

Promotion and prevention orientations in the choice to attend lectures or watch them online

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Abstract

When presented with the option to use a new instructional technology, students often face an approach–avoidance conflict. This study explored promotion and prevention orientations, concepts linked to approach and avoidance in Higgins’s regulatory focus theory, in the choice to attend lectures or watch them online. Openness, a core disposition in the Big Five Model of personality, and positive attitudes towards the utility of the Internet, reflect promotion orientations that are potentially related to the choice to watch lectures online. By contrast, neuroticism, another core disposition in the Big Five Model, and anxiety about the Internet as a computer technology, reflect a prevention orientation that is potentially related to the choice of attending lectures in class. The results illustrate that both promotion and prevention are at work in the choice to attend lectures or to watch them online. Neuroticism and anxiety about the Internet as a computer technology were related to the choice to attend lectures in class, whereas the perceived utility of the Internet was related to the choice to watch lectures online. Instructional mode choice was not related to examination performance, suggesting that the choice to attend lectures or watch them online has more to do with individual differences in promotion and prevention orientations than with pedagogical characteristics that impact learning.

Keywords

asynchronous, attitude, Internet, lecture, personality, streaming.

Online learning is increasingly a matter of choice. Not only is the number of online courses offered by colleges and universities growing explosively (Allen & Seaman 2004; Carlson 2004), but this growth is propagated in large part by online courses offered to students who attend a campus and take many of their courses face-to-face (Carnavale 2004). As a result, today’s students can choose among a wide array of programmes and courses, and the very format in which they access lecture material is often also a matter of choice.

The availability of different media of instruction that students can choose from raises important ques-

tions about potential performance outcomes associated with different media as well as about the factors that drive the choices that students make. The evaluation of the effectiveness of various instructional media has had a long and contentious history in education. One position articulated by Clark (1983) has been that media ‘are mere vehicles that deliver instruction but do not influence student achievement’ (p. 445). This conclusion reflected a growing realization based on reviews of empirical findings that few stable performance differences have been associated with different media (Mielke 1968; Levie & Dickie 1973; Schramm 1977), a realization that culminated in the dubbing of the ‘no-significant-difference’ phenomenon (Russell 1999).

Others researchers, most notably Kozma (1991, 1994), have argued that media are important because

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they rely on distinctive symbol systems that interact with the mental representations and cognitive processes involved in learning. Another concern with the 'no-significant-difference' notion is that methods of instruction and media are seldom independent, and that together they may well yield different learning outcomes (Bates & Poole 2003). The lack of independence between methods of instruction and media also creates methodological challenges in controlling for a host of possible influences on outcomes (Joy & Garcia 2000).

One factor that has contributed to the controversy regarding the role of media in learning, is that variations in media differ in the extent to which they entail distinct symbolic systems with the potential to affect mental representations and cognitive processes used in learning. Many studies of the effect of different media on learning (e.g. Koehler *et al.* 2005) compare text and video, media that clearly differ in symbol systems. Despite these substantive symbolic variations, the effects of media on learning have been inconsistent, a number of studies comparing online courses that did not involve video streaming with their face-to-face equivalents, yielding a mixed picture of learning success in the two settings. For example, Wang and Newlin (2000) found that students in online sections of a statistical methods course did not perform as well as students in traditional sections on a common comprehensive final exam; Maki and Maki (2002, 2003) found that online students in an introductory psychology course performed better than face-to-face students, while Sankaran *et al.* (2000) found no difference in exam performance of students in online and face-to-face sections of a business computer course.

Given that the role of media in education is not necessarily linked to measurable performance outcomes, important questions arise regarding factors that influence student acceptance of instructional technologies (Jaffee 1998). Technology adoption by end users has been an important field of study in organizations where considerable time and money can be spent introducing new systems (Rogers 1983; Kraut *et al.* 1998). According to Rogers (1983), choice in the adoption of a technological innovation is determined in part by the perceived attributes of the innovation, and in part by the personality of the person adopting it.

Much research attention has been given to the effect of perceived attributes of innovations on their adop-

tion (e.g. Davis *et al.* 1989; Kraut *et al.* 1998). Much less attention, however, has focused on personality and other individual difference variables in technology adoption (Viushwanath 2005). Recently, this has also been true in the field of education where the impact of personality on students' adoption of Web-based technologies is poorly understood (Allen *et al.* 2002). For example, Wang and Newlin (2000) compared students who chose a Web-based statistics course with students who took it in a face-to-face format. Only a marginally significant personality difference was found, with online students being slightly higher in locus of control than students in traditional sections. Other studies (e.g. Litchfield *et al.* 2002; Neuhauser 2002) similarly found few student characteristics that differentiate those who favour instructional technology from those who shun it.

One important but neglected question regarding students' adoption of an instructional technology is whether their decision is motivated by a promotion or a prevention focus (Higgins 1997, 1998). Higgins's regulatory focus theory posits that a promotion focus is associated with openness to change, whereas a prevention focus is associated with a preference for stability. The theory is grounded in the notion that people evaluate their actual selves against two standards: their notion of what they ideally would like to be (their hopes, goals and aspirations), and their notion of what they ought to be (their duties, responsibilities and obligations). According to Higgins (1997, 1998), focusing on what one would ideally like to be entails a focus on promotion goals, whereas focusing on what one feels one ought to be entails a focus on prevention goals. The way people react with a promotion or prevention focus when comparing their actual selves with their ideal and ought selves has been the object of considerable empirical research (e.g. Strauman 1989; Carver *et al.* 1999). One prediction of the theory that has received support, for example, is that a promotion focus is associated with a risky bias, whereas a prevention focus is associated with a conservative bias (Crowe & Higgins 1997).

Promotion and prevention orientations can influence choices in education because new instructional technologies present students with an approach-avoidance conflict. On the one hand, the new technology may offer advantages in convenience, efficiency and learner control. On the other, students may

not feel technically proficient in the use of the technology and may worry about missing out on perceived advantages of traditional modes of instruction. Thus, the choice to adopt or shun a technology can be driven by an openness to its potential benefits (a promotion focus), or by anxiety about one's ability to use it, and worry about what may be lost by relying on the technology rather than conventional modes of learning (prevention foci).

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 a dual-mode presentation of lectures in large courses and fits in the general 'lecture on demand' framework provided by asynchronous learning networks (e.g. Schultz & Rouan 1998; Latchman *et al.* 1999). The matching of in-class and online sections of the introductory psychology course affords an opportunity to explore student characteristics associated with the choice to attend lectures or watch them online, a variable called 'instructional mode choice' here. Although students are free to migrate between online and face-to-face lectures, not all do to the same extent. Some students take all their lectures in class while others take them all online. Many students fall between these two extremes, creating a continuum of class versus online lecture viewing. Because students self-select onto this continuum, the continuum constitutes a useful variable for exploring factors associated with the choice of various mixes of face to face and online lecture viewing.

Research questions and hypotheses

Adopting as a backdrop the debate on the effect of media on learning, we begin by exploring whether variations in media introduced by instructional technology of the sort explored here are significant (Kozma 1991). Lectures taped in class and presented over the Web by streaming video differ little in their symbol systems, and thus in their propensity to interact differently with learner's mental representations and cognitive processes. Still, it is possible that learning outcomes differ significantly depending on whether students attend lectures or watch them online. For this reason, it is important to evaluate the hypothesis that such a difference exists.

H1: The choice to attend lectures face-to-face or to watch the taped version of the lectures online by streaming video is related to performance in the course.

In cases where media variations are not central to learning outcomes, a question arises as to factors that drive student choices in the use of instructional technologies. As we saw earlier, Higgins's regulatory focus theory posits that a promotional focus will be associated with openness to change, whereas a prevention focus will be associated with a preference for stability. The present study explores the promotion-prevention distinction at the level of personality and of attitudes. The personality variables explored in the study consist of neuroticism and openness, two of the 'Big Five' traits that represent overarching domains of personality (John & Srivastava 1999). Many psychologists consider that neuroticism, extraversion, openness, agreeableness and conscientiousness underlie personality (e.g. Costa & McCrae 1992; Goldberg & Rosolack 1994). Logically, openness and neuroticism map onto the promotion-prevention distinction, openness, with properties such as imaginativeness, creativity and curiosity, being closely linked to promotion, while neuroticism, with properties such as anxiety, nervousness and fearfulness, being closely linked to prevention (Digman & Inouye 1986; McCrae & Costa 1987). The links between promotion and openness on the one hand, and prevention and neuroticism on the other, suggest the following two hypotheses:

H2: Instructional mode choice is driven by a promotion focus, so students who score high on the openness factor of personality will watch more lectures online than students who score low on openness.

H3: Instructional mode choice is driven by a prevention focus, so students who score high on the neuroticism factor of personality will attend more lectures in class than students who score low on neuroticism.

The attitudinal variables explored in this study consist of anxiety and perceived utility, two core dimensions of attitudes towards computer technologies (e.g. Koohang 1989; Milbrath & Kinzie 2000). As might be expected, attitudes towards computers have been

found to play a significant role in both students' and teachers' successful use of computerised instructional technologies (Jorde-Bloom 1988; Campbell 1992; Milbrath & Kinzie 2000). Logically, perceived utility and anxiety map onto the promotion-prevention distinction and lead to similar predictions as in the case of openness and neuroticism. Self-efficacy, which entails confidence and expectation of success, is closely linked to promotion, while anxiety, which entails fearfulness in the use of computers, is closely linked to prevention. The links between promotion and perceived utility of the Internet as a computer technology on the one hand, and prevention and anxiety about the Internet as a computer technology on the other, suggest the following two hypotheses:

H4: Instructional mode choice is driven by a promotion focus, so students who perceive utility in Internet technology should watch more lectures online than students who perceive less utility in Internet technologies.

H5: Instructional mode choice is driven by a prevention focus, so students who are anxious about using Internet technology should attend more lectures in class than students who are not anxious about Internet technology.

Because convenience can play a central role in the choice to watch lectures online, this variable was entered in our analysis as a control. Convenience was assessed by asking students how many hours they worked for pay during the semester and how far they lived from campus. Outside work commitments and distance from campus most likely affect how conveniently students can come to campus to attend lectures, a factor that may well be related to the choice to attend lectures or watch them online.

Method

Participants

Participants were enrolled in the 2004 session of the second part of an introductory psychology course. The lecture hall in which classes met had the capacity of accommodating more students than were enrolled in the class section of the course so students registered in the Web section had the option of transferring to the

class section but opted not to. An announcement was posted on the home page of the course inviting students enrolled in the Web section to attend any live lecture they wished. Similarly, students enrolled in the class section of the course were granted the same access privileges to online lectures as those enrolled in the Web section. Students from both sections took the exam together and were invited to fill out the questionnaire for this study after completing their midterm exam. Six hundred and seventy three students completed at least one item of the questionnaire. For ethical reasons, students were free to skip questions or stop responding to questions at any time they wished. Four hundred and sixty students answered most questions on the questionnaire, 69% of them being female and the rest male (Table 1).

Procedure

Classes in the lecture section of the course met three times a week and were taught by a member of the psychology faculty who had over 25 years of teaching experience. Lectures, which were 50 min in duration, were organised by chapter of the textbook (Carlson *et al.* 2004), with the instructor striving to elaborate on, and highlight, selected topics rather than to 'teach the book'. One aspect of this approach was, whenever possible, to illustrate topics with videos, over 70 videos edited to an average length of about 7 min, being shown over the duration of the course. PowerPoint slides provided outlines and illustrations throughout lectures, each video being embedded in a PowerPoint slide and being presented in full-screen format in the lecture hall. An assistant, who sat among the students in the lecture hall, taped the lectures.

The tape of each lecture was captured by computer and was subjected to minimal editing consisting of the splicing of videos shown in class in appropriate places in the taped lecture, and the addition of titles at the beginning and the end of the lecture. After compression, the video file of the lecture was uploaded to a University server where it could be accessed by streaming video. Two compression levels were adopted using a Real Media codec: one resulting in a file about 36 Meg in size for access by broadband connection at a rate of 100 kbps, and the other in a file about 13 Meg in size for access by a modem at a rate of 35 kbps. The video window in either case consisted

Table 1. Percentage of students enrolled in online and class section who reported watching a number of lectures online and in class.

Section	Number of lectures				
	None	1–5	6–10	11–15	All
Lectures attended in class					
Online	73.1 (196)	14.6 (39)	1.5 (4)	6.0 (16)	4.8 (13)
Class	8.9 (17)	14.2 (27)	15.3 (29)	22.1 (42)	39.5 (75)
Lectures watched online					
Online	6.7 (18)	8.2 (22)	9.7 (26)	16.0 (43)	59.5 (160)
Class	20.0 (38)	37.4 (71)	16.8 (32)	10.5 (20)	15.3 (29)

Twenty lectures had been presented by the time this measure was taken. Values presented in parentheses represent the number of students who selected a response option.

of 320×213 pixels and the audio was of equal quality and very clear. The PowerPoint slides were presented side by side with the streaming video window so that students could view the slides at appropriate times during the lecture. The PowerPoint slides were made available ahead of lectures so that students could print them before attending or watching a lecture online.

Students in the online and face-to-face sections of the course took exams in the course at the same time. All measures taken in this study were administered by means of a questionnaire that was distributed to students at the end of their midterm exam. This approach allowed us to overcome the difficulty of reaching students who took the course online, and ensured that the testing session was identical for students in the online and face-to-face section of the course.

Individual difference measures

Neuroticism and openness

Neuroticism and openness were measured using relevant subscale items from the Big Five Inventory (BFI). As a whole, the BFI consists of 44 items with high coefficients of internal consistency (mean α 0.85) and mean convergent validity correlations (0.75, John & Srivastava 1999). For the purpose of this study, only 14 items relevant to the neuroticism and the openness factors were used.

Internet attitudes: anxiety and perceived utility

Thirty-two items asked students about their attitudes towards the Internet (see Appendix A). While past

research on affect towards computer technology has tended to focus on computers (Milbrath & Kinzie 2000; Litchfield *et al.* 2002), informal discussion with students revealed that their feelings towards the Internet was more relevant to their reactions to online instruction than their general feelings towards computers. Accordingly, six items from Kinzie *et al.* (1994) Attitudes Toward Computer Technologies (ACT) survey were adapted to explore the extent to which students perceived utility in the use of the Internet. For example, the item 'I don't have any use for computer technologies on a day-to-day basis' was changed to 'I don't have any use for the Internet on a day-to-day basis'. Seven items were created to capture anxiety with the use of the Internet. These items were inspired by Kinzie *et al.*'s (1994) Self-Efficacy with Computer Technologies (SCT) scale and focused on anxiety in using the Internet to research a topic for school work, find entertainment and shop for consumer goods. The scale also contained items tapping other aspects of attitudes towards the Internet, but these items are not relevant to the present study.

Items relevant to anxiety and utility in attitudes towards the Internet were identified on the basis of a factor analysis of the 32 items pertaining to attitudes towards the Internet. The analysis initially yielded five factors, accounting for 53% of the variance before eigen values fell below 1. Examination of the scree plot, as well as preliminary attempts to portray these factors, suggested that setting the number of factors to three would yield more interpretable factors. The three-factor solution, which is shown in Table 2, accounted for 46% of the variance and had the advantage

Table 2. Factor loadings for Internet attitude items.

Items with keywords	Anxiety	Entertainment	Utility
1 No use for Internet	0.59	-0.22	-0.03
2 Entertainment	-0.25	0.74	0.01
3 Effective in job/studies	-0.18	0.52	0.25
4 Design Web page for fun	0.04	0.59	0.18
5 Confident about ability	-0.32	0.30	0.55
6 Internet very frustrating	0.66	0.36	0.19
7 Internet causes work	0.60	0.19	0.20
8 Great time searching it	-0.30	0.61	0.29
9 Not useful in my profession	0.38	-0.08	-0.40
10 Internet is boring	0.61	-0.39	-0.06
11 I am at ease learning it	-0.31	0.36	0.51
12 More time on it than on TV	-0.27	0.61	0.08
13 Create enhancing materials	-0.08	0.41	0.55
14 Annoyed at what I find	-0.48	0.37	0.02
15 I don't do well on Internet	0.60	-0.20	-0.46
16 Internet improves my mood	0.00	0.73	0.14
17 Internet makes me productive	-0.04	0.54	0.42
18 Surfing most pleasurable	-0.18	0.76	0.11
19 Can do well without it	-0.42	0.11	-0.01
20 Internet technologies frighten me	0.73	-0.03	-0.33
21 Internet confuses me	0.67	0.01	-0.42
22 I would use it for material	-0.18	0.25	0.61
23 Surfing makes me feel tense	0.73	-0.08	-0.21
24 Internet does not threaten me	0.13	0.05	-0.48
25 Anxious about Internet	0.57	-0.01	-0.41
26 Internet helps organize	-0.05	0.38	0.57
27 Doesn't help with new skills	0.45	-0.13	-0.43
28 Comfortable with my ability	0.43	-0.19	0.59
29 Not helpful in future work	0.34	0.06	-0.21
30 Helps find entertainment	-0.31	0.55	0.28
31 Confident using it for school	-0.21	0.26	0.55
32 Confident using it for shopping	-0.03	0.33	0.35
Variance (%)	33	8	5

Bold numerals highlight factor loadings above 0.5 that were used in the computation of the factor-based indexes discussed in the text.

of yielding factors that corresponded to factors identified by past research on computer attitudes (Milbrath & Kinzie 2000).

Nine items loaded on the first factor, which accounted for 33.0% of the variance. The top two loading items were: 'Surfing the Internet makes me feel tense' and 'The thought of using Internet technologies frightens me'. Scores for these nine items were averaged to produce an index labelled *Internet anxiety*. Nine

items loaded on the second factor, which accounted for 8.3% of the variance. The top two loading items were: 'Surfing the Internet is one of the most pleasurable things I do each day' and 'The Internet is one of my favourite sources of entertainment'. Scores for these nine items were averaged to produce an index labelled *Internet Entertainment*. Seven items loaded on the third factor, which accounted for 4.8% of the variance. The top two loading items were 'I would use the Internet to access many types of information sources for my work/studies' and 'The Internet can be used to assist me in organising my work'. Scores on these seven items were averaged to produce an index labelled *Internet utility*. The Cronbach's α associated with each of these indexes was 0.89, 0.85 and 0.84, respectively. Given the nature of H4 and H5, only Internet anxiety and Internet utility scores were explored further in this study.

Convenience

Two items assessed the difficulty that students may experience in attending classes on campus. One item inquired about the number of hours a week that the student worked for pay and the other inquired about the distance the student lived from campus.

Outcome measures

Instructional mode choice

The WebOption affords substantial flexibility in the way students can view lectures. This flexibility was made obvious to students in both the class and Web section of the course and students knew from the outset that they could come to class or watch lectures on the Web. By the time students took their midterm exam, twenty 50 min lectures had been delivered. The number of lectures attended in class and watched online was measured by the following two items: 'How many of the 20 lectures did you attend in class?' and 'How many of the 20 lectures did you watch online?' To check on whether students attended lectures and then watched the same lectures online, a question asked 'How many times did you attend class and watch the same lecture online (please count only cases where you watched the same material both ways for a least 30 min)'. The response options for the three questions were: 'None'; '1 to 5'; '6 to 10'; '11 to 15'; and 'Just about all lectures'.

Grades

The grades obtained by students on the midterm and final exams were recorded. Each exam consisted of 50 multiple-choice questions, four of which were on material that arose in the discussion forum for the course. Performance on these questions was not recorded in this study.

Results

The results are presented in three sections. The first section explores the extent to which students chose to attend lectures or watch them online. The focus of the second section is on whether instructional mode choice was related to performance in the course. H1 states that the choice to attend lectures face to face or to watch the taped version of the lectures online by streaming video is related to performance in the course. The focus of the third section is on whether the choice to attend lectures or watch them online is driven by a promotion or a prevention focus. H2 to H5 pertain to whether the choice to attend lectures or watch them online is related to neuroticism and openness (H2 and H3) and whether it is related to anxiety and utility in attitudes towards Internet technology (H4 and H5).

Instructional mode choice

The proportion of lectures that a student watched in class and on the Web is a pivotal variable in this study. Table 1 shows the percentage of students in the class and Web sections who reported watching various proportions of lectures in class and on the Web. The table reveals substantial traffic between the two sections in the way students watched lectures. That traffic was primarily in the direction of watching lectures online; only 39.5% of students enrolled in the class section reporting that they attended 'just about all lectures' in class, with 80% of these students reporting that they watched at least some lectures on the Web. Students enrolled in the Web section were more loyal to their format, 59.5% of them reporting that they watched 'just about all lectures' online, with 27% reporting that they attended at least some lectures in class. Although a few students occasionally attended lectures and subsequently also watched them online,

this was rare, 80% of the students never watching the same lecture in both modalities, and the rest only doing so on very few occasions.

An instructional mode choice score was computed for each participating student by dividing the number of lectures watched online by the number of lectures watched online *plus* the number of lectures attended in class. This score reflects the extent to which a student viewed lectures in class or on the Web. The ratio of lectures watched online to lectures watched online *plus* lectures attended in class takes into account cases where a lecture was watched both ways, so no special adjustment was made for the few cases where this occurred.

Mode choice and grades

Students' grades on the midterm and final exams were regressed separately on their instructional mode choice scores in the first step of a regression analysis (adjusted $R^2 = -0.002$, $F(1, 396) = 0.348$, $P > 0.1$ and adjusted $R^2 = 0.003$, $F(1, 380) = 2.12$, $P > 0.1$, respectively) revealing that grades on neither of the exams were related to watching lectures in class or online. Because aptitude-treatment interactions have been known to influence examination performance for some students more than for others (Tobias 1987), and because of known relationships between individual difference variables, such as openness, and academic success (Farsides & Woodfield 2003), interaction terms were computed by multiplying instructional mode choice by neuroticism, openness, Internet anxiety and Internet utility, respectively. The addition of these interaction terms in the next step of the analysis did not result in a significant increase in R^2 for either midterm (R^2 change = 0.019, $F(9, 388) = 0.860$, $P = 0.561$) or final examination performance (R^2 change = 0.030, $F(9, 372) = 1.541$, $P = 0.132$).

The lack of a relationship between instructional mode choice and performance in the course does not support H1. Another way of testing the hypothesis is by comparing the mean performance of students who attended all lectures in class and those who watched all lectures online. Performance did not differ significantly either on the midterm or the final exam ($F(1, 175) < 1$ in both cases). There is clearly no indication in these results, therefore, that the choice to attend lectures or watch them online had an impact on examination performance.

Neuroticism, openness and instructional mode choice

The items of the BFI associated with Neuroticism and Openness were averaged to yield an index of each of the two personality dispositions ($\alpha = 0.80$ and 0.79 , respectively). Instructional mode choice was regressed on these two variables to test H2 and H3. The distance the student lived from campus and the number of hours the student worked per week for pay were entered in the equation to control for the possible effect of convenience of access to campus on instructional mode choice. The model was significant (adjusted $R^2 = 0.015$, $F(4, 364) = 2.376$, $P = 0.05$), revealing that neuroticism was negatively related to watching lectures online ($\beta = -0.103$, $P < 0.05$). The number of hours a student worked per week was positively related to watching lectures online ($\beta = 0.109$, $P < 0.05$). Neither Openness nor distance from campus were significantly related to instructional mode choice ($\beta = 0.028$ and -0.040 , respectively, $P > 0.4$ in both cases). These results are consistent with H3 but not with H2. That is, the choice to attend lectures in class is linked to neuroticism, suggesting a prevention focus. The choice to watch lectures online is not linked to openness, suggesting the absence of a promotion focus in the use of this novel instructional technology.

Internet anxiety, Utility and Mode Choice

Instructional mode choice was regressed on Internet anxiety and Internet utility as well as distance from campus and number of hours worked, the last two variables serving as controls for convenience of access to campus. The model was significant (adjusted $R^2 = 0.080$, $F(4, 365) = 10.677$, $P < 0.001$), revealing that anxiety about using the Internet was negatively related to the choice to watch lectures online ($\beta = -0.193$, $P < 0.01$), whereas the perceived utility of the Internet was positively related to that choice ($\beta = 0.125$, $P < 0.05$). Hours worked per week were, once again, positively related to the choice to watch lectures online ($\beta = 0.108$, $P < 0.05$).

The results stemming from Internet Attitudes are consistent with both H4 and H5. The choice to watch lectures online is linked to the perceived utility of the Internet, a promotion concern. The choice to attend lectures in class is also linked to anxiety about the use of the Internet, a prevention concern.

Discussion

This study capitalised on the close match between face-to-face and online lectures created by the Web-Option, to explore students' promotion and prevention orientations to instructional technology. Because the WebOption allows students to attend lectures in-class or to watch their exact facsimile online, and because students availed themselves of these two modes of instruction to varying degrees, it was possible to explore student variables associated with the propensity to attend lectures or watch them online.

One possible reason for students to choose to attend lectures or watch them online is that these modes of instruction differ in their potential for producing successful learning outcomes. The question of whether media directly impact learning has been hotly debated (Clark 1983, 1994; Kozma 1991, 1994) although face-to-face lectures and their videotaped counterparts explored in this research were probably too similar to have the potential to impact learning, examination performance not being associated with mode of lecture viewing.

Given that new instructional technologies present students with an approach-avoidance conflict, and given that actual learning outcomes are not affected by the choice to use or avoid the technology, this paper explored whether these two concerns influenced instructional mode choice when the option to watch lectures online is available. Approach and avoidance concerns are part of Higgins's (1997, 1998) regulatory focus theory, which posits that students' choices to attend lectures or watch them online may be driven by a promotion or a prevention focus. The present results suggest that a prevention focus linked to personality and attitudes plays an important role in the choice to attend lectures rather than to watch them online. Specifically, neuroticism, a core personality factor in the Big-Five Model (Costa & McCrae 1992, Goldberg & Rosolack 1994), was associated with the choice to attend lectures in class. Similarly, anxiety about the use of the Internet was associated with the choice to attend lectures. It appears, therefore, that avoidance forces play an important role in the resolution of the conflict created by the potential advantages and disadvantages offered by this new instructional technology. Whether these forces reflect a general risk aversion when it comes to new instructional technologies, or

anxiety on the part of a small subset of students, remains to be determined.

Prevention in the face of a new technology was not, however, the only orientation revealed by the present research. A promotion focus was evident in the finding that students who had a positive attitude towards the utility of the Internet were more likely to watch lectures online. Students' openness, the core personality factor that reflects a promotion focus, was not, however, associated with the choice to watch lectures online. One can only speculate that openness can manifest itself in a variety of ways in education, students being able to exhibit openness by the way they participate in face-to-face learning as much as in the way they learn online.

Implications

End-user technology adoption is a complicated process potentially laden with approach and avoidance tendencies. By focusing on promotion and prevention concerns associated with personality and attitudinal dispositions, the present findings shed light on the dynamics of instructional mode choice. Prevention concerns associated with both personality and attitudes played a significant role in students' choices to attend lectures in class rather than to watch them online. This finding implies that the introduction of new instructional technologies would benefit from information that addresses at least two concerns: first, fears about what may be lost by departing from conventional ways of achieving a learning task; second, anxiety about the use of the technology itself.

Promotional concerns were manifest in the finding of increased usage of online lectures for those with positive attitudes towards the utility of the Internet as a computer technology. The implication of this finding is that efforts to introduce new instructional technologies would benefit from parallel efforts to demonstrate to potential users the general utility of the technology on which the approach is based.

Limitations

The WebOption has proven to be very popular, a large proportion of students enrolled in the face-to-face section of the course choosing to watch at least some of their lectures online. The present findings, there-

fore, pertain to a technology that is widely adopted by those who are presented with the option to use it. Examination of the significant R^2 's and β 's reported above suggests that only a modest amount of variance in instructional mode choice was accounted for by neuroticism, perceived utility of the Internet and anxiety about its use. The reason for these relatively weak relationships probably has to do with the popularity of the WebOption with students. Instructional technologies that do not enjoy this level of popularity may well reveal stronger prevention and promotion influences than were observed here.

Given the popularity of the WebOption, it is not surprising that anxiety-based prevention concerns, rooted in personality and attitudes, may account for the reticence on the part of a relatively small proportion of students to use the technology. The appeal of the technology, however, appears to have been multifaceted, gaining from the convenience it offers, and feeding into positive attitudes about the utility of the technology. The surprising finding that the personality factor of openness was not associated with the use of the technology may simply reflect the methodological difficulty of identifying promotional influences that operate in concert with many other positive influences on the use of instructional technology.

Most measures used in the study are of a self-report nature and thus suffer from possible memory and self-presentational biases. One positive feature of the present approach is that it relied on actual examination performance rather than on reports of performance. Still, the present data are correlational and do not lend themselves to causal analysis of relationships between factors. For this reason, the results point to a relationship between personality- and attitude-based promotion and prevention concerns and instructional mode choice but do not establish unambiguously a causal relationship between these variables. Given that the present data are about choice in an applied context, they provide a useful means of exploring relationships between variables relevant to instructional mode choice.

Conclusion

The broad conclusion suggested by the present findings is that the option of watching lectures online is appealing to a plurality of students. Students who opt

to watch lectures online seem comfortable with using the Internet and value the convenience afforded by online lectures. Students who are prone to worry as well as those who are anxious about the use of the Internet are less likely to watch lectures online. The fact that the choice that students make to attend lectures or to watch them online is not related to learning outcomes as measured by exams suggests that approaches such as the WebOption should be seen primarily as methods for enhancing flexible access to lectures and providing students who welcome the online option with a means of learning in a manner they find appealing.

This research focused on broad dimensions of personality and attitudes, and its conclusions are limited to these broad dimensions. Constructs such as neuroticism and Internet anxiety subsume a range of more specific individual difference characteristics that remain to be explored. The broad perspective provided by the present research has the advantage of assuaging any sweeping concerns about the efficacy of online lecture viewing at the same time as it points the way for further exploration of this rapidly growing mode of learning.

Appendix A

Attitude Towards the Internet Scale Items

1. I don't have any use for the Internet on a day-to-day basis.
2. The Internet is one of my favourite sources of entertainment.
3. Using the Internet to communicate with others can help to be more effective in my job/studies.
4. I think that everyone should design and post a Web page on the Internet for fun.
5. I am confident about my ability to do well in a task that requires me to use the Internet.
6. I find it very frustrating spending time on the Internet.
7. Using the Internet in my job/studies will only mean more work for me.
8. I have a great time searching the Internet.
9. I do not think that the Internet will be useful to me in my profession.
10. I find the Internet boring.
11. I feel at ease learning about the Internet.
12. I spend more time on the Internet than watching TV.
13. With the use of the Internet, I can create materials to enhance my performance in my job/studies.
14. I am usually annoyed by what I find on the Internet.
15. I am not the type to do well with the Internet.
16. When I am in a bad mood, surfing the Internet makes me feel better.
17. If I can use the Internet, I am more productive.
18. Surfing the Internet is one of the most pleasurable things I do each day.
19. Anything that the Internet can be used for, I can do just as well some other way.
20. The thought of using the Internet technologies frightens me.
21. The Internet is confusing to me.
22. I would use the Internet to access many types of information sources for my work/studies.
23. Surfing the Internet makes me feel tense.
24. I do not feel threatened by the impact of the Internet.
25. I am anxious about the Internet because I don't know what to do if something goes wrong.
26. The Internet can be used to assist me in organizing my work.
27. I don't see how I can use the Internet technologies to learn new skills.
28. I feel comfortable about my ability to work with the Internet.
29. Knowing how to use the Internet will not be helpful in my future work.
30. I feel confident using the Internet to find entertainment.
31. I feel confident using the Internet to research a topic for schoolwork.
32. I feel confident using the Internet to shop for consumer goods.

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