Thematic Stimulus Presentation in Asynchronous-Based Coursework Lectures

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Research Article

Keywords: costumes, asynchronous lectures, remote learning, higher education, distance learning

Posted Date: May 19th, 2022

DOI: https://doi.org/10.21203/rs.3.rs-1670500/v1

Abstract

While synchronous, direct methods of teaching technology may be more traditional (Lovett et al., 2011; Saville et al., 2013), students may prefer or be limited to an asynchronous platform of learning based on environmental variables (Choe et al., 2019). Some of the instruction given in asynchronous courses may be delivered in lecture-based format. Ensuring that students are interested and engaged with the material is a high priority of many instructors and finding new ways to encourage engagement should be a priority in research. This study examined if the addition of novel, thematic stimuli in the form of costume pieces (novelty hats with themed language) would increase student engagement in pre-recorded lectures for an asynchronous masters level course. When comparing the results between a control and an experimental group, the first experimental test results showed better outcomes including a decreased range of scores between the lowest score and highest score across group participants and an increased average score on the exam. Following the first experimental test, however, scores leveled out to scores similar to baseline and the control groups, suggesting either satiation (i.e., wearing off of the effect) or anticipation of the procedure, resulting in no effect. Limitations and future research considerations are also discussed.

Introduction

Online instruction has become more common with the availability and accessibility of internet and technology, along with increasing popularity (Choe et al., 2019). Since the start of the 2020 COVID-19 pandemic, many educational institutions switched from on-campus, hybrid, or other course models to a fully asynchronous model in a rapid attempt to protect students and faculty. Public institutions which previously rejected online learning pivoted toward this model, which was already increasing in popularity due to lower infrastructure costs, ease of accessibility for students, flexibility for students with demanding schedules, and minimizing former barriers to learning previously related to formal education (Choe et al., 2019). With this occurring, many lectures are recorded and uploaded to learning management systems (LMS) for student availability asynchronously access course lectures. While there are effective instructional methods generally delivered through synchronous (i.e., live) model, such as active responding, precision teaching, interteaching, peer coaching, equivalence-based instructional methods, and personalized system of instruction (Gayman et al., 2018; Gayman et al., 2020; Lovett et al., 2011; Saville et al., 2013), the scope of effective techniques to apply toward asynchronous lectures could be expanded.

The practice of adding novel or previously unseen stimuli, as used in this study, to academic coursework or lectures to signal instructor presence is not entirely new. Stimuli could involve a variety of items, images, or other applications to increase instructor presence, thus increasing engagement by learners. The presence or absence of stimuli in different environments shape behavior and can be contrived in a manner to assist student outcomes and perception (Cheryan, 2009). In a study by Chia-Hung et al. (2016), the effects of using humorous images as reinforcers for answering questions correctly were evaluated in a synchronous format online course. These results correlated to increased attention and positive association with the teacher, however, test scores did not increase with the intervention (Chia-Hung et al., 2016). While Wolfe and Slocum (2015) determined that there may not be a significant difference between methods of instructional delivery between synchronous and asynchronous models, it is still necessary to examine components across both formats of instruction, as they are very different and cater to different audiences and preferences.

The novelty of stimuli has been assessed in different forms of academic instruction. For instance, Fanguy et al. (2017) evaluated whether the addition of a guest lecturer to online video lectures would increase student engagement for a graduate-level course in Scientific Writing. The findings of the following study determined that there was no significant difference between the guest lecture group in the study and the control group on test scores. Further, the researchers explained that this could have been partially attributed to scene changes, which could have led to confusion or contextual loss (Fanguy et al., 2017). In another novel stimulus study, Rambe and Bere (2013) sought to increase engagement and participation with students using the WhatsApp MIM (Mobile Instant Messaging) application. The application was used as a synchronous and asynchronous discussion and note taking platform and was implemented at a South African university-based information technology course. The researchers determined that the method resulted in increased participation among students and increased peer relationships (Rambe & Bere, 2013). While this was a novel method of increasing student engagement, it may not determine a similar benefit of real-time interactions, as in an asynchronous instructional platform, not all students are accessing lectures and peer comments simultaneously.

In addition to determining student attentiveness to materials and effectiveness of content, learner preferences should be considered when utilizing different strategies to increase engagement. Skyler (2009) compared student preferences between online instruction based on asynchronous text-based lectures and synchronous web conferencing-based lectures. The research determined that while both methods were effective at delivering instruction and had similar results with acquisition, students preferred the synchronous model (Skyler, 2009). Kunin et al. (2014) found similar results when assessing course delivery preference (asynchronous, traditional face to face learning, etc.) among students. Students reported that technology was less effective at delivering content in an online instructional format at the time of this study but reported that the quality of instructor-student and student-student interactions was better in an online course. Even though these studies reported findings relating to a preference for the synchronous model of instructional delivery, some students elect to take asynchronous coursework for specific reasons which can include convenience, lifestyle, scheduling availability, accessibility, medical, or other reasons. When students are limited to taking courses in an asynchronous format and this is not the main preference, Guo et al. (2014) determined some components of student preference with video-based

lectures through a study, which included the use of digital drawing boards, short slides, and using a talking head shot versus a classroom lecture recording.

For video lectures, common complaints by students can involve limited engagement due to a lecturer presenting either too fast or too slow, or just sat and read notes, which does not work to keep student attention and promote engagement; students also noted video problems such as not being able to appropriately see the any shared visual materials/aides, and having little to no visual and/or auditorial engaging content (Lange & Costley, 2020). Some guidelines are fortunately available on how to increase student engagement with recorded lecture videos. Not only is learner preference an important consideration, but also what is effective based on learning outcomes, exam scores (Gayman et al., 2020), completion and accurate demonstration of the video content along with making sure students are interested in the materials and understanding concepts correctly (Lange & Costley, 2020). To start, students are reportedly more likely to watch the duration of a lecture video if it is less than 6 minutes (Brame, 2016; Geri et al., 2017; Guo et al., 2014). If students are given a 9-12 minute video, completion decreases to around 50% across populations, decreasing further as the time increases for the video.

The way material is presented by audio and visual components is important as well. Conversational language and style are mentioned as another effective strategy to maintain or increase student engagement (Brame & Perez, 2016; Mayer, 2005). Conversational language in lectures is also referred to as the “personalization principle”, which connects students to instructors in a less formal manner, resulting in more engagement (Brame & Perez, 2016; Mayer, 2005; Mayer, 2008). The voice principle explains that human voices are more effective for listeners than specific accents or computerized audio, adding to audio considerations for multimedia presentation (Mayer, 2005). Another factor to consider with recorded lecture videos includes context, or relevance of the presentation to the course material to the environment the content will be used in (Brame & Perez, 2016). Mayer (2005) also determined that in half of opportunities, the visual cue of a speaker for a recorded lecture was helpful.

Motivation theory is an important learning perspective, which suggests that a learner must be interested in the material and want to achieve specific outcomes to learn more effectively (Keller, 1983). When using learner feedback to create more effective video lectures for students to obtain necessary content with, motivation can increase, however it is also necessary to continue to determine additional ways to increase interest in the material. When students are viewing content not just in lecture halls and classrooms but also in a variety of public and private environments, this becomes especially important. Working in home or work or public gathering places can pose more distractions, thus determining effective ways to promote student engagement in video lectures in higher educational settings is important, especially when forms of online instructional models may be one of convenience, and not necessarily preference.

Since recorded lectures are commonly used in an asynchronous model of instruction, it is also necessary to determine helpful strategies for instructors, especially when attempting to make exceptionally difficult content conversational or appealing, maximize the content available in shorter video recordings, and consider context for content use (Brame & Perez, 2016). Obtaining appropriate exam scores, whether in course grades or through external competency exams, such as those needed for certification in specialized areas, is a generalized measure of achievement. Preparing students for exam taking and ensuring appropriate exam scores at the coursework level may be the best measure of generalization to the next step if certification or licensure is needed based on a standardized exam. If attention is not given to the materials presented in the course, this could be due to lack of interest, which directly connects to student motivation to learn the concepts, resulting in poor performance in the course content or with future measures, such as a board or certification exam (Keller, 1983).

Based on the concerns mentioned, the research question for this study was: would the addition of thematic stimuli (i.e., costume pieces worn by the lecturer paired with theme-based phrasing) during pre-recorded video lectures for an asynchronous course increase student engagement through test scores?

Method

Participants

Participants for this study were students enrolled in an asynchronous graduate course on functional assessment procedures in Applied Behavior Analysis (ABA). The study was conducted across two separate semesters, one during a summer semester (the control group), and the other during the following fall semester (the experimental group). For the control group, three sections of 16 students per section were enrolled in the course, totaling 48 participants. For the experimental group, 32 total students (composed of three different course sections varied in number) were enrolled in the course, serving as participants. To register for the assessment course, students had to meet passing prerequisite courses and take the course in their third semester of a two year program, so participants were familiar with the program structure before starting the content. All participants across semesters had the same instructor, or the experimenter.

Materials and Setting

Students were required to have reliable internet access, computer equipment capable of running varied technology requirements specified by the graduate school where the courses were held and had access to the LMS (learning management system) Moodle. Lectures were displayed on the LMS through recorded videos featuring PowerPoint presentations and included a webcam recording of the experimenter on-screen

(recorded through Screencast-O-Matic software and uploaded to YouTube on a private listing). The experimenter also used varied costume pieces including bee antennae/wings, a rabbit ear “hat”, a wizard hat, and a pirate hat for the experimental group lectures. The study was conducted virtually through Moodle, as the courses targeted for the research were part of an asynchronous ABA masters program.

Experimental Design

A between-groups design was used, which served as a comparison of test scores between the control and the experimental groups. The dependent variable involved the number of correct quiz answers on quizzes associated with lectures modified with stimulus control procedures (Gayman et al., 2020). Quiz scores were used as students going through ABA programs generally seek board certification, which is based on a standardized exam. Quiz topics and content in the study covered similar content and structure to the credentialing exam students would be taking at the end of their program to help them better prepare for the credentialing exam.

Procedure

In all phases of the study, video lectures were used which were pre-recorded by the experimenter. These lectures focused on components mentioned by Guo et al. (2014) and Mayer (2005) for baseline and experimental conditions for both groups of participants. The video lectures were a minimum of 5 minutes and varied in duration up to 12 minutes. Regardless of novel stimuli presentation or non-presence, the experimenter used conversational lecture style, which also included applied examples and relevance to professional practice (Guo et al., 2014; Mayer, 2005). The experimenter was the only person delivering lectures and used normal audio (i.e., no computerized effects or filters) for all lecture recordings. For the experimental condition lectures, the only change was the addition of the novelty hats with connected verbal phrasing.

Control

In the control condition, the students were given lectures and quizzes based on three topics in functional behavior assessment in a standard format (i.e., researcher dressed in general professional attire); indirect assessments, direct assessments, and functional analysis procedures. Following the lectures, students were given 25 question quizzes over the content of the lectures, readings, and additional information provided in the units. An additional control condition lecture was delivered, which was the same set of lectures across both cohorts, with no change of content/lecturer/stimuli, etc. Content included information on client record reviews and served as a true control across the experiment.

Experiment

In the experimental condition, the students were given lectures and quizzes based on the same three selected experimental topics in functional behavior assessment in a themed, costumed format (i.e., wearing a bee antenna and wings, saying phrases such as “making a buzz about assessments”, “busy as a bee when completing assessments”, etc.). While the researcher added costume pieces and phrases connected to the theme of the pieces (not exceeding three phrases in a maximum 12-minute lecture recording), the content and PowerPoint for the lecture remained the same, with the only difference between the control and the experimental conditions of the study being the groups, the costume pieces, and a few thematic phrases spoken by the researcher. The stimuli added to these experimental phases were not directly connected to the material other than discussion of the material in a humorous format. The consideration was made to evoke interest and engagement in the lectures (Keller, 1983), serve as an indirect prompt to attend to the lectures with novel phrasing that would not normally be present in a lecture based on the content presented, and provide a visual stimulus that was possibly more entertaining than what students are acclimated to viewing in traditional lecture format.

Social Validity

Social validity is an important measure in behavior analysis, which involves inquiry with the stakeholders on if the intervention is appropriate to use, effective, and if the benefits may outweigh any risks (Hanley, 2010). A survey was administered at the end of the course as part of the standard evaluation process by the university where the research was conducted. Two questions included information from course content, which were relevant to the study, however, included other elements of curriculum design, which unfortunately did not isolate the lectures independently. Questions included examples such as “did the professor show enthusiasm for the material?” and “did the course lectures help you learn?” In addition, social validity data were collected through incidental opportunities including video-recorded discussion forums between students and graded by the instructor/researcher, and an additional survey administered with a focus on creating student connections in an online community.

Results

Findings of the study are reported in figures 1-4. In the control exam across both groups (control and experimental group), the high and low scores of the exam were the same (35 and 21), while there was only a slight drop in the overall average of grades from the control group to the experimental group of 29.6-28.5 (1.1 difference). These findings are reported in figure 1.

In the first experimental exam with the addition of the novel stimuli in the lectures (noted in figure 2), there is a significant difference between the control and experimental groups. The high scores remain at 35 across both groups, however, the low score increases from 16.8

(control group) to 21 (experimental group). The difference in scores close the range from 18.2 to 14. The average score across groups remained similar from the control test, with scores of 28.83 (control) and 27.41 (experimental), resulting in a decrease of 1.42.

In the second experimental exam (figure 3), there is stability like that seen in the control test, even though novel stimuli were used in this phase of the study. High scores were 35 across both groups, low scores were 21, however, average scores were closer in range. For the control group, the average score was 29.28 and for the experimental group, the average score was 29.14, resulting in a slight decrease of 0.14.

In the final experimental exam (figure 4), there is also stability, as high scores remained at 35 across both groups, with a consistent average low score of 19.6. Average scores in the control group were 28.09 and in the experimental group were 26.94, a decrease of 1.15. Scores and comparisons across the groups and throughout the experiment are depicted in table 1, with “C” representing the control group and control testing, “E” representing the experimental group, and each number representing each experimental test presented in the study.

The following tables depict results from the compiled data. In table 1, measures across each group in the study are depicted with the t score, degree of freedom, standard deviation, etc. In table 2, percentages across the groups in the study are depicted in a pass or fail format. Criteria for “pass” in the courses the students participated in involved achieving a score of 80% or higher, while “fail” involved a score of 79.99% or less.

Table 1

Results from graphical analyses across control and experimental group exam scores

Measure	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Test 1 (control)	34	28.341	4.1566	-1.610	80	.111
Test 1 (exp)	48	29.698	3.4531			
Test 2 (control)	33	27.41	4.925	-1.547	79	.126
Test 2 (exp)	48	28.93	3.942			
Test 3 (control)	32	29.138	4.1231	-.170	78	.866
Test 3 (exp)	48	29.283	3.5114			
Test 4 (control)	32	27.781	4.5415	-.313	75	.755
Test 4 (exp)	45	28.093	4.1402			

Table 2

Results from graphical analyses depicting pass (80% or higher) or fail scores for each test per group

Measure	Test 1		Test 2		Test 3		Test 4	
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
Cntl.	56%	44%	48%	52%	66%	34%	56%	44%
Exp.	77%	23%	71%	29%	69%	31%	62%	38%

Discussion

In formative design, it is important to consider new possibilities in a student’s environment to improve learning outcomes. This study’s intention was to find a new way to deliver necessary and difficult content in a manner that was conversational, concise, informative, but also in an engaging and interesting manner to increase motivation, thus engage with more quality with the important content. Since similar patterns of responding were depicted across the control test and all tests used in the experiment with no statistical significance, it isn’t likely that the intervention improved motivation or had an effect on test scores. With the addition of novel stimuli to asynchronous lectures in the first phase of the experiment, the low score for the exam increased over 4 points from the control group, the largest change in the study. While it was not possible to increase overall scores for these exams, as at least one student in each group was able to meet the high score at each administration of the exam, increasing the low score or average is ideal. Since this was the only exam in the experiment that had an increasing effect, based on the experiment and the previous findings in the literature it is difficult to determine what specific environmental variable could have had this impact. Since other studies have reported different stimulus control procedures can be effective (Chia-Hung et al., 2016; Fanguy et al., 2017; Skylar, 2009), it may be necessary

to continue to vary and randomize the modes of instructional delivery while embedding student preferences and considering effective structure of video lectures (Brame & Perez, 2016; Guo et al., 2014; Mayer, 2005; Mayer, 2008).

The increasing effect could potentially be linked to the novelty of the presented stimuli but is likely connected to learner preference. As reported in video discussion forums by some of the participants, some embraced a theme and adopted their version of the procedure, which they self-reported helped them to retain the unit material and increased engagement. Once participants were exposed to the themed lectures in exam two, some began wearing hats and discussing content in a thematic manner in their video discussion forums, demonstrating interest in the way the material was presented and possibly suggesting that motivation theory was briefly applicable (Keller, 1983). Imitation was seen following the first themed lecture, however, was not seen in the following two experimental exams. The lack of imitation in the last two exams could have been due to a satiation effect resulting from a large amount of material exposure or potential burnout. At the end of the semester, the voluntary social validity survey was distributed to participants, and all items from the course that asked about course content (e.g., the course material was presented in a way students could easily understand, and the instructor showing enthusiasm for the subject matter) were answered as “agree” or “strongly agree”.

While it was important to determine effective ways to increase learner engagement and interest through video lectures in the study, some limitations were evident. One limitation involves the lack of direct connection of the themed elements (costume pieces and themed statements through lectures) to the content delivered. While the statements used may have generally mentioned the material in a themed manner, there were no direct connections to the content and the costume pieces were used to draw attention. There is no guarantee, however, if students watched the lectures, regardless of the presentation or not. Additional limitations of the study include having different comparisons across groups, as different learners engaged in different behaviors across semesters. Some students may have been more engaged in the material naturally, students may have withdrawn from the course, had other life obligations that would impede their motivation to complete course tasks with better quality, etc. Having other activities present in the course as well serves as a limitation, although for the study, none of the activities across experimental semesters were changed to establish more experimental control and internal validity.

Future research could combine previous research considerations of preference and efficacy (Chia-Hung et al., 2016; Fanguy et al., 2017; Guo et al., 2014; Rambe & Bere, 2013) in a rotating model to see if novelty increases student engagement more consistently than using just one method of lecture delivery across several units. Rotational considerations could involve lectures using novel stimuli, such as those presented in the previous study, using digital drawing boards, shorter slides, and changing different views of the lecturer (floating headshot versus traditional lecture view in a classroom), incorporating preferences resulting from varied studies. It may be recommended to change methods frequently to avoid satiation effects, or students tiring of exposure to the same style of instruction and lecture. When considering that students generally prefer the synchronous format of instruction over asynchronous (Skyler, 2009), it is important to note that students will sometimes pick a program which may not match the format they prefer based on other extraneous variables, such as accessibility, time, availability, convenience, or other factors (Choe et al., 2019). If a student is limited to an asynchronous model based on their environment but would not be able to pursue an alternative program otherwise, it is important that student preferences and other effective strategies are considered so content engagement can increase (Brame, 2016; Guo et al., 2014; Mayer, 2005; Mayer 2008). While the study focused on asynchronous lectures, the method examined could be studied in synchronous models of instruction as well (Gayman et al., 2020). Future research would review these limitations and preference factors, continuing to develop novel approaches to create interest and maintain student engagement.

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Declarations

Competing Interests: The author declares no competing interests.

Figures

Figure 1

Results across control and experimental groups for test one, connected to lectures recorded with costume pieces

Figure 2

Results across control and experimental groups for test one, connected to lectures recorded with costume pieces

Figure 3

Results across control and experimental groups for test two, connected to lectures recorded with costume pieces

Figure 4

Results across control and experimental groups for test three, connected to lectures recorded with costume pieces