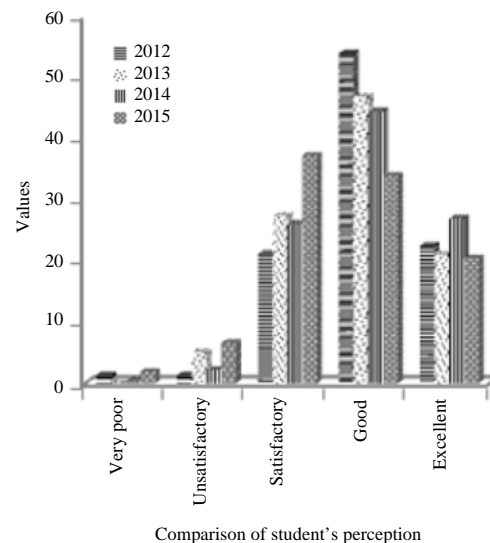


Fig. 2: Snapshot of ITS interface for students



Comparison of student's perception



Comparison of student's perception

Fig. 3: Comparison of student's perception on registration

Fig. 4: Comparison of student's perception on placement

time, we can see that the percentage in good category is slightly decrease by 31% while the % for satisfactory level is increases from about 27% in year 2014 to 37% year 2015. Some variation can be observed in % for in excellent level that ranges from 14-24%.

The result also shows that there are still some students rate the function as unsatisfactory and poor but the percentage of the respondents is quite low which is <10%. The problem may be owing to the case which student did not properly select the organization for the placement and get rejected for several times. Whereby, the policy for the placement allow student to select only one organization at one time.

online log book module of ITS for the 4 year. Based on Fig. 5, most of the students satisfied with the facility of online log book provided in ITS.

Most of the student demonstrates good ranking for every year with the highest percentage exceeds 50% in 2012. Online log book eases student in reporting their industrial training activities in timely manner. In fact, it helps both organization and faculty supervisors to monitor the student's progress. However, some of the student has ranked the online log book with very poor. From the student's feedback, this is due to the poor internet access which affected the performance of the online log book writing.

Student's perception on online log book writing: Figure 5 shown the student's perception comparison for

Students perception on communication and messaging: Figure 6 shows the result for the student's percentage on

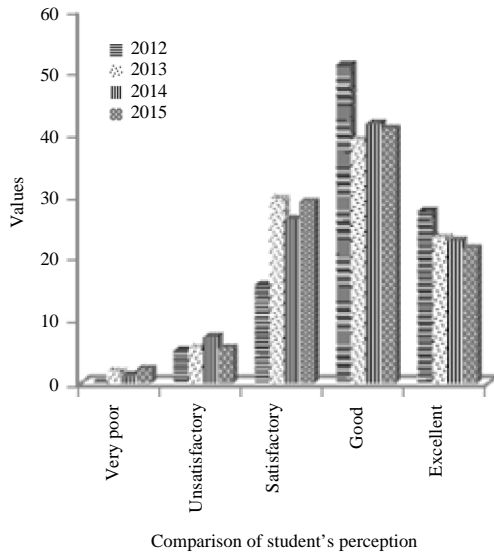


Fig. 5: Comparison of student's perception on online log book writing

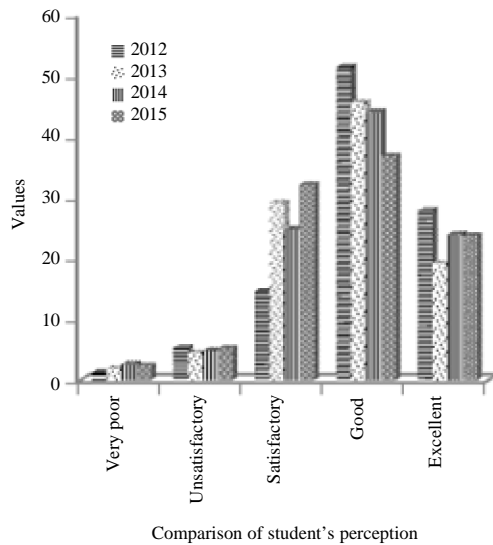


Fig. 6: Comparison of student's perception on communication and messaging

communication and messaging for 4 year. It can be seen from Fig. 6 that the student's perception on the communication and messaging function in ITS are consistent for 4 year. It is apparent from this figure that only minority of the students rated this functionality as very poor and unsatisfactory where there are only 6.58% in 2012, 6.33% in 2013, 7.49% in 2014 and 7.55% in 2015. Although, the percentage is slightly increasing form year to year, it only represents minority of the student which is below 8%. The majority of the respondents were

Table 1: Usability criteria that needs to be improved

Function	F1	F2	F3	F4
Criteria				
Learnability	✓			✓
Memorability		✓	✓	
Efficiency	✓		✓	
Errors				

satisfied with the functionality with >92% of respondents have rated the function as satisfactory, good and excellent level. Among the three levels of satisfaction, most of the respondents rate the communication and message function as good with 51.32% in 2012, 45.57% in 2013, 44.05% in 2014 and 36.79% in 2015. Whilst, throughout the 4 year there are about 18-27% students rated this function as excellent which is 27.63% in 2012, 18.99% in 2013, 23.79% in 2014 and 23.58 in 2015. Results showed there was a decline in the percentage of respondents who are satisfied with this function from 92.51% in 2014-92.45% in 2015. However, the decrement is considered low hence we can conclude that majority of the students are satisfied with the communication and messaging function provided in ITS.

According to the student's comments, there was a weakness in terms of memorability this system. Students feel that it is difficult to read notices that appear in the announcement window on the system because of limited display space and the inappropriateness of the display method. As a result, students are likely to miss important information featured from time to time, for instance, the due date for them to filling some survey forms in the system. Student also claimed that the system failed to notify them that the faculty supervisor had conducted a review and approval of their log books writing. The memorability weakness somewhat affected their acceptance towards the usability of the system. Other than that students also gave feedback that there are difficulties to contact the faculty supervisor since the supervisor did not update his profile information as well as not to respond to the email sent.

Based on the analysis of data from 2012-2015, it shows that students are mainly satisfied with all the functions of ITS which are the registration function, the communication and messaging function that act as a communication medium between their faculty supervisor, industrial training committee and their friends, the online log book writing and placement function.

However, these functions need to be improved in term of usability. The improvement in term of learnability need to be done to the function of registration and log book writing. As for improvement in memorability will involve the function of placement and communication and messaging. For improvement in term of efficiency, registration and communication and messaging functions need to be improved. The ITS functions need to be improved based on the usability elements as shown in Table 1.

CONCLUSION

In this study, we have studied the student's satisfaction towards four main functionalities of ITS: registration, placement, log book writing and communication. From the result it can be concluded that the students are satisfied with ITS whereby the overall result are good and excellent. However, ITS functionalities need be improved in term of usability. Therefore, the improvement of ITS functionalities based on the identified usability elements will become the future work of this study.

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