

Learning systems for an asynchronous online course

Vishal Iyer
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Michigan State University

I. Introduction

The aim of this research is pre-production for a 'learning system' for an online course. Online courses have the obvious advantage of learning independent of space. They could either be 'synchronous' (wherein the students attend lectures online), 'asynchronous' or anywhere in-between the spectrum. Each type serves its own purpose. This research deals with the courses that range from 'asynchronous' to 'predominantly asynchronous'. These courses have the added advantage of learning independent of time.

The challenges posed by an asynchronous online course are interesting owing to independence of time and space. The process of learning, interactions between the instructors and the students and between the students themselves differ from a physical class. Hence the need of new design paradigms that are true to its nature and create a system that not only 'teaches' effectively but also maximizes the advantages of it being 'online'.

II. Methods

1. Secondary Research

The content in this section is derived from the plethora of research conducted by other people in the field of online education. Issues ranging from pedagogical approaches to design of Computerized Learning Environments are discussed. The current research in this field is both fascinating and voluminous. The matter presented in this paper is edited to be as concise as possible, while simultaneously making an effort to provide all relevant information.

2. Ethnographic observation

Observing any system 'naturally' can be a surprisingly enriching experience. The process and inferences derived from them are briefly summarized in this section. The sample chosen for this process are three online courses conducted by Michigan State University and Lansing Community Colleges. They are:

- Design Theories (TC816) at Dept. of Telecommunication, Michigan State University.
- Packaging Theory (PKG815) at Dept. of Packaging, Michigan State University.
- Shakespeare (ENG 301) at Dept. of English, Lansing Community College.

(Note: The names of the courses have been changed, the department and class level haven't)

All the mentioned courses could be classified as asynchronous (PKG815 and ENG301) to predominantly asynchronous (TC816). TC816 had a few online chats and an online focus group.

3. Interviews

In-depth one-on-one interviews were held with one student each from the three courses mentioned in the previous section. This was intended to obtain personal insights, preferences and peeves of

students who had taken online courses.

4. Focus Group

The focus group was conducted by Carrie Heeter, Instructor of TC816 (Dept. of Telecommunication, M.S.U) and the report generated by the author. It tackles with issues that are specific to the course as well as other general issues like the Course Management System, content organization and Interactions.

5. Prototype/ Conclusions

The prototype is the solution to the equations derived from the various methods discussed above. It is a description prototype detailing the features of the proposed learning system.

III. Secondary Research

Introduction

Online education has come of age. Today, hundreds of universities and colleges are offering individual courses and degree programs online via the Web. Such academic offerings provide students with an important advantage in that they can take coursework at any higher education institution, or pursue studies at their local college or university without having to come to campus. Such flexibility is essential in creating distributed learning environments (Oblinger & Maruyama, 1996) that can increase students' opportunities for learning and academic achievement. It is estimated that 1.5 million students took part in online education in 1998 (National Center for Education Statistics, 1999); that figure continues to grow and more higher education institutions are increasing their offerings of online classes and entire programs of study on the Web (Smith & Diaz, 2004).

Theories

Learning system designs that adopt a traditional instructional design paradigm do not offer suitable support in performing these new learning tasks. Applying a traditional instructional design paradigm in Computerized Learning Environments or CLE's is just like implementing old solutions to new problems. This way makes CLE courses nothing more than a set of classroom lecture materials presented through the Web. They simply lack basic design considerations (e.g., analysis, synthesis, evaluation, and the underlying learning theory) (Abdelraheem, 2003).

New instructional design paradigms should offer guidelines for the design of learning environments that provide suitable combinations of challenge and guidance, of empowerment and support, as well as of self-direction and structure (Reigeluth, 1996).

Concerning the theoretical bases, three schools of thought have been widely used: *behaviorism*, *cognitive psychology*, and *constructivism* (Villabla & Romiszowski, 2001). Among these theories, constructivism has been acknowledged to be the most suitable one for CLE's (Hung, 2001; Hung & Nichani, 2001).

This theory sees effective learning as not merely involving absorption of information, but rather as a gradual process of actively constructing knowledge (Salomon, 2000). To accomplish this, the learners are

requested to be, among other things, active participants in designing the learning process and its outcomes (Chambers & Sprecher, 1980; Bruner, 1990).

A significant problem for instructors and students is that the level of *interactivity*, between and among students and the course contents, may be difficult to achieve online (Guernsey, 1998). Interactivity is conceptualized as a vital learning process (Tu, 2000), and the level of interactivity, according to Muirhead (2001) has an impact on the quality of computer-mediated instruction. Interactivity has been defined as two-way communications among two or more persons (Hillman, Willis, & Gunawardena, 1994), the purposes of which are to promote explanation and challenge perspectives among learners (Garrison, 1993). Northrup (2001) and others (e.g., Moore, 1989; Northrup & Rasmussen, 2000), view interactivity as that which occurs not only between students and the instructor, and students among one another, but also between students and the course contents—including the assigned texts and related instructional materials. Although, strictly speaking, students and course contents cannot “interact,” in that texts cannot respond to students, a number of educational technology advocates claim that interactivity may be present between learners, texts, and other materials and resources that are assigned to students (Bannan-Ritland, 2002; Soo & Bonk, 1998; Tremayne & Dunwoody, 2001).

In a survey of students in distance education courses for health professionals (e.g. occupational therapy, social work), Townsend et al. (2002) found greater interactivity took place when students had opportunities to communicate with their instructor rather than when working collaboratively in small groups. Students also reported that when instructors graded students’ participation, required students to post questions, or discuss case studies, then interactivity was enhanced. Larson (2002) found that student interactivity increased in an online marketing course when the instructor was frequently and actively involved in discussions (Smith & Diaz, 2004).

Further, according to Northrup (2001), interactivity must be intentionally designed into a Web-based course, as it does not simply happen because the materials and tasks are presented to students for their consumption. In fact online courses can create greater opportunities for instructors and students to interact more frequently, communicate more effectively, and collaborate on learning projects and research (Alexander, 1999; Ko & Rossen, 2004).

Piaget (1952) pointed to the need for more interaction between the learner and his or her surrounding learning environments to build better understanding. Teachers sometimes fail to create an environment for such interaction. More recently, the concept of systems approach in which the emphasis is on the individual learner as a system interacting with instructional materials entered the horizon. The idea of interaction between the learner and instructional systems stems from cognitive learning theory, constructivism, and information processing models.

As a result, new learning environments that consist of the learner and the surrounding environment in which the learner acts have come into existence. These new environments emphasize learning over teaching, calling for learner-centered systems instead of teacher-centered systems. These systems have been influenced by the movement of optimizing the use of teaching and learning resources to become more wide and inclusive (e.g., resource-based teaching and learning environments). This new vision of learning environments adopts new concepts such as interaction and cooperation between learners, facilitation, support, scaffolding, guidance, delivery systems, immediate feedback, electronic portfolio, and the use of a variety of tools and information resources to achieve goals and solve problems (Hannafin & Land, 1997; Papert, 1993).

Current literature suggests that there is a discrepancy between the body of knowledge related to learning theories, instructional design principles and research into student learning, and the body of knowledge pertaining to online learning technologies (Abdelraheem, 2003). Siragusa (2002) indicated that students struggled to identify learning strategies that worked best for them in online learning environments while they were satisfied with feedback, interaction, and the content provided by these environments. Moreover, recent research involving online education has emphasized the learners' achievement and course evaluation (Kearsley, 2000; Russell, 1999). In addition, research shows that online learning promotes self-learning and develops an understanding of learning styles (Hoven, 1999).

Conclusions:

Levin, Waddoups, Levin, and Buell (2001) identified five dimensions that contribute to effective online learning. These dimensions include using relevant and challenging assignments, having coordinated learning environments, providing adequate and timely feedback from instructors, developing rich environments for student-to-student interaction, and flexibility in teaching and learning.

There is, however, another dimension that also may be important to effective student learning in the online environment. The ways in which student interactivity, or engagement, is fostered within a course is also critical (Berge, 1999; Lally & Barrett, 1999; MacKinnon, 2002; Northrup, 2001). Instructional strategies that can support and extend learner engagement must be carefully considered. Interactivity goes beyond simply having students discuss ideas or critiquing articles in a real-time chat room or an asynchronous discussion board (Northrup, 2001). The instructional environment must be arranged so that students can read, critically reflect, discuss, argue, generate and present new interpretations, and share and exchange information and ideas (Smith & Diaz, 2004).

Evidence from several studies, however, suggests that online discussion often fails to adequately engage students in learning (Williams & Pury, 2002). The depth of student learning is likely to vary depending upon the type and purposes of the course, the nature of the discussions, and the ways that students' learning is assessed. Prompting students with challenging questions that require them to think carefully and critically about the course reading materials, or giving assignments that necessitate application (of theory), analysis (of data), and synthesis (of diverse points of view) go a long ways toward increasing the quality of student discussions. Also, different kinds of instructional strategies, feedback, and discussion questions may be useful to prompting and facilitating students' engagement with the course materials (Bonk et al., in press; Northrup, 2001; Rosenberg, 2001).

IV. Ethnographic Observations

The ethnographic observation was done around the penultimate week of each course. The online nature of the courses was an advantage as this allowed the observation of its 'flow'. Factors like content evolution, class interactions within the CMS and message boards could be observed as the CMS dated and stored each activity. TC816 and PKG815 were hosted on Angel while ENG301 was hosted on Blackboard.

In all three courses, the instructor posted materials that were divided into weekly segments. Each week's segment consisted of 'notes' pertaining to a specific topic(s). In terms of the materials posted by the instructor, PKG815 and ENG301 had only text, while TC816 had some audio clips spread throughout the course. The audio clips ranged from 1 minute to around 4 minutes and were dispersed in-between the text. All classes had assigned external readings too.

The first week's material in TC816 had elaborate introductory sessions wherein the instructor as well as the students introduced themselves to the class. It included personal photographs of the instructor and three audio clips describing her. The students were strongly encouraged to upload their photographs too and more than 20 of the 25 students obliged. In stark contrast, the other two courses had no such introductory sessions. Interestingly, the instructor of ENG301 posted a photograph of a gorilla in her profile. TC816 repeatedly used the students' name in the reading materials (dynamically within one's own login; like, "Hello Robin, welcome to week 10") and also used the views and information provided by students as a part of the content. The other two courses had neither feature.

A major difference in TC816 was the nature of materials posted. While PKG815's and ENG301's notes essentially consisted of the instructor 'imparting' knowledge: a more conventional didactic approach, while TC816 assumed a more 'discussion' type approach. TC816's notes consisted of varied types of materials including feedbacks to quizzes, information about the external reading materials and a plethora of related external links. These aspects were lacking in the other two courses. The overall interactivity of the instructor within the class materials in TC816 was really amazing and the overall feel of the class was more 'personal'. This was not the case with the other two courses.

PKG815 and ENG301 used a 'theme' that was provided by the CMS to present the material, but the TC816 instructor used custom graphics

(within the CMS's restrictions) to present the material. Also, the TC816 notes had photographs of the instructor in almost every page of content. The presentation style used in TC816 was consistent and used HTML for the content. PKG815 used a combination of HTML and MS-Word documents while ENG301 used MS-Word documents exclusively.

The organization of weekly content was fairly elaborate in TC816 with effective subdivision of the content. ENG301 had just one single MS-Word file for each week. Interestingly, the weekly reading content was placed in the assignment folder. The quality of organization of content in PKG815 was somewhat in-between the two. TC816 also used an agenda page that briefly explained the activities required for the week.

TC816 and PKG815 used message boards for communication with the class. A separate message board was created for each topic. Most message boards counted as class participation (which was graded- 20% of the total grade for TC816 and 10% of the grade for PKG815), while a 1-2 general discussion boards were created. Interestingly, neither courses explicitly mentioned quality and meaningfulness of discussions as a criteria for grading the message boards. The difference in the responses generated by the two classes is rather fascinating. In PKG815, the message board was more 'discussion' oriented- where the instructor asked a question and the students discussed the topics amongst themselves by replying to each other's posts. However the instructor did not take part in the discussion once the gauntlet was thrown. In contrast to this, the TC816 course followed a 'Question-Answer' type format. The instructor would ask a question regarding some subject matter and the students would individually respond to it. The instructor would respond back (and so on) if necessary, but there was very minimal discussion between the students of the class in these message boards.

This variation was basically due to differences in the nature of questions asked by the instructor. TC816 had questions like "Please invent a media product idea and target audience which interests you", "Invent a project and a medium where you think it would be appropriate to involve members of your target audience in the design" etc; while the PKG815 had questions that elicited debate among students. The participation in the message boards (in both courses) dropped as the course progressed, especially in the last few weeks.

TC816 had two separate message boards: one wherein the students had to post five design research related links. This was included as a part of the class participation. Around 25 messages were posted by 8 of the 25

students in the entire semester, but none of the posts elicited any response from the rest of the class. The other message board that was for general discussion generated less than 10 posts.

The ENG301 course used no message boards for discussion and there was no communication between the 'class' within the CMS.

All three courses made extensive use of group mails (mails that could be sent to the entire class or groups within the class). But this was basically done to pass on important messages like announcements, posting or cancellation of quizzes, call for group participation etc.

All the courses had weekly to fortnightly assignments. While TC816 and PKG815 used drop-boxes within the CMS for submission, ENG301 students had to e-mail it to the instructor.

PKG815 and ENG301 were entirely asynchronous, while TC816 had one focus group meeting (in two groups) and a few meetings in an environment called the Wonderwall, wherein students could compose dynamic post-it's as well as chat synchronously. All but one student participated in the focus group, while the Wonderwall meetings were never attended by more than 5 people. The focus group meeting was a part of an assignment, while it was unclear if the Wonderwall meetings were graded, although they could have been considered a part of class participation. The students were also encouraged to post on the Wonderwall. The response to this was fairly good, but seemed to elicit no meaningful dialogues. PCK815 and ENG301 did not use any other means of interaction.

Personal mails between the instructor and the students and between the students themselves could not be monitored.

V. Interviews

(The interviews were conducted with three students, (one each) from the courses described above. Their names have been changed to protect their identity.

Student of PKG815: PKG

Student of TC816: TC

Student of ENG301: ENG)

Introductory Questions:

The courses were three credits each. PKG and TC said that they spent around 5 hours a week for the class while ENG spent around 7 (including external readings, quizzes and assignments). All three of them didn't have any fixed time (or schedule) when they worked on the course. PKG said, "I study anywhere, anytime for this course...at work, home, library..." As a result no one could specify (even approximately) the duration of each session. PKG revealed, "I would always log in when I'm at work...and would go through the material whenever I can catch some time".

TC and PKG agreed that they tended to procrastinate the work till the very end. TC added that he almost did all the work including class participation in the last few days. On probing whether this pattern was unique to the online class, both answered in affirmative.

TC and PKG used a combination of dial-up (at home) and Ethernet (at work) to access the course materials. ENG used Ethernet exclusively (on-campus) as he didn't have access to a computer at home.

Learning Process

In all three classes the professor posted materials weekly that included reading material, external assigned readings and quizzes. PKG815 and TC816 had graded class participation too. PKG and ENG complained that the course had only textual content and they would have loved to have audio in the materials, although PKG was slightly concerned about its effectiveness when he was on dial-up. TC was happy with the audio used in the course; he said that it made the course "more personal". But he also complained that he had problems with longer clips because he preferred learning at his own pace rather than at one set by the instructor.

PKG and ENG felt that the course was generally boring, sometimes even when the actual content was interesting to them. Both complained about the lack of "personal touch" in the class. PKG even went to the extent of saying that "It's no better than reading a book".

None of them used others' help in the learning process and none seemed to think that was important.

Interactions

TC and PKG used graded message boards to interact with the class. PKG added that he used to class message boards only because he "had to". He continued, "I preferred to use email to interact with the instructor. I never asked any queries on the message boards. I used the message boards only for class participation". E-mail seemed to be a very popular medium to communicate with the instructor and all three affirmed that it was very effective. ENG joked that he was initially scared about asking queries to the instructor because of the photograph of the gorilla, but later realized that she was a very nice lady when he met her once. All three mentioned that the instructors were very prompt in replying to queries; TC added, "...more often than not, I would get the response almost immediately". When asked about interactions with peers, all three asserted that it was never on their priority list and hence never happened, save a few instances.

TC and PKG said that most discussions in were held on message boards, but both mentioned that they used it only for the grade and didn't think that they were of too much value. TC added, "I wasn't too happy with the format of the message boards. They should have followed the format of commercially available ones". PKG said, "I never participated too much in them, because it was only 10% of the grade and they were never too meaningful. I would read everyone's messages initially, but when I realized that it wasn't doing too much good, I stopped doing that too...I guess people are too busy to respond to others' messages properly because they are so busy".

ENG had to do a few assignments with an assigned partner. He mentioned, "That's all the interaction I had with other students". He added that "on a couple of assignments we had to evaluate each other's assignment, but I don't think that it was too effective because people were trying to be nice to each other. I critically evaluated the first

assignment, but I had to be nice in the second one because I didn't want to look like an asshole".

TC added that instructor used an external environment called the Wonderwall (*see ethnographic observation*) for interactions, but he asserted that he thought that "it was nothing more than a glorified message board for children" and posted on it only for the grade. He also added that he never attended the weekly meetings. He continued "I would have loved to have live chats with the rest of the class though...but the instructor posted the dates only like one week earlier...if she had informed us of the live chats at the beginning of the class or something, I would have made it a point to attend those sessions...I think they would have been really useful".

PKG mentioned too that the instructor had organized a couple of online chats. He said that he didn't turn up; neither did most of his classmates. On probing why that had happened, he reasoned, "The chats didn't seem to have any purpose. That was the basic problem. If the instructor had assigned topics for the chat, I would have definitely attended them. I feel that such interactions between the prof (sic) and the students are very important, but I do want to know what matter we are going to discuss".

ENG mentioned that the department strongly discouraged online chats as they were against the philosophy of online classes; the instructor complied for that batch, but she had indicated that she might use them in later versions of the class.

There were no interactions in any of the class during the learning process. PKG thought that "...its obvious because it is an online class".

Differences between an online and a physical course

PKG and ENG weren't too happy with the online class and thought that they would have learnt much more if it were a physical one. PKG complained that he didn't get to know the instructor as well as his peers. "The only one's I know are the one's I'd met earlier". He added "I wasn't happy with the interactivity in the class and because of that, the class didn't have a personal feel to it. It's just like reading a book, wonder how different it is from a correspondence course".

TC on the other hand was very satisfied with the class. He thought that he learnt more in the class because of its online nature. "For one, the lectures

are very focused in an online class. That's not the case in a physical class...I also like the fact that I'm able to learn at my own pace without anyone watching over my shoulder; for me, that's a very important aspect". He was not too concerned about interactions with the peers because "I hardly interact with peers in a physical classes either...I know people in a physical class by their face and in an online class by their names". " Interactions with the instructor was is much better in an online class because they are much more approachable this way...In a physical class I'm not too comfy with e-mailing the instructor, because that comes across as impersonal. But in a physical class, that's the only way".

ENG thought that it was very difficult to get his queries cleared and thought that it would have been much better if it were a physical class. He added, "I wonder if online courses will garner as much respect as a physical class. Atleast I view it as less important than a physical course".

VI. Focus Groups

Objectives:

The objective of this focus group is to understand how students of a Graduate level 'Design Research' course (TC841) perceive its Course Management System (CMS) -Angel, its tools and other tools used to facilitate interaction between the 'class' (Wonderwall, live chats). Another aim is to understand the students' views on assignments, quizzes and readings. This discussion will give the instructor and the developers of the course a better understanding of its strengths and weaknesses, so that it can be improved in upcoming versions.

Part I: Angel (CMS) and Angel Tools

Part II: Course Content and Organization

Part III: Course Interactions

(The Focus Group was conducted online using the 'chat' function of the CMS)

Participants:

There are eight participants and one moderator. The participants are students of TC841 (Spring 2004) and are around 10 weeks into the course. So they are fairly familiar with the course structure and the various tools of the course (and the CMS). The participation in the Focus group is a part of Class participation. The students were given an option of attending two focus groups (that discussed the same topics) depending upon their convenience.

The discussion was electronically recorded, hence not anonymous. However the transcript will be "sanitized" (wherein the students' names are replaced by fake ones) before the instructor can view it, so as to avoid any bias towards/ against students, depending upon their views.

Executive Summary:

Angel and Tools

- Too many clicks to get to the present weeks material.
- Need to make the course more personal.
- CMS needs to remember user preferences and track activity.
- Agenda could be used as the Welcome page.
- Need to improve message boards, but solution not apparent.

Course Content and Organization

- Welcomed audio. Made lectures more personal.
- Opinion on quiz content split.
- Need of more 'done'/'what's left' indicators.

Course Interactions

- Wonderwall a very innovative product, though not suitable for the class.
- Interest shown in live chats.

Detailed Report:

I. Introduction:

All participants were in and around Michigan State University, at libraries, labs and homes. Jamie and Pat were connected using dial-up; Kerry and Regan on DSL; Cory, Jean and Kendal were on T1. Three of them (including one on DSL) complained about the flashing (refreshing) of text on the chat function. (*Others did not mention their connection type*)

Part I: Angel (CMS) and Angel Tools

II. Strengths and Weaknesses of Angel

The response to this question was varied. Kerry and Kendall thought that there were too many clicks to get to the current weeks content. Kendall added, "I don't want to go through Angel everytime to get to our class web page". Kerry also complained that there was nothing to indicate completed participation assignments. Regan however felt that the overall organization of the course was good despite the high learning curve that "...distracts from content..." he experienced initially. Pat wanted to be able to download the course materials when he was on dial-up. He was dissatisfied with the fact that 'next' button was only on top of the page and also with the structure of the message boards. Cory agreed.

The overall response of the participants could be termed as 'slightly negative'. None of them had any major problems with Angel although almost all them had their 'own' small complaints about it.

III. Welcome page, Polls and Announcements

The participants' opinion on polls was unanimously positive. Jean says, "I love polls, its fun and shows that the teacher cares about the way we use Angel and experience this class". Also unanimous was the complaint that the CMS does not remember the fact that the student has already answered the quiz when he/ she use another computer. The reaction to the announcements page was not too positive. Most students thought that it wasn't too informative. Regan added that the welcome page would be more useful if it showed "personalized information with work completed/ pending". Jean and Kendall felt that the alien that was used in the first few weeks was 'cute'. Kendall said "...and makes this site more human".

The participants seemed to echo a common sentiment that the software should be more sensitive to 'user', remembering his/her preferences and making the student feel 'important'.

IV. Message Boards

Regan and Jean felt that there were too many message boards that made it difficult to follow up on each of them. Lauren wanted to modify messages after posting them while Jamie thought that it would be best to "follow popular bbs format like vbulletin or idealbbs".

Lauren, Kendall and Ragan wanted to receive responses by email. This was interesting considering the fact that this was actually possible. None of the students however had any suggestions to improve the usage of message boards in the class.

V. Drop Boxes and Sharing Assignments

Everyone had a good opinion of drop boxes owing to its convenience. Kendal would however like a shortcut to the drop box. When it came to sharing assignments, all but Regan and Jean liked the idea. Jean commented "...it forces us to professional in our papers". Regan's view was "...that's not what learning is all about".

VI. Agenda and What's New Page

All but Lauren use the Agenda page to know what's required and catch a glimpse of the week ahead. Regan added that the Agenda would serve better as the welcome page. Kendal backed Regan on his suggestion.

Only Pat, Jean and Kendall seemed to be aware of the What's New Agent. They however never used it. The others were oblivious to its existence.

Part II: Course Content and Organization

VII. Use of Audio

All but Jamie were enthusiastic about the idea of using audio in the course content. Kendal and Jean were of the opinion that it added a personal touch to the course and also "helped in understanding Carrie's character which is difficult just reading the material". Regan felt that

audio was most useful for interviews. Kendal added that would be better if the audio was downloadable. Jamie would "be happy reading it in half the time". He was also very critical of interruptions by Carrie's cat in the audio recordings. Cory backed him while Kendal and Jean thought that the cat was rather cute.

Pat, who seemed to use dial-up (almost) all the time added, "I don't like audio with dial-up (who does?)". This is an indication that the developers should be sensitive to dial-up users.

VIII. Quizzes

Kerry, Jean and Jamie were rather satisfied about the quizzes. Kerry added "...very effective. Good time limit, good substance, good structure". Cory, Regan and Kendal however felt that the content of the quizzes are not an effective determinant of their knowledge. Kendal was more critical of the quiz content than the rest. He sometimes felt that "The quiz has some intention of making us confused". The group was divided on the True/ False Questions. Pat thought that some of them were vague. Cory felt that "Research in real life wouldn't work like True/False..." Others seemed to have no problem with the True/ False questions. Kendal added that he would like a 1-3 minute notice before the test ended.

IX. Course Organization

Most of them were pretty satisfied with the overall organization of the course. Only Regan still had trouble with the course organization. Regan, Jean and Kendal opined that the number of clicks to the current weeks materials could be reduced. Jean however felt that it wasn't possible. Jamie and Jean added that they would like to have more indicators like a "... to do list that can be checked off..." and a "last page visited or last board participated".

Part III: Course Interactions

X. Wonderwall

"Kill it", Jamie moaned. Most of them thought that it was "fun and innovative", but inappropriate for the class. "It's just a glorified message board for children..." Jamie continued. "It's like an additional assignment...dynamic post-it notes? Please", "Doesn't work to good with us", "I agree wonderwall is a no", others added. Kendal argued that the feedback would be faster in message boards. Kerry added "I don't think

the wonderwall is effective. I do it for points, but I don't feel it is very interactive".

Jean however was of the view that "I liked the idea I could ask a question about anything (like traveling).....I can't really do that on a message board". Regan was the only person who explicitly mentioned that he would prefer the wonderwall when it is "refined and optimized for speed".

Most of them seemed to be fascinated by the Wonderwall, but none of them seemed to think that it was useful as a learning tool or an interactive tool for that matter.

XI. Live chats and Interactions

Though the group didn't discuss this topic at length, the students who responded to this question opined positively. Jean mentioned early on in the discussion that "And I like to meet with my fellow students..." Jean later (in the discussion) added, "I wish we'd made this kind of live chat at the beginning".

Regan complained that he 'didn't at all' get to know the instructor and fellow students (apart from the one's he had earlier met). Others pointed out the same too. A couple of them had met each other when they got together for group projects. Kendal thought that live chats would have helped him know the instructor and his peers better.

Interestingly, the participants exchanged their MSN, Yahoo!, ICQ and AIM id's at the end of the discussion as they felt that they were better than the (CMS) inbuilt chat they were presently using.

VII. Prototype/ Conclusions

The important aspects that contribute to effective online learning are:

- Developing rich environments that foster student-to-student interaction.
- Having coordinated learning environments.
- Providing adequate and timely feedback from instructors.
- Flexibility in teaching and learning.
- Ways in which student interactivity, or engagement is fostered.
- Maintaining high motivation levels for the students.
- Giving a 'personal' touch to the class.
- Using relevant and challenging assignments.

It is clear that applying traditional pedagogical theories and design is not an effective solution for online courses. They are not classroom lectures presented through the web. There is a need to come up with new designs not only to fully justify and optimize it but also maximize its advantages and minimize its disadvantages.

Constructivism is often the best strategy for online education and hence 'interactions' - with the instructor, peers and the content itself, is very important. It is very important to note that the interactions are asynchronous and this is where the advantage of it being online must be effectively utilized. Unlike face to face discussions:

- Both parties need not be present in the same place at the same time.
- Interactions are never 'lost'.
- Interactions can be returned to and continued any time.

As Northup affirms, interactivity does not automatically occur in an online course, unlike most physical classes. But when implemented effectively, online courses can create greater opportunities for instructors and students to interact more frequently, communicate more effectively, and collaborate on learning projects and research.

Learner-centric systems work best and the class needs to have a personal feel. It was evident from the interviews that students tend to feel the course 'boring' otherwise. Both ENG and PKG affirm this fact. Use of the instructors' photographs, students' names and also use of their inputs

within the course materials keeps the motivation level high among students.

Another option that could be considered is the use of vector animations (like Flash). This low-bandwidth option will allow the creation of 'avatars' for both the students and instructors. This will bring in an interesting touch of personality to the class.

One interesting observation from the focus group and interviews is that students tended to view message boards and other forms of interactions (like the Wonderwall in TC816) in the course as 'outsiders'. They were considered as 'separate' assignments and most of them were done just for the grades.

There is also competition from other external systems like email-the students in the interviews indicated that email was their favorite mode of communication, even for general queries which could easily be posted in message boards. It was also evident at the end of the focus group that the students preferred to use other commercial messaging services like AOL, Yahoo and Hotmail instead of the inbuilt chat of the CMS. Obviously if the tool has the same features as an external one, or is not as good, students will prefer the latter. TC also affirmed that he'd rather use a commercial message board than use the one built into the CMS.

The most effective solution to this would be the 'integration' of the interaction process with the learning process. Since interactions are so important, more so in an online class there is a need integrate it with the actual learning process. When pedagogical approaches like constructivism are used, this methods' efficacy improves further.

When a student is reading (listening to) the notes online, there should be a facility, **at the very same page** to:

- Send asynchronous messages to instructor or peers.
- View the students (or instructor) who are presently online and message synchronously with them.

This allows the integration of the interaction and the learning processes. The fact that students can interact asynchronously or synchronously with the instructor as well as peers during the learning process will encourage interactions. This system uses a more '*in your face*' approach. In the present systems available, the students can synchronously message other students only if it is intentional. The fact that this function is in a different

page altogether makes it much less powerful, because under these circumstances, most students would prefer to use the more robust and powerful commercially available applications. In the present systems, the student would have to go to a message board in a different page. This system will allow (and facilitate) intentional or unintentional collaborative learning between students.

Similarly the asynchronous messaging system should allow students to post their views (arguments) to the entire class, groups within the class or the instructor at any point in the material. This would be a much more effective solution again because of its in your face nature.

Each message posted should have a place within the content. Suppose the student is reading a piece of text, he/she should be able to post messages at the same place (say, at the end of the paragraph). Other students should be informed in some way that there is some activity in that paragraph. As with the present systems, there should be an option to view all messages together. These discussions should be treated as a series of conversations; in other words, the students must be given the privilege of starting a message board (conversation). So, each message board is a conversation thread. This will be more effective than use of general discussion boards that don't seem to be too effective. Besides these, the instructor could also use mandatory conversations for grading. Emphasis on the quality of discussion will be effective.

The use of course cartridges- like CD's that are shipped at the start of the course should be considered (based on feasibility and cost-effectiveness). This will enable the use of some bandwidth hungry applications like video or even supplementing materials that are posted online. It could also be used as a cartridge to be filled in with weekly materials that could be downloaded at the start of a cycle and later uploaded once the student completes his / her work. This approach will benefit dial-up users for sure, but might also be of interest to 256 Kbps – 1 Mbps users wherein some high bandwidth applications might still be jerky. The problem with this method is that the user might be forced to download more than what he/ she wants to use, but that's a trade-off that will have to be decided.

Much more research and time is required to develop a complete system for effective online education. The findings of this research will be used to develop such a system.