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Making content relevant: a teaching and learning experiment with replication

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ABSTRACT
Two experiments examined the effect of teaching with content relevance strategies on student learning outcomes. In both experiments, college students were randomly assigned to one of three teaching conditions in which the instructor (a) made no effort to teach the lesson content as relevant (control), (b) taught the same lesson content in a relevant manner (treatment 1), or (c) taught the same lesson content in an irrelevant manner (treatment 2). Results indicated that teaching with relevance strategies caused students to (a) become more situationally interested in what they were learning, (b) believe the lesson had greater task value, and (c) have more positive affect for their instructor, which in turn, (d) improved their performance on a post-lesson quiz. Overall, findings suggest that instructors can generate affect and stimulate learning by teaching in ways that relate course content to students' interests, needs, and goals.

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Across disciplines, grade levels, and educational settings, engaging students in the learning process has been, and remains, one of the foremost challenges encountered by college educators. To meet this challenge, instructors often emphasize the applicability of lesson content to students' various interests, needs, and goals—or, in other words, present their lesson content to students in ways they find relevant. Previous instructional communication scholarship has suggested that instructors make course content relevant for their students, because when they do, students report greater motivation to engage with and learn the content (Fedesco et al., 2017; Frymier et al., 1996; Frymier & Shulman, 1995). Although this is useful pedagogical advice, determining what students do (or do not) perceive as personally relevant is inherently challenging because interpretations of relevance are highly subjective and vary from student to student on an individual basis (Frymier, 2002). That is, students possess different personal interests, needs, and goals, which ultimately change over time throughout their college careers as they develop and mature (Goldman & Myers, 2017). Because it is difficult for instructors to know at any given time what students might find relevant, this creates a teaching obstacle for instructors who attempt to incorporate relevant teaching into their lectures. Likewise, this same obstacle makes it difficult for researchers who want to manipulate relevance as a teaching

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behavior in experiments (Frymier & Houser, 1998). The current study seeks to address these difficulties by experimentally manipulating relevant teaching strategies to more fully understand how or if it influences students' learning experiences.

Content relevance

To make content relevant, instructors facilitate students' perceptions that course content aligns with their current or future personal needs, personal goals, and/or career goals (Keller, 1983). Expanding upon expectancy-value theory (Atkinson, 1957). Keller (1983, 1987a, 1987b) positioned content relevance as one of four fundamentally necessary criteria for stimulating students' affective engagement and motivation to learn: *attention*, *relevance*, *confidence*, and *satisfaction* (ARCS model). Keller (1983) suggested that students' overall perceptions of content relevance are informed by the specific types of *value* they perceive instructional content to offer, including *personal-motive value* (a personal need or desire), *instrumental value* (alignment with achieving a specific objective), or *cultural* value (social relevance and consistency with the values of an individual's larger cultural reference group). Keller (1987b) argued that promoting student interpretations of instructional content as offering any of these three types of value facilitates students' broad impressions of content relevance. To that end, Keller (1987b) recommended a variety of pedagogical strategies for enhancing relevance and differentiated these strategies into three general categories: *familiarity* strategies (facilitating connections between instructional content and students' personal experiences), *goal orientation* strategies (framing content as conducive to students achieving their goals), and *motive matching* strategies (using pedagogical tactics perceived as relevant in and of themselves). Keller's (1987b) strategies for enhancing content relevance thus provide a blueprint for how instructors can facilitate students' affective engagement and motivation to learn and cultivate students' perceptions of instructional content as enjoyable and valuable.

Content relevance has been examined from a communicative perspective in a series of survey studies conducted by Frymier and colleagues (Frymier et al., 1996; Frymier & Houser, 1998; Frymier & Shulman, 1995), revealing that relevance is associated positively with students' state motivation to learn (Frymier et al., 1996; Frymier & Shulman, 1995), affect for instructor and content, sense of empowerment, and learning indicators (Frymier et al., 1996). However, subsequent experimental studies have encountered challenges in replicating these survey results because of difficulty in manipulating relevance (Frymier, 2002; Frymier & Houser, 1998). For example, Frymier and Houser (1998) found that students' perceptions of relevance did not appear to correspond with relevance-enhancing strategies suggested by prior scholarship (e.g., Keller, 1987b; Weaver & Cottrell, 1988), which led these researchers to question if they manipulated relevance successfully because relevance had no effect on either motivation or learning. The authors reported having encountered challenges in modifying relevance across experimental conditions in a manner that did not fundamentally alter lesson content. As a result, they reported their attempts to manipulate relevance by changing the wording of isolated examples may have lacked sufficient strength for participants to perceive different levels of relevance across their experimental conditions (Frymier & Houser, 1998). Even now, relevance remains a difficult variable to manipulate in teaching experiments.

Muddiman and Frymier (2009) suggested that the lack of alignment reported by Frymier and Houser (1998) between students' relevance perceptions and relevance-enhancing strategies may ultimately have stemmed from the method used to identify those strategies. Contending that the deductive approach employed by relevance research may not necessarily resonate with students' actual relevance perspectives, Muddiman and Frymier (2009) conducted an inductive study soliciting students' own perceptions of the strategies and behaviors their instructors use to present course content as relevant. Four categories of relevance-enhancing strategies emerged from their data: *outside course relevance* (i.e., connecting content to students' out-of-class interests, needs, or goals), *methods and activities relevance* (i.e., structuring a lesson such that the way in which students learn content is relevant in and of itself), *teaching style relevance* (i.e., employing a general instructional style conducive to student perceptions of relevance), and *inside course relevance* (i.e., connecting content with students' in-class interests, needs, or goals).

Each category identified by Muddiman and Frymier (2009) comprised subcategories that more specifically delineated the specific types of strategies and behaviors students perceived their instructors use to promote content relevance. The *outside course relevance* category, for example, comprised 10 subcategories: *current life and interests*, *popular culture and media*, *future lives and interests*, *current events*, *real world*, *personal stories*, *examples*, *time/place proximity*, *future studies,* and *guest speakers*. Of all the strategies and behaviors identified by Muddiman and Frymier (2009), those categorized under *outside course relevance* theoretically resonate with the instructional strategies recommended by both Keller (1987b) and Weaver and Cottrell (1988), as well as correspond with the evaluative judgments which Keller (1983) proposed inform relevance perceptions. Furthermore, the *outside course relevance* subcategories (Muddiman & Frymier, 2009) include a variety of pedagogical methods whereby instructional content may be presented to students as relevant to their needs and goals beyond the classroom. Knoster and Myers (2020) found that students reported their instructors frequently engage in *outside course relevance* behaviors and believed that these behaviors were effective in enhancing the relevance of course content. Because of Frymier and Houser's (1998) observation that their efforts to manipulate relevance likely failed due to insufficient modification of the wording of examples, the subcategories of instructional behaviors and tactics subsumed within Muddiman and Frymier's (2009) *outside course relevance* category may offer additional ways to manipulate relevance in teaching experiments.

As such, utilizing the *outside course relevance* strategies and behaviors identified by Muddiman and Frymier (2009), this study sought to experimentally substantiate and expand upon the findings of previous survey research regarding the impact of content relevance on students' learning outcomes. The work of Frymier et al. (1996) is one example of such survey research. In this study (Frymier et al., 1996), the authors reported that instructors' efforts to present course content as relevant was positively associated with students' affect toward both their instructor and instructional content. This positive association between relevance and affect aligns with, and lends support to, Keller's (1983, 1987a, 1987b) contention that relevance is an important criteria for facilitating students' motivation to learn as it stimulates students' affective engagement in their learning experiences. That is, when students perceive instructional content aligns with or fulfills their interests, needs, and goals, they appraise the process of learning that content as more enjoyable and

valuable. Given this, we anticipated that students participating in a lesson where an instructor strives to enhance content relevance using the strategies identified by Muddiman and Frymier (2009) will report greater affect toward both their instructor and lesson content than students participating in a lesson where their instructor refrains from using relevance strategies. Thus, the first hypothesis is offered:

H1a: Compared to a standard lesson, students will report greater positive affect for their instructor in a lesson where the instructor presents lesson content as relevant.

H1b: Compared to a standard lesson, students will report greater positive affect for content in a lesson where the instructor presents lesson content as relevant.

However, it is unlikely that all efforts to promote students' perceptions of relevance are equally effective. Indeed, teaching with the relevance-enhancing strategies uncovered by Muddiman and Frymier (2009) entails a number of considerations on the part of instructors (e.g., What are my students interested in?). While instructors may deliberately attempt to present course content as relevant to their students, such considerations likely play a critical role in determining whether those attempts are ultimately effective. As Frymier (2002) put it, "being knowledgeable about student concerns, lifestyles, and interests is important to the task of making content relevant, and this information is constantly changing" (p. 89). Therefore, an instructor who employs relevance strategies effectively (e.g., uses examples which are contemporary and up-to-date) should create greater positive affect with students than an instructor who uses relevance strategies ineffectively (e.g., uses examples which are outdated and disconnected from the current lives of students). Therefore, the second hypothesis is offered:

H2a: Compared to a lesson in which the instructor presents lesson content in an irrelevant manner, students will report greater positive affect for their instructor in a lesson where the instructor effectively presents lesson content as relevant.

H2b: Compared to a lesson in which the instructor presents lesson content in an irrelevant manner, students will report greater positive affect for lesson content in a lesson where the instructor effectively presents lesson content as relevant.

Keller's (1983, 1987a, 1987b) conceptualization of content relevance, particularly his argument that relevance is conducive to promoting students' perceptions of instructional content as valuable, closely coincides with the subjective judgements which Eccles and Wigfield (2002) propose inform students' appraisals of task value. Task value, or the degree to which students appraise instructional content as worth learning (Eccles & Wigfield, 2002), is based on a number of different considerations that students make when they encounter instructional content, such as the extent to which instructional content offers attainment value (i.e., whether engaging with content is consistent with one's self-image), interest value (i.e., whether engaging with content aligns with one's interests), utility value (i.e., whether engaging with content will support one's goals), and perceived cost (i.e., whether engaging with content requires one to give up something else; Eccles, 2005). Students' appraisals of course content as relevant, then, appear to play a central role in influencing the degree to which students make these considerations. Therefore, we anticipate that students who perceive that their instructors have effectively presented course content as relevant will be likely to appraise that content as higher in

task value (i.e., students with instructors who present course content as relevant will be more likely to appraise that content as worth learning; Eccles & Wigfield, 2002) than they would in classrooms where they perceive course content as unrelated to their interests, needs, or goals. Given this, the third hypothesis is offered:

> H3a: Compared to a standard lesson, students will report greater perceptions of task value in a lesson where the instructor presents the content as relevant.

> H3b: Compared to a lesson in which the instructor presents lesson content in an irrelevant manner, students will report greater perceptions of task value in a lesson where the instructor effectively presents the content as relevant.

Relevance strategies might also peak students' interest while learning. *Situational interest* refers to a temporary psychological state facilitated by particular aspects of a learning environment, task, or resource, and is characterized by sensations of effortless attention, natural curiosity, and positive affective involvement (Schiefele, 2009). Situational interest is generally believed to be short term in nature, aroused by contextual stimuli and lasting for relatively brief periods of time (Hidi, 2000). The degree to which this arousal occurs is largely dependent on the alignment between characteristics of the contextual stimuli and characteristics of a given student (Bernstein, 1955)—that is, interest emerges when a student perceives a learning task as relevant to their interests, needs, or goals. When students perceive learning tasks as relevant, they are likely to exhibit similar states of effortless attention, natural curiosity, and positive affective involvement to those used to characterize situational interest (Schiefele, 2009). As such, it seems plausible that situational interest may emerge as an outcome of student perceptions of content relevance. When students perceive instructional content as relevant, they will exhibit greater situational interest than they would in scenarios where instructors either (a) do not present instructional content as relevant or (b) present instructional content in an irrelevant manner. Based on this reasoning, the following hypotheses are forwarded:

> H4a: Compared to a standard lesson, students will report greater situational interest in a lesson where the instructor presents the content as relevant.

> H4b: Compared to a lesson in which the instructor presents lesson content in an irrelevant manner, students will report greater situational interest in a lesson where the instructor effectively presents the content as relevant.

Teaching and learning is a process; that is, there are mechanisms that explain why effective teaching causes students to learn (Goodboy, 2017). Research suggests that cultivating student affect can serve as a causal mechanism to foster students' cognitive learning (Allen et al., 2006; Goodboy et al., 2018), a process which may be explained by the cognitive affective theory of learning with media (CATLM; Moreno, 2005, 2006). CATLM provides a framework for the ways in which instructional media (i.e., "the physical system or vehicle used to deliver instruction—such as a teacher's lecture, a textbook, or a desktop computer;" Moreno, 2005, p. 49) can influence students' learning. CATLM is grounded in the assertion that learners have a limited capacity to process information, so they must selectively attend to the signals (i.e., messages) they receive. As learners attend to specific signals, they organize the information presented in those signals into spatial representations and verbal models within their working memory. Learning occurs when these

representations and models are integrated with related knowledge already stored in learners' long-term memory. Cognitive theorists (e.g., Mayer, Moreno) argue that meaningful learning occurs "when the learner engages in appropriate selecting, organizing, and integrating during learning" (Mayer & Estrella, 2014); thus educators should employ instructional designs which prime these cognitive processes effectively. Cognitive theorists assert that this can be done by teaching in a manner that inhibits students' extraneous processing (i.e., cognitive processing unaligned with instructional objectives), supports students' essential processing (i.e., cognitive processing necessary to create mental representations of instructional content), and enhances students' generative processing (i.e., cognitive processing that organizes and integrates mental representations of instructional content into long-term memories; Mayer & Estrella, 2014).

CATLM is unique from other cognitive learning theories in its assumption of "affective mediation" (Moreno, 2005, p. 4), contending that motivational factors—particularly the affective features of instructional messages (i.e., aspects of a message conducive to liking or disliking)—play an important part in influencing the extent to which students become engaged in the generative processing that is necessary for meaningful learning to occur. Mayer (2014) characterized motivation as "the internal state that initiates, maintains, and energizes the learner's effort to engage in learning processes" (p. 171) and claimed that it is heavily influenced by the affective responses that instructional messages elicit from learners. Instructional messages that facilitate positive affective responses (e.g., enjoyment, appreciation, interest) from learners stimulate and guide appropriate cognitive processing by encouraging learners to attend to important information (i.e., selecting) and put forth effort to understand it (i.e., organizing and integrating; Mayer & Estrella, 2014). That is, instructional messages that arouse positive affect from students enhance generative processing. On the other hand, "learning can be hindered if the learner fails to engage in the learning task due to lack of motivation" (Moreno, 2005, p. 4), as instructional messages that elicit negative affective responses from learners (e.g., dislike, disinterest, frustration) can inhibit the extent to which they engage in generative processing.

While much research exploring the role of affect in facilitating students' learning has been conducted outside of the communication discipline (Leutner, 2014; Mayer, 2014; Mayer & Estrella, 2014), several instructional communication researchers have examined student affect as a causal mediator for learning. For example, exploring the impact of teacher misbehaviors on students' cognitive learning, Goodboy et al. (2018) reported that the negative effect of teacher misbehaviors on students' learning was mediated through student's negative affective responses to those misbehaviors. In other words, teachers' antagonistic behaviors did not undermine students' learning in and of themselves—rather, they facilitated negative affective experiences for students which, in turn, deterred students from learning the material. Similarly, in a meta-analysis of studies exploring the ways in which immediacy influences students' cognitive learning, Allen et al. (2006) reported that the positive influence of instructor immediacy on student learning was mediated through students' positive affective experiences. That is, immediate instructors increase their students' cognitive engagement in the learning process by promoting positive affect.

Given that students' affect for their instructors is hypothesized to emerge as an outcome of instructors' effective presentation of course content as relevant (H1a and H2a), and considering evidence suggesting that students' affective experience is a causal mechanism

through which teaching behaviors influence students' learning (Allen et al., 2006; Goodboy et al., 2018; Moreno, 2005, 2006), it is further predicted that increased affect will, in turn, improve students' ability to recall lesson content (Goodboy, 2017). In other words, we anticipate that instructors who effectively present course content to students in a relevant manner will elicit more positive affective responses from students, thereby facilitating cognitive engagement and learning. In addition, because previous research suggests students' overall GPA is a salient predictor of learning outcomes (Richardson et al., 2012), as well as influences students' learning during experimental studies (Bolkan & Goodboy, 2019), it was also measured as a covariate to control for its effect on learning. Therefore, the final hypothesis is offered as a test of mediation:

> H5: After controlling for GPA, teaching in a relevant manner (compared to an irrelevant manner) will create more student affect toward the instructor, and in turn, will foster greater learning as lesson recall on a test.

Method

Study 1 pilot study

To test the hypotheses in an experiment, we needed to create a lecture script. A brief lecture was created on a lesson subject that participants would not have attended already based upon a review of course offerings at the institution where the study was conducted. This lecture, entitled "The Science of Love," included scientific explanations about the ways individuals experience love; a subject matter which could be presented in a manner that is either relevant or irrelevant to the lives and interests of study participants. Of the 10 *outside course relevance strategies* identified by Muddiman and Frymier (2009), eight were incorporated into the lecture scripts developed for the relevant and irrelevant experimental conditions: *current life and interests*, *popular culture and media*, *future lives and interests*, *current events*, *real world*, *personal stories*, *examples*, and *time/place proximity*. However, given the inherent challenge in determining what is truly relevant due to the subjective nature of the construct (Frymier, 2002), we also needed to conduct a pilot study to ensure that the experimental manipulations of content relevance were ultimately successful.

This pilot study consisted of two phases. In the first phase, two undergraduate students enrolled in upper-level communication studies courses at a large university participated in interviews with one of the researchers. Given demographic similarities (e.g., age, geographic location) between these two undergraduates and the anticipated sample for the main experiment (e.g., undergraduates enrolled at the same university), we believed their perceptions of what content is (and is not) relevant would be important for generating teaching manipulations. During these interviews, students reviewed drafts of lecture scripts developed for each experimental condition and provided feedback regarding each script's manipulations of relevance. In instances where manipulations were perceived as insufficient, the two undergraduates provided input about how the manipulations could be revised based upon their personal experiences as students enrolled in undergraduate classes (e.g., "I hate when my professors talk about their pets, your cat has nothing to do with me"). The lecture scripts were subsequently revised to reflect the feedback from

these interviews (e.g., in the irrelevant condition, the instructor uses a story involving a pet cat to exemplify lesson content).

During the second phase of the pilot study, a survey was distributed to six additional undergraduate students enrolled in an upper-level research methods course at the same university. This survey provided respondents with a list of the relevance manipulations ($N = 24$) obtained from the first phase of the pilot study, each of which were accompanied by a 7-point semantic differential scale ranging from *irrelevant* (1) to *relevant* (7). Twelve of the 24 manipulations were designed to promote student perceptions of course content as relevant via effective implementation of *outside course relevance* strategies (Muddiman & Frymier, 2009), whereas the remaining 12 manipulations were designed to evoke student perceptions of irrelevance. Respondents were instructed to report how relevant each instructional strategy was using the semantic differential response format. Upon reporting their relevance perceptions for both the effective ($M = 5.58$, $SD = 0.36$) and ineffective ($M = 2.25$, $SD = 0.64$) relevance strategies, respondents then participated in a post-survey focus group discussion where they provided additional feedback. Similar to the recommendations obtained in the first phase of the pilot study, this feedback was also integrated into the appropriate lecture scripts.

Study 1 participants

In the main experiment, participants were 219 undergraduate students enrolled in communication studies courses at the same university where the pilot study was conducted. The participants were 88 men, 129 women, one participant who indicated that they preferred not to indicate their sex, and one participant who identified as "other." The age of participants ranged from 18 to 40 years ($M = 20.4$, $SD = 2.5$). There were 170 participants who identified as white/Caucasian, 15 participants who identified as black/African American, 15 participants who identified as Middle Eastern, six participants who identified as Asian/Asian American, six participants who identified as Hispanic, six participants who identified as "other," and one participant who identified as Native American. Participants were 60 first-years, 53 sophomores, 52 juniors, and 52 seniors, and two who reported "other."

Study 1 procedures

Participants were able to access the study from any location with a stable Internet connection using an anonymous link and were randomly assigned to one of three experimental conditions of a videotaped lecture: (1) a control condition (5:40 in length) in which lesson content was presented to students by an instructor without any relevance strategies (i.e., a straightforward lecture), (2) a relevant teaching condition (10:40 in length) in which the instructor utilized *outside course relevance* strategies effectively, and (3) an irrelevant teaching condition (10:51 in length) in which the instructor employed relevance strategies ineffectively. Relevance was manipulated at the same timed locations during the relevant and irrelevant lecture conditions using differing implementations of Muddiman and Frymier's (2009) *outside course relevance* strategies. A comparison of manipulations exactly as they were implemented across experimental conditions, full lecture scripts, and

PowerPoint presentations are available at "https://figshare.com/projects/Making_Content_Relevant_Study_1_/82304".

In each condition, the high-definition (1080p) video lecture was overlaid in a PowerPoint format simultaneously displaying a slideshow of lecture information and a video of the instructor's face while teaching the lesson (i.e., picture in picture). The instructor's face was formatted to a small box in the bottom right corner of the slide. Participants were able to see the instructor teaching for the duration of the lesson. The same instructor, a late-thirties man dressed in business-casual attire, taught the video lesson in each of the three experimental conditions.

The lesson taught in each condition was entitled "The Science of Love," and the lecture material for the lesson was based on research in evolutionary psychology surrounding topics such as lust, attraction, attachment, and courtship behaviors (Regan, 2011). This topic was chosen as the stimulus material because this is not a topic taught in the communication studies classes that the researchers recruited from.

Upon starting the lesson, participants were unable to continue to post-lesson survey questions until having attended the lesson in its entirety. After the lesson, participants in the relevant and irrelevant conditions were presented with five questions serving as attention checks to ensure that participants actually watched their assigned lesson (e.g., "During the lesson, the instructor used a television show as an example of some of the content he presented. What television show did the instructor use?"). Participants in each condition then responded to measures of relevance, situational interest, affect, and task value prior to completing a brief five-item quiz concerning the content presented during the lesson.

Study 1 instrumentation

Quiz

To measure student recall of lecture concepts, a five-item multiple-choice quiz (five answer options: a through e) was administered. Quiz questions were coded as (1) for correct answers and (0) for incorrect answers. The five-item quiz was scored to reflect a percentage of correct answers (*KR-20* = .56, *M* = 67.31%, *SD* = 28.10%, range = 0%—100%).

Relevance

A modified version of Frymier and Shulman's (1995) Relevance Scale was used as a manipulation check to examine differences in overall content relevance across conditions. This 12-item scale (*M* = 3.54, *SD* = 0.83) prompts respondents to report the frequency with which an instructor performs particular behaviors to present course content as relevant (e.g., "Helps me understand the importance of the content"), with responses ranging from *never* (1) to *very often* (5). Because this scale was originally developed to solicit student perceptions of content relevance in interactive live lecture classes, three of the total 12 items (e.g., "Gives assignments that involve the application of the content to my career interests") were excluded from this study due to difficulty in modifying them to apply to an isolated online lesson. Composite reliability (ω) for this scale was .88 [95% CI: .85, .91].

Situational interest

Situational interest was measured using Schraw et al.'s (1995) Perceived Interest Questionnaire. This 10-item instrument ($M = 3.30$, $SD = 0.88$) was originally designed to assess students' overall situational interest after reading a brief text, employing a series of statements (e.g., "I thought the story was very interesting") using a 5-point Likert scale (ranging from *strongly disagree* [1] to *strongly agree* [5]). Scale items were adapted for the current study by modifying the language used in each statement such that they referred to the online lesson participants watched instead of a narrative passage (e.g., "I thought the lesson was very interesting"). Composite reliability (ω) for this scale was .94 [95% CI: .92, .96].

Affect

Affect was measured using Mottet and Richmond's (1998) Revised Affective Learning Measure.[1] This instrument examines eight constructs related to students' affective experience, two of which are students' affect toward the course instructor (e.g., "My attitude about the instructor of this course"; $M = 5.30$, $SD = 1.29$, $\omega = .92$ [95% CI: .89, .94]) and six of which are students' affect toward the course content (e.g., "My attitude about the content of this lesson"; $M = 4.82$, $SD = 1.28$, $\omega = .97$ [95% CI: .96, .98]). Each affective construct is measured by four 7-point semantic differential scales.

Task value

Task value was measured using the task value subscale from the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1991). The subscale ($M = 4.59$, $SD = 1.42$) consists of six items (e.g., "It is important for me to learn the material in this lesson") which solicit responses from participants ranging from *not at all true of me* (1) to *very true of me* (7). Composite reliability (ω) for this scale was .94 [95% CI: .92, .96].

Study 1 results

Manipulation check

Prior to testing hypotheses, we assessed the manipulation of content relevance across the three experimental conditions. Results of an analysis of variance (ANOVA) indicated that the manipulation was successful, revealing significant differences between respondents' perceptions of content relevance across the three teaching conditions; $F(2, 214) = 34.48$, $p < .001$, $\eta^2 = 0.24$. Tukey post-hoc comparisons revealed that students assigned to the relevant condition perceived lesson content as more relevant to their interests, needs, and goals ($M = 4.07$, $SD = 0.66$, $n = 71$) than students assigned to either the irrelevant ($M = 3.52$, $SD = 0.78$, $n = 68$) or control ($M = 3.08$, $SD = 0.76$, $n = 78$) conditions. Further, students assigned to the irrelevant condition reported perceiving lesson content as significantly more relevant than students assigned to the control condition (i.e., ineffective relevance strategies were perceived as more relevant than no strategies at all).

Hypothesis tests

Intercorrelations among variables are presented in Table 1.

Table 1. Zero-order correlations in study 1.

Variables	1	2	3	4	5
1. Relevance	—				
2. Situational Interest	.539 [.433, .632]	—			
3. Affect for Instructor	.468 [.357, .575]	.561 [.461, .648]	—		
4. Affect for Content	.457 [.348, .558]	.765 [.703, .817]	.712 [.637, .778]	—	
5. Task Value	.506 [.395, .613]	.842 [.795, .881]	.505 [.392, .607]	.745 [.679, .803]	—
6. Quiz score	.078 [−.039, .198]	.153 [.051, .253]	.250 [.138, .361]	.227 [.125, .332]	.175 [−.019, .190]

Note: Confidence intervals are in brackets using 5,000 bootstrapped samples (percentile).

Hypotheses one and two predicted students would report greater positive affect for their instructor (H1a; H2a) and lesson content (H1b; H2b) when instructors effectively presented course content as relevant compared to when they made no such effort or presented content in an irrelevant manner. Four Welch's *t*-tests partially confirmed these hypotheses, such that students reported significantly greater affect for their instructor when the instructor effectively presented course content as relevant than when the instructor made no effort to do so (Table 2) or attempted to do so in a way which was irrelevant (Table 3). Although students in the relevant condition did not report significantly different affect for course content than those in the control condition (Table 2), they did report significantly greater affect for content than those in the irrelevant condition (Table 3).

Hypothesis 3 predicted students would perceive lesson content as having greater task value when instructors effectively presented course content as relevant than when instructors refrained from presenting content as relevant (H3a) or attempted to do so in an irrelevant manner (H3b). Two Welch *t*-tests supported this hypothesis, such that students' perceptions of task value in the relevant condition were significantly greater than those reported by students in either the control (Table 2) or irrelevant (Table 3) conditions.

Hypothesis 4 predicted students would report greater situational interest in lessons where instructors effectively presented course content as relevant than in lessons where instructors refrained from presenting content as relevant or attempted to do so in an irrelevant manner. Two Welch's *t*-tests supported this hypothesis, such that students'

Table 2. Differences in affect, task value, and interest between students in the relevant and control conditions.

Variables	Relevant		Control						
	M	*SD*	*M*	*SD*	*df*	*t*	*p*	Cohen's *d*	U_3
Affect (Instructor)	5.75	1.17	5.20	1.25	148	2.82	.005	.52	69.8%
Affect (Content)	5.13	1.35	4.78	1.25	144	1.63	.105	.27	60.6%
Task Value	5.00	1.39	4.50	1.36	146	2.20	.029	.36	64.1%
Situational Interest	3.67	0.88	3.20	0.76	134	3.42	.001	.57	71.6%

Table 3. Differences in affect, task value, and interest between students in the relevant and irrelevant conditions.

Variables	Relevant		Irrelevant						
	M	*SD*	*M*	*SD*	*df*	*t*	*p*	Cohen's *d*	U_3
Affect (Instructor)	5.75	1.17	5.30	1.24	131	2.41	.017	.42	66.3%
Affect (Content)	5.13	1.35	4.66	1.20	135	2.15	.034	.38	64.8%
Task Value	5.00	1.39	4.42	1.44	135	2.41	.017	.41	65.9%
Situational Interest	3.67	0.88	3.26	0.85	132	2.77	.006	.47	68.1%

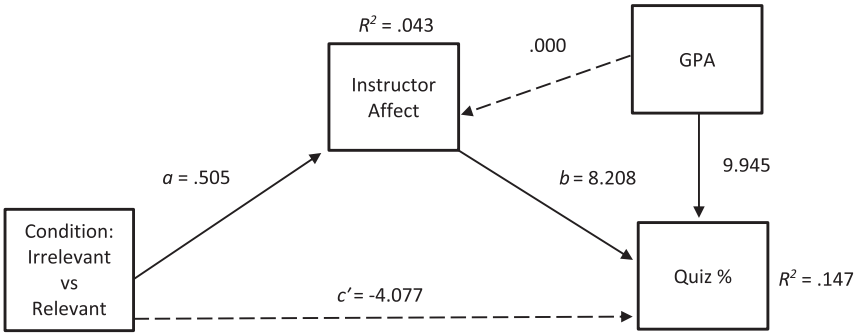

Figure 1. Study 1 mediation model of student learning.

The lecture conditions were indicator coded (0 = irrelevant, 1 = relevant). $c = .072$, $p = .988$. Solid arrows are significant paths, and dotted arrows are nonsignificant.

situational interest in the relevant condition was significantly greater than that reported by students in either the control (Table 2) or irrelevant (Table 3) conditions.

Hypothesis 5 predicted mediation: that relevant instruction (the teaching conditions were indicator coded to reflect a mean difference) would facilitate greater student affect for an instructor and, in turn, result in more cognitive learning. Using PROCESS 3.3 (Hayes, 2018), a simple mediation analysis using ordinary least squares path analysis revealed that relevant instruction indirectly helped students learn through its effect on instructor affect. Figure 1 displays the unstandardized path estimates.

Controlling for GPA, students in the relevant teaching condition had more affect toward the instructor than students in the irrelevant teaching condition ($a = .505$), and instructor affect led to higher scores on the recall quiz percentage ($b = 8.216$). A percentile bootstrap confidence interval for the indirect effect ($ab = 4.149$) based on 10,000 bootstrap samples was entirely above zero [.696, 8.096], and there was no evidence of a direct effect ($c' = -4.077$, $c'_{ps} = -.144$; $p = .388$). The partially standardized indirect effect was .146 [.025, .285]. Therefore, this hypothesis was supported as students, on average, scored 4% better (or about 1/7th of a standard deviation) on the quiz because they had more affect for the (same) instructor giving the relevant instruction.

Discussion

This study provided evidence that students report greater situational interest, perceive course content as having greater task value, and experience increased affect for instructors when those instructors are effective in presenting course content as relevant. Further, results of this study suggest that students gain slight increases in learning from relevant instruction because they have more affect toward their instructor. It is important, however, to replicate these findings to ensure that they are not sample-specific or dependent on the lecture topic, recall quiz (i.e., on the science of love), or the instructor. Therefore, we conducted a replication experiment the following semester and manipulated relevance using (1) a new instructor, (2) teaching a completely new lesson topic, with (3) a different quiz, and (4) a different participant sample and learning environment. If these teaching effects are to be believed with some confidence, they must replicate in a

new experiment unrelated to the first experiment. Replication, however, is not just a matter of finding a statistically significant result in a replication experiment; in fact, consulting *p*-values is a poor choice for determining if a result has replicated or not (Kline, 2013). That is, determining if a finding is statistically significant across two studies does not compare for the equivalence of effect sizes uncovered. Instead, the results from the original and replication study should be analyzed as a single paper meta-analysis, and the effect sizes can be pooled from the original study and replication study (Braver et al., 2014). Then, the homogeneity of effect sizes can be determined as a testable hypothesis by consulting the *Q* statistic (Hedges & Schauer, 2019). McShane and Böckenholt (2018) echoed this sentiment by criticizing statistical significance as evidence for replication, and proposing instead that "there is no reason why a single paper meta-analysis should not be the default statistical tool whenever multiple similar studies of a common phenomenon are published in a single paper" (p. 38). Therefore, we conducted a second study to replicate and compare the effects between our two independent experiments using meta-analysis.

Study 2 participants and procedures

In the second experiment, participants were 209 undergraduate students enrolled in communication studies courses. The participants were 81 men, 122 women, two participants who indicated that they preferred not to indicate their sex, one participant who identified as male-to-female transgender, one participant who identified as nonbinary, one participant who identified as "other," and one participant who did not respond. Participants' ages ranged from 18 to 53 years ($M = 20.0$, $SD = 3.1$). There were 154 participants who identified as white/Caucasian, 19 participants who identified as Middle Eastern, 18 participants who identified as black/African American, nine participants who identified as Hispanic, five participants who identified as Asian/Asian American, three participants who identified as "Other," and one participant who did not report ethnicity. Participants were 70 first-years, 43 sophomores, 56 juniors, and 39 seniors. One participant did not report class rank.

Participants were able to access the study from any location with a stable Internet connection using an anonymous link and were assigned to one of three experimental conditions at random: (1) a control condition (6:15 in length), (2) relevant teaching condition (14:05 in length), or (3) an irrelevant teaching condition (13:55 in length). Relevance was manipulated at the same locations during the relevant and irrelevant lecture conditions using differing implementations of Muddiman and Frymier's (2009) *outside course relevance* strategies. A comparison of manipulations exactly as they were implemented across experimental conditions, full lecture scripts, and PowerPoint presentations are available at "https://figshare.com/projects/Making_Content_Relevant_Study_2_/82316". The same lecture features in study 1 were applied to study 2 (e.g., high-definition video lecture with PowerPoint overlap of the instructor's face), except this instructor was a late-twenties man dressed in business-casual attire.

The lesson taught in each condition was entitled "Emailing 101," and the lecture material for the lesson was based on research regarding best practices when preparing and sending emails (Stephens et al., 2012). This topic was chosen as the stimulus material for this study because this is not a topic taught in the communication classes that the

researcher recruited from. Participants attended the lecture, answered attention check questions (e.g., "During the lesson, the instructor mentioned a dating app. Which dating app did the instructor mention?"), and then responded to the same post-test measures as in study 1 (relevance, situational interest, affect, and task value prior to completing a brief five-item quiz concerning the content presented during the lesson).

Study 2 instrumentation

Quiz

To measure student recall of lecture concepts, a five-item multiple-choice quiz (five answer options: a through e) was administered. Quiz questions were coded as (1) for correct answers and (0) for incorrect answers. The five-item quiz was scored to reflect a percentage of correct answers (*KR-20* = .48, *M* = 71.35%, *SD* = 22.29%, Range = 0%—100%).

Variables

Composite reliability estimates (ω) for the same scales used in study 1 were: relevance (.88 [95% CI: .84, .91]; *M* = 3.93, *SD* = 0.77; Frymier & Shulman, 1995), situational interest (.94 [95% CI: .92, .95]; *M* = 3.09, *SD* = 0.88; Schraw et al., 1995), affect toward instructor (.93 [95% CI: .90, .94]; *M* = 5.69, *SD* = 1.22; Mottet & Richmond, 1998), affect toward content (.95 [95% CI: .93, .96]; *M* = 4.89, *SD* = 1.15; Mottet & Richmond, 1998), and task value (.90 [95% CI: .86, .93]; *M* = 5.28, *SD* = 1.23; Pintrich et al., 1991).

Study 2 results

Manipulation check

Prior to testing hypotheses, we assessed the manipulation of content relevance across the three experimental conditions. Results of an ANOVA indicated that the manipulation was successful, revealing significant differences between respondents' perceptions of content relevance across the three experimental conditions, $F(2, 199) = 16.61$, $p < .001$, $\eta^2 = 0.14$. Tukey post-hoc comparisons revealed that students assigned to the relevant teaching condition perceived lesson content as more relevant ($M = 4.31$, $SD = 0.68$, $n = 67$) than students assigned to either the irrelevant ($M = 3.86$, $SD = 0.73$, $n = 71$) or control ($M = 3.60$, $SD = 0.73$, $n = 64$) conditions. Students in the irrelevant and control conditions, however, did not report significantly different perspectives of content relevance.

Hypothesis tests

Intercorrelations among variables are presented in Table 4.

The first two hypotheses predicted students would report greater positive affect toward their instructor (H1a; H2a) and the lesson content (H1b; H2b) when instructors effectively presented course content as relevant compared to when they made no such effort or presented content in an irrelevant manner. Four Welch *t*-tests partially confirmed these hypotheses. Students reported significantly greater affect for their instructor when the instructor effectively presented course content as relevant than when the instructor made no effort to do so (Table 5) or attempted to do so in an irrelevant manner

Table 4. Zero-order correlations in study 2.

Variables	1	2	3	4	5
1. Relevance	—				
2. Situational Interest	.417 [.292, .535]	—			
3. Affect for Instructor	.495 [.374, .602]	.351 [.222, .466]	—		
4. Affect for Content	.403 [.267, .530]	.684 [.602, .754]	.473 [.343, .591]	—	
5. Task Value	.480 [.347, .598]	.627 [.540, .708]	.519 [.394, .636]	.694 [.626, .758]	—
6. Quiz score	.175 [.032, .313]	.086 [−.076, .243]	.184 [.028, .334]	.119 [−.029, .267]	.357 [.205, .497]

Note: Confidence intervals are in brackets using 5,000 bootstrapped samples (percentile).

(Table 6). Students in the relevant condition did not report significantly more affect for course content than students in either the control (Table 5) or irrelevant (Table 6) conditions.

Hypothesis 3 predicted students would perceive lesson content as having greater task value when instructors effectively presented course content as relevant than when instructors either refrained from doing so (H3a) or attempted to do so in an irrelevant manner (H3b). Two *t*-tests partially supported this hypothesis, such that students' perceptions of task value in the relevant teaching condition were significantly greater than those reported by students in the irrelevant condition (Table 6), but were not significantly different from students in the control condition (Table 5).

Hypothesis 4 predicted students would report greater situational interest in lessons where instructors effectively presented course content as relevant than in lessons where instructors either refrained from doing so or attempted to do so in an irrelevant manner. Two *t*-tests partially supported this hypothesis, such that students' situational interest in the relevant condition was significantly greater than that of students in the control condition (Table 5), although it was not significantly different from that reported by students in the irrelevant condition (Table 6).

Hypothesis 5 predicted mediation; that relevant instruction (the teaching conditions were indicator coded to reflect a mean difference) would create more affect toward the

Table 5. Differences in affect, task value, and interest between students in the relevant and control conditions.

Variables	Relevant		Control						
	M	*SD*	*M*	*SD*	*df*	*t*	*p*	Cohen's *d*	U_3
Affect (Instructor)	6.04	1.05	5.54	1.28	127	2.49	.14	.43	66.6%
Affect (Content)	5.09	1.10	4.85	1.16	134	1.25	.213	.21	58.3%
Task Value	5.50	1.11	5.27	1.22	131	1.13	.261	.20	57.9%
Situational Interest	3.29	0.85	2.95	0.84	132	2.33	.022	.40	65.5%

Table 6. Differences in affect, task value, and interest between students in the relevant and irrelevant conditions.

Variables	Relevant		Irrelevant						
	M	*SD*	*M*	*SD*	*df*	*t*	*p*	Cohen's *d*	U_3
Affect (Instructor)	6.04	1.05	5.51	1.26	132	2.69	.008	.46	67.7%
Affect (Content)	5.09	1.10	4.74	1.17	137	1.84	.067	.31	62.2%
Task Value	5.50	1.11	5.07	1.31	131	2.06	.041	.35	63.7%
Situational Interest	3.29	0.85	3.02	0.91	134	1.79	.077	0.31	62.2%

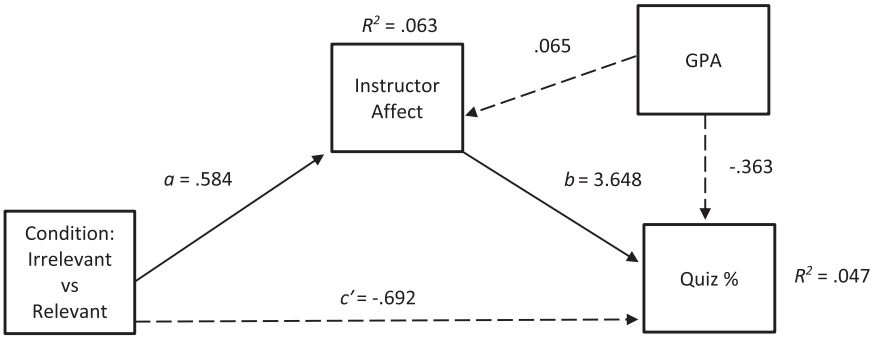

Figure 2. Mediation model of student learning.

The lecture conditions were indicator coded (0 = irrelevant, 1 = relevant). $c = 1.440$, $p = .693$. Solid arrows are significant paths, and dotted arrows are nonsignificant.

instructor, in turn, foster more cognitive learning. Using PROCESS 3.3 (Hayes, 2018), a simple mediation analysis using ordinary least squares path analysis revealed that relevant instruction indirectly helped students learn through its effect on instructor affect. Figure 2 displays the unstandardized path estimates.

Controlling for GPA, students in the relevant teaching condition had more affect toward the instructor than students in the irrelevant teaching condition ($a = .584$), and instructor affect led to higher scores on the recall quiz percentage ($b = 3.648$). A percentile bootstrap confidence interval for the indirect effect ($ab = 2.132$) based on 10,000 bootstrap samples was entirely above zero [.172, 4.526] and there was no evidence of a direct effect ($c' = -.692$, $c'_{ps} = -.035$; $p = .851$). The partially standardized indirect effect was .108 [.009, .233]. Therefore, this hypothesis was supported, as students, on average, scored 2% better (or about 1/10th of a standard deviation) on the quiz because they had more affect for the (same) instructor giving the relevant instruction.

Lastly, a single paper meta-analysis using a random-effects model was conducted in Comprehensive Meta-Analysis Version 3.3 (Borenstein et al., 2014) to determine whether the results obtained from study 1 were replicated in study 2. This random-effects meta-analysis revealed that each of the results observed in study 1 (H1–H4) were fully replicated in study 2, despite these two studies using (1) different instructors (2) teaching different lesson content which was (3) tested using different quizzes and (4) completed by different participants in different learning environments. Results from the effect size comparisons are displayed in Table 7. Notably, the Q statistics for all replications were nonsignificant, indicating that the results from studies 1 and 2 shared a common effect size (i.e., there was no heterogeneity). Likewise, I^2 was zero in all studies, suggesting that the variance in true effects is zero, or alternatively, that all the variance between the effect sizes was sampling error only (Borenstein et al., 2009). Thus, the results were completely replicated in both studies.

Discussion

Results from study 2 revealed that students had increased affect for their instructor and course content, greater perceptions of task value, and heightened situational interest

Table 7. Replication results from the meta-analysis.

Dependent variable	Conditions compared	Study	Statistics for each study							
			Hedge's *g*	*SE*	LLCI	ULCI	*Z*	*Q*	*p*	I^2
Instructor Affect	Relevant/ Control	Study 1	0.459	0.165	0.135	0.784	2.779	–	–	–
		Study 2	0.427	0.176	0.083	0.772	2.431	–	–	–
		Average Effect	0.444	0.120	0.208	0.680	3.690	0.018	.894	0.000
	Relevant/ Irrelevant	Study 1	0.412	0.165	0.089	0.735	2.499	–	–	–
		Study 2	0.455	0.176	0.110	0.800	2.585	–	–	–
		Average Effect	0.432	0.120	0.196	0.668	3.591	0.032	.859	0.000
Content Affect	Relevant/ Control	Study 1	0.267	0.164	−0.054	0.588	1.629	–	–	–
		Study 2	0.211	0.174	−0.130	0.553	1.212	–	–	–
		Average Effect	0.241	0.119	0.007	0.475	2.017	0.055	.815	0.000
	Relevant/ Irrelevant	Study 1	0.359	0.165	0.037	0.682	2.184	–	–	–
		Study 2	0.307	0.175	−0.036	0.649	1.754	–	–	–
		Average Effect	0.335	0.120	0.100	0.569	2.793	0.048	.826	0.000
Task Value	Relevant/ Control	Study 1	0.362	0.165	0.039	0.684	2.200	–	–	–
		Study 2	0.197	0.174	−0.144	0.539	1.132	–	–	–
		Average Effect	0.284	0.120	0.050	0.519	2.376	0.473	.492	0.000
	Relevant/ Irrelevant	Study 1	0.407	0.165	0.084	0.731	2.471	–	–	–
		Study 2	0.327	0.175	−0.016	0.670	1.868	–	–	–
		Average Effect	0.369	0.120	0.134	0.605	3.079	0.113	.737	0.000
Interest	Relevant/ Control	Study 1	0.571	0.167	0.244	0.897	3.428	–	–	–
		Study 2	0.400	0.176	0.056	0.744	2.279	–	–	–
		Average Effect	0.490	0.121	0.253	0.727	4.055	0.498	.480	0.000
	Relevant/ Irrelevant	Study 1	0.471	0.171	0.136	0.806	2.754	–	–	–
		Study 2	0.282	0.170	−0.052	0.616	1.657	–	–	–
		Average Effect	0.376	0.121	0.140	0.613	3.117	0.614	.433	0.000

when their instructor was effective in presenting course content as relevant. Further, as in study 1, this increased affect toward the instructor, due to instructor relevance strategies, consequently caused slight increases in cognitive learning.

General discussion

Results from both studies expanded upon previous scholarship examining relevance from a communicative perspective. Employing experimental designs, we explored the causal mechanisms through which relevance fosters students' learning experiences. Together, the results of both studies adhere to the guiding assumptions of CATLM (Moreno, 2005) and align with previous communication research (Allen et al., 2006; Goodboy et al., 2018) situating student affect as a mediator of students' cognitive learning. Our findings suggest that instructors who strive to teach content in a relevant manner are able to better facilitate positive affective responses from their students and thereby stimulate students' cognitive engagement in the learning process, supporting Moreno's (2005) contention that students' affective experiences are an important component of meaningful learning.

Implications for teaching and learning

While the results of this study demonstrated the influence of relevant teaching, it is important to bear in mind that no single topic or presentation of lesson material will be universally perceived as relevant by all students (Frymier, 2002). Indeed, the irrelevant teaching condition in this experiment exemplifies how instructors' attempts to communicate the relevance of course content can sometimes miss the mark—making connections and employing examples that may be obscure, out of date, or otherwise disconnected from the lives of contemporary students. Instructors seeking to enhance student perceptions of content relevance, therefore, need to carefully consider the specific needs, interests, and goals of their students. While conveying the relevance of lesson content to each and every student may be unrealistic given differences in students' individual perspectives (Frymier, 2002), there are nevertheless several strategies instructors can use to increase the likelihood of students perceiving lesson content as relevant.

Based on our findings, one way instructors can stimulate content relevance is by sharing personal experiences related to instructional material that may resonate with students' experiences. In this study, for example, the instructors in the relevant conditions began their lessons by reflecting on their own experiences as students and relating them to (1) the topic of each lesson and (2) possible thoughts, feelings, or frustrations their students may be experiencing as current undergraduates (e.g., dealing with unresponsive instructors, being required to complete irrelevant coursework). Instructor self-disclosure (i.e., instructors revealing personal information which their students likely could not obtain from other sources; Sorenson, 1989), therefore, may be an effective strategy for framing lesson content as relevant, so long as students perceive the information that instructors disclose as connected to lesson content. Indeed, Cayanus and Martin (2008) argued that relevance is an important criteria by which students appraise the overall appropriateness of their instructors' self-disclosures, reporting that relevant self-disclosure is positively associated with students' perceptions of course content as meaningful and impactful. In contrast, the instructors in the irrelevance conditions exemplify the importance of refraining from self-disclosures which are not clearly related to lesson content, sharing information involving topics with which their students likely had little experience (e.g., immigration) or interest (e.g., barbequing) and thereby promoting perceptions of course content as irrelevant despite their efforts to the contrary. Instructors who engage in self-disclosure to enhance content relevance should thus carefully consider how closely the information they share is connected to lesson content to avoid student perceptions of their disclosures as random or off topic.

Instructors can also promote content relevance by using examples related to recent events, news, and popular culture that their students are familiar with, or otherwise connect instructional material to the "real world." For instance, the instructors in the relevant conditions employed examples such as current media (e.g., *Game of Thrones*), recent news (e.g., Arianna Grande's break-up with Mac Miller), contemporary app-based dating (e.g., Tinder, Bumble), college football (e.g., an upcoming game at the university students were recruited from), and applying for jobs after graduation, to name a few. In contrast, the irrelevant instructors attempted to use the same general types of examples but did so in ways that students perceived as disconnected, referring to dated media (e.g., *How Harry Met Sally*), old news (e.g., Pamela Anderson's break-up with Kid Rock), dating networks their students did

not use (e.g., eHarmony.com), a football game unrelated to their students' institution, and emailing a financial advisor. Discrepancies in students' relevance perceptions across these conditions underscore the fleeting nature of relevance, suggesting that something perceived as relevant at one point in time may not necessarily continue to perceived as relevant indefinitely (Frymier, 2002). Indeed, numerous examples which students perceived as relevant at the time of this study may no longer be seen as such given the passage of time (e.g., *Game of Thrones* has ended, Mac Miller has passed away). Using examples, therefore, is neither relevant nor irrelevant in and of itself—rather, it is the content of examples which seems to ultimately impact students' relevance perceptions. Given this, instructors should be mindful that the examples they employ to enhance content relevance are contemporary in nature and exercise caution when reusing examples due to students having perceived them as relevant in past (e.g., previous semesters, previous years).

Despite making these recommendations, we must admit that we initially were unsure how to derive these strategies ourselves as instructors. Admittedly, we had to seek assistance from undergraduate students who helped us successfully manipulate and integrate these strategies into our study's lectures. What might an instructor do, then, to seek similar strategies from college students? Perhaps on the first day of class, instructors could utilize introductory in-class activities to become acquainted with their students and familiar with their interests. This can be done by distributing a brief questionnaire, speaking with students one on one, or having students participate in small group discussions. The goal of these activities would be to collect information regarding students' personal interests, needs, and goals—information which can then be incorporated into subsequent instruction. If successful, instructors' efforts to enhance content relevance are more likely to be effective in that they will be structured specifically around students' own self-identified perspectives, rather than based exclusively on instructors' interpretations (which may be inaccurate). These activities might work well in small enrollment classes where instructors can better get to know their students on a personal level.

Instructors might also increase the relevance of their teaching simply by keeping apprised of current local and national news. Effective implementation of *outside course relevance* strategies, such as *popular culture and media* and *current events* (Muddiman & Frymier, 2009), requires that instructors remain aware of what is current and noteworthy in the press. An event that happened a decade ago in a far-away location will not be as salient for students as something that happened a week ago just down the street. As such, instructors can benefit from collecting information from multiple news outlets, in multiple forms (e.g., video vs. print), and at multiple levels (e.g., a national newspaper vs. the university newspaper).

As expected, when instructors taught with effective relevance-enhancing strategies, students reported the greatest overall perceptions of content relevance. Interestingly, when instructors taught in a relevant manner but did so ineffectively, students still reported greater perceptions of overall content relevance than did students with instructors who made no effort to teach in relevant ways. This finding suggests that although it may be difficult for instructors to determine what is currently relevant to students (Frymier, 2002), trying to be relevant may nevertheless be better than simply not trying at all. Keller (1987b, p. 2) identified several important questions that instructors should consider when attempting to enhance the relevance of course content (e.g., "How can I tie the instruction to the learner's experiences?" "How can I best meet my learner's needs?") and argued

that instructors should engage in persistent audience analysis to answer those questions (i.e., instructors should try to learn as much as possible about their students' interests, needs, and goals). Communication research suggests that students recognize and appreciate when their instructors make such efforts (Knoster & Myers, 2020; Muddiman & Frymier, 2009), stimulating students' perceptions that their instructors are at least trying to make content relevant. Perhaps this, in itself, is conducive to student's overall perceptions of content relevance to some degree. While a particular example an instructor provides might be out of date or otherwise disconnected from students' daily lives, it may still present course content to students in a more relevant light (even if only slightly) than if the instructor had provided no example at all. Indeed, examples (relevant or otherwise) can enhance the clarity of course content by reinforcing abstract ideas with concrete illustrations, helping students comprehend and retain information (Bolkan & Goodboy, 2019). Instructors' use of any examples while teaching may thus enhance content relevance by providing students with tangible representations of conceptual subject matter. If so, this finding is encouraging in that it reinforces Keller's (1987a) argument that "relevance can come from the way something is taught; it does not have to come from the content itself" (p. 3)—even for instructors frustrated by the inherent challenges in determining what, exactly, their students perceive as relevant. Perhaps in students' minds, even if an instructor misses the mark, at least trying to be relevant is better than not trying at all, although actually being relevant is even better.

Limitations and future directions

This study had several limitations. First, learning in both experiments was operationalized using a brief multiple-choice quiz immediately following a video lesson. While this provided us with the means to examine the influence of relevant instruction on short-term recall, it does not capture the complexity of learning as it occurs in actual classroom environments. Future research could thus benefit by utilizing assessments which capture deeper levels of learning (e.g., application, analysis) beyond basic recall, as well as from administering post-lesson assessments at different time intervals than immediately after a lesson (e.g., a week after participating the study).

Second, each study employed an isolated lesson to examine the immediate effects of presenting instructional content as relevant at a single point in time—yielding findings which may not necessarily apply to real world learning environments to which students typically return repeatedly (e.g., across a semester, throughout a school year). It is possible, then, that instructors' emphasis on the relevance of instructional content has farther-reaching implications for teachers and their students than the duration of a single lesson, influencing long-term affective, motivational, and cognitive outcomes. It is possible too, that relevance strategies could be successfully employed one week in a semester, but also potentially backfire in subsequent weeks. Future research should examine the effects of relevant teaching on students' learning experiences over time (i.e., throughout course of a semester by modeling the longitudinal trajectories of relevance and its effects on students).

Conclusion

Expanding upon previous research appraising content relevance from a communication perspective, this research explored the influence of relevant teaching on student affect,

evaluations of task value, situational interest, and learning. Despite the inherent challenge in determining what is (or is not) relevant (Frymier, 2002), the results of these two experiments suggest that instructors who overcome this obstacle may be able to better facilitate interesting, enjoyable, and valuable student learning experiences. Anecdotally, each of us can likely reflect on our own student experiences and recall at least one instructor (hopefully) who took a topic we were initially disinterested with and presented it to us in a new and engaging light. Effective teaching is not simply the regurgitation of facts to students—rather, it is a complex communicative process whereby instructors facilitate students' affective and cognitive involvement in their learning. While it is clearly important for instructors to communicate what it is that students need to know and learn, it is also important to do so in a manner that considers who students are, taking into account their diverse interests, needs, and goals, and structuring lectures in ways that make content relevant to them.

Note

1. This instrument does not measure affective "learning" but rather affective experience (Bolkan, 2015).

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