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Jump-starting Learning Communities in the Philippines Using Available Online Tools: Educational Outcomes and Student Feedback

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Abstract

This paper describes the pioneering trials in using widely available and accessible online tools to build a course-based learning community in a higher education institution in the Philippines. A quasi-experiment was devised using two intact groups to determine cognitive learning outcomes for an online course on Ecological Product Design, and focus group discussions and survey questionnaires gathered student feedback on their online experiences. The study found that the achievement scores of the online and face-to-face students during both the pre-test and post-test examinations were not significantly different. In general, the online participants appreciated the convenience, flexibility, appropriate pace, and increased freedom and self-responsibility that the "new way to learn" afforded in their off-campus learning communities. In the end, this project was able to demonstrate that the online tools of information technology can be ingeniously harnessed to allow peers to study and work together in spite of separation and relatively simple resources.

Background

In recent years, Filipino students found themselves facing increased difficulty in safely accessing the physical campuses of their schools, resulting in a significant loss in contact time with their teachers and in a greatly diminished lesson coverage and learning experience. Parents naturally feel uneasy about letting their children leave home for school, in the light of such precarious situations as flooded streets, political protest rallies, bomb explosions, incidents of rape and kidnapping, as well as the bumper-to-bumper traffic has become a daily routine for commuters in Metro Manila.

Lesson delivery via information and communication technologies is one way to mitigate the impacts of the above impediments to safe educational access, as it allows the learning experience to continue in the security of each other's domiciles. Various evaluative studies [6,8] draw attention to the possibility of "no significant difference" in student achievements between the face-to-face tradition and Internet-based distance learning models.

Nevertheless, some authorities maintain that online education will never be equal to conventional classroom instruction [4], and one critic has branded virtual universities as "digital diploma mills" [3].

The dozens of web-based educational delivery applications commercially available now in the technologically advanced economies are generally unaffordable and incompatible with the somewhat simpler needs of learning communities in the Philippines. A different strategy must obviously be formulated for realistically harnessing the power of the Internet for improving educational access in a developing country.

Trial online modules for a course in Ecological Product Design (EcoDesign) were developed at the De La Salle University College of Saint Benilde (CSB) in Manila in 1998 by the author of this paper.

In 1999, CSB became the first Philippine institution to acquire the WebCT™ course management software for supplementing traditional classes with programmed lessons on the Internet. Despite the software's many promises, it fell short of many teachers' expectations, as the early version that the College acquired was still largely in its developmental stages. Various programming imperfections and errors were perceptibly impeding the smooth flow of the conduct of the trial lessons, and a significant amount of time was spent by teachers, students and network administrators trying to resolve software-related lesson delivery and interaction issues. The WebCT platform was regarded by many as not being "transparent", as it was expected to be working silently behind the scenes and allowing the learning experience to take place without the participants being bothered by it. Moreover, the College network was disappointingly slow and home-based users couldn't effectively connect to it without suffering frequent disconnection events. CSB's initially limited WebCT licenses also meant that not everybody in the College community would have access to this online experience.

The Study

A quasi-experimental research was devised to examine the hypothesis that instruction in an online learning community can result in cognitive and affective outcomes comparable to that in a face-to-face classroom.

Two intact classes of third-year Industrial Design students enrolled in an EcoDesign course were chosen to unknowingly participate in a trial examining the learning effects of Internet-based educational tools.

The EcoDesign course is a technology-intensive subject that focuses on the creation and patronization of products that promote ecological balance and a healthy living environment. The usual pedagogy in this course involves a mix of environmental science theories and application of sustainable strategies in industrial design. Teaching methods conventionally used are PowerPoint presentations, blackboard lectures, paper-based quizzes, group brainstorming exercises, studio conceptualisation leading to the formulation of ecological product solutions, and personal consultations with the teacher in class.

The research was conducted over a period of seven weeks. In one block (the control group) students attended classes on-campus with the teacher physically present. In the other (experimental) block, students formed off-campus learning communities and “met” and interacted with their teacher and classmates via online tools.

Both blocks were quizzed for prior knowledge before the start of the experiment: the two groups did not differ significantly in mean pre-test scores [Table 2]. At the end of the course, both blocks took the same paper-based final examination on-campus. This test was the determinant for assessing the equivalence of learning under the two educational delivery systems.

Instructional Innovation Methodology

Participants in the online learning experiment were given three weeks to secure Internet access and to obtain an email account. During this preparatory period students were also expected to practice themselves with such online technologies as chatrooms and web browsing. Most have claimed prior competence with these Internet-based tools. Those who lacked the experience were encouraged to seek tutelage from their peers.

The following pedagogical strategies and activities were used on the online learning communities.

CD-ROM Lectures. The teacher’s PowerPoint presentations were saved on compact discs and distributed to the off-campus students. As the lectures included a fair amount of video clips and animations – plus a demo version of the EcoDesign analysis software EcoScan (from www.pre.nl) and other utilities – the CD-ROM was considered far more cost effective than requiring the students to download or view the material while connected to the Internet.

Quizzes. At a designated time every week the teacher “handed out” quizzes in Excel format to the online students via email, and expected the answers back in 30 minutes. The Excel software compares every response with the answer key using a logical function, returning a

point for every correct match. Students receive emailed feedback on their scores about half an hour after the quiz receiving time closes, a feature which was much appreciated.

Discussions. Before the quizzes were emailed out, all students were expected to log into the global chatroom where the teacher opens up a live forum about the day’s topic which was on the CD-ROM. Other issues about online class tasks are also raised during the live chat.

Group Brainstorming. The online students were divided into clusters of threes; these clusters became mini learning communities with their own chatrooms. Under time pressure, students attempted to accomplish the task of the hour by actively brainstorming within their chatrooms, on such topics as reuse possibilities for glass, paper or plastic waste. The teacher was considered a “guest” in every group’s chatroom and had free access to each room, but students were not allowed to enter and eavesdrop into others’ chatrooms. The teacher routinely checked on each group’s progress in the chatroom and ensured that discussions are kept on track. At the end of every timed session, students were required to submit a transcript of the chat. The free public domain software mIRC (from www.mirc.com) was used for chatting.

Design Projects. Students submitted concepts and final solutions to individual design projects via email. Most did their technical drawings and pictorial renderings using CAD (computer-aided design) software such as AutoCAD and 3D Studio Max, and these students found that submitting CAD files online saved them money which would have gone to paying a large-format color printing service.

Consultations. Student inquiries about the tasks were answered by the teacher via email and broadcasted to all participants, to avoid having to answer the same question repetitively. Students who were rather shy in asking questions found such email broadcasting useful. Replies to project-specific inquiries were emailed to the relevant students only.

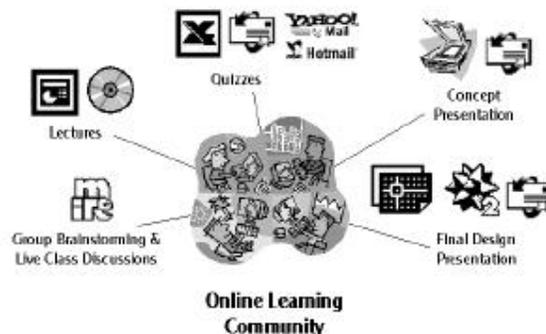


Figure 1. Structure of the Online Classroom using Available Online Tools

Cognitive Learning Results

The cognitive effects from learning EcoDesign in an online community were quantitatively measured from pre-test and post-test score differentials.

Mean post-test comparison of the two groups show a marginal arithmetic difference in favour of the online class [Table 1]. Mann-Whitney U calculations show that this is not statistically significant, and one can accept equivalence of the two groups in terms of test achievements [Table 2]. This similarity in examination outcomes indicates that students can learn the same amount in the EcoDesign course whether they attend classes on-campus or online.

F2F Student	F2F Pre-test Score	F2F Post-test Score	F2F Post-test less Pre-test	OL Student	OL Pre-test Score	OL Post-test Score	OL Post-test less Pre-test
Mean	38.7	69.8	31.1	Mean	38.9	70.5	31.6
SD	10.1	14.9		SD	6.2	15.8	
Min	13.4	45.8	3.5	Min	25.4	37.4	-4.4
Max	51.7	96.5	60.1	Max	47.7	98.9	51.3
Range	38.3	50.6	56.6	Range	22.2	61.5	55.7

Table 1. Summary of Pre-Test and Post-test Results of Face-to-Face (F2F) and Online (OL) Classes

Array 1: F2F Array 2: OL	Pre-test Scores	Post-test Scores
Value of the U statistic	223	218.5
Expectation	234	234
Variance	1754.753	1752.774
Normalized statistic used for the Wilcoxon-Mann-Whitney test	-0.26259	-0.37023
Critical value under normality assumption with a 0.05 significance level	-1.9600	-1.9600
p-value corresponding to the U value under normality assumption	0.7929	0.7112
Conclusion: With a confidence range of 95%,	Accept arrays 1 & 2 as identical	Accept arrays 1 & 2 as identical

Table 2. Summary of XLSTAT comparisons of the pretest and posttest scores, using 2-tailed Mann-Whitney U Test $\alpha=0.05$

Participant Feedback: Appreciation and Discontent

The behavioural and emotional effects of participating in the online learning community were gathered using two instruments: a Likert-style questionnaire which produced quantitative indicators of the opinions; and qualitative discussions in focus groups to elucidate on the numerical results. Responses to the 57-item attitudinal questionnaire were interpreted using the following scale: 1.00 to 1.49 strong disagreement; 1.50 to 2.49 disagreement; 2.50 to 3.49 neutral; 3.50 to 4.49 agreement; and 4.50 to 5.00 strong agreement.

The act of learning via Internet tools was generally looked upon in a positive way. Many considered the networked learning community a "success", and a number expressed willingness to continue learning the online way for certain subjects where the method proves practical. In general, the students appreciated the convenience, flexibility, and appropriate pace that the "new way to learn" afforded in the networked learning communities. Several welcomed the innovative strategy as a challenging opportunity for themselves, and as a break from the "teacher talks, students listen" pedagogical tradition that they have been subjected to since grade school. Participants were amused that they can communicate and collaborate on group projects even without their physical togetherness (mean=4.0, sd=0.98).

Many felt liberated from the controls implicit in the arbitrary power of the face-to-face teacher. Suddenly they were free from the usual rules of the physical classroom, and they appreciated the absence of such repressions as no talking, no eating, no walking around, no going out, etc. They found ease of movement and felt unconfined, contrary to the traditional classroom settings.

They took pleasure in experiencing the lessons in the comfort of their own homes, without having to travel and being stressed by traffic congestion. They did not have to be up so early to bathe or dress up or to take a rushed breakfast in preparation for school; they can even wake up late or just in time for the online session. Another stress-removing factor was the fact that students can learn the materials at their own pace, without having to keep up with fast lectures or fast-learning classmates.

Posting questions or messages to the teacher via the email list made students feel more at ease than questioning face to face. This is probably explained by the Filipino student's trait of deference for their mentors while inside the classroom. It is not customary for Filipino teachers and pupils to carry on conversation or contact outside of class hours. Students agreed that email offered them an informal off-campus, off-classroom contact with their teacher and peers, thereby opening more channels for communication (mean=3.6, sd=1.02).

Many valued the chance that online learning allows them to discover on their own, instead of having a teacher instructing them step by step (mean=3.5, sd=0.95). Putting them in charge of their own learning has pushed them towards developing discipline in their study habits, and instilled in them a greater sense of responsibility, independence from the instructor, and interdependence with their peers in their learning communities.

Students appreciated the fact that the chatroom discussions can be recorded so that they did not have to take down notes. Those who missed a particular session can review the saved transcript to get a feel of what transpired during their absence. Knowing that their chat transcripts would be submitted also kept the discussions on track: some admitted that without these transcripts they would probably have just talked about other things.

While participants appreciated the innovative features of the online community, they expressed various frustrations and disinclinations about their experience. Most dissatisfaction sprang from network problems, centring on difficulties with initiating connections with Internet service providers, with reconnection after disengagement, and with logging into the chatrooms. Whenever participants get disconnected from the network, they miss part of the discussion.

A good number expressed feelings that the online method seemed to be "an expensive way to learn", because they had to pay for Internet time, although they failed to consider the cost of the time, effort and money saved by not travelling to campus.

Remarks about sluggish links to the participants' ISP servers were abundant, and emails sometimes took more time than necessary to send and receive. On several instances, the Hotmail website (which many used as for their web-based email address) wasn't functional, so students could neither check nor send mails.

Hassles surfaced with the use of chat when the whole class overcrowded the global chatroom: it was chaotic, with too many people trying to ask questions all at once. There was a deluge of nonsensical and repetitive postings.

Students who were used to having a classmate physically beside them argued that the virtual learning community could curtail the close relationships and bonding between students. Many however reasoned that the online methods actually allowed them to have a discussion with peers whom they normally do not converse with in the physical classroom.

Participants valued the fact that email messaging reduced the urgency of responding, but disliked it when message recipients delayed their responses markedly. Problems with email bordered on non-receipt by the other party of email attachments such as quizzes and sketches, either due to Internet server inefficiency, or to file size limitations imposed by the email server, resulting in messages bouncing back to the sender.

Students detested the time spent in having to image-scan concept drawings, then emailing the scanned file to the teacher or group mates, waiting for the other party to successfully retrieve the message, and waiting for the response, which could take some time if the other party does not act on the inquiry with immediacy. (A whiteboard feature via Microsoft Netmeeting and a digitising tablet could have been used to combat this inconvenience.) They tended to compare the graphics incapability and text-based limitations of the online tools to the straightforward manner in the traditional classroom in which they could sketch on a pad, show their teacher or group mates, and instantaneously receive comments. Many found it limiting to explain their visual concepts with words. Those who did not have scanning equipment also had to pay for bureau services.

Participants unanimously admitted that there is a great temptation to cheat in the online quizzes because of the absence of a proctor. A sizeable number confessed that they "looked back" at the lesson materials while they took the online quizzes.

Current technologies for holding automated examinations are only able to engage the learner with fixed-response questions. While the advantages of speed in assessing correctness and the complete absence of checker subjectivity are obvious, students' higher-order thinking capacities could be little challenged by such question types.

Participants strongly recommended that the online learning community method be fully or partially replicated in some of their other courses within the Industrial Design curriculum. It appears that the medium renders itself most practicable in such "general education" courses as Communication Skills, Psychology, History, and Sociology. Participants had widespread agreement that subjects like these do not necessitate a high degree of personal student-teacher contact, and can be easily learned off-campus using good self-instructional materials, online consultation with the teacher, self-tests, and some online collaboration activities with other students whenever applicable.

Many creative subjects which have a large lecture component for the presentation of theories, practical examples and animated demonstrations – such as Furniture, Packaging, and Ergonomics – can benefit considerably from supplementation with multimedia-integrative lessons for off-campus delivery. However, the idea creation components of these courses, which are visually demanding, should probably still be done via face-to-face sessions.

It is apparent that the application of the Internet in education will intensify in the near future. Computers will also continue to increase in power while dropping in cost and escalating in speed and reliability [1], and the price tag for sending information will keep plummeting, to the

point where communication charges will be too cheap to meter [7]. Indeed these are very good signals for the growth of online learning communities as the logical next step towards arriving at an effective alternative pedagogy for the very near future.

Conclusions

The study allows us to reach the following generalization with confidence: that instruction via an online learning community can result in educational outcomes comparable to that of face-to-face teaching in a physical classroom. Furthermore:

Conclusion 1: Cognitive learning outcomes among online and face-to-face learning communities are statistically very similar. In some instances students using Internet tools were able to post gains slightly larger than the face-to-face students, but in general the pre-test and post-test results could not show appreciable differences in learning achievements. The study results imply that students in online communities have the potential of learning just as well and attaining the same academic levels as their on-campus counterparts.

Conclusion 2: Students derive about the same amount of satisfaction in the virtual learning community as they do in the traditional classroom. The qualitative portion of the study point to the insight that student satisfaction can be reasonably derived from online means of teaching EcoDesign. While some online students might not have liked certain aspects of teaching design subjects via electronic means as much as they have liked it done face-to-face, the experiment participants nevertheless echoed their positive attitude towards the other benefits that the new learning mode offers. Travel time economy, personal security, and "all the comforts of home" are consistently the best-rated bonuses of the networked learning community. By being selective with the courses where Internet tools are highly appropriate, student satisfaction with their educational experience is more likely to be achieved.

Conclusion 3: The absence of face-to-face contact does not necessarily result in a substantially inferior learning. The study demonstrates that achievement in a learning community can be independent of the location or setting where the teaching takes place. Collaborating students appeared to perform equally well whether their teacher was physically in front of them or was only manifesting his/her presence in a virtual sense.

The absent attributes of the traditional teaching method were clearly yearned for in the virtual class: eye contact, speech intonation and modulation, verbal humour, on-the-spot sketches and diagrams, and verbal interaction with no time delay.

It is imperative to assert that academics need to recognize the difference that the online experience has

with the face-to-face classroom, and given the right stimulus it is possible for networked learners to outperform their traditional counterparts, or at least be as good in spite of the transactional distance and asynchronicity of interactions.

The conclusions support the familiar philosophy that educational media and educational technologies are mere vehicles for delivering instruction, and that they have no intrinsic effect on the amount of learning gained. The messages contained in the educational media, the overall instructional designs, and the interactions with peers are the crucial elements for learning effectiveness, not the media by themselves. This supports Pogrow's [5] assertion that "the sophistication of the learning produced by technology depends on the sophistication of the conversation surrounding its use, not the sophistication of the technology."

Lastly, this study of online learning communities upholds the theory by Moore & Kearsley [2] that "what makes any course good or poor is a consequence of how well it is designed, delivered and conducted, not whether the students are face-to-face or at a distance".

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