

Using Neuromarketing to Understand Motivation and Learning Performance in Online Learning

In recent years, higher education has experienced increased growth in online teaching. The various reasons for the expansion of online learning include improved accessibility, advances in communication technologies, an increased demand for “flexible” online or distant learning, and the need for institutions to remain competitive by offering students a variety of learning platforms. In addition, the recent Covid-19 pandemic forced institutions to suspend face-to-face teaching and to go online.

While online learning makes education available to the general public, the lack of effective monitoring of how students react mentally and emotionally to the presented material might jeopardize its success. Hence, the purpose of the research was to gain insight into students’ motivation, learning performance, engagement and preferences by applying neuromarketing techniques to measure neural and physiological signals, and consequently make the required changes to the teaching material, and to investigate what methods of neuromarketing can be used to improve students’ engagement.

Approach

We conducted neuromarketing research on a sample of 297 students at Oxford Business College, UK, to answer the question: How can neuromarketing enhance the motivation and learning performance of students in an online classroom?

This research question was approached from three different perspectives: the teacher (how many students follow the teacher), perceptual (following the teacher’s expressions) and conceptual (following the teacher’s discourse). Facial coding and eye-tracking were used to capture students/teacher co-attention, student motivation, student learning performance and student interest.

The research was conducted using the participant’s web camera and neuromarketing software “Tobii Sticky” to capture emotions, attention and motivation. Hence, access to a computer with an embedded web camera was a prerequisite. The study used two pre-recorded video lectures. The professors in the two videos were different to achieve compatibility with real life where students have several teachers per module. The videos were divided into two separate links for improved accuracy, to avoid poor quality calibration and prevent student fatigue and/or lower levels of responsiveness when watching the second video.

Students were sent a participation link to a video lecture based on the experimental group they were randomly assigned to. They were also given a set of images with instructions to ensure compliance with the technical requirements before starting the eye calibration.

In the 90-second video, the main goal was to evaluate students’ listening attention and elicited emotions during an online lecture where no visual material was presented (Figure 1). The main goal of the 10-minute online video lecture was to evaluate elicited emotions based on facial coding where visual material was presented and the lecturer’s camera was kept on in the upper right corner of the screen (Figure 2).

Results

In the 90-second online lecture, students were mostly focused on the teacher when looking and fixating on the lecture; however, their mouse-clicking behavior and the relatively small number of fixations and time spent looking at other areas of interest (AOIs) imply that their concentration levels dropped during the lecture, whereas visits to other AOIs were used to “restart” concentration. Students also showed an increase in aversiveness as the lecture progressed and higher intensities of neutral emotions and sadness (Figure 3). Such results may suggest that students

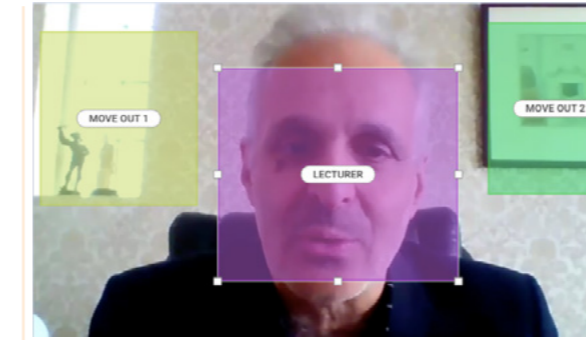


Figure 1: 90-second online video lecture and AOIs

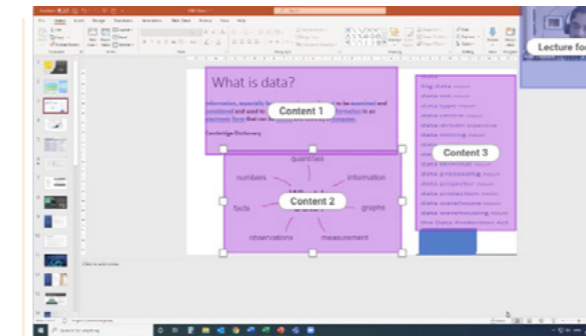


Figure 2: 10-minute online video lecture and AOIs

had difficulties focusing on the lecture because no accompanying visual material was presented in the video lecture.

Similarly, in the 10-minute online lecture, students mostly elicited neutral emotions and sadness (Figure 3). They also subconsciously produced higher intensities of unpleasantness; however, such intensity dropped with the change of visual material and/or when a student discussion activity was presented (Figure 4). Hence, the results could imply that during longer online lectures, students should be exposed to a greater number of slides or introduced to other didactic materials to improve their mood and enhance

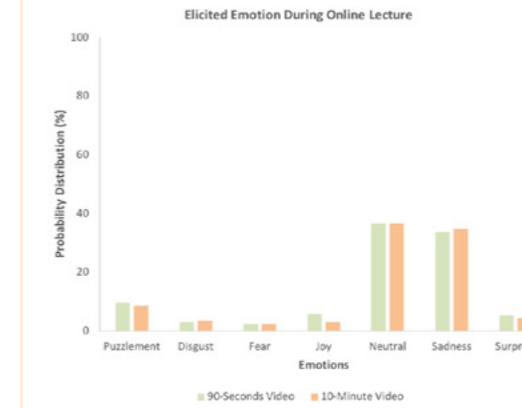


Figure 3: Elicited emotions during 90-second online video lecture and 10-minute online video lecture]

their learning performance. After all, recall and retention increase when information is presented using both auditory and visual channels.

Conclusions and Final Thoughts

A thorough examination of the behavioral and emotional condition throughout the lecture sheds a light on understanding how students acquire educational information during online lectures and helps with knowing the cause of their emotional detachment when participating in online learning. The findings of the study demonstrate how neuromarketing technology – facial expressions and eye-tracking - may be used to study the behavior and emotional engagement of students in an online learning environment. The resulting data should serve as a signpost to enhance online learning by engaging students more actively in real-time and increasing their motivation levels.



Figure 4: 10-minute online video lecture the mood during lecture

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CONTACT INFORMATION

Institute for Neuromarketing
www.neuromarketinginstitut.com
 Doc. Dr. Hedda Martina Šola
ravnatelj@neuromarketinginstitut.com