Using Web-Based Course to Enhance Educational Process at Jordan Universities – A Case Study

Samir A. El-Seoud, Baha Al-Khasawneh, Arafat Awajan

Using Web-Based Course to Enhance Educational Process at Jordan Universities – A Case Study

Professor Samir A. El-Seoud, Dr. Baha Al-Khasawneh and Dr. Arafat Awajan

Princess Sumaya University for Technology (PSUT), IT-College, Computer Science Department
Amman - Jordan

Key words: *Web-based learning, Moodle, E-Learning*

Abstract

This paper shows that the use of web-based instruction in IT undergraduate distance-learning program is one vivid demonstration of the potential of using technology in instruction. The paper also shows that using web-based course strongly contributed to the effectiveness of distance learning by improving the quality of students' comprehension in areas of critical thinking, problem solving, decision-making ability, aptitude for detail, written communication, knowledge of information, and ability to organize and analyze. Currently at PSUT, an e-learning system based on the open source Moodle platform has been implemented to aid the university in delivering such educational contents. A survey evaluating the outcomes of the e-learning system has been conducted among more than 160 PSUT students involved in this e-learning education. It showed that the web-based course is very promising not only for IT education programs, but also for other disciplines such as humanities and Engineering. The web-based course offers many advantages over only traditional class room course, such as, fast feedback time, protection of students' identity, and elimination of bias of students' response with their grades.

I. Introduction

E-learning and the delivery of educational contents via the internet is gaining great deal of interest locally and internationally. In Jordan and in many other countries, universities face many problems in delivering their educational programs. These problems are mainly related to the cost, availability of facilities and shortage of professors. Using new technologies such as e-learning and web-based authoring tools in delivering the content of educational programs may solve many of these problems. We thought that using one of asynchronous distance education delivery systems could be helpful to bridge the gap and provide institutions with various possibilities for implementing asynchronous distance education delivery.

The search for excellence in teaching normally involves a large amount of complex work. Familiarity with and application of instructional design principles in the preparation and delivery of course material do not guarantee success; course assessment must also allow for the evaluation and, if necessary, modification of instructional design. To this end, course assessment must incorporate at least three dimensions of the educational process: the instructor's perception, the student's perception, and the student's performance. The instructor designs and delivers the course material and perceives the effectiveness of educational strategies by reading the student's reactions. This assessment can be formative, performed during the offering of the course, or summative, done at the end of the course [9]. The most

common method of obtaining the student's perception is summative, performed as a capstone activity at or close to the end of the course. The student's performance, or learning achievement, may be evident throughout the course in "homework, tests, and class discussions," but in many classroom activities learning "is fugitive, recordable only at great cost and inconvenience" [13]. However, Web-based tools can facilitate course assessment by transforming a dauntingly cumbersome task into a feasible one, thereby making possible an interactive approach to course assessment.

For the purposes of the work, the examples are based on programming, multimedia, and online-Internet production courses that we taught at PSUT in the fall of 2006. The courses have been conducted at PSUT in parallel as web-based courses and traditional face to face classroom courses.

Effective teaching is always an intriguing topic to educational professionals. However, intellectual stimulations in traditional classroom education can be irreplaceable using this web-based education system. It is critical for educators to obtain course evaluation to determine how successful and effective a course is taught in the classroom. Teaching evaluation is as important to instructors as to their students, and is equally critical as students' ability to grasp knowledge. American Board Engineering and Technology (ABET) accreditation guidelines recommend engineering education evaluation as a three-loop process [10]:

i. process of teachers evaluating students,
ii. process of students evaluating teachers,
iii. Process of employers evaluating students.

These three-way evaluations provide a full feedback to determine how effectively a student can apply the material learned into real world applications. Most universities can determine the outcome of process (ii), because students are available in the school. This evaluation process is direct, and is conducted in possibly two ways:

1. paper-based evaluation,
2. Web-based evaluation.

The paper-based evaluation is often conducted at the end of the semester, as it is currently applied at the PSUT. The method is time consuming with slow feedback response. In addition, questionnaires are often outdated with rapidly changing student population and instructional technologies. Furthermore, the results are often too late for faculty member to make appropriate changes in the classroom. The web-based course evaluation is more adaptable to the rapid and continuous changing in student population and technologies, along with the additional advantage of instant feedback. However, reference [11] disagreed that a web-based survey could improve faculty members' teaching styles. The author's argument was that a course survey cannot affect faculty teaching style, but teaching workshop and other measures may be the solution. At the same token, this argument is also applied to the paper-based evaluation system. The web-base survey is advantageous since appropriate course specific questions can also be added in the questionnaire. These benefits of using an online course survey are apparent: fast feedback cycle (sending students' comments as email), and ease of statistical analysis.

Students' responses from a course evaluation can be statistically analyzed to determine how effective an instructor is/was in a course. However, improper analysis can hurt an instructor reputation if the responses are biased, especially in a smaller sized survey. It is a problem in many university campuses that faculty members are unable to truly evaluate the students' performance. The students do not often learn what they should have learned, rather they learn mostly for an

acceptable grade. The education goal is sometimes compromised due to this problem so that course survey does not help.

II. Background

E-learning

E-learning is gaining more and more interest at all levels of education due to the unlimited resources and services it provides. While it is known as “the use of electronic technology to support, enhance or deliver learning.” It includes online courses, courses on CD-Rom, classroom based courses using video, audio or CD-Rom as well as informal learning and communicating using email and the internet. Simply put, e-Learning is an umbrella term that describes learning using technology, giving us the opportunity to learn almost anytime, anywhere. The aim of all this is to make learning more interesting, flexible and tailored to individual needs.

Web-Based learning

Web-based learning (a major subcomponent of the broader term "e-learning") is one of the tools with which education is delivered. In traditional academic institutions, web-based learning systems are generally housed administratively in a "distance education" department alongside other at-distance delivery methods such as correspondence, satellite broadcast, two way videoconferencing, and videotape and CD I ROM/DVD delivery systems. All such systems seek to serve learners at some distance from their learning facilitator. Many such systems attempt to serve learners interacting with the learning source at different chronological times (for example, email). Distance Education, then, is often referred to as those delivery modalities that seek to reduce the barriers of time and space to learning, thus the frequently used phrase "anytime, anywhere learning". Be careful, however, with that euphemism as not all topics or learning goals lend themselves to "anytime" as a delivery method [1] [2].

As the field is evolving rapidly, it offers several different ways to categorize or think about web learning tools and strategies as a preface to listings of the tools and resources.

In the last several years, terms such as Web-based instruction, computer conferencing, asynchronous learning networks and online threaded discussion groups have become familiar to many faculty and staff in higher education settings. Although most faculties believe that the use of computers in the college classroom can enhance learning, they also cite technology as a source of stress. With the wide spread popularization of Internet and Web-based technologies, teaching online has increased significantly with one report showing almost a 40% increase in distance education courses and use of corresponding technologies from 1995 to 1998. University faculty navigates a steep and continually changing learning curve to keep pace with the explosion of new online tools that are appearing almost daily. In the quest to incorporate innovative instructional solutions, many faculties in higher education are experimenting with online technologies long before they have been thoroughly tested in the classroom or in research studies.

Asynchronous learning tools that provide computer conferencing capabilities have been integrated into many current Web-based course development software applications (e.g. WebCT, CourseInfo, Web Course in a Box, etc.) permitting higher education faculty to easily integrate Web resources and online discussions into their courses. However, recently the focus in the literature related to Web course development has shifted to what is more difficult to grasp, the strategies and techniques to use these tools effectively for learning. Faculty are motivated to integrate these type of tools into their teaching by factors such as the opportunity

to use technology, develop new ideas and improve their teaching. Without specific guidance based on sound instructional principles however, faculty may indeed perceive the use of these tools as added stress and not a vehicle to improve their teaching [3].

Figure 1 below shows the relation between a web-based course and a virtual class room as well as the connection between teacher and students

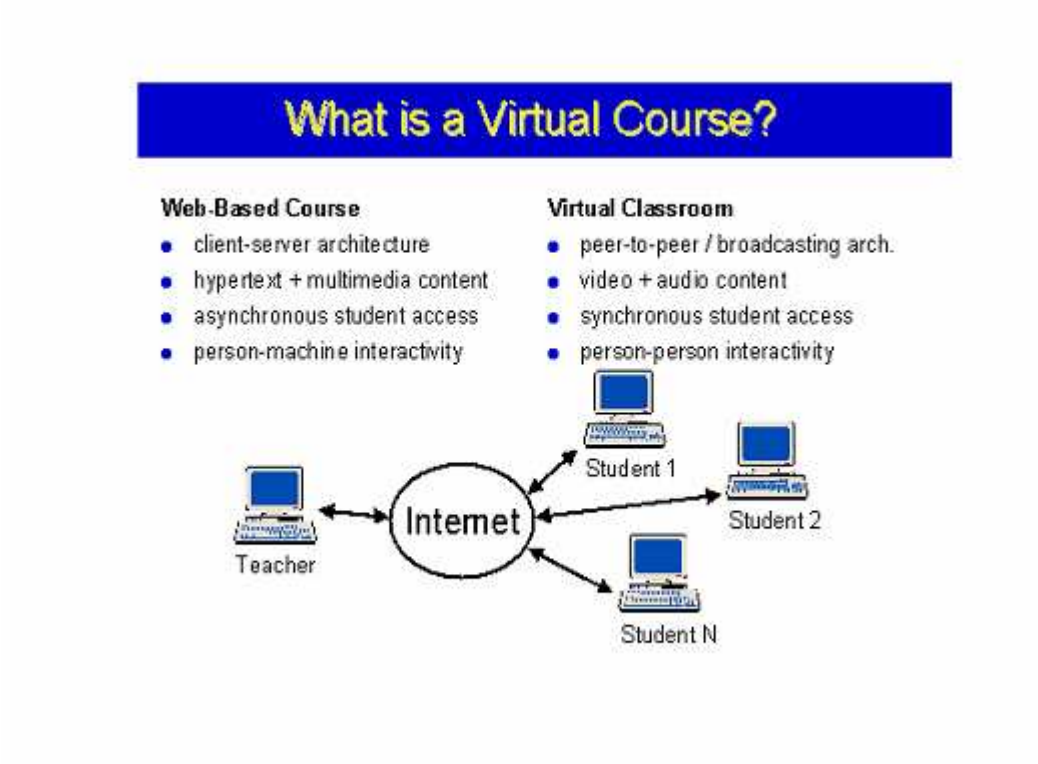

Figure 1 Virtual course interaction layout

Benefits of Web-Based learning

- Use the Web as a "mega" library: no local library may now compete with the Web as an information source, at least regarding the quantity of information available.
- Use IT to learn about IT: many students have poor skills on the technical side of IT. One of the objectives of the course is to get them to the point where they will be able to make efficient decisions about IT implementation. They are encouraged to search for this information on the Web, and then to join them to the models developed in the local course.
- Better understand the problematic of document information management
- Increase the part dedicated to auto-training [4].

Guidelines for developing a Web-Based course

When developing a web-based course there are four stages that must be considered.

1. **Analysis:** This is very important as it is crucial that careful thought be given as to whether the course should be developed at all.

2. **Planning:** This involves planning the course. It is imperative that the course will be educationally sound as well as utilizing one of the major benefits of the web interactivity.

3. **Course Development:** The greater challenge for a writer of online course material is not only to keep the user interested by abiding by known three principles of scannability, conciseness and objectivity, but also to present the content in such a way that it is meaningful and promotes effective learning. It is imperative that all the lesson content is presented in a clear and meaningful format suitable for the web. If a student is confused in a classroom environment they can raise a hand and ask a question but an online student is distanced not only geographically from the lecturer but also by time.

4. **Running the course:** This is the ongoing management of the actual course and the students, this involves posting up weekly lessons and interacting with the students online.

III. Aims

The goals of our study case are to better explain the need for web based courses and to measure the degree of acceptance of such method among the different users. We had conducted a survey among PSUT students of different fields and reported on their assessments. Also, one of the purposes of this paper is to provide some food for thought about the roles Web-based tools can play in the active learning process, interactive assessment, and closing the feedback loop in course assessment.

From the simple task of presenting a course syllabus available online to the complete delivery of instruction at a distance, Web-based environments are gaining popularity because they appeal to students, are flexible, and facilitate new kinds of learning. Used as support for face-to-face instruction, Web-based environments can be instrumental in enhancing student-centred approaches. The paradigm change from students as passive receptors of data to students as active learners, well explored in "Seven Principles for Good Practice in Undergraduate Education" [12], can be facilitated by a Web-based learning environment provided by a course management system like Blackboard, WebCT, or Moodle.

As we mentioned before, Moodle's modular design makes it easy to create new courses, adding content that will engage learners. Over 1150 organizations in 81 countries had registered Moodle sites by April 2004 [6]. This number is growing by about 10% each month as educators and trainers learn the value of implementing open source Moodle.

Moodle is an ideal online learning solution for: K-12 Schools, Colleges, Universities, Governmental Agencies, Businesses, Trade Associations, Hospitals, Libraries, and Employment Agencies.

IV. Techniques and survey results

The online course management system was used to make available the course syllabus, the class assignment rubrics (guidelines plus evaluation criteria), and the weekly class agenda. The calendar tool was employed to inform students about on-campus events, conferences, and other resources that we thought might be of interest to the students. E-mail and bulletin board tools were used for communication between instructor and students, students and instructor, and students and students. Students could monitor their progress by accessing their grades for every activity that had a grade associated with it. Reading quizzes, class surveys, and final course evaluation were also made available online.

The 7 figures below show the result of web-based course evaluation for the programming, multimedia, and online-Internet courses completed by almost 160 students at PSUT in fall 2006.

In sections 1 and 2, the scaling has been ranged from:
1=bad to 10= Totally confident

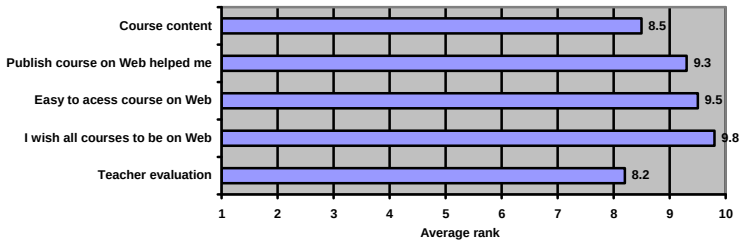

Figure 2. Course Evaluation

The above graph unquestionably shows that students have good evaluation for the approach of having web based projects and the ease of use. However, the content and the teacher evaluation is lacking behind. These results unmistakably emphasizes the need for better content and better delivery of such content by instructors.

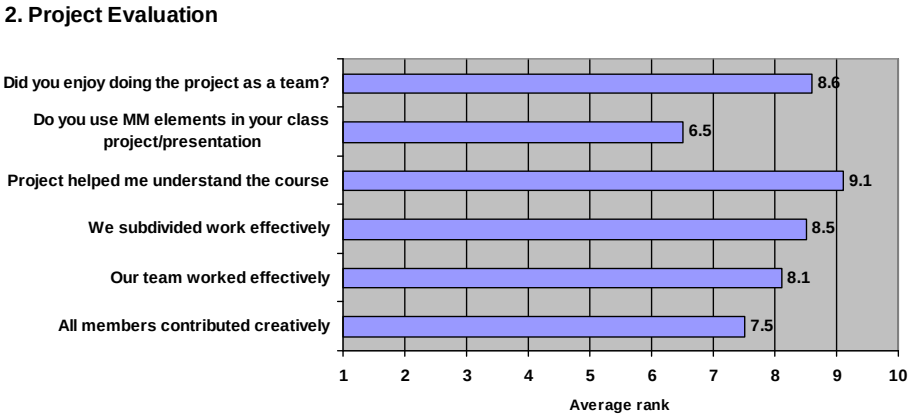

Figure 3. Project evaluation

The project evaluation clearly shows that the quality of cooperation among group memebers has helped in the completion of a succssful projects. However, almost two thirds of the projects were lacking the use of multimedia elemnts in their projects. This might be due to the additional requirements that would be added to the project overall constraints in terms of time,cost, and students experties.

In section 3, the scaling has been taken to be as follows:
1= strongly disagree 2= Disagree 3= Neutral
4= Agree 5= strongly agree

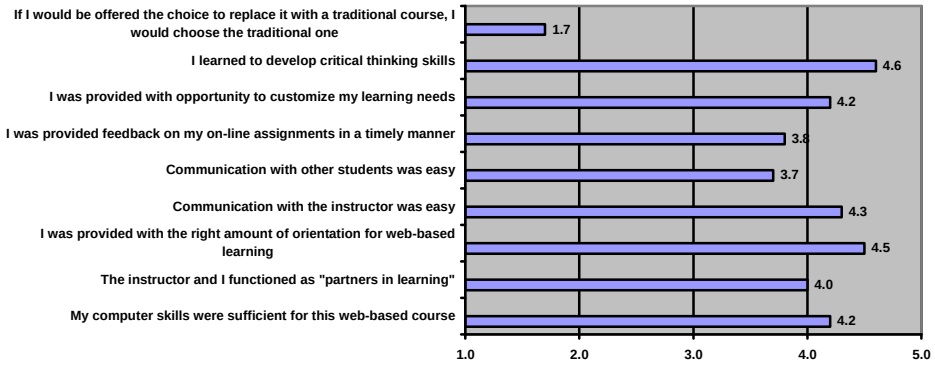

Figure 4. General feedback on the Web course in this web-course

In the general feedback on the web course evaluation, the results show a strong encline topward the web based course over the traditional ones. Nevertheless, this approach according to our sample lacks the ease of communication among colleges, and the appropriate feedback from instructors.

In sections 4 - 7, the scaling has been taken to be as follows:
1= strongly disagree 2= Disagree 3= Undecided
4= Agree 5= strongly agree

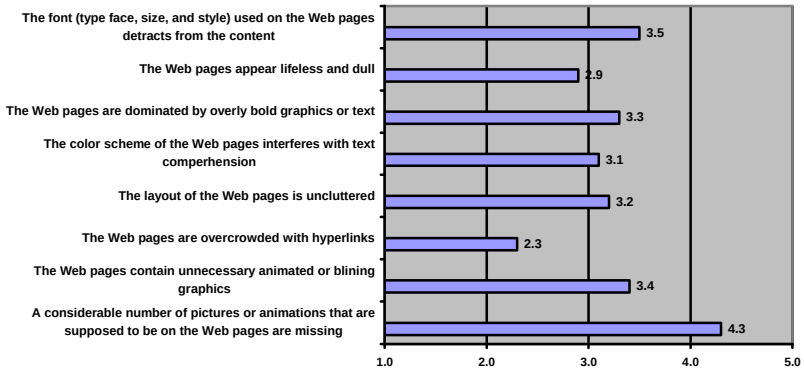

Figure 5. Appearance of Web Pages

As for the design of the web pages provided for students, this graph shows that the way content was laid did not meet the expectations of our sampled students and better design is in need.

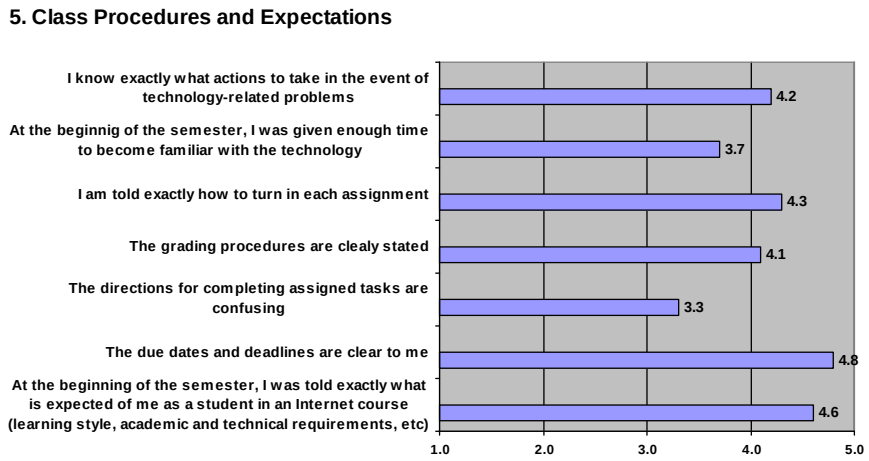

Figure 6. Class procdures and expectations

Students expectations and thier knowledge of procedures in dealing with web based classes shows more that 80% of our sample know these procedures, or find it easy to follow the logical steps of such navigation. Despite this fact, the directions for assignment completion was confusing and not enogh time was given to familiaries the students with the proceudres or what was expected from them.

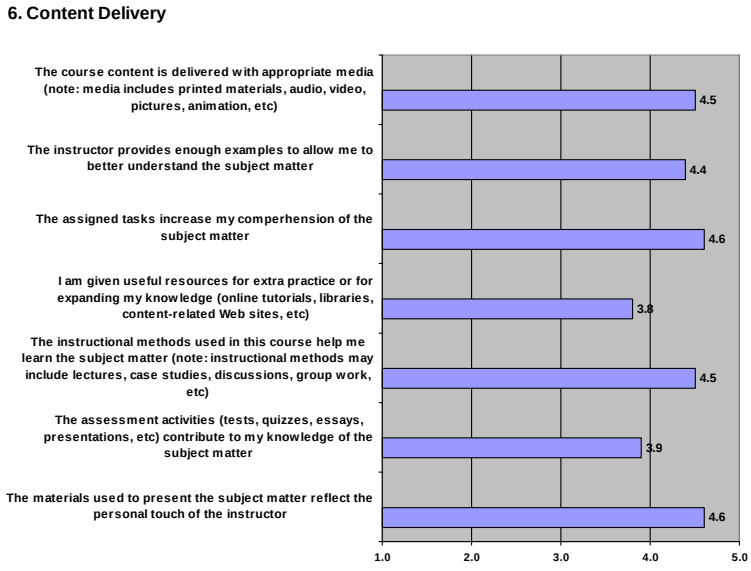

Figure 7. Content delivery

Our study clearly shows that the lack of additional or more appropriate resources affected theundersatnding of the provided materials and the assement activities did not contribute greately to the knowledge of the subject matter. While the content should be general in its design many felt that the content reflected the way certain instructors approach the subject matter.

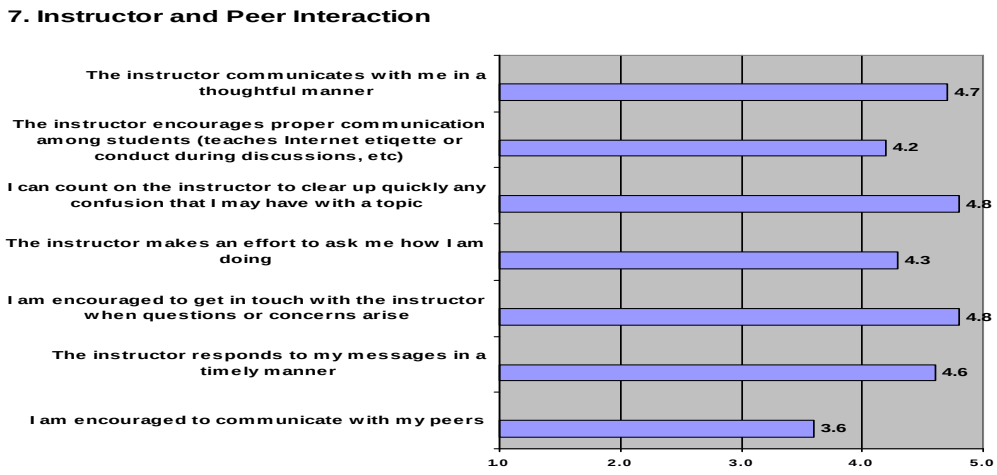

Figure 8. Instructor and peer interaction

This graph shows that despite the fact that almost 90% of the sample has good feed back on the interaction with instructors, this approach did not encourage students to communicate among themselves.

V. Conclusion

In traditional as well as Web-based courses there is a gap between what is taught and what is learned. Reid [1] mentions that methods of assessing the teaching and learning experience in online education are in high demand but short supply. No measurement yet exists that would adequately evaluate how well a faculty member performs in a virtual classroom. Angelo and Cross [7] observe that by cooperating in assessment, students reinforce their grasp of course content and strengthen their own skills at self-assessment. Furthermore, student motivation is increased when they realize that faculty are interested in their success as learners. To achieve pedagogical improvements in interactive Web environments for assisting teaching and promoting learning, faculty can empower themselves by using technologies to facilitate a proven educational process of receiving and acting on feedback from learners.

We designed and launched an online easy-to-use course survey in the IT College at PSUT. It provides instantaneous feedback to the instructor about the course as well as the instructor. Most importantly, we develop a method to identify the biasness that may occur in students' course evaluation. This technique introduces a two dimensional analysis process that may be more appropriate for course evaluation.

There are many things that could be interpreted from the analyzed result. We can draw the conclusion that web-based courses are preferred among students rather than traditional classroom courses. The survey results may also show if the students are interested in the subject area covered in the course. Other inferences are needed to be studied and understood in future work.

This analysis can also help us to understand how well the web-based course has been taught by the instructor. In this tool, we can design some criteria to determine the teaching effectiveness. This method removes the fear that the faculty members have to give better grades to students in order to get good course evaluation result.

REFERENCES

[1] Valeria Mirabella, Stephen Kimani, Tiziana Catarci**,** Accessibility: A no-frills Approach for Accessible Web-based Learning Material. Proceedings of the 2004 International Cross-Disciplinary Workshop on Web Accessibility (W4A) W4A 2004**.**

[2] Christina Brodersen, Bent G. Christensen, Kaj Grønbæk, Christian Dindler, Balasuthas Sundararajah ,Web-based Educational Applications: eBag: a Ubiquitous Web infrastructure for nomadic learning**,** Proceedings of the 14th international Conference on World Wide Web**,** May 2005.

[3] Dushyanthi Hoole & S. Ratnajeevan H. Hoole, "Web-based Teaching: Infrastructure Issues in the Third World".In Anil Aggarwal (Ed.), "Web-Based Learning and Teaching Technologies: Opportunities and Challenges", Idea Group Pub., 2000.

[4] Liliane Esnault & Romain Zeiliger, "Web Learning with Nestor: The Building of a New Pedagogical Process". In Anil Aggarwal (Ed.), "Web-Based Learning and Teaching Technologies: Opportunities and Challenges", Idea Group Pub., 2000.

[5] William Horton, "Designing Web-Based Training: How to Teach Anyone Anything Anywhere Anytime", John Wiley & Sons, 2000.

[6] http://moodle.org/sites.

[7] Angelo, T., and Cross, K. 1993. Classroom Assessment Techniques, a Handbook for College Teachers (2nd ed.). San Francisco, CA: Jossey-Bass Publishers.

[8] Reid, J., Jr. 1997. "Measurements in online study: Items useful in quantifying pedagogical, social and technical issues." Retrieved November 3, 1998 from the World Wide Web: www.caso.com/articles/reid05.html.

[9] Worthen, B. R., & Sanders, J. R. (1987). Educational evaluation: Alternative approaches and practical guidelines. White Plains, NY: Longman.

[10] Standard Process 00 – Three Loop Assessment/Evaluation Structure, Available on-line: http://ceaspub.eas.asu.edu/mae-ec2000/PDF_documents/standard_processes/sp00.pdf, accessed August, 2003.

[11] Michael Theall. Electronic Course Evaluation Is Not Necessarily the Solution. The Technology Source, November/December 2000, Michigan Virtual University. Available on-line:
http://ts.mivu.org/default.asp?show=article&id=823, accessed August 2003.

[12] Chickering, A., & Gamson, Z. (1987, March). Seven principles for good practice in undergraduate education. AAHE Bulletin, 3-7.

[13] Keith, S. Z. (1996, June). Self-assessment materials for use in portfolios. Primus, 6(2), 178-192.