Motivation and Cognitive Strategies in the Choice to Attend Lectures or Watch them Online

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Abstract

This study explored relations between students' motivational and cognitive orientations as assessed by the Motivated Strategies for Learning Questionnaire (MSLQ), and their attitudes and choices relating to online lecture viewing. Examination performance was also assessed to determine if there were particular affinities between certain motivational or cognitive orientations and success in learning by attending lectures or watching them online. The results of regression analyses revealed that students who considered the course interesting and important and who were motivated extrinsically to do well in it, expressed particularly positive attitudes towards the option to watch lectures online. Students who did not particularly want to learn in interaction with their peers, and who were not inclined to monitor their learning, were particularly likely to watch lectures online rather than to attend them in class. The results suggest that attitudes towards the option to watch lectures by streaming video are related to students' motivational orientations whereas the actual choice to attend lectures or watch them online is related to their cognitive strategies. The extent to which students attended lectures or watched them online was not related to examination performance either alone or in interaction with any motivational orientation or cognitive strategy.

Résumé

Cette étude explore les relations entre les orientations motivationnelles et cognitives des étudiants, telles qu'évaluées par le questionnaire sur les stratégies d'apprentissage motivées « Motivated Strategies for Learning Questionnaire (MSLQ) », ainsi que leurs choix et attitudes face au visionnement de conférences en ligne dans le cadre de leur cours. La performance aux examens a aussi été évaluées pour déterminer s'il existait des affinités particulières entre certaines orientations motivationnelles ou cognitives et le succès dans les apprentissages, en se présentant aux cours en salle de classe ou en le regardant en ligne. Les résultats des analyses de régression ont révélé que les étudiants qui considéraient le cours important et intéressant et qui étaient motivés intrinsèquement à performer, ont démontré des attitudes particulièrement positives à regarder le cours en ligne. Les étudiants qui n'étaient pas particulièrement intéressés à apprendre en interaction avec leurs pairs, et qui n'étaient pas enclin à gérer leur apprentissage, étaient plus susceptibles de regarder le cours en ligne plutôt que de se présenter en classe. Les résultats suggèrent que les attitudes envers l'option des

cours en ligne par streaming vidéo sont liées aux orientations motivationnelles alors que la décision de suivre le cours en ligne ou en classe est liée aux stratégies cognitives. Le fait de suivre le cours en ligne ou en classe n'était pas lié à la performance aux examens, que ce soit seul ou en interaction avec les orientations motivationnelles ou cognitives.

Introduction

Web-mediated instruction has been growing so rapidly and with such diversity that our understanding of the factors that influence students' attitudes and choices regarding the way they obtain instruction is, at best, spotty. For example, Sankaran, Sankaran and Bui (2000) found that students' choice of instructional format was related to their initial attitudes towards online instruction, while Neuhauser (2002) found few demographic characteristics that differentiated students who chose to enrol in an online or a face-to-face section of a management course. Litchfield, Oakland and Anderson (2002) found that demographic variables and computer experience were not linked to the use of online tools. Wang and Newlin (2000) compared, on a number of demographic and psychological properties, students who chose a Web-based psychological statistics course with students who took it in a face-to-face format and only found a marginally significant effect with online students being slightly higher in locus of control (Rotter, 1966) than students in traditional sections.

The import of such disparate findings for our understanding of student attitudes and choices is further bound by the rapid changes that have occurred in the instructional options available to students. None of the preceding studies, for example, involved choices beyond that of enrolling in a face-to-face or an online section of a course. Moreover, the variables explored in these studies revealed little about the motivational and cognitive factors involved in learning. Podcasting, a web technology that is growing in importance in education, is also beginning to yield a number of findings regarding lectures available via download (Brittain, Glowacki, Van Ittersum & Johnson, 2006; Campbell, 2005; Flanagan & Calandra, 2005; Lipscomb, Guenther & McLeod, 2007), thus adding to the need to understand web-mediated instruction.

A series of papers by Maki and Maki and colleagues (Maki & Maki 2000, 2002, 2003; Maki, Maki, Patterson & Whittaker, 2000) provide evidence about cognition, at least as it pertains to comprehension skills. In these studies of an introductory psychology course consisting of a face-to-face and Web-based sections, online students performed better than lecture students on most exams and on mastery questions about course content (Maki & Maki 2000, 2002). Yet, despite this improved performance, student evaluations of online sections were lower than their

evaluations of lecture sections. Interestingly, the performance advantage of students in online sections was accentuated for students with high comprehension skills (Maki & Maki, 2002). The preceding studies illustrate the potential interaction between cognitive skills and performance outcomes in face-to-face versus Web-based courses. At the same time, these studies demonstrate that attitudes towards learning approaches are not necessarily linked to performance outcomes. What is not yet well understood, however, are the cognitive and motivational factors related to students' attitudes towards online instruction and their choices to attend lectures in class or watch them online. This is the focus of the present research.

Motivation and Cognition in Media Attitudes and Choices

Of the many factors that can influence students' attitudes and choices towards Web-mediated instruction, motivation and cognition are the most pedagogically relevant. Long traditions of research on motivation and cognition have established the importance of these constructs to many aspects of learning. Cognition, for example, comprises processes of attention (Grabe, 1986); critical thinking (Halpern, 1997; Nickerson, Perkins, & Smith, 1985), the organization of information in memory (Anderson, 1995; Craik & Lockhart, 1972) and the metacognitive regulation of learning (Baker, 1989), processes that are fundamental to learning. Similarly, motivation in the form of mastery and performance goals (Dweck & Leggett, 1988), intrinsic and extrinsic interests (Deci & Ryan, 1992), and feelings of self-efficacy (Bandura, 1997) have been related to academic performance and achievement.

Students differ in a host of motivational and cognitive orientations that influence the way they learn. This is clearly demonstrated in a line of research based on the multi-faceted Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia & McKeachie, 1991). For example, the scale has been used to investigate critical thinking in learning (Garcia & Pintrich, 1992); motivation for conceptual change (Barlia & Beeth, 1999; Linnenbrink & Pintrich, 2001), self-efficacy (Bong & Hocevar, 2001), beliefs about knowledge (Dahl, Bals & Turi, 2005), intrinsic and extrinsic motivation (Lin & McKeachie, 1999), integrated metacognitive instruction (Higgins, 2000), adolescent help-seeking in math classes (Ryan & Pintrich, 1997) and goal orientation (Pintrich, 2000). The scale has undergone extensive psychometric development (Pintrich et al., 1991) and has the benefit of providing data on the correlation between each of its components and final grades in courses (Pintrich, 1990). The fact that most components of the MSLQ are correlated with academic performance attests to the importance of the constructs it measures, and its success in measuring them.

Aims of Present Research

The present research focuses on three questions. The first question is whether motivational orientations and cognitive strategies are related to attitudes towards, and choice of, instructional media. This question is of particular importance when controlling for convenience of access to campus, because it explores the contribution of factors relevant to learning in students' adoption of an increasingly widespread instructional medium, namely Web-delivered streaming video of lectures. Motivation and cognitive strategies were measured with the MSLQ. Motivational orientations involve intrinsic and extrinsic orientations towards a course, its perceived interest, importance and utility to the student, as well as the student's control beliefs and expectancy of success in the course. The cognitive strategies constructs involve memory enhancing processes of rehearsal, elaboration and organization, metacognitive strategies of planning, monitoring and regulating the study process, and resource management strategies of management of time, environment, effort and help-seeking. Given the central role these motivational orientations and cognitive strategies play in successful learning (Pintrich et al., 1991), the first hypothesis posits that they will also guide attitudes and choices of learning media.

> (H1) Students' motivation and cognitive strategies are related to their attitudes towards online lectures and to their reported choices to attend lectures or watch them online.

H1 does not specify which specific motivational orientations or cognitive strategies are likely to play a significant role in media choice. Given the complex relations between components of the MSLQ with each other and with academic performance, it is premature at this stage of explorations of media choice to formulate very specific hypotheses about each motivational orientation and cognitive strategy.

The second question, given the diversity of motivational orientations and cognitive strategies under investigation, is whether the effect of these components is the same on attitudes towards the option to watch lectures online and on the actual choice to attend lectures or watch them online. Although the view that attitudes mediate behavioural choices has a long tradition in the social sciences (e.g., Bassili, 1995; Markus, 1982) and consumer product choice (e.g., Berger & Mitchell, 1989), there are reasons to expect that different factors may be involved in attitudes and choices in the case of online instruction.

Specifically, it could be that different features of the option to watch lectures online are pertinent to attitude judgments and to decisions about how to watch a lecture. In particular, attitudes towards watching lectures

online may be driven by motivational considerations that the respondent is aware of at the time of expressing an attitude towards online lectures. The actual choice to attend a lecture or watch it online, by contrast, is made in the service of learning and is likely more closely linked to the cognitive strategies that support the learning process.

(H2) Attitudes towards online lecture are related to motivational orientations whereas the choice to attend lectures or watch them online is related to cognitive strategies.

As in the case of H1, H2 does not specify which specific motivational orientations or cognitive strategies is likely to play a significant role in influencing attitudes towards, and reported choice of media. Here, too, it is premature to formulate very specific hypotheses about the role of each motivational orientation and cognitive strategy in influencing attitudes and behaviour towards media choice.

The third question relates to performance. Past research on the effect of media on learning has yielded little evidence to support the view that media influence learning significantly (Clark, 1983, 1994; Russell, 1999). Although this view has been criticised on conceptual (Kozma, 1991, 1994) and on methodological grounds (Joy & Garcia, 2000), it bears special scrutiny in the present context. This is because several aspects of motivation and self-regulated learning have been found to correlate with academic performance (Pintrich, Smith, Garcia & McKeachie, 1991, 1993). To the extent that motivational and cognitive orientations influence the choice to attend lectures or watch them online, these orientations may interact with the medium of lecture viewing in producing special performance outcomes. This is particularly likely in the case of self-regulated learning, because different media lend themselves to different cognitive strategies. A student inclined to engage in rehearsal who chooses to watch streaming videos of lectures may, for example, benefit particularly from this medium's tools for pausing and reviewing lecture content. Motivational orientations can also interact with media choice in cases, for example, where a student who favours learning with others, is pushed by other factors to watch lectures online. Thus, even when no statistical main effects are found for the relationship between media and performance, interactions reflecting particular synergies between media and learning orientations may emerge.

(H3) Motivational orientations and cognitive learning strategies, in interaction with media choice, will be associated with different examination performance.

Method

Participants

Participants were students in the second part of an introductory psychology course. At the time of the study, 1071 students were enrolled in the course, 446 being registered in the class section and 625 in the online section. Of these, 847 students, 572 female and 275 male, completed most items on the questionnaire (ethical considerations mandate that respondents be allowed to skip any question they wish without fearing reprisal from the researcher, an option that participants occasionally exercise). Their mean age was 19.5 years, with 95% of the sample being 23 or younger. Past research on this student population reveals that they nearly all have home Internet access, with over 80% having high-speed connections.

Lecture Format

Online lectures were produced using the WebOption, an approach that involves online versions of large lecture courses. Although students in this course enrol in either a face-to-face or an online section, all students are free to attend lectures in class or watch them online. Students can make this choice lecture by lecture, creating a continuum of class versus online attendance.

Lectures were taped and uploaded to the Web, where students could download them in RealMedia format by means of streaming video. The video window appeared on the right of the screen and had a size of 320 X 213 pixels. RealPlayer, which is used by students to view lectures, contains a pause button and a seek bar that allow students substantial control over the incoming flow of lecture information (Bassili & Joordens, 2006). PowerPoint slides are presented to the left of the video window along with shuttle buttons that allowed students to view the slides shown in class. Students can also download and pre-print the slides so that they can annotate them while watching lectures.

Procedure

Responses were collected on the Internet. The questionnaire, which contained 100 questions, was posted on a commercial Web survey host, links to the survey being provided on the home page of the course. The questionnaire was made available to students during the last three weeks of classes.

Measures

The questionnaire contained 100 questions pertaining to two conceptually

distinct studies — the study presented here and another on circadian preferences and learning habits. The 43 questions pertinent to the present study pertained to the MSLQ, the choice to attend lectures or to watch them online, attitudes toward the WebOption, and demographic variables that served as controls. Performance measures consisted of examination scores in the course.

MSLQ Questions

The MSLQ consists of 81 items, a number that was too large for a questionnaire that also explored issues. Accordingly, only the two items with the highest parameter estimates for each of the latent factors measured by the MSLQ were included in the questionnaire (see Pintrich et al., 1991). Moreover, questions on the test anxiety and the help seeking subscales of the MSLQ were not included in the questionnaire because they were not deemed relevant to the focus of the present study.

Ten items focused on the five motivational components of the MSLQ. An example from each pair of items along with Cronbach's Alpha coefficients for the pair are shown in Table 1; Task Value (e.g., "I am very interested in the content area of this course", Alpha = .751); Control Beliefs about Learning (e.g., "If I try hard enough, then I will understand the course material" Alpha = .566); Self-Efficacy for Learning and Performance (e.g., "I expect to do well in university" Alpha = .740); Intrinsic Goal Orientation (e.g., "In a class like this, I prefer course material that really challenges me so I can learn new things", Alpha = .313).

Table 1. Items for the Motivational Component of the MSLQ

Scale	Number of items	Cronbach Alpha	Sample Item
Task Value	2	.751	I am very interested in the content area of this course.
Control of Learning Belief	2	.566	If I try hard enough, then I will understand the course materials.
Self-Efficacy	2	.740	I expect to do well in university.
Extrinsic Goal Orientation	2	.681	Getting a good grade in this class is the most satisfying thing for me right now.

Scale	Number of items	Cronbach Alpha	Sample Item
Intrinsic Goal	1	---	In a class like this, I prefer course material that really challenges me so I can learn new things.

Note: Because the Alpha for the pair of items for the Intrinsic Goal Orientation scale was low, only the item shown here, which had the highest parameter estimate reported by Pintrich et al. (1991), was used in the analyses.

Twenty-two items focused on the cognitive strategy component of the MSLQ, which consists of nine components, one of which was subdivided into three further components. An example from each pair of items along with Cronbach's Alpha coefficients for the pair are shown in Table 2.

Table 2. Items for the Cognitive Strategy Component of the MSLQ

Scale	Number of items	Cronbach Alpha	Sample Item
Rehearsal	2	.515	When I study for this class I practice saying the material to myself over and over.
Elaboration	2	.597	When reading for this class, I try to relate the material to what I already know.
Organization	2	.679	When studying for this course, I go over my class notes and make an outline of important concepts.
Critical Thinking	2	.602	I try to play around with ideas of my own related to what I am learning in the course.
Time and Study Environment	2	.688	I make good use of my study time for this course.

Scale	Number of items	Cronbach Alpha	Sample Item
Effort Management	2	.572	Even when the course materials are dull and uninteresting, I manage to keep working until I finish.
Peer Learning	2	.698	When studying for this course, I often set aside time to discuss course material with a group of students from the class.
Planning	1	---	When I study for this class, I set goals for myself in order to direct my activities in each study period.
Monitoring	1	---	I often find that I was reading for class but don't know what it was all about.
Regulating	1	---	If course materials are difficult to understand, I change the way I read the material.

Note: Because the Alphas for the pairs of items for the Metacognitive Self-Regulation strategies of Planning, Monitoring and Regulating were low, only the items shown here, which had the highest parameter estimates reported by Pintrich et al. (1991), was used in the analyses.

Attitude Toward the WebOption

Three questions asked students for their feelings towards online lecture presentation: "I think that the presentation of lectures online is a great idea and that it should be used in more courses", "Overall, it is really good to be able to take some courses like PSYA02 online, and others in class" and "I am very happy to have had the option to watch lectures online in PSYA02 this semester." Each question was accompanied by a five-point scale labeled "Strongly Agree" at one end and "Strongly Disagree" at the other (Alpha for the three items .776).

Instructional Mode Choice

Because the WebOption allows any lecture to be attended in class or watched online, students benefit from substantial flexibility in the mode they chose to receive their instruction. Some students watch all the lectures online; some attend them all in class, while others fall between these two extremes, creating a continuum of class versus online lecture viewing. Twenty-five 50-minute lectures had been delivered by the time the survey 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. In addition, online versus in-class lecture viewing was measured in another way with the following two questions: "What percentage of all lectures so far did you watch in class?" and "What percentage of all lectures so far did you watch online?"

A variable reflecting the extent to which a student viewed lectures in class or on the Web 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. A similar variable was computed on the basis of the reported percentage of lectures watched online and in class. The logic behind these two variables 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 may attend class and also watch the lecture online. Similarly, on occasion a student may miss a lecture altogether. Such cases do not detract from the present computation because double attendance and missed lectures are reflected in the denominator in the computation of the ratio.

The two measures of proportion of lectures watched online yielded very similar results (Alpha = .939) and were averaged into an index labeled "Instructional Mode Choice."

Grades

The sum of the grades obtained by students on the midterm and final exams was computed (Alpha = .809). The exams each consisted of 48 multiple-choice questions and accounted for 96% of the grade. The remaining 4% of the grade was assigned for participation in the discussion forum of the course and was not used as an index of course performance in this study. The average on the combined exams was

66.64% (SD = 13.33), an average that is within the norms for introductory courses at this university.

Control Variables

Six questions assessing the respondent's age, gender, hours worked for pay on a weekly basis, convenience of access to campus, whether a language other than English is spoken at home, and household income were presented at the end of the questionnaire. In addition, respondents' rated on a five-point scale their anxiety about using computer technologies in response to the following two statements: "The thought of using computer technologies frightens me" and "Surfing the Internet makes me feel tense" (Alpha = .780). Finally, to control for the possibility that section enrolment had an impact on instructional mode choice and attitudes toward the WebOption, the course section in which the student was enrolled also served as a control variable.

Results

Validation of Abridged Version of MSLQ

Because an abridged form of the MSLQ was used in the present research, it was important to begin by establishing that the abridged version is representative of the full version. This was accomplished by correlating the extent to which each of the components of the MSLQ was correlated with performance in the course. Thus, the correlations between components and grade reported in the MSLQ manual (Pintrich, Smith, Garcia & McKeachie, 1991) were correlated with the corresponding correlations between the component of the MSLQ and final grades in the present study (see Table 3). The correlation was r = .80 (p < .01). The abridged version of the MSLQ used in this study appears, therefore, to be representative of the longer version.

Motivational Orientations and Learning Strategies, Liking for the WebOption and Instructional Mode Choice

Linear regression analyses were conducted to explore the relationship between instructional mode choice and components of the MSLQ while controlling for shared variance among these components, and also while controlling for demographic characteristics, for anxiety towards computer technologies, and for section enrollment. In the first analysis, attitudes toward the web option were regressed on all components of the MSLQ, the age and gender of the student, the number of hours worked

for pay, convenience of access to campus, whether a language other than English is spoken at home, household income, computer anxiety and section enrollment, gender, language and section enrollment being dummy coded. The model was significant (adjusted R square = .094, F(23, 764) = 4.55, p < .001) revealing that students who valued the task highly (Beta = .136, p < .001), and who were extrinsically motivated (Beta = .105, p < .005), liked the WebOption more. Among the control variables, there was a negative relation between anxiety about computer technologies and liking for the Web Option (Beta = -.146, p < .001). No other relation was significant.

Table 3. Zero-Order Correlations Between Grades and Components of the MSLQ

Individual Difference Variables	Full MSLQ	Abridged MSLQ	*M*	*SD*
	Correlations with Grade			
Motivation Scales				
Intrinsic Goal Orientation	.24	.19**	4.14	.85
Extrinsic Goal Orientation	.02	.03	4.15	.77
Task Value	.22	.28**	4.17	.76
Control of Learning Beliefs	.13	.26**	3.71	.74
Self-Efficacy	.41	.23**	3.45	.79
Learning Strategies Scales				
Rehearsal	.10	.10**	3.36	.99
Elaboration	.22	.25**	3.87	.78
Organization	.17	.05	3.33	1.02
Critical Thinking	.15	.16**	3.30	.86
MC Self-Regulation	.12	.08*	3.17	1.04
MC Planning	.19	.20**	3.40	1.05
MC Monitoring	.27	.29**	3.55	1.05
Time & Study Environment	.11	.11**	2.99	.95
Effort Regulation	.32	.27**	3.42	.87
Peer Learning	−.06	−.11**	2.19	.99

Note: * p < .05 ** p < .01 (all tests two-tailed).   The abridged MSLQ consists of the items used in this study as described in Tables 1 and 2. For purpose of the correlation between correlations of grades with the full version of the MSLQ and of the present abridged version (reported in the text), components that were represented by a single item in this study were compared with corresponding items in the MSLQ. The means are from the present study and are based on responses on a five-point scale.

Task value is a motivational construct that refers to the extent to which a student finds the course material interesting and useful. Extrinsic motivation is also a motivational construct that refers to the extent to which a student engages in a task for reasons such as grades and evaluation by others. Both task value and extrinsic motivation were high among participants in this study, the average ratings on a five-point scale being $M = 4.17$ and $M = 4.15$ respectively. Thus, the tendency for those who valued the course highly and who were extrinsically motivated to do well in it, to watch lectures online occurred in the context of high levels of interest and motivation. Reported convenience of access to campus, which was entered as a control variable in this analysis, did not emerge as significant, revealing that task value and extrinsic motivation influenced the choice to watch lectures online independently of considerations having to do with access to campus.

The next analysis was identical with the exception that the dependent variable was Instructional Mode Choice instead of Attitude Toward the WebOption. The model for this analysis was also significant (adjusted R square = .241, $F(23, 764) = 11.88$, $p < .001$) revealing that students who liked learning with peers or who used a metacognitive strategy of monitoring were more likely to attend lectures than to watch them online (Beta = -.165, $p < .001$, and Beta = -.081, $p < .25$ respectively). Among the control variables, anxiety about computer technologies and enrollment in the class section of the course were negatively related to online lecture viewing (Beta = -.102, $p = .01$, and Beta = -.400, $p < .001$ respectively). Age, by contrast, was positively related to online lecture viewing (Beta = .093, $p < .025$), a relation that is surprising given common assumptions about the particular appeal of Web communication for the young. Given that the age distribution had a long tail that included a few students at each of the age decades extending to over 60 years of age, the present regression analysis was repeated on students who were no older than 23. The positive relation between age and online lecture viewing was significant (Beta = .115, $p = .001$) suggesting increased liking for online lectures by senior students of typical university age.

Peer learning and monitoring are learning orientations in the MSLQ. Peer learning has to do with the extent to which students welcome collaboration with others when learning. Metacognitive monitoring refers to students' tendency to track their attention to insure learning is proceeding effectively.

The preceding results provide support for H1 and H2. The first hypothesis proposed that students' motivation and learning orientations are related to their choice to attend lectures or watch them online. This proved to be the case for two motivational orientations - task value and extrinsic motivation, and two cognitive strategies - learning with peers

and monitoring. The second hypothesis proposed that motivational orientations are likely to be related to attitudes towards online lectures whereas cognitive strategies are likely to be related to media choice. This hypothesis was also supported, task value and extrinsic motivation, two motivational orientations, being related to attitudes towards online lectures while learning with peers and monitoring, two cognitive strategies, being related to media choice.

The last analysis related to students' performance in the course, with a particular focus on whether online lecture viewing interacted with motivational orientations and learning strategies in yielding enhanced learning outcomes. Students' examination performance in the course was regressed on the MSLQ components and control variables reported earlier, on the proportion of lectures they watched online and on interaction variables created by multiplying the MSLQ components by the proportion of lectures they watched online. The variables entered as main effects in the first step of the regression analysis accounted for a significant percentage of the variance in examination performance (adjusted R square = .218, $F(24, 768) = 10.210$, $p < .001$). Specifically, Effort Management (Beta = .145, $p = .003$), Task Value (Beta = .152, $p < .001$), Self-Efficacy (Beta = .156, $p = .002$) and Metacognitive Monitoring (Beta = .169, $p < .001$) were positively related to grades. By contrast, Peer Learning (Beta = -.108, $p = .003$), Organization (Beta = -.152, $p = .002$), Extrinsic Motivation (Beta = -.083, $p = .014$) and number of hours worked for pay (Beta = .156, $p < .001$) were negatively related to examination performance.

More important to our focus is whether instructional mode choice interacts with motivational orientations and learning strategies to yield better or worse examination performance. This was tested in the second step of the analysis by adding the interaction terms to the model. The increase in R square was not significant (R square change = .007, $F(39, 753) = .450$, $p = .963$), suggesting that instructional mode choice does not benefit or handicap students in ways that are linked to their MSLQ profiles. This finding, therefore, fails to provide support to H3.

Discussion

This study capitalised on the WebOption, a method that allows students to choose, on a lecture-by-lecture basis, how to watch the lecture, in order to explore three questions. The first is whether motivational orientations and cognitive strategies are related to attitudes towards, and choice of, instructional media. Students who valued the course highly, and who were extrinsically motivated to learn its contents, were found to have a more positive attitude towards the WebOption. Task value, or the

tendency to find a course interesting and important, and extrinsic motivation, are motivational constructs measured by the MSLQ, suggesting that attitudes towards online lectures are linked primarily to students' motivational, rather than to their cognitive, orientations to learning. It is notable, given concerns about the negative effect of Web-based learning (Brown 1996; Hara & Kling, 2000; Ryan, 2000), that enthusiasm for the course reflected by these motivational constructs was associated with positive rather than negative attitudes towards the option to watch lectures online. The fact that extrinsic motivation was associated with online lecture viewing is intriguing. As we saw earlier, keenness for the course as well as extrinsic motivation were generally high in this study. The fact that extrinsically motivated students had a particularly positive attitude towards the WebOption may thus reflect an assumption on the part of students that online-lecture watching may provide an efficient route to good marks and other extrinsic outcomes.

When the actual choice to attend lectures or watch them online was regressed on the various MSLQ components, students who like learning with peers and who tend to use a cognitive strategy that involves monitoring tended to attend lectures rather than watch them online. Peer learning and monitoring are cognitive constructs, suggesting that, unlike attitudes towards the WebOption which were related to motivational constructs, the actual choice to attend lectures or watch them online is related to cognitive constructs. This finding is important because it reveals that when it comes to the actual selection of an instructional technology such as Web-streamed videos of lectures, convenience is not the only consideration influencing students' choices. In the present findings, the choice to attend lectures or watch them online was in part driven by factors relating to their learning orientations. In particular, it appears that the social and collaborative elements of the lecture hall appeal to some students more than to others and that these preferences influences their choice of media. Moreover, a meta-cognitive focus on processes involved in learning was more relevant to the choice of instructional media than were attitudes towards the WebOption. The fact that students who tend to monitor their learning tend to go to lectures rather than watch them online suggests either that the lecture hall experience provides better clues than online learning of how learning is progressing or, alternatively, that the lecture hall provides better supports for some students for maintaining attention and learning.

The second question explored in this study is whether attitudes towards the WebOption mediate the relation between motivation and cognition and the choice to attend lectures or watch them online. The first step in establishing mediation would have been to find that scores on the same components of the MSLQ are related to attitudes towards the

WebOption and to instructional mode choice (Baron and Kenny, 1986). As we have just seen, this was not the case, motivational constructs of the MSLQ being related to attitudes towards the WebOption and cognitive constructs being related to the choice to attend lectures or watch them online. The relation between MSLQ constructs and the choice to attend lectures or watch them online does not, therefore, appear to be mediated by students' attitudes toward the WebOption. Although this may appear perplexing, it is possible that questions assessing attitudes towards the WebOption activate different aspects of motivational orientations and learning strategies than the conditions that lead to the choice to attend a lecture or watch it online. Context effects are well known in attitude research (Bassili & Brown, 2005) and are often caused by variations in the cues that trigger an attitude response or a choice behaviour. It is possible, therefore, that different considerations are brought to bear on attitudes and behavioural judgments that relate to attending lectures or watching them online.

Ultimately, questions regarding the use of instructional technology boil down to whether they add value to the learning process and its experience by students. Accordingly, the relation between examination performance and instructional mode choice alone and in interaction with scores on the components of the MSLQ was the third question explored in this study. Instructional mode choice was not related to examination performance either alone or in interaction with any motivational orientation or learning strategy. Thus, while many of the motivational orientations and learning strategies explored in this study are related to examination performance, instructional mode choice is not, nor does there appear to be particular affinities between motivational orientations or learning strategies and whether lectures are attended or watched online.

Implications for Web-Mediated Learning

The present results do not reveal learning differences linked to whether lectures were attended in class or watched online, nor do they reveal particular learning affinities between students' motivational and learning orientations and the way they watched lectures. To this extent, the results are consistent with the view that media do not necessarily impact learning. The more notable implication of the present results is that both motivational and cognitive forces are at play in students' attitudes and choices in regards to an instructional technology such as streaming video.

Students who may be considered keen about the course by virtue of valuing it highly and being motivated to do well in it, had a positive attitude towards the option to watch lectures online. This suggests that

keen students do not consider the presentation of lectures by streaming video to be an impediment to learning and may, in fact, see instrumental value in learning in this modality. This finding has important implications for the view that students see convenience as the main benefit of information technology (e.g., Caruso, 2004; Kvavik & Caruso, 2005). Not only was convenience, in the form of access to campus and competing work demands, controlled in the present analyses, but there is little reason to assume that the allure of convenience is more attractive to more rather than less enthusiastic students.

When one moves from sentiments towards streamed lectures to the actual choice to watch lectures online, the picture becomes more pragmatic. Students who choose to attend lectures in class like to learn with peers. This is not surprising, since attending class offers obvious social advantages in the learning process. Interestingly, the additional finding that students who tend to use cognitive strategies that involve monitoring are more likely to attend class suggests that comparison with peers may play a role in the monitoring process.

Also instructive, when considering the implications of the present findings for Web-mediated learning, is the fact that one variable that was used as a control in the present study was found to influence both attitudes and choices regarding live versus Web lectures. The variable is anxiety towards the Internet technology, an attitudinal factor that has to do with general comfort with the use of the Internet rather than with specific aspects of Web-streamed lectures. While not surprising, this finding underscores the importance of addressing basic issues relating to familiarity and comfort with a technology prior to using the technology for more specific purposes.

Together, the present results suggest that attitudes and choices relating to watching lectures by streaming video are influenced by fundamental properties of their motivational and learning orientations. It is by seeking to understand the match between students' characteristics and particular information technologies, such as in the present research, that progress in harnessing the power of the Internet in higher education will be achieved.

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