

*Using Streaming Technology to teach Communication Research Methods:  
Practical applications for intercultural education*

by

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## ABSTRACT

### *Using Streaming Technology to teach Communication Research Methods: Practical applications for intercultural education*

The rise of the Internet as a medium continues to transform virtually every part of society, and educators must re-think how teaching materials are offered to students. Professors are currently encouraged to post lecture notes and other materials on-line to help students master the material. But *streaming technologies—a form of video-on-demand through the Internet*--offer an effective means of re-presenting actual lectures in condensed form. This enables students to capture the essence of a given body of course material. This is especially beneficial to highly motivated students trying to learn in a second language. This manuscript suggests in the specific example of “Communication Research Methods” how material central to Communication programs can take advantage of streaming technology. Specific steps to implementing this approach are provided, as well as the benefits to students, educators, and institutions.

## **Overview**

The end of the 20<sup>th</sup> century has seen the rise of the Internet as a medium that is transforming virtually every part of society. Convergence in technologies is transforming every institution in modern society, and Education is no different. It is time, therefore, for educators to re-think how teaching materials are offered to students. Professors are currently encouraged to post lecture notes and other materials on-line to help students master the material. But *streaming technologies—a form of video-on-demand through the Internet*--offer an effective means of re-presenting actual lectures in condensed form. This enables students to capture the essence of a given body of course material. This is especially beneficial to highly motivated students trying to learn in a second language.

### **The Internet and University Education:**

The World Wide Web has had a profound impact on higher education (Starr, 1997). In the same way that news media and businesses are experimenting with ways to deliver goods and services through the Internet, so Universities are too. For example, Barnard (1997) found that University administrators value the Internet/WWW as a means of marketing the institution as well as deliver distance learning. More recently, there have been “Virtual Universities” launched, which combine the Web with existing communication technologies such as satellite TV, CD-ROM, cable and videocassettes to deliver education (Sutherland & Stewart, 1999, p.17).

But virtual universities have been criticized over lack of rigor and quality, and there have been mixed reviews on the usefulness of simply placing computers in the hands of students. In

spite of the uncertainty over what technology can best be used to educate (and in what manner), vast sums of money are still being invested in technology.

Since *Course Content* is still the focus and most important aspect of education, it is not enough to simply send students to various web sites. The vastness of the Internet can result in hours of wasted effort and fruitless searches. The key to education is the packaging and presentation of relevant information. This information, and the delivery thereof to the student, is primarily in the hands of the educator.

The time that students spend in the classroom is extremely valuable, and it may be argued that the importance of the scheduled lecture will never be replaced. There are a number of benefits to attending class and working in a classroom environment. Teachers are most effective when they can create an atmosphere where students feel involved and accept responsibility to learn the material on their own. The classroom changes from being a “lecture hall” to a “learning laboratory” where students interact with other co-learners, applying theoretical principles in applied exercises. This approach leads to deeper and more lasting levels of learning as well as greater student satisfaction.

To help transform the traditional top-down lecture class into a student-centered learning laboratory, supplementing in-class lectures with on-line offerings are very helpful--especially in cases where the lecture is in the student’s second (or third) language. The Web has been found to be particularly useful for accessing vast electronic libraries; lectures and notes on-demand to facilitate self-study; basic assignments and course syllabi (Barker and Tan, 1997).

Educators know that some degree of exposure to interactive media is an important component in teaching students (Smethers, p.15, 1998). A key question, however, is what information can best be presented through this technology?

### **Information Form and Content on the Internet**

There are many examples suggesting that entertainment and information must be tailored to the medium through which it is sent. For example, the traditional television program is offered in segments of 30 to 60 minutes. This type of segmentation enables the audience to plan and find the programs they wish to view. Film tends to run in the range of one to two hours, but this may have more to do with the physical limitations of sitting in one place than anything else. But time is a convention, an artifact created out of convenience and necessity. We have no such limitations in cyberspace, and this relatively new medium is still experimenting with alternate ways of presenting/segmenting information/entertainment.

In October 1999, Hollywood filmmakers Steven Spielberg and Ron Howard announced they would experiment with this new form of storytelling by producing short videos specifically designed for the Internet (“POP(.com) goes the studios”). Dream Works SKG and Imagine plan to debut “live action, animation and video-on-demand in small one- to six-minutes episodes.”

As Communications experts in Industry move in this direction, perhaps Educators should also be experimenting with using this technology in a similar fashion. The nature of web-use suggests that some material--such as a one or even two hour lecture--cannot be simply placed on the Internet. Murphy, for example (1998) found radio station web sites--visited for information and entertainment--are often visited for less than 15 minutes at a time. Taking this lead, educators must explore packaging information in a similar manner. With careful editing, a typical one-hour lecture could be turned into a number of 5-10 minute segments that could be streamed over the Internet.

### **Using Streaming Media to Enhance Learning**

Since streaming technology was launched in 1995 by RealNetworks, thousands of web sites and countless hours of audio and video have been web-cast (Kaye & Medoff, 1999). Many Universities have invested extensive resources into using this technology, and most have

purchased at least one generation of Video Server with which to offer video on demand.

Collaborative work between Universities has also explored the applications of video-on-demand (For example, the “Video Development Initiative” whereby a number of Universities are collaborating to establish a standard for Internet video, URL: <http://www.vide.net>). Further, many Universities now offer high-speed Intranets throughout their campus. Although these are increasing in number, the number of teaching faculty involved in this work seems to remain small. Part of this may be due to the lack of training and expertise, and an absence of incentives for faculty (Wilkinson, 1999).

There are three primary consumer platforms for streaming. RealNetworks Realplayer, Microsoft Windows Media Player, and Apple Quicktime are all free plug-ins that can be downloaded and installed from the Internet. Streaming video provides almost instant video signal because nothing is permanently downloaded onto the computer. After a few seconds of buffering, the video segment comes across the computer screen like low-quality television. Streaming video is most useful for presenting information where the visual aesthetics are not important. The applications for educators are almost endless as a way to deliver important information to students.

The benefits of streaming video over CD-ROM are Control and Flexibility. Control is greater in the sense that, streaming signals cannot be copied or duplicated because they are not stored on a client’s hard drive. The master file is stored on the University mainframe, and password protected. The professor retains ownership of the work.

Streaming video is also a more flexible format than distributing CD-ROMs to students. The streamed segments can be placed individually onto the mainframe video server. Changes or updates to one segment can be made without affecting the others. With a CD-ROM, each update demands an entirely new “version.”

Because access is controlled for streaming segments, an instructor also has the flexibility of deciding when material can be viewed. Passwords can be withheld until the appropriate time in a semester. For example, advanced lecture material can be off-limits until the second half of a semester.

Finally, streaming can be used in conjunction with books. The reliable, flexible, portable, textbook is still indispensable to learning. Streaming may be considered as simply a more passive form of presenting the material—kind of a “low quality” television. Because it consists of the lecturer verbally presenting the material in a conversational manner, it may be easier for the student to understand in this fashion. Whether students can learn more from streamed material versus a textbook is an empirical question that cannot be addressed yet, but is clearly one aspect of assessing the value of the technology.

### **A Case in Point: The Undergraduate Communications Research Methods Course**

Because educators must frequently update material each semester, a model course for taking advantage of this technology would have to be one that is a regular part of the curriculum, where a significant amount of core material remains relatively unchanged each time. Using this criteria, the basic Communications Research Methods course was selected to begin incorporating edited, streamed lectures.

Communications Research Methods (or Mass Media Research) is common to many programs. As an undergraduate course, it is often required and covers material such as the Scientific Method, Survey Methods, Experimental Designs, and Content Analysis. The same basic material must be covered each time. The topic of “levels of measurement” for example, must always provide examples of Nominal, Ordinal, Interval, and Ratio level data. This type of material rarely changes and lends itself to be stored in some fashion, and provided to the students to view and re-view as often as they like.

## **Creating edited on-line lecture materials**

### Step One: Rolls and Preparation: Executive Producer, Director, Scriptwriter, and Talent

Initially, the educator must wear many hats and play several roles—especially that of executive producer. Most if not every University now has some sort of studio and video equipment. Sometimes these services are housed in specific departments; sometimes they are under a unit devoted to improving teaching. This office must be approached and arrangements made for the videotaping of these mini-lectures. It may take place in an actual classroom, or a facility specifically designed for studio work. The educator must spend time explaining what the project is, what the goals are, and what resources are needed. The educator must also discuss and help decide the hiring of studio crew, set design, scheduling, pay rates, etc.

Next, the educator must become the scriptwriter. A well-written script enables the educator to minimize the need for editing. For example, a two-page single-spaced script can be read in 4-6 minutes. In script writing, the educator has to decide what parts of the lecture will go into the edited segment and (more importantly) which parts will not. Time is a key element. The segments must not be too long, or the viewer will not sit through the segment. Each educator must be highly critical of the lecture, and make the tough decisions on what is best offered as an Internet video supplement, and what is best presented in the classroom.

Once these arrangements have been made, the educator must begin to think like a performer. As educators increasingly move toward capturing their expertise in some form of video, it is unavoidable they adopt performance techniques to enhance the attention and interest of their audience--their viewers.

It is beyond the scope of this paper to debate the relationship between education, information, and entertainment. However, it is clear that the best teachers are those who have found ways to keep their students interested. This principle is the essence of performance, and



must be addressed by the individual instructor in considering the best way to present a body of material. Some types of information can be presented in creative ways; some cannot.

Step Two: Work with your University's computer network services department, store the edited segments on your University's video server.

At the same time, before you've gone into the studio, you need to initiate contact with your campus computer administration and arrange for server space. On most campuses, the computer administration and support is kept within a particular unit—Network Services and Computing (or something like that). This enables a University to upgrade and coordinate all the traffic on the campus-wide Intranet, linking various buildings together.

In recent years these units have been encouraged to work closer with faculty as a way of justifying equipment budgets through fulfilling the academic mission of the University.

Therefore, educators should seek out these offices and make efforts to work with them. It is up to the educator to clearly outline what is intended, however. These departments are charged with housing and providing the technology. The professor is the user and is responsible for course content. This can be very good because it releases faculty from worrying about maintaining and upgrading equipment.

Step Three: Arrange to either setup your own Web page or operate through your University Library to have links set up through the Library's Electronic Reserve System.

Even as our teaching methods are evolving, so also the role and scope of the Library is evolving on University campuses as well. They are becoming re-defined as the storage area and clearinghouse for information. They are also developing repositories for audio/video information, film, and Internet offerings. To stay viable, it is not uncommon for University Libraries to offer on-line support for faculty. This means not only keeping material on reserve, but also help with putting notes and lectures on-line. Often they will set up the links and provide

the storage for teaching materials. Libraries are moving in this direction in order to stay central to the needs of a modern University.

#### Step Four: Follow Up

It is the responsibility of the Scholar-Teacher in this new paradigm to be the writer, producer, performer, and executive producer of this material. University Computer and Network Services will supply the hardware and computer space. The Library will help archive and set up Internet links so the students can access it. Content and Delivery (performance) will remain under the control and responsibility of the educator.

#### **Applied Example:**

In December, 1999, the author was approved by the host institution to begin videotaping lectures on Communication Research Methods. Beginning in January 2000, short mini-lectures between five and ten minutes were produced and streamed onto the university video server at a rate of 150 Kbps (Kilobits per second). Studio sessions were scheduled for every two weeks. By the end of March, 2000, 14 lectures were recorded for a total of almost 85 minutes of video. Through a University-sponsored grant, an assistant was trained to help edit the lectures into 5-10 minute modules according to the list provided in Appendix 1 and Appendix 2. Regrettably, the assistant began in mid-February but left for a full-time job in early March.

These self-contained segments incorporate video of the lecturer speaking in a studio with PowerPoint information to help guide the viewer through the material. Afterward, each segment was processed through the host University's Computer Services department streaming video encoder, and saved on the University's video server. When classes began on January 17<sup>th</sup>, 2000, the first 3 weeks of course material (3 segments) were completed and made available to the 97 students enrolled in the course. The University library set up links for the students through the on-line system, and in this instance there was no password protection set up.

By April (BEA conference in Las Vegas), 14 of these Internet video mini-lectures were on-line and streamed at 150 Kbps (for high speed connections) and 40 Kbps (for home connections using a 56 modem). In the last week of March, students were asked to assess these mini-lectures on usefulness, interest, professionalism, and other relevant factors.

To boost response, the instructor announced one week in advance that extra credit would be given to participants at the time of assessment. Therefore, 68 out of 97 students participated, for a response rate of 70%. A screener question was asked whether students had ever used the service. If they answered “no” they were asked to provide reasons why. A total of 30 out of 68 (44%) had not gone to the web site. The reasons and number of responses were as follows:

Table 1 Student Reasons for Not Visiting the Web Site

Trouble with the technology	18
Lack of interest in the material	12
Lack of Interest in the course	8
Didn't see the need to use	7
My friends said it was a waste of time	3
I didn't know it existed	2

Open -end responses yielded similar comments--long download times, hard to use, my computer doesn't have a sound card, no time. Of the 56% who HAD visited the sites, open-end responses were provided to the investigator.

### **Open-end comments**

Thematic analysis of the listed open-end comments identified the following themes: The best things about the service were that students could review course material anytime. It was a convenient way to quickly review lecture material whether the student to make it to class that day or not.

The worst thing about this method was the technology. Streaming is still a relatively new technology and proved to be the biggest complaint lodged by a majority of the students. Many of

them complained that the “download time” took too long (although streaming does not entail downloading!). Therefore, the instructor needs to design tutorials for training students and making sure the university computer labs have correctly installed these plug-in devices.

Student suggestions to improve/increase use focused on mastering the technology, and including exercises and/or test questions. It was also noted that, “nothing can be done. Hardworking students will watch the lecturer.” (A complete list of these comments is provided in Appendix 3).

### **Benefits:**

There are three immediate and primary benefits of incorporating streaming media into our courses. There are benefits to the students, the teachers, to the University as a whole.

#### 1. Enhanced student learning.

These short edited lectures on the Internet provide access to learning like never before. Educators have long sought ways to accommodate the hardest working students. This application helps motivated students, and allows the lecturer to develop more in-depth explorations during the class time.

Furthermore, the student who has trouble learning in a second language needs more time to process classroom lectures. This technology overcomes this problem in that the students can review lecture materials at their convenience in a self-access learning mode--as often as necessary—until they have mastered it.

#### 2. Enhanced professor teaching.

This method of presenting course information also results in a better teacher. By placing the essence of the lecture material in Internet video form, it requires greater organization on the part of the lecturer in the teaching of the material. If the essential lecture material is available (in lecture form) before the class, the lecturer can then devise advanced exercises that expand on the

lectures. This is a more effective means of time management in delivering education to the student.

### 3. Synergies within the University

This type of innovation accomplishes a number of goals at the individual, department, and university level. Further, it brings together existing university resources (computer and network services, library, multimedia, and academic units). This type of interactivity between units mirrors the “convergence” evidenced in the business world and fosters the development of a learning community in the University. Computers, Libraries, Video technology, and Education can be brought together to enhance teaching effectiveness.

By providing short, video lectures of standardized course topic material, other educators may refer their students to this material as well to supplement the teaching of their courses. This can also be used as a model or template for other professors, which in turn can enhance the overall reputation of the host professor/university as an innovator in technology and class instruction.

The long-term significance of this approach is the transformation of our approach to our job. It is an application of the most basic of education principles. The educator is charged with distilling the most important points or aspects of a body of knowledge and presenting it to the students on their level of understanding. By videotaping and editing lecture materials to the most essential points and placing them on the Internet, the learning process is maximized. Besides affording students the chance to view and re-view material, it also allows the educator to creatively use classroom time for practical applications of the more general theory presented in the Internet videotaped lecture segments.

### **Conclusion:**

The past decade has been a time of technological Convergence. Previously, Audio, Video, Text, and Film were different media and relatively non-transferable. But the computer has made these compatible through digitization; and can seamlessly be woven together into a single presentation. The term used for this is *Convergence*. So now we have integrated audio, visual, and text images through the Internet and World Wide Web.

The Internet and WWW are changing the way the world does business. It has changed the way news and information are gathered, packaged, and made available. Educators must also have a basic use of and understanding of this technology because it can also be used to change basic concepts about education and how we deliver it. For those who choose to take advantage of it, they will become more relevant and important to the university. Further, there is a higher probability that these students will be better equipped to face the challenges of the new millenium.

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## **Appendix 1:**

### **Research Methods Modules**

- M#1: [TRT 6:03] Introduction to Communication Research
  - M#2: [TRT 7:32] Developing Research Ideas
  - M#3: [TRT 9:00] Basic Elements of Research and Research Terms
  - M#4: [TRT 4:46] Measurement Scales, Reliability & Validity
  - M#5: [TRT 4:48] Sampling, Population versus Sample, Non-probability samples
  - M#6: [TRT 7:21] Probability Samples, Sample Size, Weighting
  - M#7: [TRT 5:27] Qualitative Research Overview
  - M#8: [TRT 5:54] Focus Group Research & Field Observation
  - M#9: [TRT 6:26] Content Analysis
  - M#10: [TRT 4:14] Questionnaire Construction
  - M#11: [TRT 5:26] Hypothesis Testing, Type I/II Error and Significance
  - M#12: [TRT 7:23] Survey Method (overview), advantages and disadvantages  
(M#12A: Telephone Survey method(s))  
(M#12B: Mail Survey Method and procedure)
  - M#13: [TRT 6:41] Experimental Design (overview), advantages and disadvantages
  - M#14: [TRT 3:54] Basic Experimental Designs  
(M#15: Factorial Designs)
- Total: 14 Modules, 01:24:55 (84:55 minutes)**

## **Appendix 2: (to be done May-June, 2000)**

### **Tentative Statistics Modules/Segments (approximately 5 minutes)**

- S#1A: What are statistics? Histograms, Frequency Polygons, Summary Statistics (Mean, Median, Mode),
- S#2A: The Normal Curve
- S#3A: Standard Deviation
- S#4A: Hypothesis Testing, Significance
- S#5A: Error, Type I versus Type II, Power
- S#6A: Cross-tabulation, Chi-Square
- S#7A: Correlation
- S#8A: T-test
- S#9A: Regression
- S#10A: ANOVA



**Appendix 3:**  
**Open End responses from those who HAVE viewed On-line lectures**

**BEST things about it**

**LEARNING**

Content is useful and clear  
Help students to understand the main points of the lecture  
Easy to understand  
Good to have a quick understanding of the topic  
It can be a very good reference esp when I lost some important info during class  
Can catch the important of particular topics  
Can help us grasp the gist of the topic  
Can make us more clear what is teaching about

**REVIEW**

Very helpful if I find question in reviewing my test  
Can use it at home/quick review  
Can let me review the whole thing even after the lesson  
Another means for revision (review?\*)  
To review the lecture lesson  
Useful for studying and revising (reviewing?\*) the lectures  
Recall your memory  
It's good for revision (review?\*)  
Clear presentation that helps my revision a lot  
Provide short review on the topics  
It is a good way to review what I learn  
Can let us review many times even at home  
More easy to review the topic  
I can listen a few times and enhance my memory especially few hours before the test  
When students are at loss before tests, they can refer to it

**ACCESS/CONVENIENCE**

Can access at any time. Best for revision  
Easy to access  
Convenient, easy-accessing  
Access it anytime I like and it is accessible at home  
We can see it anytime we have time  
Convenient, easy to understand  
Anytime can watch  
Can view at any time at our own convenience  
Precise, and can review the class material at home at anytime

**MISSING CLASS**

Even if I have been absent from the lecture, I can review online lecture  
Although we have not attend the class, we still can know the contents by viewing this lecture  
Getting rid of reading a textbook  
I can't think of any

**Worst things about it**

**USING THE TECHNOLOGY**

Have to use computer to watch the lectures  
Can only view at school. Can't view at home, download time too long  
Sometimes quite fast  
Loading rate is really low

The speed of the lecture is too fast. I have to repeat several times in order to catch the ideas  
Takes time to download  
Takes long time to download  
Cannot save the video clip, so need to connect to the Internet every time when I want to see.  
The downloading time is too long and can't see the whole chapter continuously in one time  
It takes an hour to view one module...it takes one hour to load it! Too slow.  
It wait long long long long long long time to download and hard to save a copy for reference  
Very very troublesome to download it and very very time-wasting  
It takes time to load the materials and unlike books, these are not portable  
Quite short and it is tired to look at the monitor for a long time if I want to take a look at several lectures  
Difficult to access, buffer too much  
Too slow and hard to see the mini-lecture  
It is very slow to access due to technical problem  
Too much words  
The download speed is too slow  
It takes time to download  
Teacher talks too fast, the video goes too fast  
It's not easy to watch because my realplayer runs slow  
A bit trouble  
Time consuming  
The download time is horribly long. at home it took me too long to read the whole stuff. Sometimes it stops, too.  
Technical problem (buffering when listening to the video)  
Always have internet interruption when watching/always buffering  
My computer is slow in loading the realplayer file  
Difficult to access  
Hard to download, not smooth  
Difficult to view it as it is not loading well at home  
The time to download is too long  
Some material need to listen several times because it is not clear enough  
Difficult to load  
If I see it at home, it always connection lost

### **What to increase student use**

#### **IMPROVE THE TECHNOLOGY**

Advance the techno of this system, make it can be view smoothly at home  
Improve the speed of school network  
The material should be faster  
The material would be useful if it can be accessed faster  
If it can load faster and clearer  
Technical improvement  
Have a faster connection

#### **TEACH THE TECHNOLOGY**

Demonstration of the use of this kind of material in class  
With note provided (provide instructions\*)

Cut down the file size  
Quick download time, please.  
Shorten the download time  
Smooth download process

#### **IMPROVE THE CONTENT**

Emphasize the interesting thing of this material  
The content must be more informational. Some supplementary exercises or examples or ideas can be given beyond what we've been learned from text book.

Make it more interesting  
Add more graphics and explanation to special terms  
More references and examples of the materials

Add some exam tips in it  
Put important issue (e.g. preview of test, important announcement to material)  
Provide Exam tips

OTHER

I don't know...but I don't think it really matter to increase student use cause it's not a necessity for some lazy students to review the lecture

Nothing would be done. Hardworking students will watch the lecturer.

I think it is better to print them as an detailed notes

Accumulate points or bonus for this subject

Provide free updated realplayer to us

I have no idea

Keep telling them it's good to enhance the basic understanding of the topic  
**PROMOTION!**