Collaborative Learning Software for Secondary School: ATutor

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ABSTRACT

In today's world, technology is constantly changing especially in e-learning scope. Consideration must be given to the development of collaborative activities between students and teachers. The aim of the research was to evaluate the usage of ATutor for collaborative learning environment between students and teachers and determine the features and tools from learners and teachers' view, particularly on Secondary School and Pre University learners' participation. The instruments used to gather data were interviews, workshop online and a survey, which undertook the completion of two printed evaluation forms for both users after the implementation and usage of the software. The findings gathered and analyzed in Educational Complex of Imam Khomeini in Kuala Lumpur was found to satisfy the involvement of collaborative learning at home. Generally, the respondents were willing to consider Collaborative learning as they planned to do their homework and projects together for better learning effectiveness.

Keywords: cooperative/collaborative learning, teaching/learning strategies, ATutor, e-learning, educational software

1. INTRODUCTION

Collaborative Learning (CL) supports active student involvement in the learning field. In CL, students are able to work together in small group towards a shared learning goal. Collaborative learning emphasizes on collaborative efforts among students in their group along with the teachers’ guidance. Students are accountable for their own, and also responsible for the group members’ learning. Hence, the success of one helps other students to be successful (Gokhale, 1995). Collaborative Learning gives students the opportunity to express and discuss their opinions, and encourages their understandings (Nobel, 2002).

There are many collaborative software available. Among the more popular ones are Moodle, Sakai and Atutor. In this research, we examine one of the tools, namely the ATutor. This paper discusses the beginnings of CL and its advantages to students, teachers and institutions. It focuses on the ATutor CL software, and collects feedbacks from students regarding the features of the tool. The last section discusses the findings from this research.

2. LITERATURE REVIEW

The twenty-first century ushered unprecedented developments in the field of education all over the world. The once favored teacher-centered strategy in the classroom became the center of debates among educators and social scientists. Tracing from McLuhan’s notion of global village, the world now through computers and the World Wide Web give access to all information. Knowledge is no longer the monopoly of the teacher.

A teacher’s role is to change very slowly into a more supervisory role in a different environment where learners play a more active role. This new environment allows learners to learn in a collaborative manner.
2.1. Collaborative Learning: Its Beginnings and Scope

Computers are interactive tools in teaching and learning. Invented to assist human endeavors as well as to improve practical and theoretical aspects of science and technology, computers have now become indispensable in almost all aspects of life. In fact, in advanced countries where computer technology is already integrated in their system, the traditional institutions of learning are challenged to give way for non-face to face learning. Distance education seems to substitute formal education that requires learners to attend classes in schools and universities. Marked by congruency, computer and education poses pedagogical questions, yet educators realize that in the age of technological advancement and globalization, learning is no longer confined in the four corners of the classrooms.

In contrast to one-way learning process or teacher-centered, collaborative learning aims at giving importance to various individuals who are in a situation to learn something not as separate learners but together (Dillenbourg 1999). He explains that members of collaborative learning can be a pair, or a small group composed of three to five individuals. It can also be a class of twenty to thirty individuals, a community with a few hundreds of people, and a society of several millions of people. The phrase learning something maybe interpreted as a specific source or material or some learning activities such as problem solving that the learners follow within a limited time frame. Extending it further, collaboration effort may also include learning from lifelong work and practice. Collaborative learning as a shared experience is in the word together.

Nagata and Rondowski (1998) classify collaborative learning as an umbrella term for the various types of learning involving a group of individuals. They point out that collaborative learning is synonymous to cooperative learning. Although in essence, the common ground is cooperative among learners, in collaborative learning, the aim is to assign responsibility to students. This does not always happen in cooperative learning because the teacher depends highly on structured design that is assigned to student to accomplish. Thus, in cooperative learning, teacher’s intervention is present while in collaborative learning, the way of completing the task may diverge from what the teacher has earlier planned.

Tinio (2004) strongly insists that collaborative learning caters to all types of students because computer literacy demands hands-on. The moment the student explores the computer, he becomes aware of its potentials. The combination of E-Learning and technology opens the door to integrated learning by providing new tools. The traditional transfer of information from the book, to the board, then to the students is shortened via the computer and the Internet. This optimism, according to Baildon (2008), rests heavily on the powerful software environment. Learning models can be improvised and the varieties of methods enhance better understanding. In the end, learning is collaboratively shared.

2.2. Advantages of Collaborative Learning Applications

While collaborative learning helps students to learn more effectively, many educators place a high premium on teaching strategies that go beyond mere mastery of content and ideas. Experts believe CL promotes a larger educational agenda that encompasses several intertwined rationales involving students, teachers and staff, and various institutions, especially schools. Panitz (2002) lists more than 60 benefits of collaborative learning that enhance skills related to critical thinking, communication, and teamwork while Gokhale (1995) puts more emphasis on students’ discovery, construction, and awareness of their own thinking process. According to Katz and Lesgold (1993), studies have shown that self evaluation in terms of elaborating and explanation concepts as well as sharing the process to others assist significantly in learning. Critical thinking methods illustrate the divergent ways of information processing and active learning.

The integration of interaction in the whole process of CL between and among students or partners create practical social context in educational settings (Goodyear 2000). This environment proves beneficial in sustaining students’ interest to learn in a much more natural atmosphere where they develop their personal skills, namely, teamwork or collaboration, communication, co-ordination, and time management. Extending this area of concern to professionals leads to increasing project-based and team-based activities that are grounded on sharing of tasks and responsibilities. The end goal is aimed at lessening individual competition that has been well entrenched in almost all working environments in different centers of learning and professional endeavors.

2.2.1. Benefits to Students, Teachers, and Institutions

Collaborative learning is learner-centered or student-centered. As mentioned earlier, students are the active agencies who are provided the courseware to complete assigned tasks in collaboration with others. Towards this end,
students become “thinking” individuals. Working closely with others promotes critical thinking, develops higher level of cognitive skills, and communication skills. It also fosters metacognition among students as well as improves recall of text content. Because students are actively involved in the learning process, teachers allow them to do the exercises that are less restricted. Collaborative learning also reduces tension by increasing students’ persistence to accomplish the tasks. In its wider application, collaborative learning appropriates students the ability and freedom to solve problems using new techniques that they can discover by themselves. Weaker students are assisted by advanced students in an atmosphere of trust. Through teamwork, learning is shared among themselves (Panitz 2000).

In collaborative learning environment, teachers and staff are introduced to a range of themes, topics, and topics for students to complete. A wider range of resources through various online links result in a more dynamic engagement between students, teachers, and staff (Nobel 2002). The benefits of CL are outlined and summarized (Panitz 2000). CL is used to personalize large classes to encourage students to participate. It promotes understanding among teachers and staff and provides teachers to explore on assessment techniques aside from the traditional exams or tests after each lesson.

Wilson (2005) justifies that CL has benefits to institutions. These benefits include Return of Investment, Deployment of Technology, and Frameworks of Collaboration.

2.3. Collaborative learning tools and features

Ab –Rahman (2006) shows classification tools and features of CL applications with WeRcLeA (the reviewing tool for CL applications). Based on this Research that derived from the summary of the reviews of three classifications (Kaye (1995), Landon (2002), and Koschmann (1996)) the four aspects are found. The four categories of tools for learners are:

- Communication tools (Asynchronous (Group email, Announcement, Calendar, Discussion forum) and Synchronous (Chat, Shared Whiteboard, Application sharing, Virtual space, Voice chat, Video conferencing))
- Shared repository tools (Search Facility, curriculum objective/Syllabus, Shared Bookmark, Real-time data, data collection, List of projects, Frequency Asked Questions (FAQ))
- Group learning tools (Project Space or Group space, Personal space, Group Forming, Negotiation, Expert Services, Presentation and Submission, Online guide, Wiki)
- Assessment tools (Self-reflection, Self-assessment, Group-assessment, Progress Tracking, Online Survey)

2.4. Collaborative Learning Applications Software

Collaboration that is channeled through a network of systems needs the appropriate and effective software. This software is known as groupware or workgroup systems. As the name suggests, the system is specifically designed to assist people who are involved in group-based activities or tasks. Thus, collaborative software is the heart of computer supported cooperative work. This means that without a computer (or its equivalent), collaboration is not possible.

2.4.1. ATutor

In the education sector, one of the collaborative types of software is highlighted because of their collaborative nature involving teachers/lecturer and learners/students. This software is also called Open Source-based Learning Content Management system (LCMS). Used in many contexts, ATutor enables users to do a number of activities through this software. The services of ATutor include online course management (for instance, students can choose their subjects with being physically present in the school), in-house or continuing professional development (a good example would be the sharing of lesson plans and other reading materials to other colleagues), career development (teachers do collaboration with students by being good models on how they could plan their future careers), and academic research. In every institution, research is important. Through ATutor, lecturers can post their research projects and work collaboratively with other colleagues. Another unique feature of ATutor is its open accessibility to people with disability, specifically the visually-impaired. In terms of its suitability for educational use, software is designed to evaluate its affectivity based on the criteria set by The American Society for Training and Development (ASTD). Because of its multifarious benefits, ATutor is internationally used and translated in different languages. The software is distributed under one of the OSI-approved licenses.
3. METHODOLOGY

This research focuses on evaluating of ATutor based on the importance and essential of the tools and features for users in supporting Collaborative Learning and Teaching activities and it also concentrates on its tools and features, CL application suitable for supporting learners’ and teachers’ collaborative activities from their views. The methodology used in this research follows the steps written below:

- Getting information from Literature reviews on
  - Studies of collaborative learning
  - Suitable tools and features of collaborative learning
  - Existing CL software: ATutor

- Preparing ATutor workshop
  - Install the software
  - Arranging two meeting for describing ATutor and its tools and features
  - Describe the software for students and teachers online
  - Joining students and teachers to system
  - Make the evaluation form for learners and teachers based on the tools and features of the software
  - To distribute and return the evaluation forms by the system
  - Obtain weighted average values of the features and tools of CL application, Mean Value for users, based on the evaluation form

- To evaluate the existing tools and features of ATutor from users’ view

3.1. The Meetings

To gather suitable the user evaluate form for ATutor, we arranged two meetings each taking 1.5 hours (one period), with two classes of Grad 11 (containing 25 and 22 students) and two classes of Pre University (containing 10 and 8 students). We followed these items in each meeting

- Introducing CL software for using in learning and teaching area
- Explaining each CL tool and feature for learners
- Introducing ATutor for collaborative learning in education area
- Showing the system with features and tools.

3.2. Data collection and Analysis of the evaluation forms

From 65 students and 10 teachers in Educational Complex of Imam Khomeini in Kuala Lumpur that had involved in the meetings, only 26 students and 4 teachers participated in online workshop. The evaluation form was analyzed and the following values were calculated:

**Weighted Average Value (WAV) of each feature and the Mean Value for learners and teachers:**

\[
WAV = \frac{P + 2Q + 3R + 4S + 5T}{30}
\]

Where P, Q, R, S and T are the number of responses for the Likert Scale 1, 2, 3, 4 and 5 respectively and 30 is the total number of responses.

**Mean Value for each part of System Evaluation and User Interface Evaluation**

The mean value of each category of parts is calculated by the following formula:

\[
\text{Mean Value} = \frac{(WAV_1 + WAV_2 + WAV_3 + \ldots + WAV_n)}{n}
\]

Where n is the maximum number of objects in that category of parts.

3.3. The Workshop

We organized online e-learning workshop for supporting our research and it involved invited students and teachers of Educational Complex of Imam Khomeini in Kuala Lumpur. We had invited 65 students and 10 teachers for our online workshop but only 26 students and 4 teachers attended online workshop from all of invited users. Duration of online workshop was about two hours from 7 to 9pm. In during the online workshop, evaluation form via evaluation course was sent to users who attended online workshop. They returned them back by the system after one day.
Fig. 1. Home

Fig. 2. Chat

Fig. 3. List of users
3.4. The User evaluate Forms

One form of questionnaire that is being two-page structured consisting three sections was made for learners and teachers in order to find the evaluation of ATutor and its tools and features. Section I measures the general details and users’ satisfaction of using CL applications. Section II, measures the system evaluation that is to test the system usability. In this part, the tester requires to rank the use ability of A Tutor’s functionality according to the use ability, criteria of “efficient to use”, “easy to remember how to use”, “easy to learn”, “safe to use”, and “have good utility”. While the second part of evaluation form is concern with the system functionality, the third section is user interface evaluation that is focused on the non functional requirements, such as user interface design and performance. The end of this part is free response feedback.

4. RESULTS AND DISCUSSIONS

The results of this research are divided in three sections of the user evaluation form.

The Result of Section I

This section obtained general details. There were 13 questions for users. Some questions required general data, such as age, gender. There are questions requiring details related to the research, as well. The important statements are listed in Table 1.

<table>
<thead>
<tr>
<th>Statements</th>
<th>users’ Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Having computer at home</td>
<td>100</td>
</tr>
<tr>
<td>2- Having computer at school</td>
<td>100</td>
</tr>
<tr>
<td>3- Using computer every day</td>
<td>80</td>
</tr>
<tr>
<td>4- Using Internet every day</td>
<td>80</td>
</tr>
<tr>
<td>5- To like using computer in group activities</td>
<td>80</td>
</tr>
<tr>
<td>6- Not to like traditional learning</td>
<td>80</td>
</tr>
<tr>
<td>7- To like to communicate together through the Internet to do the homework</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 1 shows that most participants like to use computer and technology in learning and teaching fields. They are also interested in sharing activities and tasks and like to engage to CL applications for learning and teaching.

The Results of Section II

This section obtained the system evaluation. The results were analysis and summarized in table 2.

<table>
<thead>
<tr>
<th>System evaluation</th>
<th>Weighted Average Value (WAV) for Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Email (teacher/students are able to send message or information to students/teachers.)</td>
<td>4.1</td>
</tr>
<tr>
<td>2. Announcement</td>
<td>4.5</td>
</tr>
<tr>
<td>3. Discussion forum (it is a threaded online text conversation between participants.)</td>
<td>4.5</td>
</tr>
<tr>
<td>4. Chat</td>
<td>4.7</td>
</tr>
</tbody>
</table>
5. Search Facility (you can search in the web site or in www)  

6. Shared bookmarks, hot lists or suggested resources archive (provides motivation for discovering websites and encourages sharing of knowledge)  

7. Categorized list of projects (this gives opportunity for students to explore themselves thus giving authority to students to decide on the project to work on.)  

8. Syllabus, Curriculum objectives and upload shared repository by teacher  

9. Frequently Asked Questions (FAQ)  

10. Personal Workspace (it is a space for every student that they involve in projects and courses according to different setting and subjects.)  

11. Group Forming (there is possibility of broader choice of members)  

12. Wiki (a wiki is a collection of Web pages designed to enable anyone who accesses it to contribute or modify content.)  

13. Presentation & submission by students  

14. Online guides and support or advice on demand  

15. Self-assessment  

Mean Value 4.37

Table 2 shows that all the functional requirements of the system exist are very applicable as the WAV obtained in all seems to exceed 4.00. Search Facility and Group Forming are rated to be the lowest with 3.7 point. The mean value 4.37 proves that the functional requirements of the system are appropriate for users.

**The Results of Section III**

This section obtained the User Interface Evaluation. The results were analysis and summarized in table 3.

**Table 3: The output of user interface evaluation**

<table>
<thead>
<tr>
<th>User Interface evaluation</th>
<th>Weighted Average Value (WAV) for User</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hyperlink and navigation between WebPages</td>
<td>4.7</td>
</tr>
<tr>
<td>2. Background colors</td>
<td>3.5</td>
</tr>
<tr>
<td>3. Arrangement of information</td>
<td>4.5</td>
</tr>
<tr>
<td>4. Text style</td>
<td>3.5</td>
</tr>
<tr>
<td>5. Text color</td>
<td>3.9</td>
</tr>
<tr>
<td>6. Download/Upload time</td>
<td>4.6</td>
</tr>
<tr>
<td>7. Aesthetic design</td>
<td>3.9</td>
</tr>
<tr>
<td>8. Internal consistency (logo, font, label,..)</td>
<td>3.9</td>
</tr>
<tr>
<td>9. Information visibility</td>
<td>4.5</td>
</tr>
<tr>
<td>10. Header design</td>
<td>4.2</td>
</tr>
<tr>
<td>11. Footer design</td>
<td>4.2</td>
</tr>
<tr>
<td>12. As overall, what do you think about the system’s interface</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Mean Value 4.16

Table 3 shows that all heuristic evaluation of the system is very useful as the WAV obtained in all seems to exceed 4.00. Background color and Text style are rated to be the lowest with 3.5 point. The mean value 4.16 proves that heuristic evaluation of the system is appropriate for users.
5. CONCLUSIONS

Based on this research, the functional requirements and the non-functional ones which are shown in section II and section III have Mean Values of 4.37 and 4.16 respectively. As indicated, these Values exceed the average of 4.00; which means that the usability, user interface design and performance of the system are very well designed. Although some weaknesses are seen as well, these include Search Facility, Group Forming, Background colors and Text style. For further improvements of the system, these weaknesses should be considered. In the final analysis, this system is more preferred and convenient to be used particularly by Secondary Schools.

REFERENCES


