

A Preliminary Evaluation of a Short Online Training Workshop for TPACK Development

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National plans in higher education institutions are being developed in various aspects of the academic world for technology integration. Short online training has the potential for accelerating and facilitating the implementation of those plans. So far, a little is known about the suitability of this mode of training for faculty members' development. Expository, active, and interactive training are the dominant online experiences today. This study explores the evaluation of a short online training workshop that applied expository experience. Direct observation and post questionnaires were used to evaluate this mode of training. Results showed a positive effect for expository training. Participants strongly recommended blending expository with active experiences in the future online training workshop. Playing an active role during the training process is critical for adult learners as reported in the literature of adult learning as well as TPACK development programs. The results of this research confirm the significance of applying active experiences for online programs that are designed for faculty development.

As an effective way of teaching, the intent to integrate online learning in higher education institutions (HEIs) has been well received today. Providing a flexible environment for learning, utilizing different learning resources on the Internet, and increasing interaction with learners are some of the factors that encourage HEIs to embrace this trend (Ellis, Hughes, Weyers, & Riding, 2009).

HEIs have different domains that will be influenced inevitably by the integration of instructional technology. According to Williams (2002), higher education learning environments should be reorganized in order to get the full advantages of the new digital tools in HEIs. Leading this change in HEIs—especially the educational parts—requires updating faculty members' knowledge in different aspects. According to Bates (1997), one of the 12 organizational strategies for change is the training of faculty members on how to use the technology as well as teaching them why there is a need to integrate digital technology in learning today.

Technological, pedagogical, and content knowledge (TPACK) constitutes the main required knowledge for faculty members to conduct online classes successfully (Mishra & Koehler, 2006). The factors mentioned by Bates (1997) are covered by the TPACK model since faculty members can identify easily the rationale of using e-learning tools according to the content they teach and the pedagogies they use. Thus, integration programs of instructional technology may include independent domains of TPACK model such as technological knowledge, a combination of two domains such as technological and pedagogical knowledge, or a coverage of the whole domains of this model. The domains within the TPACK model are seven, namely technological knowledge, pedagogical knowledge, content knowledge (CK), technological pedagogical knowledge (TPK), technological content

knowledge, pedagogical content knowledge, and TPACK (Mishra & Koehler, 2006). Cox and Graham (2009) specified the boundaries that differentiated each sub-model and clarified their results with real case studies. For example, TPACK can be defined as “a teacher's knowledge of how to coordinate the use of subject-specific activities or topic-specific activities with topic-specific representations using emerging technologies to facilitate student learning” (Cox & Graham, 2009, p. 64). Also, TPK can be defined as “a knowledge of the general pedagogical activities that a teacher can engage in using emerging technologies” (Cox & Graham, 2009, p. 64). Today, many instructional technologists utilize the TPACK model in faculty development programs (Chen & Tsai, 2009; Koehler Mishra, Hershey, & Perusky, 2004; Koehler Mishra, & Yahya, 2007; Mishra & Koehler, 2006; Pryor & Bitter, 2008; Shin et al., 2009; Voogt, Almekinders, van den Akker, & Moonen, 2005; Yang & Liu, 2004).

Some of the major factors for the successful integration of online learning in HEIs are related to technology and resource support. The technological factors include technology infrastructure, hardware, and software (Khan, 2001), while the resource support consists of online support, instructional/counseling support, technical support, and career counseling services. The other online support services are online and offline resources (Garrison & Kanuka, 2004; Khan, 2001). For faculty members, any form of resources support can facilitate the use of instructional technology such as technical support and online/offline support. Also, instructional support for technology integration can be divided into seven types (Stesa, Min-Leliveldb, Gijbels, & Petegema, 2010). Those types are workshops and seminars, feedback from students, practice with feedback, and concept-based training. The other three

forms of instructional support are colleagues helping colleagues, resources materials such as newsletter manuals or sourcebooks and instructional grants. These different approaches to faculty members' development can be used according to the contexts of training, the topics being taught, and the level of technology integration. TPACK development research focused mainly on using training workshops as the early stages of technology integration require guidance, support, and structured training.

Today, national centers of e-learning, supporting centers and computing services are different names for resource support that provide different training workshops in order to support faculty members to teach online (e.g., Computing Services in Oxford University and Centre of Teaching and Learning in University Teknologi Malaysia). Most of the training workshops are conducted face-to-face. Few of those workshops are conducted fully online as noted in their training schedules. The newly practice of online training in HEIs requires understanding how faculty members evaluate their participation in this form of training. Thus, observing and evaluating the actual practice of online training for TPACK development is promising in identifying the chance of succeeding in using this style of training during the early stages of the technology integration process.

For the purpose of exploring the actual practice of short online training in HEIs and evaluating the acceptance of this mode of training, the researcher joined a short online training workshop that was conducted in January 2011. During the training sessions, four elements were observed: participants' characteristics, interaction, the presenter, and products of the program. Also, by the end of the training sessions, four elements were evaluated: the acceptance of online training in developing faculty members' TPACK, the behavioral intentions of faculty members to use the workshop information in their educational practices, and faculty members' self-efficacy of using online learning after joining the workshop. Lastly, the best practices of the workshop and the aspects that need to be improved were explored as well.

Methodology

Research Design

This study used direct observation and a post-questionnaire to evaluate the acceptance of using short online training for TPACK development. The first source of the evaluation was the direct observation by the researcher. In this study, the researcher conducted the observation for this training as a participant (Creswell, 2005). The observational method that used was unobtrusive (nonreactive) observation to detect the

natural behavior of both trainers and trainees. According to Angrosino (2003), when people who are observed are unaware of observation, unobtrusive observation is taking place. Also, the technique of observation in this study was a focused observation where there were well-defined categories to be observed (Angrosino, 2003). It included the elements that were proposed by Cloutier, Lilley, Phillips, Weber, and Sanderson (1987) for training evaluation as cited by Taylor-Powell and Steele (1996). Four elements were mentioned, namely participants' characteristics, interaction, the presenter, and products of the program. The relationship between these elements of observation and TPACK main domains is as follows. In the technology domain, we observed types of technology that were used by the trainer to interact with the trainees. In the pedagogy domain, we observed participants' characteristics, training experiences (Zawacki-Richter, Backer, & Vogt, 2009), and pedagogies that were used by the trainer (Khan, 2001). The presenter's knowledge about the subject matter and presentation skills were observed as well. Lastly, for content domain, we observed if products of the program were content specific or were for a general content.

Identifying these elements was critical to understand faculty members' evaluation of the training workshop. The second source of the data was a Likert-style post questionnaire which contained seven closed-ended statements and two open-ended statements. Items one, two, and three inquired about the usefulness of the training (Davis, 1989; Venkatesh & Davis, 2000). Item four inquired about the behavioral intention (Venkatesh & Davis, 2000) to apply the acquired knowledge at the training in the actual teaching practice. Item five inquired about the self-efficacy of using e-learning after joining the training, while items six and seven inquired about the presentation skills and the content organization. The internal reliability of the closed-ended elements, completed using SPSS 15, is $\alpha = 0.946$. The last two statements were open-ended questions for exploring the best aspects of the workshop and the aspects that needed to be improved. Appendix A shows the questionnaire that was used in this study.

Sample

The short online training workshop was organized by the National Centre for e-Learning and Distance Learning (NCEL) in the Kingdom of Saudi Arabia (KSA). As a part of its mission, NCEL conducts different training workshops in order to support faculty members to teach online. According to its availability, one of the online training workshops was selected to be studied. The name of the workshop, the length, and the applied online pedagogies will be reported in the observation section of the findings.

The sampling technique that was used in this study is a convenience sampling technique since registration in this workshop was open to all faculty members in KSA. After the closure of registration, the first 25 faculty members in the registration list were chosen to participate in the training according to the registration policy of NCEL. Twenty-one out of 25 faculty members from different universities completed the training. Their disciplines were education, English teaching, computer science, physics and dentistry. Male participants numbered 11, while female participants numbered 10. The variation of the sample discipline, gender, and universities are valuable in providing a diverse evaluation of online training.

Findings

Observation

Although we have participated in the training workshop, all the training sessions were recorded by using Illuminate software. After revisiting the recorded sessions of the training, here is a description for participants' characteristics, interaction, the presenter, and products of the program.

This training workshop was fully online and lasted for three days. Each training day was divided into three sessions. The first session ran from 8:30 a.m. to 10:00 a.m. The second session was from 10:30 a.m. to 12:00 p.m., and the last session was dedicated for answering participants' questions and lasted for one hour from 1:00 p.m. to 2:00 p.m. Two persons conducted this training. The main trainer was a male professor from an Australian University while a female trainer who works as an instructional designer in the same university coordinated the training. The trainer used Illuminate software to open and conduct virtual sessions and a learning management system called Jusur to upload the structured content and learning resources. Also, the trainer used Google Docs (i.e., Google Drive) to share some files. The trainer used these different software tools to deliver all of the training during the entirety of the workshop.

It appears from the trainees' characteristics that they were positive towards each other and to the subject of the training. The reason is that faculty members joined this course in a voluntary basis without being requested either by the Ministry of Higher Education nor their universities. Also, they were friendly to each other and frequently gave thanks to the technical support personnel and their colleagues when they gave them some advice to solve technical problems. Skills of the trainees regarding using the Illuminate software were sufficient since most of them were able to log in to the system, join the training, and follow the instruction of others if they faced any technical problems.

Then we clearly identified through the direct observation of the training and by revisiting the recorded sessions of the training experiences, as well as by reviewing the training pedagogies that were used. The trainer was actually guiding the training sessions. According to Means, Toyama, Murphy, Bakis, and Jones (2009), when trainers expose training content to trainees, this mode of training is providing expository experiences. For example, the trainer presented the content using PowerPoint slides in Illuminate software. Then, the trainer used demonstration to show how to design online quizzes and used some e-assessment activities. Both the presentation and the demonstration pedagogies were two forms of expository experience.

The Internet connection was stable. Rarely was a sound interruption encountered. Very limited complaints were noticed from the trainees neither in text "chats" or in the oral chats during breaks. The participants were advised to use "Raise the hand icon if they want to ask questions." Answering participants' questions was interesting as in Session 1 (01:05:40; hours, minutes, and seconds, respectively) and (02:08:10). The activities were sequenced as appeared from the slides, but participants did not get a chance to complete them.

During the training sessions, the communication was clear. The presenter was speaking slowly and using a simple language. It seems from the direct observation and recorded sessions that the presenter did not encourage a full participation. The trainer asked about the discipline of the participants so he could prepare the right examples of authentic evaluation techniques (1:15:00), but he gave some examples for chemistry only. It seems the trainer has a deep knowledge about the subject as he authored a book about the same topic and was speaking confidently during the training sessions.

Lastly, we identified that one element of the TPACK model was covered that discussed technological and pedagogical knowledge. The central topic of the training was the use of e-assessment tools in general without relating them to a specific content. The training content in LMS Jusur was organized in a tree structure representation. There were other forms of the content such as PDF files and Doc files as well. The main topics that were covered in the workshop are as follows:

- Theory and practice of online learning
- Instructional design tips
- JISC e-learning models
- IDMM design model
- Learning styles
- Modeling pedagogy and practice
- Evaluation models
- Rubric for online instruction
- Rubric for online instruction (self-assessment form)

Questionnaires

Closed-ended questions. The results of the questionnaire were encouraging and revealed that short online training can be an effective way to develop faculty members’ TPACK. Most of the statements were evaluated as *strongly agree* or *agree*. Table 1 shows the results of the online training evaluation. Participants strongly agreed with statement number five that is related to self-efficacy to teach online after joining the online training. Also, participants highly agreed with statement number four that is related to applying the knowledge they acquired in their future teaching.

Open-ended questions. Two questions in open-ended section of the questionnaire inquired about the best aspects of the training workshop and the aspects that need to be improved. The aspects that mentioned to be the best were the quality of the training in terms of: the trainer’s presentation skills, the practicality of the topic, and the variation and organization of the online resources. Participants’ understanding was mentioned as needing to be improved as a result of introducing learners to different e-learning and e-assessment tools, as well as the content size and the new ideas that were introduced as well. Lastly, they mentioned the interaction between learners to be a distinguishable element in this mode of training. The aspects mentioned that needed more improvement were the shortage of hands on experience and activities, the shortage of the activities that elicit previous knowledge of the participants and the length of the training. In their comments about the need for hands on experience and activities, almost half of the comments identified this shortage in the training workshop and expressed that clearly. For example, one of the participants requested “having participants practice some applications or doing a kind of assignment.” Some of the statements that clearly appear in their comments about the need for activities were “practical applications,” “giving time to practice,” and “adding the practical side.” They

mentioned the need to “get the materials” before “the training time” so they can prepare for the training sessions. Some of the participants also mentioned the need to “reduce the daily session’s time” to three hours instead of four, and to extend the training days to four days instead of three days. Lastly, one participant faced communication difficulties during the training sessions. The comments, as can be noticed, show the participants are interested with this mode of training and are willing to see more improvement for online training. The absence of any form of complaints from the mode of training itself is a positive sign for the faculty members’ acceptance of the online training.

Discussion

Although face-to-face training mixed with online training was reported to be an effective technique for TPACK development (Koehler et al., 2004; Koehler et al., 2007; Shin et al., 2009; Voogt et al., 2005; Yang & Liu, 2004), using full online training was reported to be a useful technique for TPACK development as well (Marreo, Woodruff, & Schuster, 2010; Pryor & Bitter, 2008; Schrum, Burbank, Engle, Chambers, & Glassett, 2005). Using full online training to utilize its valuable merits (Wolf, 2006) especially in providing timely efficient training (Quality, Interoperability and Standards in e-Learning, 2004) is significant for TPACK development. Using such a mode of training in this study was highly accepted by faculty members. Both modes have yielded positive results as is reflected in the literature, but using online training is expected to be more efficient than using face-to-face training mixed with online training.

Using long-term training workshops is a dominant approach for TPACK development. Positive results have been reported in most of the studies (Chen et al., 2009; Koehler et al., 2004; Koehler et al., 2007; Mishra & Koehler, 2006; Voogt et al., 2005; Yang & Liu, 2004).

Table 1
Results of Online Training Evaluation

Item Description	Item No.	Average score
Usefulness of the training	1	4.33
	2	4.52
	3	4.57
Behavioral intention to apply the acquired knowledge	4	4.61
Self-efficacy of using e-learning tools	5	4.33
The presentation skills of the trainer	6	4.66
The content organization	7	4.52

Note. Strongly agree = 5, strongly disagree = 1, N = 21.

These long-term training workshop continued mainly for one semester (Chen et al., 2009; Koehler et al., 2004; Koehler et al., 2007; Mishra & Koehler, 2006; Pryor & Bitter, 2008; Shin et al., 2009; Yang & Liu, 2004) or extended to nine months (Voogt et al., 2005). The positive results of these studies are encouraging and can make TPACK development an actual reality. But unfortunately, the length for these studies is an obstacle from implementing long-term training in some of the HEIs contexts since faculty members have a wide range of responsibilities. According to (Chick et al., 2002), “time is the biggest obstacle preventing faculty members participation in the [training] opportunities that are available” (p. 1).

Although limited studies reported an evaluation of short training for TPACK development, Marreo et al. (2010) explored the evaluation of using short online training workshops for TPACK development. A positive acceptance of this mode of training was reported just as in the results of this study. The appreciation of the short training in both studies is promising for creating a practical training environment for TPACK development.

Short expository online training, through content presentation in a synchronous mode accompanied by demonstrations for some of the content, can be used for TPACK development. The acceptance of this mode of training aligned with results of previous research since the training content was structured (Ke & Xie, 2009), the trainees’ number was limited, the training was led by an instructor (Georgina & Hosford, 2009), and the training was delivered in an efficient time (Chick et al., 2002). Those elements were used in this training workshop, but participants strongly suggested to be given a chance to play a more active role during training.

Playing an active role during training session for TPACK development is supported generally by adult learning theory (Knowles, 1973) and specifically by TPACK development literature. Using adult learning theories for designing faculty members’ training programs was recommended (McQuiggan, 2007). Moreover, TPACK literature reported a preference for training sessions that encourage trainees’ active participation. For example, using design-based learning reported to be a successful technique for TPACK development (Chen et al., 2009; Koehler et al., 2004; Koehler et al., 2007; Mishra & Koehler, 2006). Also, using video modeling and reflections (Pryor & Bitter, 2008) as well as group discussions (Shin et al., 2009; Yang & Liu, 2004) are mentioned to facilitate TPACK development. Those different techniques gave a chance for active participation either by designing an artifact, reflection, or discussion. This type of training can be achieved by using active or interactive experiences, but training literature shows some difficulties in using

interactive experiences. According to Owston, Wideman, Murphy, and Lupshenyuk (2008), instructors reported a lack of time to participate online when collaborating with colleagues either online or at the place of work hinders effective online participation. Moreover, collaborative online learning, which is a form of interactive learning, is complicating the process of group work and is time-consuming as well (Ke, 2010). The nature of online collaborative learning depends heavily on collaboration and creating a useful content-related interaction between participants and trainers (Doherty, 2011). The level of the content related interaction between trainees in online training was reported to be low (Yang & Liu, 2004). Therefore, as collaborative learning or collaborative experiences are enrolled under interactive training, it is required to be reduced when designing short online training programs. Thus, designing training programs that are short, fully online, and blending expository and active training is expected to be a very effective pedagogy for creating ideal environments for TPACK development.

Conclusion

Although this study was a preliminary evaluation for a faculty development program, the limitation of research in this area encouraged us to publish this work. Nineteen international experts in distance learning identified the faculty development area as one of the most neglected area of the research although it can be considered one of the most important research areas in distance training (Zawacki-Richter, 2009). Faculty members’ evaluation of the short online training shows its capability to be highly accepted by faculty members in HEIs. The use of this technique for TPACK development can sustain the time of faculty and provide a flexible training environment as well. Specifically, the use of presentations and practice (as described in this study) is a successful training strategy for TPACK development that can be added to other TPACK development techniques. It can develop faculty members’ knowledge to decide which pedagogies can be used according to the content being taught. Also, it can help in deciding which technology will be used according to the pedagogies that are selected. With this level of knowledge, the core of TPACK concept is developed. The following training sessions would try to enhance faculty members’ TPACK in order to increase the quality of choosing the pedagogies and technologies according to the content that will be introduced to the learners.

Designing online training programs for TPACK development may improve the faculty members’ attitudes towards using online learning in their classes (Carr, 2000). Moreover, it can pass time constraints especially in asynchronous mode of communication and

facilitate faculty members' professional development. Lastly, online training can facilitate recruiting international experts for training. All those merits support using online training for TPACK development.

Participants' evaluations were encouraging, although they preferred to have some active roles during online training sessions. The most critical item is the positive impact of the online training as mentioned in answers to both closed-ended questions and open-ended questions. According to Davis (1989) and Venkatesh and Davis (2000), usefulness and easiness are critical variables for the acceptance of technology. Therefore, online training is most likely to be accepted by faculty members for TPACK development. Future short online training workshop for TPACK development should include elements of active experiences such as artifact development or creating some e-learning elements that are related directly to the content of the training. By mixing both expository training and active training, the acceptance of the short online training can be improved, as was shown from the findings of this study.

The next step of this research is to conduct a training workshop that will be structured, instructor-led, fully blended online (expository and active training) and limited in trainees' numbers. Different forms of evaluation such as a pre-post questionnaire follow up interviews and frequencies of attendance will be used. Triangulation of the findings between these data sources can increase the reliability of the findings and clarify the effectiveness of developing TPACK for faculty members by using short blended online training.

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BAHARUDDIN BIN ARIS, PhD, is a UTM professor in multimedia and internet-based learning at the Faculty of Education and presently working as a director of Centre for Teaching and Learning, Universiti Teknologi Malaysia. He received His BSc and MSc from Iowa State University, USA, and a PhD from the Robert Gordon University, UK. His current research interest includes Information and communication technology, integrating technology into teaching and learning of children to adults, instructional design and human-computer interaction, development and evaluation of computer-based learning and training courseware, computer-based management information and resource systems, and learning and using ICT. Professor Aris is the first Malaysian and Asian listed in the directory of world experts, Who’s Who in Instructional Technology online since May 15, 2001, and included as one of the top 20 e-learning academics on e-business website, e-Business: Who’s Who, a database of researchers in the field of e-Business since 2005.

REBECCA EYNON holds a joint academic post between the Department of Education and the Oxford Internet Institute (OII) at the University of Oxford. Since 2000 her research has focused on education, learning and new technologies, and she has carried out projects in a range of settings (e.g., higher education, schools, the home) and life stages (e.g., childhood, adolescence, late adulthood). Rebecca’s research focuses around three broad inter-related areas: digital inclusion and learning online, the use of the Internet for learning in everyday life, and the role of new technologies in higher education. Recent research projects include: the Learning Companion (supported by the John Fell OUP fund), the Learner and their Context (supported by BECTA), and ULab: European Laboratory for Modelling the Technical Research University of Tomorrow (supported by the EC). Rebecca is co-editor of Learning, Media and Technology and has published a number of academic articles, reports, and conference papers. At the OII Rebecca teaches on the MSc Social Science of the Internet and at the Department of Education she is a lecturer for the MSc Education (Learning and Technology). At both departments, she supervises DPhil students interested in learning, education, and/or digital exclusion for various individuals or groups in different contexts.

Appendix A Questionnaire

Questionnaire questions

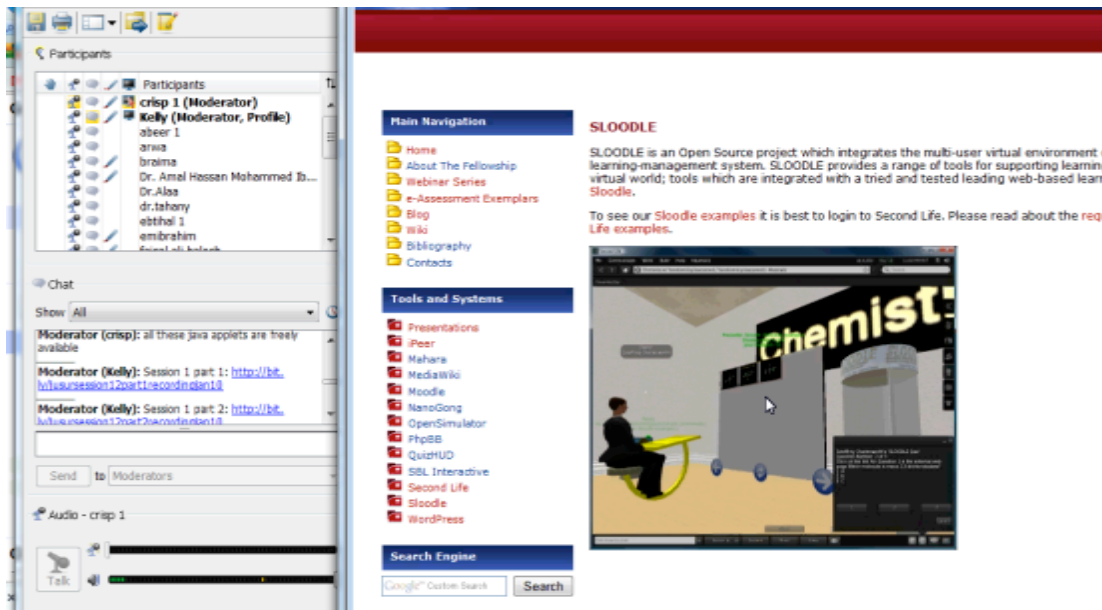
1. The workshops have improved my understanding of online assessment and evaluation.
2. The workshops have improved my understanding of appropriate online assessment methods.
3. The workshops have improved my understanding about the rationale for developing online curriculum evaluation processes.
4. I plan to use the information from the workshops in my own teaching or educational practice.
5. After the workshops I feel more confident in my ability to teach online (or support faculty to teach online) using effective models and concepts.
6. The workshop presenters were well organised and gave clear explanations.
7. The workshop resources available in Jusur and Google Docs were organized in an appropriate way.

Online 5-point Likert-type scale by using LMS Jusur

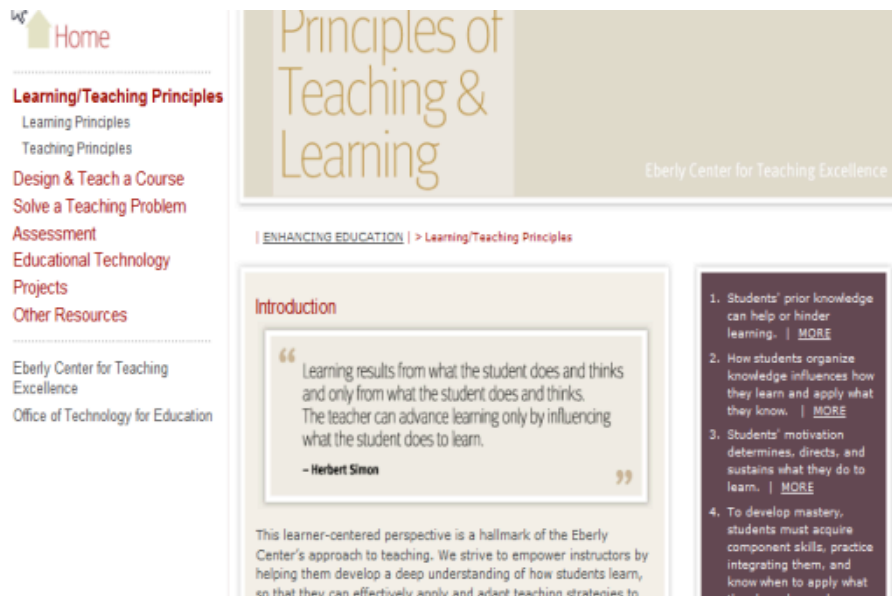
Open-ended Questions

1. The best aspects of the workshops were: _____
2. The workshops could be improved by: _____

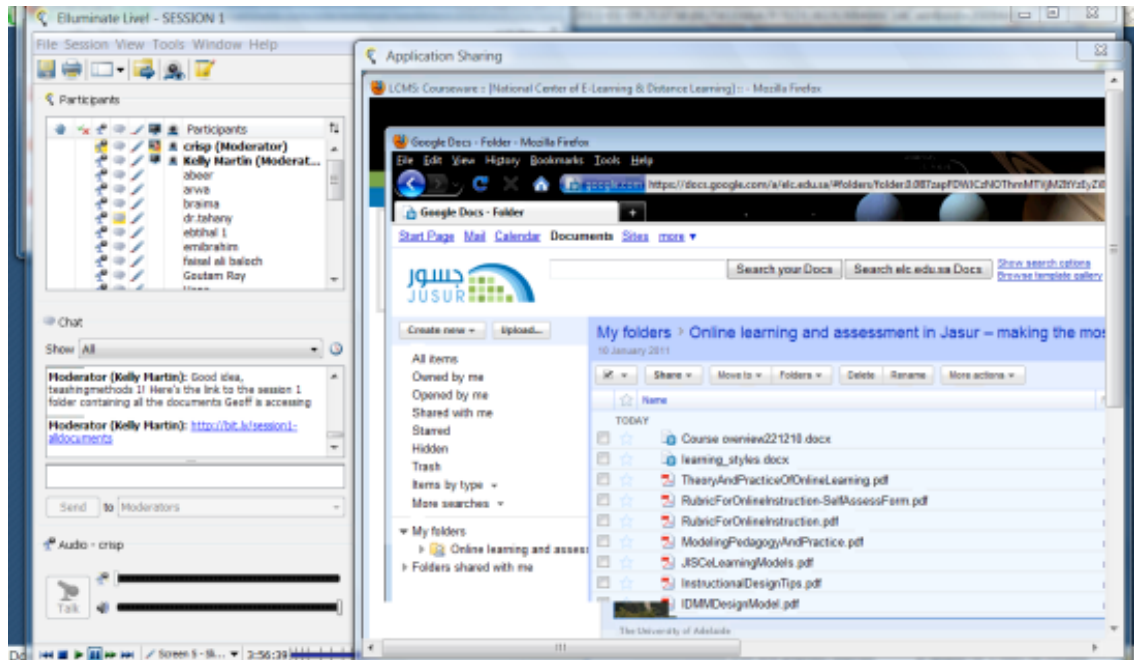
Appendix B
Screen Shots of Online Components



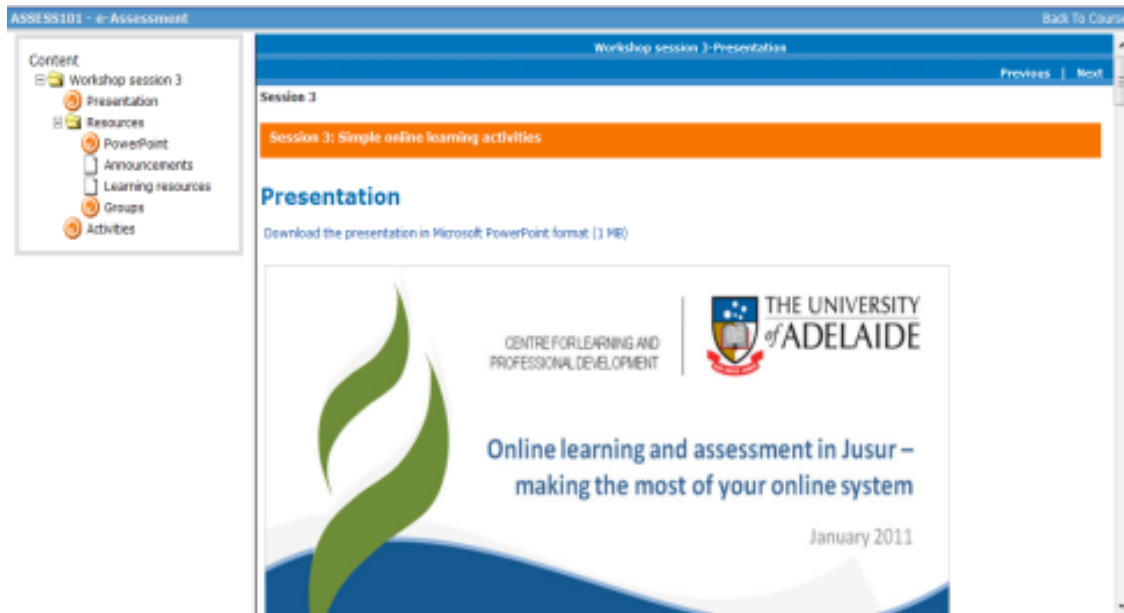
Synchronous demonstration of virtual Chemistry lab



Synchronous demonstration of teaching and learning principles



Virtual class in Illuminate software



Interactive modules in LMS JUSUR