

Malay philologists' acceptance of an e-workspace to support teaching, learning and researching manuscripts

Z. Zahidah¹, A.Noorhidawati² and A.N.Zainab²

¹Department of Information Systems,
Kulliyah of Information Communication & Technology,
International Islamic University Malaysia, Kuala Lumpur, MALAYSIA

²Digital Library Research Group, Department of Library & Information Science,
Faculty of Computer Science & Information Technology,
University of Malaya, Kuala Lumpur, MALAYSIA
e-mail: zahidahz@iium.edu.my (corresponding author);
noorhidawati@um.edu.my; zainab@um.edu.my

ABSTRACT

This paper reports on the user evaluation to examine participants' acceptance of an e-workspace that has been developed to support the process of teaching, learning and researching manuscripts in the Malay manuscript community. This evaluation is conducted to answer the following research question: a) What is the perceived usefulness of the e-workspace in supporting transliteration work and collaboration from the Malay manuscript community? b) What are the usability issues highlighted regarding the Malay manuscript e-workspace? The evaluation is carried out based on five usability dimensions, namely, efficiency, effectiveness, engagement, error tolerance and ease of learning. A single case study has been employed in this evaluation which included lecturers, students, and researchers from the Academy of Malay Studies, University of Malaya as participants. These participants are directly involved in teaching, learning and researching Malay manuscripts. The user evaluation is carried out in two phases. The first phase involves a task-based approach where participants are given several tasks to perform while using the e-workspace. The second phase is a focus group discussion to elicit the participants' feedback on the perceived usefulness of the e-workspace after they have completed the given tasks. System evaluation of the Malay Manuscript e-workspace in serving the manuscript community has been reflected by the positive feedback from the 19 participants. The findings signify a positive reaction from participants towards the e-workspace. The e-workspace in general has been perceived as useful to support teaching, learning and researching manuscripts by providing a collaborative platform to conduct transliteration work electronically.

Keywords: Malay manuscript studies; Digital libraries; Malay philology; Transliteration tools; Annotation tools; User evaluation.

INTRODUCTION

Today, technology has been used to enhance traditional teaching and learning practices, and share resources. Younger voices embrace digital tools that they believe capable of regenerating the humanities, which they feel have been weakened by decades of conflict over issues relating to the canon, multiculturalism, interdisciplinary, and a critique of

humanism (Fish 2009). With digital humanities, learning is redefined in accordance with software platforms that links corporate training for employees and the delivery of “content” and this is known as e-learning (Guerlac 2012).

Malay manuscript e-workspace is one example of an e-learning application that supports the rise of digital humanities in the teaching, learning and researching manuscripts. The investigation of the current practice on the process of teaching, learning and researching Malay manuscripts has unmasked the problem situation and as a result an e-workspace for Malay manuscript community was developed to facilitate the process in a digital platform (Zahidah, Noorhidawati and Zainab 2011). As such, Malay manuscript e-workspace has been developed in order to overcome the lack of important services in the Digital Library of Malay Manuscripts (MyManuskrip, available at <http://mymanuskrip.fsktm.um.edu.my/>). MyManuskrip, developed by the Digital Library Research Group, is a good digital library initiative in archiving and making the rare collection of Malay manuscripts accessible online, however it requires more services that that could serve the needs of historians and philologists doing research in manuscript studies, as well as to be used for teaching and learning.

The development of the e-workspace is based on Soft System Methodology (SSM) that involves 7 stages: Stage 1 - Problem situation unstructured; Stage 2: Expressing problem situation; Stage 3 -Defining root definitions of relevant systems; Stage 4 - Constructing a conceptual model; Stage 5 - Comparing conceptual model with the problem situation; Stage 6 - Identifying feasible and desirable changes; and Stage 7 - Implementing action to improve the problem situation. This paper focuses on user evaluation of the e-workspace to evaluate its usefulness and effectiveness. Needs assessments to comprehensively capture the user needs and context of use (Abdullah and Zainab 2008; Zainab, Abrizah and Hilmi 2009), and user evaluation to gauge the viability of a useful and enduring digital libraries (Abrizah and Zainab 2007; Noorhidawati, Hanum and Zohoorian-Fooladi 2013) are evident in other studies conducted by the Digital Library Research Group. The purpose of this evaluation is to find problems and make recommendations to improve the utilization of the proposed solution during its design and development.

A REVIEW OF E- WORKSPACE FOR MANUSCRIPTS

Digital libraries have grown from solely archiving digital materials to support other functions for their users, such as being a platform for learning and research work. This progress can be seen in the digital library initiative *Better Access to Manuscripts and Browsing of Images* or BAMBI, which is a European digital archive of medieval manuscript collections (Rumpler and Calabretto 1999). BAMBI has been developed not only to provide a virtual platform for historians and philologists to browse and navigate the manuscripts in the collection, but also to provide a tool for philologists to write annotations, navigate between words of the transcription and match pieces of images in the numerated picture of the manuscript (Bozzi and Calabretto 1997; Calabretto and Bozzi 1998). BAMBI can be seen as a workspace that contains tools that support collaboration among users especially on the annotations on manuscript transcription tool. It is available online and in CD-ROM. However, this system does not contain the manuscripts digitized collection and it is no longer accessible via the Internet.

The *Euro-Mediterranean Union framework of Medieval Medicine*(EUMME) project, which is quite similar to BAMBI, is another example of manuscripts e-workspace that is focused on

developing tools to help users to read the manuscript collections it holds (Bozzi, Corradini and Tellez 2005). The objectives of EUMME are to increase the knowledge of the data relative to the subject treated, to increase linguistic knowledge and to develop technological tools specific for the study and dissemination of the information produced. EUMME only supports Arabic and Hebrew manuscripts and medieval medicine scholars are the target users. EUMME also supports collaboration among users. This system supports the process of transcribe, annotate and index text presented in the images. However, this system is also not accessible via the Internet and can be used for specific users only. Similar to BAMBI, it has no manuscripts digitized collection

Similarly, an *E-learning System for Greek Paleography* is an initiative to preserve antique documents and valuable manuscripts that focus on Greek Paleography of the Byzantine era and it provides an interactive e-learning platform in order to value the collections in educational practices (Drigas et al. 2005). The objectives of this project are to preserve antique documents and valuable manuscripts and to provide an interactive e-learning platform in order to value collections in educational practices. It supports the manuscripts specifically in Greek Pearlsript type paleography of the 12th-19th century. This system is available via the Internet and also offline (CD-ROM). This system can only be used for specific users only who are the Greek palaeographers.

The *Bovary* project, on the other hand, contains a collection of digitized manuscripts of Gustav Flaubert's manuscripts on *Madam Bovary*. This project initially started with collection of manuscripts without their transcriptions. It then progressed to include a text editor in order to help users to undertake transcription tasks more effectively and help to produce a structured textual representation adapted to users' requirements (Nicolas, Paquet and Heutte 2003;2004). The objectives of this project are to digitize a manuscript folder compound of almost 5,000 original manuscripts issued from "Madame Bovary" and to provide an hypertextual edition allowing an interactive and free Web access to these materials. Unlike BAMBI and EUMME, *Bovary* contains the digitized manuscripts. It includes a text editor that essentially provides an editing environment which integrates document analysis with interactive tools as well as making the original manuscripts collection available amongst researchers. However, it can be seen as a system with a lack of services since it is only offers the text editor, and in addition, it is no longer accessible via the Internet.

More recently El-Makhfi and Benslimane (2011) have proposed a platform for the transcription and annotation of old Arabic manuscripts mainly to facilitate retrieval of the digitized collection. It proposed a new platform that facilitates transcription, establishment, of the old Arab handwritten in the form of annotations. The tools are focusing on both textual annotations and graphical annotations. However, this is yet to be developed and it does not contain the manuscripts digitized collections.

The Malay manuscript e-workspace is an extension of MyManuskrip initiative which developed to provide a digital collection of Malay manuscripts, which harnesses collaboration of a union repository of Malay manuscripts (Zahidah, Noorhidawati and Zainab 2011). It was developed to support the needs of the Malay manuscript community, mainly historians and philologists, in the process of teaching, learning and researching Malay manuscripts. Figure 1 shows the functional modules of the Malay manuscript e-Workspace. The e-Workspace consists mainly of the transliteration module where users can perform transliteration work individually or collaboratively by annotating the manuscripts in the electronic form while at the same time conducting real time

discussions. Appendix A shows how users, such as students and lecturers, can use the annotation tool (Figure A-1) and the transliteration tool (Figure A-2) in the Malay manuscript e-Workspace where they can annotate and participate in group discussions with peers and lecturers in real time as well as other manuscript experts who join the community.

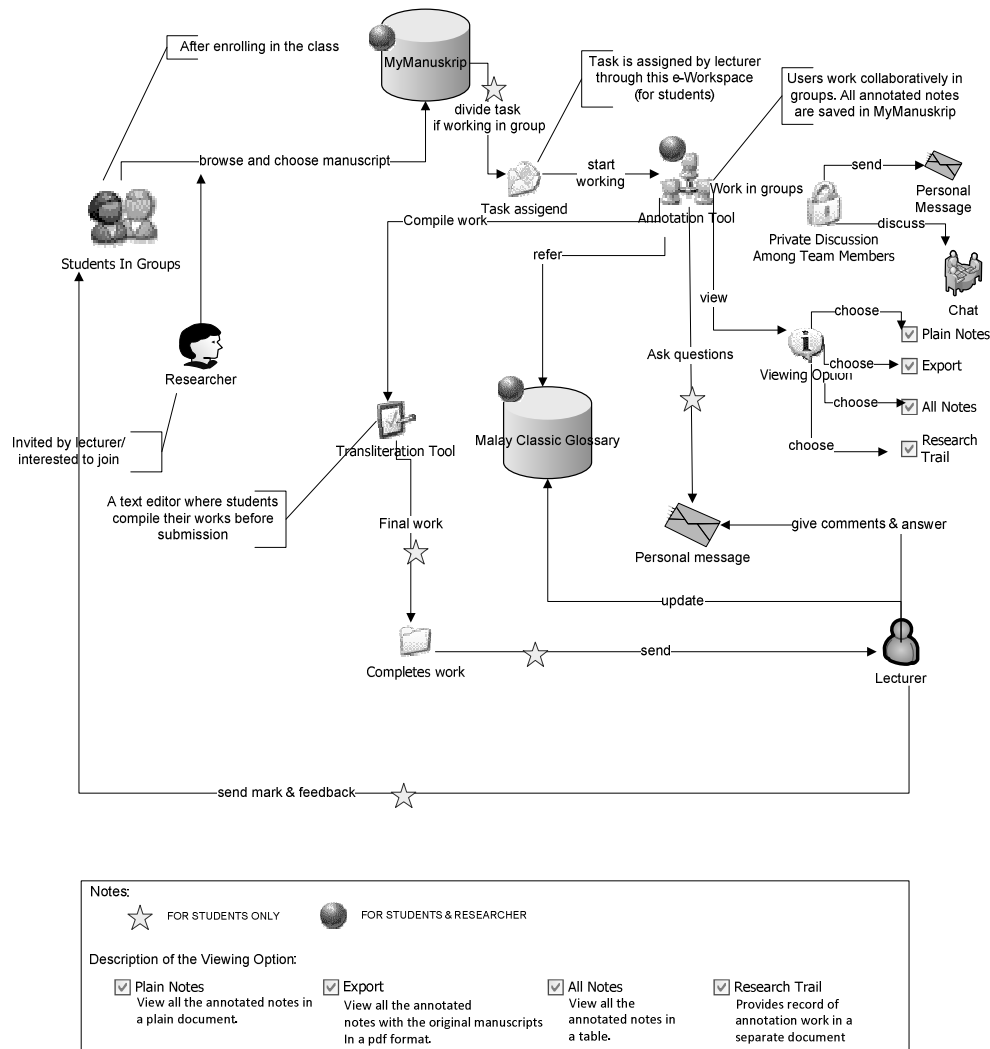


Figure 1: Functional Modules in the Malay Manuscript e-Workspace

Table 1 compares the features of an e-Workspace for manuscripts studies in this review. From the initiative worldwide, it can be seen that the limitations of the existing manuscripts e-workspaces are: supporting only specific type of manuscripts; not accessible for the general public; lack of tools that support collaboration among users; no provision to the manuscript collections. These limitations have been addressed in the Malay manuscripts e-workspace. With the aim to identify any difficulties in using the features in the Malay manuscript e-workspace, the researchers embarked on a user evaluation study to gather impressions of how people responded to the system.

Table 1: Comparison of Features in Manuscripts e-Workspace Initiatives Worldwide

Project Name	Features				
	Digital resources	Collaboration tools	Transliteration Tools	Annotation Tools	Accessibility through Internet
Malay Manuscripts e-Workspace	√	√	√	√	√
BAMBI	X	X	X	√	√
EUMME	X	X	√	√	√
Greek Palaeography	√	X	X	X	√
Bovary	√	X	√	X	X
Old Arabic Manuscripts (El-Makhfi & Benslimane)	X	X	X	√	√

OBJECTIVES AND METHOD

This main objective of the system evaluation is to examine philologists' acceptance of Malay Manuscript e-Workspace that was developed to support the process of teaching, learning and researching manuscripts in the Malay manuscript community. This evaluation was conducted to answer the following research question:

- a) What is the perceived usefulness of the e-workspace in supporting transliteration work and collaboration from the Malay manuscript community?
- b) What are the usability issues highlighted regarding the Malay manuscript e-workspace?

The perceived usefulness of the e-workspace was measured based on five usability dimension namely efficiency, effectiveness, engaging, error tolerant and easy to learn as established by Quesenbery (2003). In order to answer the research questions, a single case study approach was employed and involved lecturers, students, and researchers from the Academy of Malay Studies, University of Malaya, who are directly involved in the teaching, learning and researching Malay manuscripts. A total of 19 participants took part in this evaluation and they comprised eight students who had attended the "Introduction to Philology" course (assigned code UTS1- UTS8); eight researchers all of whom were undertaking their Masters or doctoral research programme at the Academy of Malay Studies (assigned code UTR1 – UTR8); and three lecturers teaching Malay manuscript courses (assigned code UTL1 – UTL3).

The user evaluation was carried out in two phases. The first phase involved a task-based approach where participants were given several tasks to perform when using the e-workspace. This method was proposed by Chapanis (1991) where participants were given several tasks to perform in a defined set of environments. The second phase was a focus group discussion where the participants were interviewed to elicit their feedback on the perceived usefulness of the system after they had completed the given tasks. Both data gathering method were conducted in October 2011.

The Task Based Approach

For the task-based approach participants were gathered in a digital library research laboratory at the Faculty of Computer Science and Information Technology, University of Malaya and were asked to use the Malay manuscript e-Workspace to complete a set of tasks within one hour. Three separate sessions for the three different groups of participants (lecturers, students, and researchers) were conducted. For the lecturers, the focus was on how they conduct the teaching process during the class. For students the focus was on how they use manuscripts in learning, while for the researchers' the focus was on how they use manuscripts in conducting research.

For the given tasks, participants were asked to undertake a transliteration activity in a group. Participants were directed on how to create a group, invite people to join the group, browse and search the e-Workspace of manuscripts to choose a manuscript to work on. This module required participants to complete a transliteration task in a group to demonstrate that the system could support an online collaborative platform in undertaking assignments and doing research on a Malay manuscript. Using the e-Workspace each member of the group could annotate the manuscript chosen from Malay manuscript digital library, and participate in a real time discussion while doing the transliteration work online. The final transliteration work was then compiled and submitted to the system for lecturers to review (in the case of student assignment) or to be viewed by other researchers.

Each participant was logged in using their own username and password. They were firstly given 15 minutes to explore the e-Workspace prototype. Then, they were specifically instructed to search and browse Malay manuscript and go through the task they had been given. The students and researchers in both sessions were asked to:

- a) Create a create a new assignment type, "team assignment";
- b) Create a name for the team. Students can assign descriptions for the type of work to be undertaken by the group. Respondents can see members who are assigned to the team by their lecturers. This means that a student can be a member of only one team.
- c) Register as a member in an existing team. This is possible only when the team membership is still open. Once team membership is marked closed, no additional new members are allowed.
- d) A group leader can be assigned by the lecturer or elected by members. Once assigned, the leader can remove another member of the team.
- e) Every team member can use the e-Workspace to upload or remove a manuscript and this file can be viewed by all members.
- f) By using the transliterating and annotating tool every member can add, edit or delete and annotate on the chosen manuscript downloaded from the Manuscript digital library to the e-Workspace. The final transliteration work is compiled using a text editor and submitted for marking by lecturers.
- g) Lecturers could view all members of a team and assign marks for submissions.

While lecturers are requested to:

- a) Log in as a lecturer by using given user name and password
- b) Click "turn editing on" tab in order to act as an administrator of the system
- c) For this usability testing purposes, lecturers are required to add a new course named "*Pengantar Filologi*"
- d) After entering the course, lecturer can add a resource such as sharing information and upload the assignments.

- e) To upload a new manuscript, lecturer is required to share the link if the manuscripts are available online or upload the manuscript from the local driver on their computer. Then, name and provide descriptions of the manuscripts.
- f) Lecturer see the notifications every time students send personal messages and also if students submit the assignment.
- g) Give comments and provide grade to students

The Focus Group Discussion

The second phase of the user evaluation was a focus group discussion where the participants were interviewed to elicit their feedback on the usefulness as well as issues and problems faced by the respondents when using the e-Workspace. There were three focus groups ((lecturers, students, and researchers) and each took around about two hours to complete.

RESULTS

The qualitative data was collected in form of verbatim statements from participants' focus group sessions. The data was analysed and was grouped into five usability dimensions (efficiency, effectiveness, engaging, error tolerant and easy to learn) as suggested by Quesenbery (2003). Overall, the findings indicate a positive reaction from the participants towards the e-Workspace.

The perceived usefulness of the e-workspace in supporting transliteration work and collaboration from the Malay manuscript community point of view

a) Effectiveness

Effectiveness refers to the completeness and accuracy in which users can achieve when completing the main tasks in transliterating manuscripts. When carrying out the given tasks, the users are observed to be able to successfully and correctly complete the transliteration tasks.

The Malay manuscript e-Workspace provides several options for users to view the manuscript collection, conduct transliteration and submit transliteration works. One user (UTS6) positively commented, "Honestly, I am currently using an e-learning system called SPECTRUM which is merely used for downloading lecture notes. I never can imagine that this system (Malay manuscript E-Workspace) is far different and offers more than that" (UTS6).

In addition, a researcher said, "It's a good effort to share these manuscripts since it is not easy to find them especially old collections. Last time we lost many precious of Malay manuscripts when the library was flooded and we don't want the same thing to happen again" (UTR1).

A lecturer responded, "I did enjoy doing the transliteration task, especially when I can refer to the electronic classical Malay dictionary while I'm doing the transliteration" (UTL1). Transliteration module offers groups work while provides an electronic classical Malay dictionary for users to refer while doing their works. The contents of the dictionary are updated by the lecturer from time to time. Figure 2 shows one of the interfaces of transliteration tool.

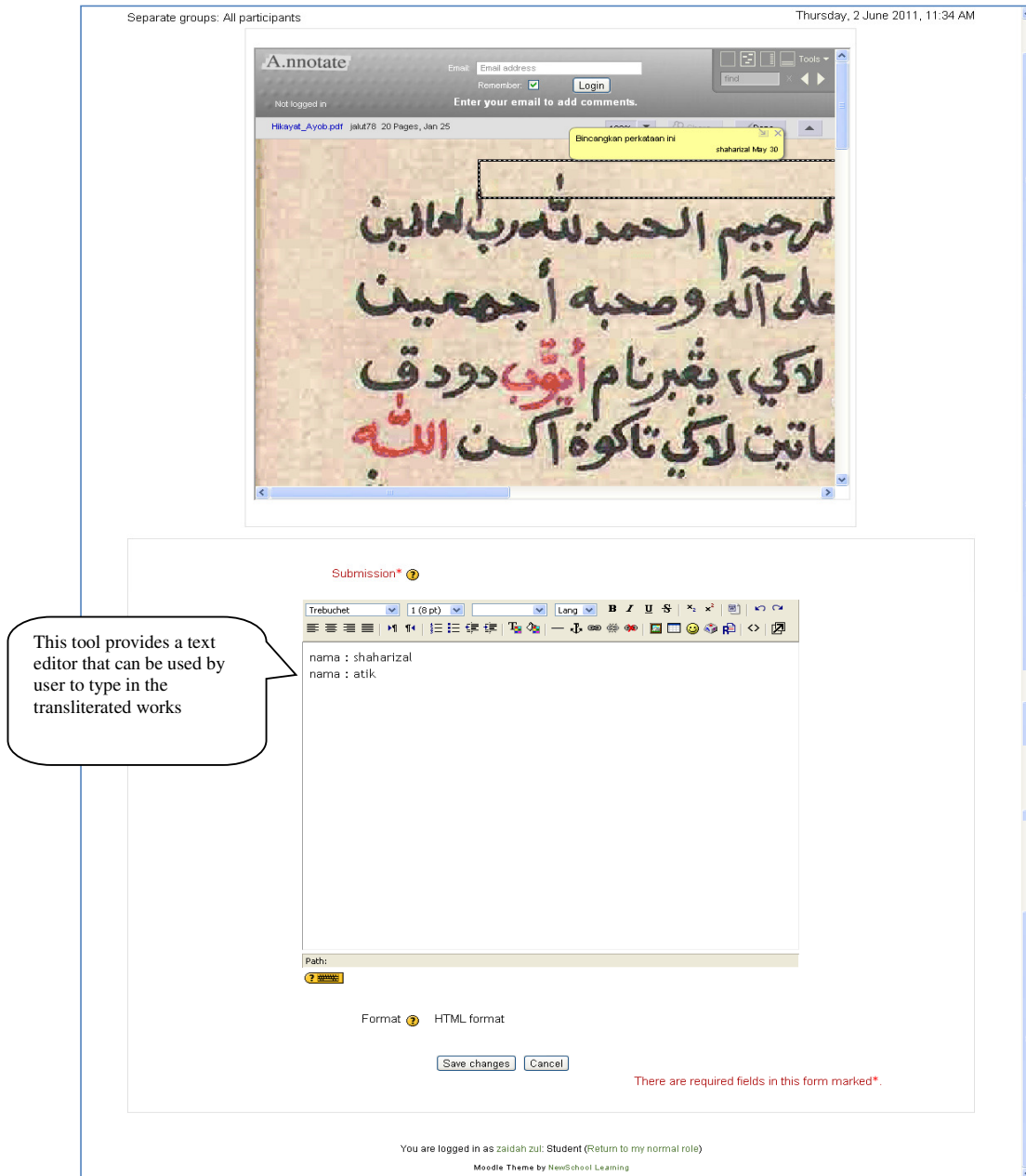


Figure 2: A Text Editor for Transliteration Tool

The evaluation session also highlighted the usefulness of the system as a platform to facilitate collaboration amongst Malay manuscript researchers worldwide as remarked by one researcher (UTR4), "I have friends in Leiden University and we met when we attended seminars. We usually keep in touch through emails, but some of them are no longer active in manuscripts research and we have lost contact. This system may be able to reunite us".

The system provides direct link from the e-Workspace which facilitates users to access manuscript collections. A lecturer (UTL1) said, "When selecting manuscripts, students are able to see the list of manuscripts from the Malay manuscript collections that are available in this e-Workspace, I think this function is very helpful".

A lecturer (UTL3) tried out the function to share an announcement and give comments, "I like this function, and so if I have anything to share, I just post it here. Sometimes, there are things that I forgot to tell them during the class".

b) Efficiency

In this study, efficiency refers to how quickly and directly users can complete a given task. Navigation design elements such as keyboard shortcuts, menus, links and other buttons are considered to have an impact on efficiency. Therefore, if these elements are well-designed, less time and effort are required for users to navigate and choose actions. It is observed from the evaluation session that fixed menus and navigation facilities prevent participants from getting lost in the system although several participants refer to the Help menu on several occasions in order to complete the given task.

A participant (UTS1) remarked, "The fixed menu on the left side of the workspace is really helpful. Sometimes I jumped to the wrong link but I can easily manage to find my way back to the right link". Beside the fixed menu, the E-Workspace also provides the root menu in order to show the path that user had been through in order to prevent lost when using the system.

c) Engagement

Engagement refers to the degree of which the system interface is pleasant, satisfying and enticing to use. During the post interviews, the respondents were asked whether the system interface, which includes colour tones, style and graphical images, are appealing and pleasing to use. In general, the participants are satisfied with the system interface, as one researcher (UTR4) commented, "I love the interface very much. The drop down menus and navigation terms used are clear and understandable. The colour and font also reflect the Malay manuscript theme".

A student (UTS7) said, "I act as the group leader, so I am the responsible person to create group and add members in my group". One of the lecturers (UTL3) expressed interest on the annotation tool, "I love the annotation tool very much. It makes the transliteration works faster and it saved all the works done and it's easy to retrieve back all the transliterated works".

A student highlighted his enjoyment in being able to exchange ideas and thoughts with peers while doing transliteration work, which he finds essential. "It is really fun. I can give comments after my friends start doing their part in transliteration, so they can comment on mine" (UTS3). As shown in Figure 3 the cooperation between members are very important and the relationship between group members can be improved while doing the assignment by using the tools provided.

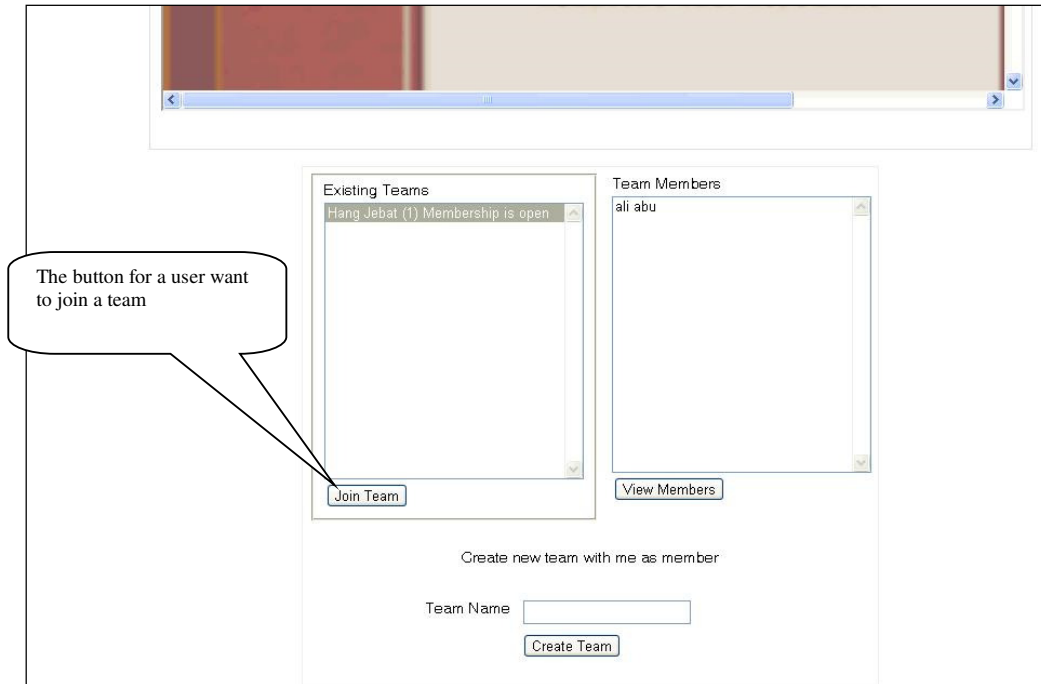


Figure 3: Interface to Create Group and Add Members

d) Error Tolerance

Error tolerance refers to how well the system design can prevent errors, or provide help for recovery. This is normally carried out by providing information, selections of actions to rectify the problem or other solutions. The Malay Manuscript e-Workspace provides a fixed front panel that prevents users from getting lost and this usefulness was commented by UTS1.

When using the Annotation tool, as shown in Figure 4, the system provides a pop-up to confirm whether the user wants to save the changes that have been made. This is important to prevent data losses as one researcher commented, "I accidentally clicked the "X" button after performing some of the transliteration work fortunately, there was a pop-up dialog that prompts whether I want to save my transliteration or cancel" (UTS1).

Figure 6 shows the interface of the annotation tool. This tool offers multiple options to view the annotated works.

e) Ease of Learning

Ease of learning determines how well the Workspace supports both initial first use, followed by extensions for deeper understanding. The common features that are normally related to "easy to learn and remember" are the user interface and functionality of the Workspace that can be easily understood. For example, users should be able to remember the several options available in the Annotation Tool and navigate the system during the first time of usage. One evaluator found the system easy to use and appreciated the chat feature. However, the evaluator requested that some explanation should be provided for each module. "I like the live chat feature, as I can refer to someone when I am lost when I use the system" (UTR2).

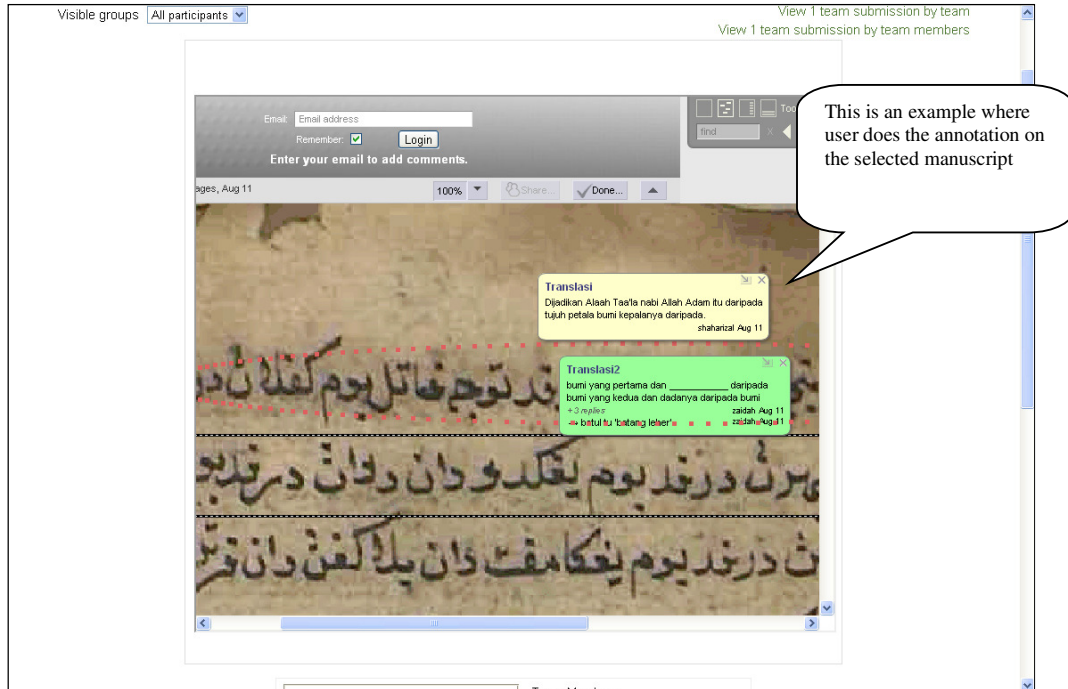


Figure 4: Interface of Annotation Tool

Issues and problems faced by the respondents when using the e-workspace

The respondents highlighted the following issues when using the e-Workspace:

a) Effectiveness

One student expected an automatic transliteration function available in the workspace. "When I heard about the system, the first thing that crossed my mind is an auto transliteration system that will allow users to transliterate from Jawi to Roman characters" (UTS2).

Another student (UTS8) expressed his concern on the possible resistance of adopting and using the workspace amongst the older generation. "This is a good idea, but I'm not sure whether the older generation prefers to use this system. Most of them are old and using computers is sometimes troublesome for them" (UTS8).

b) Efficiency

The usability testing indicates that participants experience difficulties while searching for manuscripts as a number of titles exceed 100 pages, which consumes significant downloading time and prevent them from completing the task on time. One student (UTS5) remarked, "I think the list of manuscripts needs to be categorized not only by title, but also by year, type of handwriting and perhaps by author". Another student commented, "It takes a long time to download the whole manuscript file in pdf format. I can't imagine how I'm going to download the manuscript, having lower Internet speed at my home" (UTS1).

One researcher (UTR3) highlighted the issue on system lag. "I faced problems just now. Something went wrong with the account I used. I need to log in again when I wanted to use the Annotation Tool". A student (UTS4) remarked, "I tried the live chatting tool. I think it is slow, and I'm not sure what the main cause is. I need to wait sometime before getting replies from my friends and once I received replies, I could only see a few lines and my friend was asking me questions why I was suddenly silent ...". However, this is found to be a temporary setback as sluggish network is experienced throughout the campus network.

One researcher (UTR3) suggested improvements to shorten interaction time with the system. "I think it's better to put the Transliteration Tool on the same page as the Annotation Tool. After annotating the manuscripts we need to click on the Transliteration Tool menu and perform transliteration in a different window. It is a waste of time". Figure 4 shows the interface where students edit assignments after using the Annotation and Transliteration tools.

c) Engagement

The clarity or quality of the digitized image of manuscripts unsatisfactory one student (UTS3) commented, "Sometimes the manuscripts cannot be read clearly. I choose a number of manuscripts randomly, some are clear but some are very blurred". As shown in Figure 5, manuscripts are sometimes difficult to read as they are using old *jawi* script. Another student (UTS5) commented on the organization of the manuscripts in the digital library, "I think the list of manuscripts needs to be categorized not only by title, but also by years and by type of handwriting".

One researcher (UTR2) remarked on the default naming for the downloaded pdf files. When the student downloads the pdf file "Hikayat Hang Tuah" [Tales of Hang Tuah], the saved file appears by default as "doc1.pdf" "The file name of Malay manuscript should be more specific and detail. I got confused when browsing the list of Malay manuscripts".

However, another researcher (UTR1) stated, "The main interface is good, but the layouts of other modules are boring. They look too formal and serious". One researcher (UTR6) suggested that he prefers to be notified whenever a new manuscript has been uploaded. "At the "Home" screen, I think the administrator can post a notification on the latest collection of downloaded Malay manuscripts to inform the users".

d) Ease of Learning

Another participant (UTR5) suggested, "Explanation of each module should be there, especially for the Annotation Tool. It has many good functions, and people will not know if they do not explore" (UTR5).

In addition, one researcher (UTR6) requested that some examples of transliterated works should be included as reference. "Perhaps examples of transliterated works can motivate us to do better transliterations". Another researcher (UTR8) challenged, "Why not provide us with a tutorial video, share it on Youtube, and include the video in the Help menu". One of the discussion methods can be used during assignments is the chat tool.

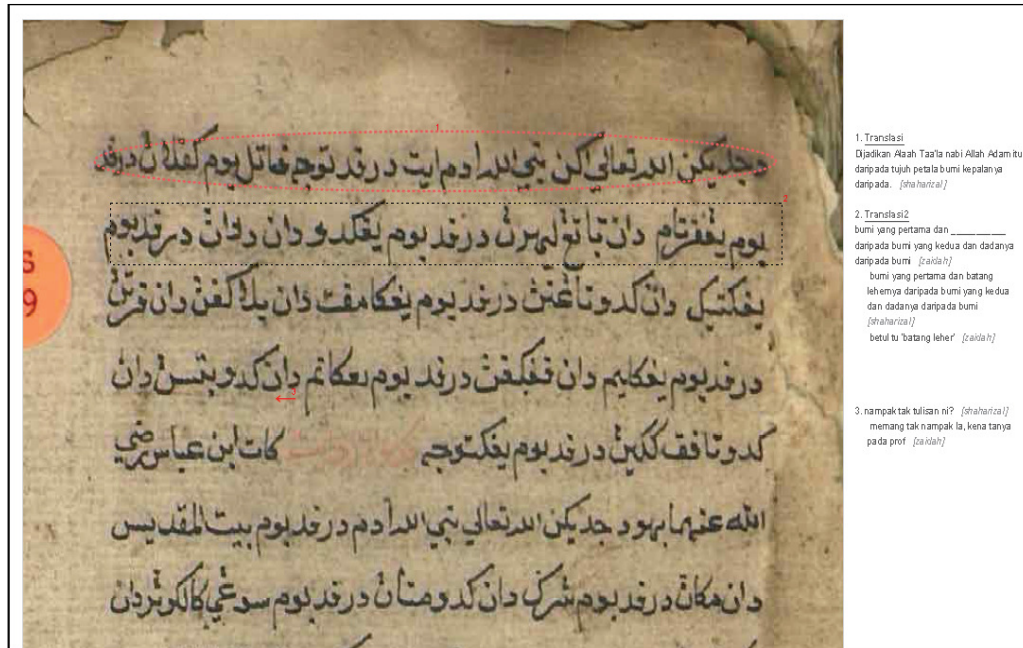


Figure 5: View of Assignment in Pdf Format

DISCUSSION

Feedbacks from the participants were analyzed and a positive reaction from participants towards the e-Workspace was reported. Most of the participants indicated that they considered the prototype to be effective. When carrying out the given tasks, participants were observed to be able to successfully and correctly completed transliteration tasks. They also highlighted the usefulness of the system as a platform to facilitate collaboration among Malay manuscript researchers all over the world and essentially being able to exchange ideas and thoughts with peers while doing transliteration.

In addition, approximately three quarters of the participants found the prototype to be error tolerant since it could prevent errors and provide help for recovery by providing information and choices of actions to correct problems, and provide a pop up message which checks the users' action when using the annotation tool: a valuable facility for preventing data loss.

Apart from that more than two thirds of the participants found the prototype e-Workspace "engaging" in which the system interface is found to be pleasant, satisfying and enticing to use. Although some participants were not satisfied with the clarity and quality of the digitized image and the organization of the manuscripts in the digital library since they would prefer the manuscripts to be categorized not only by title, but also by year and type of handwriting. In addition, the name of the manuscript file should reflect the manuscript content or title rather than be provided with a general name such as "doc1.pdf".

The majority of participants considered the prototype to be easy to learn during the first time of usage as it provides several useful options in the annotation tool and an easy navigation scheme. On the other hand, participants expressed the need for some guides in the form of a video tutorial for using each module of the prototype.

Less than one third of the participants felt that the prototype was efficient in terms of how quickly and directly participants can complete a given task. It has been observed in the evaluation sessions that the fixed menus and navigation facility prevented participants from getting lost in the system, although some participants were seen to be referring to the help menu several times in order to complete the task. The user testing also indicated that users experience difficulty while searching for manuscripts as some of the titles are over a hundred pages long, which took time to download and prevented them from completing the task on time. In addition the users highlighted the problem of system lag while doing a real time annotation task.

CONCLUSION

This paper reports user assessment of the Malay manuscript e-Workspace prototype to gauge the viability of a useful and enduring collaborative digital library for Malay manuscripts. The evaluation was conducted to gather users' feedback on efficiency, effectiveness, engaging, error tolerant and easy to learn of the collaborative e-Workspace prototype. The finding generally indicates positive reactions of the participants.

Significantly, the Malay manuscript e-Workspace has demonstrated its capabilities to better serve Malay manuscript studies communities in teaching, learning and researching activities as has been reflected by the positive feedback on the functional requirements. A number of useful comments and suggestions were put forward in the focus group sessions. These responses were the most revealing outcome of the evaluation exercise as the statements were specific and insightful. Some of the essential ones are: a) the expectation of an automatic transliteration function to be available in the e-Workspace; b) concern about the possible resistance to adopting and using the e-Workspace among the older generation; c) that notifications should be posted to members when new manuscripts had been uploaded in the digital library; and d) that it would be helpful if some examples of transliteration works were available to refer to while doing the work.

The Malay manuscript e-Workspace has been developed mainly to support lecturers in putting teaching resources online and establish collaborative e-Workspace for groups or individuals involved in transliterating and evaluating manuscript texts. This solution contributes to a new way of delivering Malay philology studies and opens up possibilities of collaboration among Malay philologists within the country and between institutions where oriental or Asian studies are offered throughout the world. The focus on including a transliterating module, where users can perform transliteration work individually or collaboratively in an electronic environment is helping to facilitate the change. This digital platform allows both lecturers and students to confer, discuss issues and share problems faced during the transliteration process. In general, the Malay manuscript e-Workspace helps foster collaboration and knowledge sharing as well as promoting the use of an otherwise underuse collection of Malay manuscripts.

This study is restricted as a single case study approach was adopted. It focuses on students who are currently active in the learning process of manuscript studies, lecturers who are currently teaching and have prior experience in teaching manuscript and researchers who refer to postgraduates (Ph.D and Masters) who are currently conducting research on Malay manuscript domain. The purpose of the case study is to emphasize on contextual commonalities amongst participants, rather than the differences. Hence, a small sample

size was collected. Further study could be conducted to a bigger case study setting involving experienced philologists to gauge the gaps between novice and expert practices in manuscript community.

ACKNOWLEDGEMENT

This research is funded by the University of Malaya Research Grant Scheme (UMRG021-09ICT), under the title Soft and Empowering Approach to Malay Manuscript Instruction & Learning.

REFERENCES

- Abdullah, A. and Zainab, A.N. 2007. Collaborative digital library of historical resources: Evaluation of first users. *Malaysian Journal of Library & Information Science*, Vol. 12, no. 2: 99-122.
- Abdullah, A. and Zainab, A.N. 2008. The digital library as an enterprise: the Zachman approach. *Electronic Library*, Vol. 26, no. 4: 446-467.
- Bozzi, A., and Calabretto, S. 1997. The digital library and computational philology: the BAMBI project, *Research and Advanced Technology for Digital Libraries*, Vol. 1324: 269-285.
- Bozzi, A., Calabretto, S., Corradini, M.S. and Tellez, B. 2005. The EUMME Project: towards a new philological workstation. Proceedings ELPUB 2005 Conference on Electronic Publishing, Kath. Univ. Leuven, June, 2005. Available at: <http://elpub.scix.net/data/works/att/163elpub2005.content.pdf>
- Calabretto, S. and Bozzi, A. 1998. The philological workstation BAMBI (Better Access to Manuscripts and Browsing of Images). *International Journal of Digital Information*, Vol.1, no.3: 1-17.
- Chapanis, A. 1991. *Evaluating usability*. Cambridge, UK.: Cambridge University,
- Drigas, A.S., Tagoulis, A., Kyragianni, P., Nikolopoulos, P., Kalomoirakis, D. Kouremenos, D., Emmanouilidis, Ch. and Vrettaros, J. 2005. An e-learning platform for multiform and interactive education of scholars in Greek Paleography, In *DIWEB'06 Proceedings of the 5th WSEAS International Conference on Distance Learning and Web Engineering*. Stevens Point, Wisconsin: World Scientific and Engineering Academy and Society, 2005, Volume 2, pp. 1096-1099.
- El Makhfi, N. and Benslimane, R. 2011. Platform of transcription the old arabic manuscripts. *International Journal of Engineering Science and Technology*, Vol. 3, no. 6: 5353-5365.
- Fish, S. 2009. The Last Professor, Opinionator, New York Times, Jan 18, 2009, on Frank Donoghue's The Last Professors: The Corporate University and the Fate of the Humanities. New York. Available at: <http://opinionator.blogs.nytimes.com/2009/01/18/the-last-professor/>
- Guerlac, S. 2012. Humanities 2.0: E-Learning in the Digital World. *The Humanities and Crisis of the Public University*. Vol. 116, no.1: 102-127.
- Noorhidawati, A., Hanum, F.N., and Zohoorian-Fooladi, N. 2013. Social tagging in a scholarly digital library environment: users' perspectives. *Information Research*, Vol. 18, no. 3. Available at: <http://www.informationr.net/ir/18-3/colis/paperC43.html#VHg05tKue1k>.

- Nicolas, S., Paquet, T. and Heutte, L. 2003. Enriching historical manuscripts: The Bovary Project, In *Document Analysis Systems 6, Lecture Notes in Computer Science*, Vol. 3 no.63: 135-146.
- Nicolas, S., Paquet, T. and Heutte, L. 2003. Digitizing cultural heritage manuscripts: the Bovary Project, In *ACM Symposium on Document Engineering Grenoble, France 2003*, France, pp. 55-57.
- Quesenbery, W. 2003. Dimensions of usability: Defining the conversation, driving the process, In *Proceedings of the Usability Professional Association (UPA) 2003 Conference*. pp. 1-8.
- Rumpler, B. and Calabretto, S. 1999. Virtual library for ancient manuscripts. *Library Review*, Vol. 48, no. 4: 181-186.
- Zahidah, Z., Noorhidawati, A. and Zainab, A.N. 2011. Exploring the needs of Malay manuscripts teaching and learning community for an e-learning platform. *Malaysian Journal of Library & Information Science*, Vol. 16 no. 3: 31-47.
- Zainab, A.N., Abrizah, A. and Mohd. Hilmi, M.R. 2009. What a digital library of Malay manuscripts should support an exploratory needs analysis. *Libri*, Vol. 59, no. 4: 275-289.

APPENDIX A

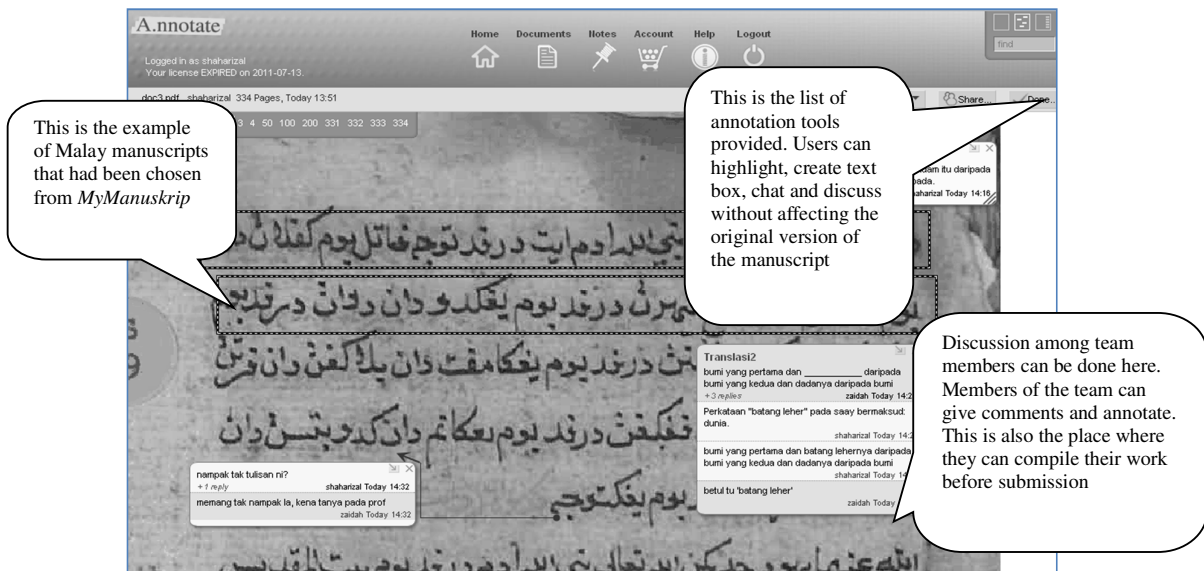


Figure A-1: Malay Manuscript e-Workspace Annotation Module

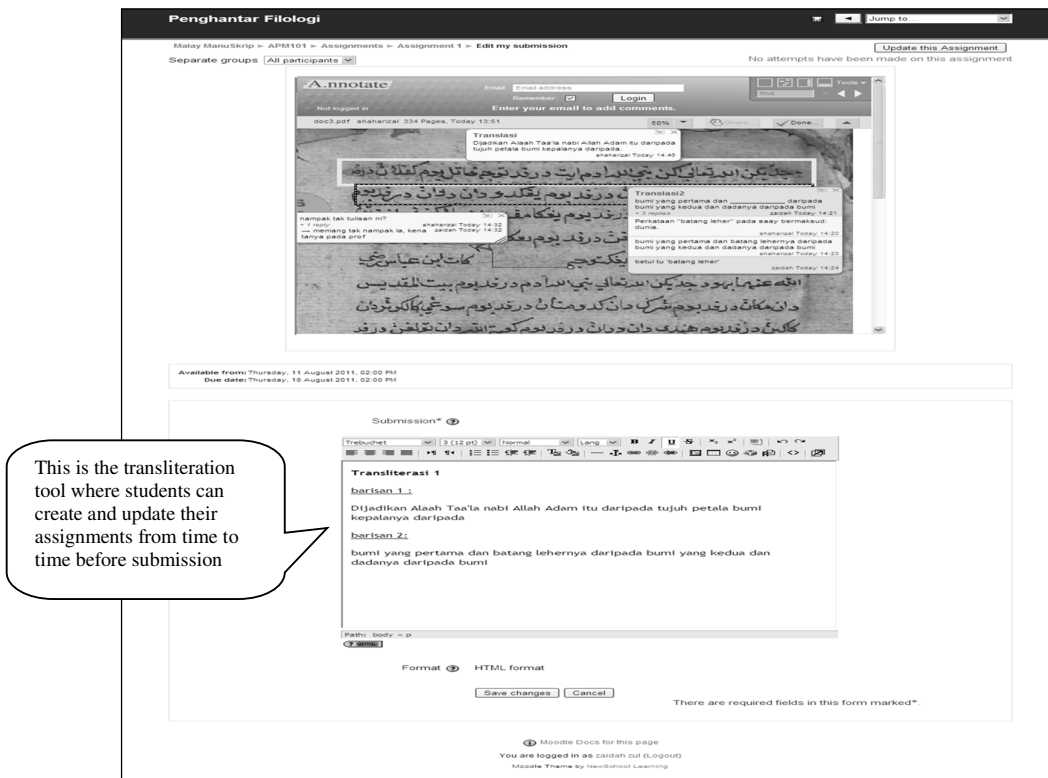


Figure A-2: Malay Manuscript e-Workspace Transliteration Module