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Media Richness and Social Norms in the Choice to Attend Lectures or to Watch them Online

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The study explored media richness and normative factors that influence students' choice to attend lectures or watch them online. Lectures in a large psychology course were taped and posted online where they could be viewed by streaming video. All students in the course had the option to attend lectures or watch them online, a choice that could be exercised on a lecture-by-lecture basis. The proportion of lectures watched online revealed that students chose between face-to-face and online lectures on the basis of their perception of the information richness of the medium. Students also chose a medium to the extent that they perceived others to favor it. When asked what medium they would use to watch lectures in various subject areas, students opted for face-to-face lectures when they anticipated the learning content to be difficult. The symbolism associated with the two media was not related to media choice.

The study of choice among communication media has, until recently, been in the sphere of business organizations interested in what media are preferred for particular messages (Daft & Lengel, 1984, 1986; Rice, 1992; Trevino & Daft, 1987, Trevino, Webster & Stein, 2000). The focus has usually been on communication tasks that vary on important characteristics such as ambiguity and uncertainty (Daft & Lengel, 1986, Daft, Lengel & Trevino, 1987), and the choice has typically been between communication media such as the telephone, email, written notes, the fax and face-to-face

meetings (e.g., Trevino, Webster & Stein, 2000; Webster & Trevino, 1995). Given the rooting of such research in organizations, communication media choice has tended to center on managerial objectives rather than on instructional ones.

Parallel interests in understanding communication media choice in interactions between faculty and students have lately been the object of increasing attention (Caspi & Gorsky, 2005; Irmer & Bordia, 2003). These efforts have concentrated on communication that occurs outside the classroom, such as what media are preferred by students (Irmer & Borgida, 2005) and by course coordinators (Caspi & Gorsky), for various communication tasks such as resolving a disagreement over a mark, or notifying students about a change in deadline for an assignment. However, the study of communication media choice has not yet explored one of the most common forms of communication in higher education, namely the communication of learning content in lectures. Given the explosive growth in the number of online courses offered by colleges and universities (Allen & Seaman, 2004; Carlson, 2004), and given that many of these courses are taken by students who are on campus on a regular basis and who have the option of obtaining lecture content either in class or on the Internet (Bassili, 2006; Carnavale, 2004), it is essential to understand the factors that influence media choice for instructional content.

The present study focuses on streaming video, a Web technology that is increasingly used in higher education to make lectures available to students on demand (Bassili, 2006). The technology was introduced at Stanford University in 1995 where graduate-level courses were made available on the Internet (Schultz & Rouan, 1998). Although the viewing experience was initially impoverished, with frames changing only about every half-second (Schultz & Rouan, 1998), compression-decompression technology, along with vast improvements in speeds of transmission and available bandwidth, now make lectures rendered by streaming video clear and appealing.

The approach to making lectures available by streaming video investigated here offers all students in a course the option to attend lectures or to watch them online. This option is offered to students irrespective of whether they are enrolled in a Web section or a lecture section of the course, and can be exercised without restriction on a lecture-by-lecture basis. The extent to which students attend lectures or watch them online is, therefore, a good indicator of instructional media choice. As studied here, this indicator benefits from being based on reports of actual media usage rather than on preference for particular media in hypothetical communication tasks.

Theoretical Framework

The choice to attend lectures or watch them online is essentially a choice between two communication media. For this reason, the present research is guided by the important tradition of research on Media Richness Theory (Daft & Lengel, 1984, 1986; Daft, Lengel & Trevino, 1987; Webster & Trevino, 1995). Media Richness Theory addresses the question of media choice by focusing on how the selection process is contingent on the level of uncertainty or lack of information, and the equivocality or ambiguity of the information that needs to be communicated. The fundamental tenet of the theory is that communication is optimal when the capabilities of the media are matched with the communication task (Daft, Lengel & Trevino, 1987). Thus, when information is inherently equivocal, and a person uncertain, that person will seek a communication medium that is capable of supporting clarification and providing a shared understanding of the situation. By contrast, unequivocal information can be communicated by simply transferring the information in a less rich medium.

Daft and colleagues (Daft & Lengel, 1984, 1986; Daft, Lengel & Trevino, 1987) have proposed that media can be ranked according to their richness, that is, their ability to support clarification and achieve a shared understanding. Several factors contribute to the richness of a medium, factors such as the medium's ability to provide various forms of feedback, cues, language nuances, and a focus on the individuals involved in communication. Research on media richness has generally found that face-to-face interaction is the richest medium, followed by the telephone, written addressed documents and unaddressed documents (Daft et al., 1987; Rice 1992; Steinfeild, 1986; Trevino, Lengel & Daft, 1987). Several studies have found support for media richness theory and its contingency hypothesis (Kraut, Galegher, Fish & Chalfonte, 1992; Daft et al., 1987). Daft, Lengel and Trevino (1987) for example, found that high performing managers were more sensitive to the relationship between message ambiguity and media richness than low performing managers.

Media richness theory does not address the totality of factors that can be relevant to media choice. Research on new media such as email and voicemail, which have recently been fitted to this framework (Dennis & Kinney, 1998), has not always yielded results that conform to media richness theory (El-Shinnawy & Markus, 1997). This has prompted researchers to explore contextual factors that influence attitudes towards media and the choice to use them (e.g., Kraut, Rice, Cool, & Fish, 1998; Trevino, Webster & Stein, 2000), normative influence processes in the adoption of a technology being especially important.

Two forms of normative influences on technology adoption have received particular attention. The first consist of peer's attitudes towards the technology (Fulk, 1993; Kraut, Rice, Cool, & Fish, 2000) which exert conformity pressures and provide modeling cues to potential users (Bandura, 1977). Thus, the social climate surrounding the introduction of a new technology can play an important role in its adoption (Fulk 1993, Fulk & Boyd, 1991; Webster & Trevino, 1995). The second form of normative influence stems from the notion of media symbolism (Trevino, Lengel & Daft, 1987). According to this view, media choices have symbolic meaning in social settings (Trevino, Webster & Stein, 2000). For example, letters suggest formality, phone calls suggest urgency, whereas meetings suggest the need for interactivity. Thus, media choice can be influenced by the extent to which media carry positive or negative symbolic meaning in a particular situation.

The multiplicity of factors that can influence media choice has led some early contributors to pit information-based theories against normative theories (Fulk, 1993; Fulk & Steinfield, 1990; Soe and Markus, 1992). Recent researchers, however, have found it more useful to study the complementary role of information richness and of normative factors in media choice (Irmer & Bordia, 2003; Kraut, Rice, Cool, & Fish, 2000; Trevino, Webster & Stein, 2000; Webster & Trevino, 1995) and to expand the search for factors relevant to choice. Given the speed with which new web-based technologies such as email have been deployed, and given their reliance on computers, a device which engenders anxiety in many (Koohang, 1989; Milbrath & Kinzie, 2000), it is natural that anxiety has been found to create a barrier to media selection (Bassili, 2006; Novek, 1999).

New web-based technologies have also brought into focus a greater variety of media capabilities. For example, Media Synchronicity Theory (Dennis & Valachi, 1999) examines five media abilities - immediacy of feedback, symbol variety, parallelism, reprocessability and rehearsability. These abilities are considered in the context of two communication processes – conveyance of information, and convergence towards shared meaning. The theory posits that communication is most effective when media capabilities match the needs of communication processes.

Research Questions and Hypotheses

The present study capitalises on a method for the creation of web courses that closely matches the content of a course offered in-class and online. The method, which is referred to as the WebOption, involves the presenta-

tion of lectures in large courses in one of two media - face-to-face and online. Online lectures are played in streaming video and fit the "lecture on demand" framework provided by asynchronous learning networks (e.g., Schultz & Rouan, 1998; Latchman, Kim & Tingling, 1999). Online lectures are posted the day they are delivered in class and are available for one week only, a constraint dictated by concerns about procrastination and a desire to keep students focused on the same material for purposes of discussion in a web-based forum associated with the course.

The WebOption offers an excellent opportunity for exploring media choice. This is because students who are enrolled in the face-to-face section of the course have the same access privileges to online lectures as students enrolled in the web section of the course. Because a good proportion of in-class students exercise the option to watch lectures online, space is created in the lecture hall allowing the instructor to invite students in the web section to attend any lecture they wish. This invitation is reinforced by the empty seats online students see in the lecture hall while watching lectures. Given that no conflicting course is offered in the same time slot, media choice can be exercised on a lecture-by-lecture basis by all students in the course, a variable that is an important focus in the research.

Two questions regarding the impact of media richness and normative factors on the choice to attend lectures or watch them online are addressed:

> (Q1) Given the variety of media richness dimensions and social and symbolic factors that can influence media choice, what dimensions are the most relevant to the choice to watch lectures face-to-face or online?
> (Q2) Given a range of disciplines that are perceived by students as varying in difficulty, what is the relationship between the perceived difficulty of a discipline and media choice?

The ability of a medium to communicate information relevant to a particular task is a central focus of media richness theory. However, the exact nature of the information relevant to learning lecture content in large classes is not clear. Reviews of research in education suggest that both subject-relevant content as well as factors germane to interpersonal relationships and cooperation among students are important to learning (Bransford, Brown & Cocking, 2000). In asking whether media richness influences the choice to attend lectures or to watch them online, one therefore needs to distinguish between particular media's ability to provide information about these two sources of information.

(H1) Students' choice between face-to-face and online lectures is related to their perception of these media's differential ability to provide information about the learning content presented in class.
(H2) Students' choice between face-to-face and online lectures is related to their perception of these media's differential ability to support interpersonal involvement with the instructor and other students.

The option to watch lectures online occurs in a social context where students can experience facilitating or inhibiting influences from their perception of what other students feel about online lecture watching as well as from the symbolic cues they see associated with this mode of learning.

(H3) Students' choice between face-to-face and online lectures is related to their perception of other's differential attitudes towards these media.
(H4) Students' choice between face-to-face and online lectures is related to their perception of the differential symbolic implications they associate with these media.

Assumptions about the difficulty of various subject disciplines are widespread among students. Media richness theory's concepts of equivocality and uncertainty capture the kind of complexity that many students associate with the subjects they consider difficult. The next hypothesis is based on the contingency assumption that is central to media richness theory.

(H5) Students' perception of the difficulty of a subject discipline will be related to their preference to attend lectures face-to-face rather than to watch them online.

Although not directly related to the focus of this article, the question of regarding learning outcomes is always at the forefront of technological developments that involve new instructional media. There has been a standing controversy about the role of media in learning (Clark, 1983, 1994; Kozma, 1991, 1994), with most evidence suggesting that media do not make a significant difference in learning. Given that students in the present study differed in the extent to which they watched their lectures face-to-face or online, and given that most past research suggests that media have no significant effect on learning, the following hypothesis was formulated.

(H6) Media choice is not related to examination performance.

METHOD

Participants

Four hundred and sixty three students enrolled in the second part of an introductory psychology course at the University of Toronto Scarborough responded to a questionnaire that was posted on a commercial survey site on the Internet. Of these, 138 were male and 282 female, with three students not reporting their gender. The median age was 18 (39%), with over 93% being under 24 year-old.

Survey Instrument

The questionnaire contained questions assessing the respondent's age and gender, as well as questions on the following variables (see Appendix).

Media Richness

Eight questions assessed students' perception of the ability of online lectures to provide information on a number of features related to learning from lectures. The same eight questions were subsequently asked with a focus on the ability of face-to-face lectures to provide information on these features. Thus, the question asking, "To what extent would you characterize online lectures in (this course) as having the ability to let you see important information being communicated in the lecture hall?" was followed, 20 questions later, by the same question asking about live lectures having this ability.

The questions were based on items drawn from research on media richness theory (Carlson & Zmud, 1999; Caspi & Gorsky, 2005; Trevino, Webster & Stein, 2000; Webster & Trevino, 1995) and were adapted to the context of instructional communication. Two questions were prepared on each of three of the criteria of richness identified by Daft and colleagues (e.g., Daft, Lengel & Trevino, 1987), namely feedback, multiple cues and personal focus. The fourth criterion, language variety, was not deemed relevant to distinguishing live lectures from their video renditions and was replaced by a more pertinent concern, namely audio/visual features of the lecture experience pertinent to the learning content. Factor analytic statistics are presented below on the structure of this set of questions.

Social Norms and Media Symbolism

Three questions measured the effect of social norms concerning media. The questions asked respondents about their beliefs regarding other students' attitudes towards the two instructional media investigated here. These questions were inspired by research on the effect of social norms on media choice (Caspi & Gorski, 2005; Kraut, Rice, Cool, & Fish, 1998;Webster & Trevino, 1995) but focused on norms that relate to learning in higher education.

Eight questions measured the effect of social influence as it operates via the symbolism associated with online lectures and face-to-face lectures. These questions were adapted from questions on media symbolism used in past research (Trevino, Webster & Stein, 2000; Caspi & Gorski, 2005) to reflect the present focus on symbolism in learning practices in higher education.

Media Choice

The WebOption allows any lecture to be attended in class or watched online, with some students electing to watch all lectures online, others electing to watch all lectures face-to-face, and others falling between these two extremes. Twenty-five lectures had been delivered by the time this study began. The number of lectures attended in class and watched online was measured by the following two items: "How many of the 25 lectures did you attend in class?" and "How many of the 25 lectures did you watch online?" Each question was accompanied by a 25-point scale that allowed students to indicate the number of lectures they watched in each modality. To avoid confusion about the time frame of the 25 lectures, a preamble to these questions provided the date by which the lectures had been delivered in the course. For increased reliability, online versus in-class lecture viewing was measured in two additional ways. First, the following question asked respondents for an overall estimate of the extent to which they watched lectures face-to-face and online: "Overall, please rate the extent to which you attended lectures in class versus watched them online." This question was accompanied by a 10-point scale defined at one end by "I watched all lecture in class" and at the other by "I watched all lectures online." Second, the following two questions asked at the end of the survey: "What percentage of all lectures so far did you watch in class?" and "What percentage of all lectures so far did you watch online?"

Perceived difficulty and Anticipated Media Choice

The extent to which students' perceived the learning content in various subject areas to be complicated was measured by asking them to rate the difficulty and anticipated experienced uncertainty with material in each of 8 disciplines: Anthropology, biology, English, mathematics, philosophy, physics, psychology and sociology. Specifically, the questionnaire stated: "The following questions ask about how difficult you expect material to be in each of a number of subject areas. That is, how difficult to understand do you expect the lecture material to be in each of the following courses?" Each type of course was then listed along with a 7-point scale defined at one end by "Not at all difficult" and at the other by "Extremely difficult". The same set of questions was then presented for anticipated uncertainty about the material.

Anticipated media choice for lectures in the various disciplines was assessed in the following manner. Respondents were asked to imagine taking a course in each of the eight disciplines and to rate on a 10-point scale labeled 0-10% to 91-100%, the percentage of lectures in that course they expected to watch online.

Grades

The midterm and final exams each contained 48 multiple choice questions. Because media choice has the potential of influencing the learning of lecture material more than that of textbook material, performance on these two components of each exam were separated. The midterm contained 12 questions on lecture content and 36 on the textbook. The final contained 16 questions on lecture content and 32 on the textbook. With their consent, students' performance on each of these four grading components was recorded for the purpose of correlation with media choice.

RESULTS

Descriptive Statistics and Computed Indexes

Media Richness

Differential media richness perceptions of face-to-face and online lectures were computed by first subtracting the rating of face-to-face lectures

from the rating of online lectures on each of the eight media richness items. These difference scores were then factor analyzed to explore their internal structure and to identify items that could fruitfully be combined into indexes. Two factors emerged before eigenvalues fell below 1 (see Table 1). The top loading item on the first factor, which accounted for 43.4% of the variance, was "To what extent would you characterized online lectures in the course as having the ability to establish a personal relationship with other students in the course?" The other items loading on this factor also had to do with relating to other students and the professor. This factor was accordingly named *Interpersonal Richness*. The top loading item on the second factor, which accounted for 18.0% of the variance, was "To what extent would you characterize online lectures in the course as having the ability to let you hear important information being communicated in the lecture hall?" while the other top loading items related to seeing important information and obtaining multiple cues about the instructor. This factor was accordingly named *Information Richness.*

Table 1
Factor Loadings for Differential Media Richness Ratings

Item	Factor 1	Factor 2
Establish relations with students.	**.89**	.10
Multiple cues about students.	**.85**	.10
Establish relations with professor.	**.82**	.16
Hear important information.	-.08	**.81**
See important information.	.13	**.80**
Feedback about content of lectures.	.31	**.61**
Feedback on other students' opinions.	.43	.54
Multiple cues about professor.	.51	.42
% Variance	43.4	18.0

Note. Principal component analysis with Varimax rotation. Scores entered in the analysis were computed by subtracting the rating of face-to-face lectures from the rating of online lectures on each of the eight media richness items.

Two criteria were used in selecting items for inclusion in an index. The first was that the item had to have a factor loading of .6 or higher on the relevant factor, while the second was that the item had to have a loading on the relevant factor that exceeded the item loading on another factor by at least

.3. Together these criteria promoted the homogeneity of each index while maximizing its discriminant validity.

A *Differential Interpersonal Richness* index was created by averaging the difference scores for the three items that met the selection criteria on the interpersonal richness factor (Alpha = .839). The mean score on this index was M = -1.97, SD = 1.87, indicating that face-to-face lectures were perceived as providing richer interpersonal information than online lectures ($t(386) = -20.77$, $p < .001$). Cohen's *d* for this comparison is 1.05, reflecting that this is a strong effect. A *Differential Information Richness* index was similarly created by averaging difference scores for the three items that met the selection criteria on the information richness factor (Alpha = .676). The mean score on this index was M = -.07, SD = 1.28, indicating that online and face-to-face lectures were not perceived to differ in their ability to provide information about lecture content ($t(389) = -1.03$, $p > .3$).

Social Norms and Media Symbolism

Differential social influence perceptions of face-to-face and online lectures were computed by first subtracting the rating of face-to-face lectures from the rating of online lectures on each of the eleven social norms and media symbolism items. These difference scores were then factor analyzed. Three factors emerged before eigenvalues fell below 1 (see Table 2). The top loading item on the first factor which accounted for 30.1% of the variance was, "To what extent does attending lectures online (attending live lectures) communicate to others that learning is a very high priority to you?" The other four items that loaded on this factor also related to dedication to one's studies. This factor was accordingly named *Symbolic Commitment.* The top loading item on the second factor which accounted for 19.3% of the variance was, "Based on your knowledge of other students at the University of Toronto Scarborough, how useful do you believe students feel the WebOption is (live lectures are) in this course?" The other two items that loaded on this factor also related to respondent's assessments of others' feelings towards the WebOption. This factor was accordingly named S*ocial Norms*. The top loading item on the third factor which accounted for 14.1% of the variance was, "To what extent does watching lectures online (attending lectures live) communicate to others that you are casual in your approach to your studies?" with the other two items on this factor also suggesting a lazy approach to one's studies. This factor was accordingly named *Symbolic Indolence.*

Table 2
Factor Loadings for Differential Social Influence Ratings

Item	Factor 1	Factor 2	Factor 3
Communicates learning is high priority	**.87**	.08	-.04
Communicates student dedication	**.87**	.05	.01
Communicates motivation to do well	**.87**	.02	-.01
Communicates interest in collaborating	**.72**	-.10	.02
Communicates urgency about studies	**.67**	.16	-.02
Perceived feelings about WebOption	.08	**.86**	.05
Perceived attitudes towards WebOption	-.03	**.84**	.22
Perceived instructor support for WebOption	.08	**.71**	-.08
Communicates casualness about studies	-.04	.09	**.82**
Communicates low effort	-.06	-.05	.77
Communicates informal approach to study	.06	.08	**.64**
% Variance	30.1	19.3	14.1

Note. Principal component analysis with Varimax rotation. Scores entered in the analysis were computed by subtracting the rating of face-to-face lectures from the rating of online lectures on each of the eleven social influence items.

A *Differential Symbolic Commitment* index was created by averaging the five items that met the selection criteria on the symbolic commitment factor (Alpha = .761). The mean score on this index was M = -.87, SD = 1.54, indicating that attendance at face-to-face lectures was perceived as symbolizing student dedication to a greater extent than watching online lectures ($t(384) = -11.14$, $p < .001$). Cohen's *d* for this comparison is .56, reflecting a medium effect size.

A *Differential Symbolic Indolence* index was similarly created by averaging the three items that met the selection criteria on the symbolic indolence factor (Alpha = .583). The mean score on this index was M = .09, SD = 1.32, indicating that perceptions of online and face-to-face lectures did not differ on the extent to which they were perceived to symbolize indolence in one's studies ($t(384) = 1.31$, $p > .15$).

Finally, as *Differential Social Norms* index was created by averaging the three items that met the selection criteria on the social norm factor (Alpha = .745). The mean score on this index was M = .56, SD = 1.14, indicating that students perceived others in the campus community to be more favourable

towards online lectures than towards face-to-face lectures ($t(386) = 9.63$, $p < .001$). Cohen's *d* for this comparison is .49, reflecting a medium effect size.

Media Choice

A variable reflecting the extent to which a student viewed lectures in class or online was computed by dividing the number of lectures watched online by the number of lectures watched online *plus* the number of lectures attended in class. The logic behind this variable is that a student's inclination to watch lectures online versus in class is captured by the ratio of lectures watched online to the total number of lectures watched. On occasion a student reported attending class and also watching the lecture online. Similarly, on occasion a student reported missing a lecture altogether. Such cases do not detract from the present computation because double attendance and missed lectures contribute to both the numerator and denominator in the computation of the ratio.

To check on the reliability of reports on lecture watching, the preceding measure of media choice was compared to two other measures. The first of these was a ratio similar to the one just described, computed on the basis of responses to the questions asking about the percentage, rather than a count, of lectures watched online and in class. The second measure was based on responses to the question assessing the overall extent to which students watched lectures in class or online. Because these three measures were highly interrelated (Alpha = .949), and because a focus on the ratio based on the numerical count of lectures simplifies the presentation of subsequent results, this measure was adopted as the index of media choice.

Figure 1 shows the proportion of lectures watched online by students in the study. As is readily apparent, the modal response was watching all lectures online, with smaller numbers of students reporting various proportions of online and live lecture viewings. Because this distribution is highly skewed, thus violating the assumption of normality, media choice was dichotomized for purposes of subsequent analyses. To divide students into two groups of roughly equal size, a ratio of .75 and higher was adopted to identify students inclined to watch lectures online ($N = 247$), with the rest of the students being identified as inclined to attend lectures face-to-face ($N = 176$). Although the criterion of .75 is arbitrary, analyses based on the continuous variable of media choice yielded the same pattern of results and will be presented in appropriate places in the description of the results.

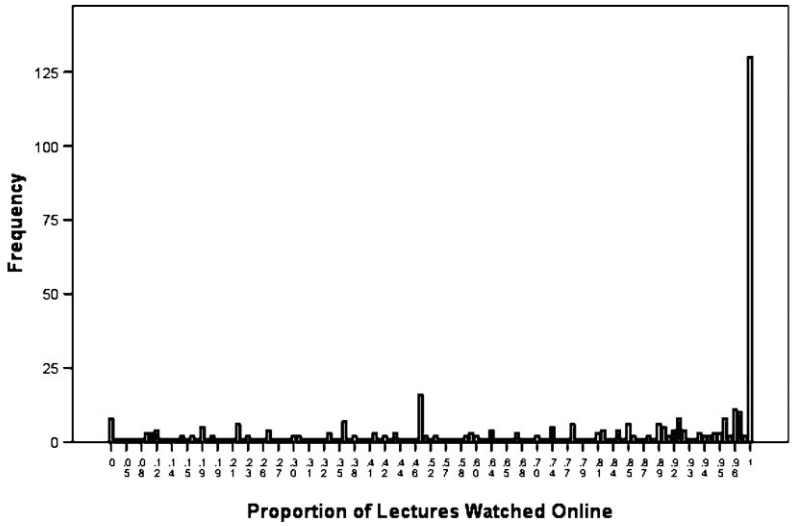

Figure 1. Number of students watching various proportions of lectures online. Proportions were computed by dividing the reported number of lectures watched online by the total number of lectures watched online and attended in class.

Perceived Subject Difficulty

Because average ratings of difficulty and uncertainty across disciplines were highly correlated ($r = .88$, $p < .005$), responses were averaged to form an index of difficulty. Table 3 shows the average perceived difficulty of the eight subject areas investigated here.

Grades

Midterm and final exam marks on textbook material were averaged into an index called *Textbook Performance* (Alpha = .822). Midterm and final marks on material from lectures were similarly averaged into an index called *Lecture Performance* (Alpha = .626).

Control Variables

The mean age of participants was M = 19.65, SD = 2.923, 67% of participants being female. The mean self-rating of fluency in English on the five point scale was M= 4.52, SD = .684.

Table 3
Difficulty Ratings of Eight Subject Areas

Subject	Difficulty
Anthropology	3.81
Biology	4.46
English	3.81
Mathematics	4.96
Philosophy	4.24
Physics	5.45
Psychology	3.84
Sociology	3.51

Note. Difficulty scores consist of the average of uncertainty and difficulty ratings of each discipline on a 7-point scale where high numbers indicate greater uncertainty/difficulty.

Test of Hypotheses

Because the outcome variable of media choice was dichotomous, the data were analyzed using logistic regression analysis. An indicator variable was used to code media choice (0 = face-to-face, 1 = online). Media choice was then regressed on differential media richness, differential interpersonal richness, differential symbolic commitment, differential symbolic indolence and differential social norms. To control for the possible effect of gender, age, and fluency in English, these variables were also entered in the equation. The results of this analysis are presented in Table 4.

Differential media richness, a variable relevant to H1, was significantly related to media choice. As stipulated in H1, students' media choices were related to their perception of the media's differential ability to provide information about the learning content presented in class (Wald statistic = 7.210, exponent of logistic coefficient = 1.317, p = .007). Specifically, students chose between face-to-face and online lectures on the basis of their perception that one medium had more ability to communicate learning content than the other medium.

Table 4
Logistic Regression Results in Prediction of Media Choice

Variable	Wald Statistic	Exp(B)	p
Information Richness	7.210	1.317	.007
Interpersonal Richness	.034	1.013	.885
Social Influence	6.240	1.310	.012
Symbolic Dedication	.936	.920	.776
Symbolic Sloth	.467	.941	.494
Age	12.786	1.440	.000
Gender	5.432	.570	.020
Fluency in English	2.038	1.264	.153

Note. The dichotomous measure of media choice was regressed on the two richness, three normative and three control variables shown here. Exp(B) values greater than one reflect that a variable was associated with increased online viewing of lectures whereas Exp(B) smaller than one reflect that the variable was associated with increased class attendance.

H2, which states that media choice is related to differential interpersonal richness was not supported, differential interpersonal richness not being significantly related to media choice (Wald statistic = .034, exponent of logistic coefficient = 1.855, p = .885).

Differential social norms, a variable relevant to H3, was significantly related to media choice. As stipulated in H3, students' media choices were related to their perception of the attitudes of other students and the instructor towards face-to-face and online lectures (Wald statistic = 6.240, exponent of logistic coefficient = 1.310, p = .012). Specifically, students chose a medium to the extent that they perceived others to favour that medium.

H4, which states that media choice is related to differential media symbolism, was not supported, neither differential symbolic commitment nor differential symbolic indolence being significantly related to media choice (Wald statistic = .936, exponent of logistic coefficient = .920, p = .776, and Wald statistic = .467, exponent of logistic coefficient = .941, p = .494, respectively).

Although we did not hypothesize about the possible relationship between the control variables and media choice, it is instructive that age and gender were significant in the analysis. Specifically, older students were more likely to watch lectures online (Wald statistic = 12.79, exponent of logistic coefficient = 1.266, $p < .001$). Bearing in mind the very small age variation in the present sample, this result suggests that students in upper

years were more likely to watch lectures online than students in their first year of university. The gender effect indicated that men were more likely than women to watch lectures online (Wald statistic = 5.44, exponent of logistic coefficient = .570, p = .020).

Because the dichotomous variable of media choice used in the logistic regression analysis forgoes what may be meaningful variance in the continuous variable on which it is based, a linear regression analysis was also conducted on the proportion of lectures watched online. The proportion of lectures watched online was regressed on the same independent variables that were in the logistic regression analysis, with the addition of interaction terms created by multiplying each of the three control variables by the five other variables. Because linear regression analysis affords a straightforward test of the significance of R-square changes with the introduction of new variables, these interaction terms were added in the second step of the regression analysis to check if the media choices of students who differ in gender, age and fluency in English are differentially affected by the richness and normative variables.

The model in the first step of the equation was significant (adjusted R square = .078, $F(9, 361) = 4.49$, $p < .001$), the pattern of effects conforming exactly to that of the logistic regression analysis. Thus, only differential media richness, differential social norms, age and gender were significant (Beta = .151, $p < .01$; Beta = .130, $p < .015$; Beta = .174, $p < .001$ and Beta = -.121, $p < .025$ respectively). The interaction terms were added to the model in the second step of the analysis. The increase in R square in this step of the model, however, was not significant (R square change = .028, $F(15, 346) = .748$, $p = .734$), revealing that the media choices of students who differ in gender, age and fluency in English are not differentially affected by the richness and normative variables.

The next analysis tested H5, which stipulates that students would report preferring to attend lectures face-to-face in subject areas they consider difficult. The correlation between perceived subject difficulty and anticipated media preference was $r = -.826$, $p < .025$, revealing a strong tendency for students to report opting for face-to-face lectures when they anticipate the learning content to be difficult.

The last analysis tested H6, which states that media choice is not related to performance on exams. The hypothesis was confirmed, examination performance on neither the textbook nor lecture material being significantly correlated with the proportion of lectures watched online, $r = .010$ and .080 respectively, $p > .1$ in both cases.

DISCUSSION

The present study focused on the choice between attending lectures and watching them online. The selection of variables explored in the study was guided by media richness theory and the normative theories that have complemented it. The study identified two media richness dimensions in the classroom, one dealing with the ability to communicate information about the learning content, and the other with the ability to communicate interpersonal information about the instructor and other students. Only the first form of richness was found to be relevant to media choice, students opting for the medium that was perceived as having a better ability to provide information about learning content. Interpersonal richness, a variable that is often thought by educators to be important for learning, was not related to students' media choices, at least in a very large course where lectures are offered in a 500-seat theatre.

The study also identified three normative dimensions stemming from social influence and media symbolism considerations. The social influence forces emerged from students' assumptions about the attitudes of other students, as well as their instructor, towards face-to-face and online lectures. Differential perceptions of these attitudes did influence students' media choices so that students were more likely to choose to watch lectures in the medium they perceived to be favoured by others. The symbolism associated with attending live lectures or watching them online broke down into two dimensions, one dealing with positive symbols depicting commitment to one's studies, and the other with negative symbols depicting indolence in approaching one's studies. Neither of these dimensions was related to media choice.

It is instructive to compare aggregate perceptions of face-to-face and online lectures in juxtaposition with the factors that were related to media choice. On average, face-to-face lectures were perceived as being more able to provide interpersonal information than online lectures, yet this factor was not relevant to students' media choices. By contrast, face-to-face and online lectures were, on average, perceived as being equally able to provide information about lecture content, yet this factor did influence media choice. What this finding illustrates is that, when aggregated, perceived properties of media are neither necessary nor sufficient for media choice. Though this finding may appear paradoxical, one needs to bear in mind that aggregate perceptions hide substantial individual differences, and it is at the individual level that perceptions of media properties influence media choice.

Implications

The creation of the WebOption at this university was accompanied by faculty concern regarding its pedagogical value. The most commonly asked question in those early days had to do with learning outcomes for students who watched lectures online compared to those who attended lectures. Two things quickly became apparent. The first, which is confirmed again in the present findings, is that there was no difference in learning outcomes linked to media. The second, also confirmed here, is that the WebOption was greeted with resounding student endorsement. The present findings shed light on some of the factors responsible for this endorsement. Primary among these factors is the perception that face-to-face and online lectures do not differ in their ability to convey information about learning content.

Educators might use the present results to help identify where and how to introduce online learning options such as the one explored here. Bearing in mind that the present research focused on a large introductory course, and given that lectures in such courses tend to involve one-sided communication from the instructor to students, it is not surprising that information richness played a much more important role in media choice than interpersonal richness. The present results suggest that the primary focus in implementing streaming video options in large courses should be on maximizing the audio and video quality. Moreover, given that media choice does not appear to impact learning outcomes, it is important to address during the implementation process any unfounded normative concerns regarding the choice to watch lectures online.

Research on media choice has exposed the complementary impact of media richness and normative factors on media adoption. Both of these influences are apparent in students' choices to attend lectures or watch them online. The fact that the richness of a medium in carrying information about the learning content is more important than its ability to carry personal information about the instructor and students demonstrates that students in large courses are primarily interested in obtaining the information being communicated by the instructor. The fact that students' choices are related to their perceptions of others' opinions further demonstrates that media choice is not made in a vacuum. The understanding of such dynamics in media choice will prove instrumental in the successful introduction of web-based technologies in learning institutions.

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APPENDIX

Media Richness Questions

Feedback

To what extent would you characterize online (live) lectures in (this course) as providing feedback on other students' opinions about material in lectures?

To what extent do online (live) lectures in (this course) have the ability to provide timely feedback about the content of lectures*?*

Personal Focus

To what extent would you characterize online (live) lectures in (this course) as having the ability to establish a personal relationship with the professor in the course?

To what extent would you characterize online (live) lectures in (this course) as having the ability to establish a personal relationship with other students in the course?

Multiple cues

To what extent would you characterize online (live) lectures as having the ability to provide multiple cues about instructor language, such as body language, facial expression and tone of voice?

To what extent would you characterize online (live) lectures as having the ability to provide multiple cues about other students, such as their body language, facial expression and attentiveness?

Audio-Visual Clarity

To what extent would you characterize online (live) lectures in (this course) as having the ability to let you hear important information being communicated in the lecture hall?

To what extent would you characterize online (live) lectures in (this course) as having the ability to let you see important information being communicated in the lecture hall?

Social Norms and Media Symbolism

Normative Referents

Based upon your knowledge of other students at (this campus), how useful do you believe students feel the WebOption is (live lectures are) in (this course)?

How useful do you think your instructor in (this course) considers the WebOption (live lectures) to be as a means of making lecture material available to students?

Rate what you believe to be, on average, the attitude of other students towards the WebOption (live lectures).

Symbolic Implications

To what extent does attending lectures online (live) communicate to others that you feel a sense of urgency about your studies?

To what extent does attending lectures online (live) communicate to others that you are informal in your approach to your studies?

To what extent does attending lectures online (live) communicate to others that you are interested in learning collaboratively with other students?

To what extent does attending lectures online (live) communicate to others that learning is a very high priority to you?

To what extent does attending lectures online (live) communicate to others that you are a dedicated student?

To what extent does attending lectures online (live) communicate to others that you are motivated to do well in the course?

To what extent does attending lectures online (live) communicate to others that you are casual in your approach to your studies?

To what extent does attending lectures online (live) communicate to others that you are not interested in putting effort into your studies?