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# Medium is the Message : Web-based Lecture Presentations in Distance Education in Singapore

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ABSTRACT :

To investigate what teachers can do to make web-based electronic lectures (e-lectures) equally (or more) effective compared to face-to-face lectures, an experiment was set up involving five lecturers and about five hundred students in a technological university in Singapore. Teachers recorded their lectures using customized software. Extensive interviews of these teachers and questionnaires administered on the students who viewed these lectures showed that teachers' concerns clashed with the students' concerns in areas related to content and delivery. While teachers seems to be more preoccupied with their body language, facial expressions, and trite organization, students seemed to focus on voice, matter on the slides and did not mind a rather repetitious delivery. The effectiveness of e-lectures in Asian education would largely depend on the extent to which the teachers are able to address the students concerns. To achieve this, the teachers would also need to enhance their awareness of the new medium. The paper proposes collaboration between students and teachers to produce more effective e-lectures.

## 1. BACKGROUND :

Many educators ask if distant students learn as much as students receiving traditional face-to-face instruction. Research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction, when the method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to- student feedback (see Moore & Thompson, 1990 ; Verduin & Clark, 1991). In the words of Bates (1994, p.1577), "It is a relatively untested assumption that advanced technologies… are pedagogically more effective than older technologies." Bartsch and Cobern (2003) studied the effectiveness of powerpoint presentations and overhead transparencies in lectures. Their study revealed that, while students preferred powerpoint presentations (as compared to overhead transparencies), students performed worse on quizzes when powerpoint presentations included non-text items such as pictures and sound effects. According to Mendeles (1999), "researchers have so far overlooked the thorny details of what is involved with online pedagogy, while extolling the educational potential of technology". Attention in recent years has also been focused on the communities in electronic space and the problems, challenges, and concerns of teachers and learners. Hara and Kling (2000) survey the difficulties faced by learners in web-based learning. They highlight three interrelated sources for learner's difficulties: lack of prompt feedback, ambiguous instructions on the Web, and technical problems. Brown (2000, p.19) elaborates the important feature of web-based learning as, " a new powerful fabric for learning …

cross-pollination of ideas … cross-linked interest groups, both real and virtual, form a rich ecology of learning." According to Brown, the web-based learning process is constantly evolving, largely self-organizing, forming an ecology, which has a feature of cross-pollination of ideas.

In the context of e-lectures, Berge (1995) summarizes the role of on-line instructor. Pedagogically, a teacher's perception has many dimensions; he views his job as a facilitator for learners having different learning styles as: self-directed learning, collaborative learning, and traditional instructional learning. Further learners are in different roles in learning process, as: accumulator, diverger, assimilator, and converger. Teachers' concerns are highly dominated by their self-perception related to these roles. Moreover, university teaching largely focuses on in-depth exploration of subject matter, and is directed by expert teachers. Teachers are thus concerned about various aspects of delivery of in-depth subject material. Such concerns equally dominate e-learning and e-teaching, In this context, Verneil and Berge (2000) provide highly relevant guidelines for designing on-line higher education and Rogers (2000) discusses important observations for integrating higher education with web-based technologies.

## 2. THE PRESENT STUDY :

### 2.1 The Context :

The present study was conducted in Nanyang Technological University, Singapore (NTU). The study involved engineering students and their teachers. Although many schools in the university have embraced web-based technologies since 1995, a uniform web-based platform was introduced only in 2000. The delivery platform is a customized version of Blackboard and is called 'edventure'. Most of the web-based content is used to supplement and enrich the face-to-face delivery. However, in 2002, many schools in NTU took a major step by deciding to replace the classroom lectures with web-based content. Tutorials are however still held in the traditional classroom.

While lecturers have been encouraged to replace the lectures with web-based content, at this stage most of the web content is based on powerpoint presentations. A few lecturers have also used voice narration recorded with the PowerPoint slides. Evolution of a complete package with video, voice, slides, and hyperlinks is a recent phenomenon, which is the subject of investigation in the present project. The crucial question at this stage is : Can the e-lectures be as effective as (or more effective than) the face-to-face lectures ?

To address this question, we tried to investigate into the human dimension of this innovation. The paper attempts to answer the question: What can the teachers do to make the web-based lectures as effective as (or more effective than) the face-to-face lectures? Teachers' concerns about the new medium and students concerns about their gains from it become vital in this context, and these are the two main aspects this project tries to investigate further.

### 2.2 Research Method :

Subjects were five lecturers in a technological university and their respective engineering students. These lecturers have been at the forefront of the on-line innovations in the university and have tried out some of the new tools used in on-line learning. However, this was the first time they recorded and published one or more video-based lectures. (The software system used for recording is described in the next section.) To investigate the concerns of the lecturers as well as the students, the following methods of data collection were used.

1. Open interviews of the five lecturers were conducted on a one-to-one basis. The lecturers were requested to debrief on their experience of the process of recording. Questions were asked on the basis of a checklist (Appendix 2) only when a specific aspect was not mentioned by the lecturer.

2. Students who had accessed the e-lectures were given a short questionnaire (Appendix 1). Students were encouraged to describe their reactions in detail at the end of the given questionnaire. A total of 120

responses were collected. Brief interviews with some students were conducted in order to clarify some of their comments and concerns.

3. After scrutinizing the data, we tried to identify areas where teachers' concerns overlap, clash or exclude students' concerns.

### 2.3 Materials and Software :

The lectures were recorded using a system called Encore™. Encore™ allows the presenter to transform standard powerpoint slides into interactive on-demand presentation with video and audio capabilities. The lecturers prepared power point slides of their presentation and took these to the video studio. The lecturers delivered their lecture projecting the slides on the screen behind the camera. In Encore™ the video and narration is automatically synchronized with the movement of the slides. If the lecturers wish to re-record parts of the lecture, they need to re-record only that particular slide. After the recording is done, the lecture is uploaded to a video-streaming server and a URL is provided to the lecturer. The lecturer needs to communicate the URL information to the students. In our experiment, we communicated this information using our on-line course-sites.

When the students click on the respective URL, the powerpoint slides as well as the video and narration are downloaded. The students only need an Internet connection and Windows Media Player™ software. The student's view of the presentation is represented in Figure 1. As the figure shows, the screen has three parts. A large window on the right hand side shows the powerpoint slides. A small window at the left-hand corner shows the lecturer's video. Below the video screen, a list of hyperlinks to different slides is displayed. If the students wish to skip, jump to, or revisit a particular slide, they can easily do so by using these hyperlinks. Although technically it is possible to re-size the windows, the video resolution drastically decreases if the window size is increased by more that 25%.

A probable reason why such video-based e-lectures are not yet widely used is that multimedia content is traditionally very bandwidth-intensive. It can clog network connections and this might lead to jerky, erratic images and loss of sound. In our institutional setting, an attempt has been made to overcome these problems by replicating content onto various multimedia engines close to the users, so that content can be pushed from there rather than from the original server. However, this means that access to e-lectures from a dial-up connection is still rather unpredictable.

## 3. FINDINGS :

### 3.1 Teachers' Concerns :

The teachers' concerns can be divided into two stages as either process concerns, or product concerns. The process concerns are mainly related to the preparation and the studio setting while the product concerns are related to the way this process affects the final product. These two are jointly discussed in the following paragraphs.

The teachers in this study were almost unanimous in voicing their concern about the preparation time. In general, the teachers felt that for the preparation and recording of a single lecture placed a heavy demand on their time. Teachers spend as much as 8 hours for recording a 45-minute lecture. It was discovered during the interviews that teachers watched the video before publishing it, and re-recorded some segments. In one particular instance, the lecturer abandoned the entire recorded video and recorded a fresh one. In another instance, the lecturer decided not to publish the recorded video since he found it to be 'not good enough'.

Another major concern of the lecturers was related to the fundamentally different nature of the e-lecture. Since the e-lecture was recorded and preserved, it was more 'permanent' than the classroom lecture. Secondly, the teachers felt that the e-lecture was more 'public', since it was posted on the web. These two features of the e-lectures made most of the teachers self-conscious during the recording.

During the interviews, we tried to point to the teachers that the permanent and public

nature of the e-lecture is only deceptive. The recording software actually allows the lecturer to quickly go to a particular slide, and re-record selected portion of the lecture. The streaming of the lecture is password-protected. In NTU, lectures are stored on a secure server that is behind a firewall, and hence it is not really as public as it seems. However, it has to be stated that teachers are overwhelmed by these two concerns and their preparation method seems to be largely influenced by these two concerns. Teachers mentioned that the jokes, anecdotes, and sarcasm that they are likely probably less noticeable in a classroom situation. They thought that these expressions might prove distracting to the students (see Figure 1).

Absence of the intended audience (and presence of unintended audience such as the cameramen, technicians) figured prominently in the interviews given by the teachers. This aspect, according to the teachers, creates a responding barrier in the communication. Classroom lectures, even the ones given to large groups, seem to benefit a lot from the feedback received from the smiles or questions-marks on the

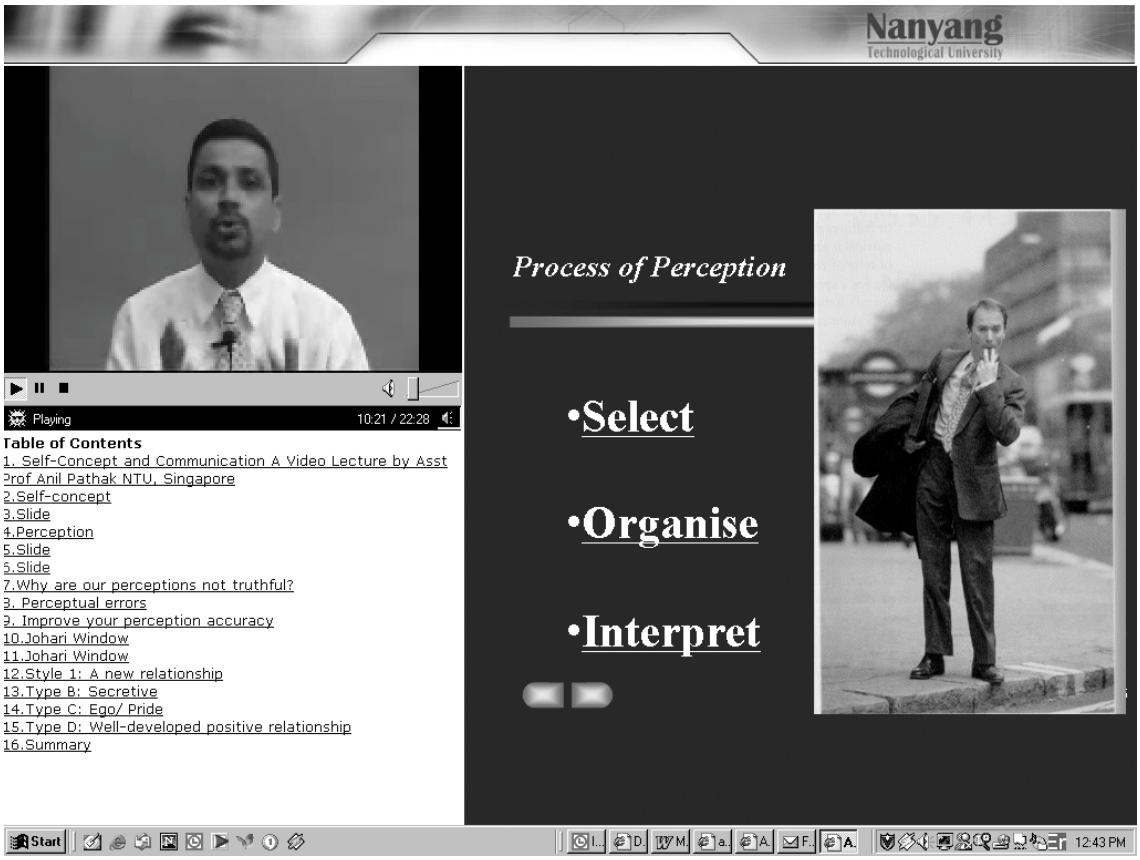


Figure 1: A screen from a web-based lecture

to be used in the classroom lectures somehow do not get used in the recorded ones. The e-lectures therefore seem rather dull, contrived, and too carefully planned.

Two teachers pointed out how facial expressions get overemphasized in this medium. They thought that though these expressions were a part of their presentation, their facial expressions were faces, laughter, silence, and whispers. These feedback features are characteristically absent in the e-lectures.

Teachers mentioned how pauses were used in the classroom lectures as a communication strategy. Pauses could emphasize a point, allow introspection, and let the content sink in. On the other hand, the teachers felt that pausing during their

e-lectures proved to be awkward. The e-lecture medium does not seem to allow silence as a communication strategy.

### 3.2 Students' Concerns :

Most of the students (78%) found the e-lectures useful, although a large number (39%) did not appreciate the idea of e-lectures eventually replacing the face-to-face lectures. Although classroom lectures are usually considered to follow teacher-dominated communication, patterns, the students seem to look at it as a more interactive medium than e-lectures. Commenting on this lack of interaction in the e-lectures, one student said -

> *I cannot instantly demand further elaboration on the point(s), which are not clear, and I forget these points afterwards. I do not have enthusiasm for raising these points through other means.* (Response No. 9)

The following response from another students also seems to be equally representative of this concern -

> *Instant interaction with other students while learning is very important for my learning habits. We are better learners when we are learning together with other people.* (Response No. 4)

Another fundamental concern of the students was about the access and access speed. Students had seen with the earlier innovations that it was sometimes difficult to access the content when they were away from the campus. Students talked at length about the stable speed required for audio-visual content. They were thus pleasantly surprised when they could access the content from their homes. As one student wrote -

> *I am viewing the video presentation from outside NTU, in the Somerset area to be exact. It was fantastic! I really hope this kind of video presentation would be made online for all the subjects and all the lectures so that we (students) will be able to view the lectures as many times as we want. This would be very helpful to us, when revising for the examination for instance.* (Response No.19)

It is clear from reactions such as these that the primary concern of the students was access. They could access something that so far was available with several limitations of time and space. It is also clear that at this stage they did not expect something radically different from the face-to-face lectures given in the classroom.

An interesting observation made by a few students related to the interaction between the video window and the slide window. The students pointed out that in a live lecture the lecturer sometimes points to a specific part of the slide using a pen or a pointer. The students thought that this is an extremely important action that easily related two or more ideas to each other. This kind of interaction is absent in the particular software that the lecturers used in our particular experiment. We tried to investigate whether lecturers were aware of this lacuna. We found that at least one lecturer had specifically tried to address this issue by using an animated arrow in the slide to point to a certain part of the slide. It was however found that the animation, voice, and movement did not synchronize as well as they would in a live lecture.

In general, the students attached great deal of importance to the voice of the lecturer. Although the presence of the video window is important for them to focus on the lecture, they did not seem to find the facial expressions and body language very important (see Figure 2).

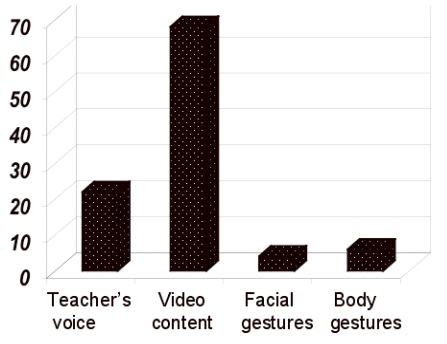


Figure 2. Students' priorities for different elements in the web-based lecture

All (100%) students agreed that the facility provided by e-lectures to see/hear parts of the lectures again was useful.

## 4. COMMENTS AND DISCUSSION :

We began this research with the question: What can the teachers do to make the e-lectures as effective as (or more effective than) the face-to-face lectures? Teachers as well as students seem to be having their own concerns regarding the effectiveness of e-lectures. We discovered that the effectiveness of e-lectures would depend upon efficiently addressing the students concerns. It is therefore useful to look into the data to locate and identify the interaction patterns between the teachers' and the students' concerns. In the best-case scenario, the two sets of concerns will have an exact match or an overlapping relation. In other cases there might be a clash between the two, and the teachers' concerns will probably go against addressing the students' concerns. It is also possible that the teachers' concerns and the students' concerns are mutually exclusive, which means that the teachers may be completely unaware of some of the concerns of the students.

Table 1 summarizes the interaction between the two sets of concerns. In terms of content, it was discovered from the interviews that the teachers are predominantly concerned with doing justice to the content. Teachers sincerely wanted to provide an adequate representation of the knowledge field. This concerns matches and overlaps with the concerns of the students who are equally keen to get an overview of knowledge in the field. However, it was discovered that students do not really mind repetition of certain points, while lecturers think it to be important to avoid undue repetition in their e-lectures.

In terms of the organization of the e-lectures, the two sets of concerns seem to be almost mutually exclusive. This indicates

Table 1 : Interaction between Teachers' Concerns and Students' Concerns

| | Teachers' concerns | Students' concerns | Relationship |
|---|---|---|---|
| **Content** | Is the content too repetitive? Is the content proportionate to the knowledge available in the field? | Am I missing anything? Does the content give me a general idea of the knowledge field? | Clash |
| **Organization** | Does the speech have a good Opening-Body-Close structure? | Can I easily find a 'map' for the lecture? | Overlap |
| | Is equal time spent on all important points? | Are the 'difficult' ideas elaborated more? Does the time spent on different points provide me a clue of the relative importance of certain points? | Clash |
| | How much time for preparation is needed? | Do I need to pause/ rewind the video too often? | Exclusion |
| **Delivery** | Are some of my body movements awkward? Is my facial expression too stiff? Is my voice too dry? | Is the voice loud enough? Can I understand the accent? | Exclusion |
| | Do some of my slides have too much content? | Do the slides have enough content, so that I don't have to refer to the textbook too frequently? | Clash |

that the teachers do not seem to be paying enough attention to students' concerns in this area. Although the Opening-Body-Close structure used by the lecturers seems to be useful for the students to map the lecture, students would like more time to be spent on the complex ideas. Teachers, however, were concerned with spending equal amount of time on all relevant points.

Even in terms of delivery, the students do not share the teachers' concerns about the body movements and facial expressions. Students unequivocally attached higher-order importance to teacher's voice rather than the body language (see Figure 2). In terms of delivery and organization, it would be more useful if teachers downplay their own concerns about body language and facial expressions, and give more importance to students' concerns about voice, accent, and matter on the slides.

## 5. IMPLICATIONS FOR DISTANCE EDUCATORS :

Without exception, effective distance education programs begin with careful planning and a focused understanding of course requirements and student needs. Appropriate technology can only be selected once these elements are understood in detail.

A fundamental implication of the present project is a strong need for student-teacher collaboration. It was found in this experiment that teacher concerns at the preparation stage are largely of an introvert nature. Although these concerns might be relevant to the Asian educational culture, values, and environment, in this process the concerns are based on a presumed antagonistic (rather than co-operative) nature of the audience. It might be useful to include a few students at the preparation stage to address their concerns. This might lift the psychological barriers that make the teacher-presenter self-conscious during the actual presentation.

Another important finding from the student survey suggests that lecturers in Asia need to increase their awareness of certain design issues. A fundamental issue is the interaction between the different elements in the presentation. The four elements (voice, video window, slide window, and hyperlinks) need to relate well to each other. In our experiment, however, it was found that only the first two elements integrated well. It is necessary to animate text and visuals on the slide so that this element is integrated with others. (In the face-to-face lecture, this is usually done by using a laser pointer.) Teachers also need to refer to the hyperlinks frequently. Suggestions such as "If you are still not sure about this idea, review Slide No. 11 again." should be frequently used.

In general, it seems that both students and teachers in the Asian culture might be overly dominated by the influence of the classroom lecture format. Indeed, the words of Shanks (2002, p.7) -"Everything that's wrong with training can be stated in four words: *It's just like school.*" acquire a significant meaning in this context. The e-lectures are a different medium. Since it uses video recording, lecturers can bring in many ideas and objects that may not be brought in the classroom. Lecturers in Asia, however, seem to be less aware of the potential of this medium. Also, contrary to teacher perceptions, the medium is more comfortable to use since a lecture need not be recorded at a stretch. Control over the broadcasting means that teachers can experiment with the delivery more freely, than they can in the classroom situation.

Lastly, the teachers are a bit too preoccupied with the secondary (and unintended) audiences. The medium may not be successful until the teachers focus entirely on the concerns of their primary audience- their students. Institutional factors might contribute to the teachers' undue occupation with the secondary audiences. Although this seems to be a chicken and egg situation, it will only take a few innovators and some supportive institutions to break the minor deadlock in this aspect.

When designing electronic lectures, the lecturer should focus attention on all types of students, not just those that he/she has met before. Lessons based on e-lectures should incorporate a variety of activities for

all types of students. Use of small group activities or brief student presentations can add variety to the lesson. A switch from lecture to question-answer to small group activity can prove to be an important instructional variation. Another excellent idea is to bring guest lecturers into the classroom. This encourages involvement of the distant students in the lecture-based lesson. Preparation for the electronic lectures should be systematized. The lecturer should keep in mind that small fonts and light colors do not show up well over the computer monitors. Use of meaningful gestures will also assist in maintaining student interest and attention. While watching the e-lecture lesson on a PC monitor, some students may adopt the "TV" attitude, expecting the course to be entertaining, not educational (Reed & Woodruff, 1995). The lecturers need to address this attitude through well planned and focused presentations with emphasis on teacher-student interaction. It is essential to ensure involvement in e-lectures by asking questions and simulating interaction (Pathak & Kathpalia, 2005).

To conclude, e-lectures seem to offer a number of benefits to students and teachers. The teachers' preoccupation with their delivery methods do not seem to be shared equally by the students, while the students' concerns with all-time access, repeatability, and clarity are not entirely addressed by the teachers. To succeed, the e-lecture innovation needs to be solidly based on teacher-student collaboration (where they address each other's concerns). Teachers also need to expand their awareness of the new medium, and look at this medium more than just an alternative to classroom lectures. Finally, we would like to quote from Brown and Duguid (2000, p.136) who state the learner's viewpoint -

> *People learn in response to need. When people cannot see the need for what's being taught, they ignore it, reject it, or fail to assimilate it in a meaningful way. Conversely, when they have a need, then, if the resources for learning are available, people learn effectively and quickly.*

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Appendix 1: Questionnaire Administered to the Students

Please view the video-lecture and answer the following questions. E-mail back your answers to me. You need not mention your name. This data is only for research purpose.

E-lecture: Questions for the Students

1. Do you find the idea of e-lectures useful?

☐ Yes, definitely
☐ Yes, but not as good as face-to-face lectures
☐ No, not really

2. Do you think that the video-size should have been larger in the e-lecture format?

☐ Yes, a bit larger
☐ No, the size is fine
☐ Does not matter

3. Did you find the presentation clear?

☐ Yes, definitely
☐ Yes, but not as good as face-to-face lecture
☐ No, not really

4. Point out any ONE slide where the explanation was NOT very clear to you.

Slide No.....

5. In e-lectures you can easily see/hear parts of lecture again. Do you find this useful?

☐ Yes, definitely
☐ Yes, but not very important
☐ No, not really

6. Which of the following are important to you in understanding the lecture?
Please rank-order

☐ Lecturer's facial expressions
☐ Lecturer's voice
☐ Matter on the slide
☐ Lecturer's body language

7. Please make comments and suggestions for improvement.

Appendix 2: Checklist for the Interviews with the Teachers

| Process Concerns | Product Concerns |
|---|---|
| Preparation for the lectures | Access |
| Studio environment | Optimal use of hyperlinks |
| Perceived audiences | Potential of the medium |
| Awareness of body language | Communication of subject matter |
| Communication strategies | Format of the e-lecture screen |
| Semi-permanent nature of the e-lectures | |

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