Preparatory Study:: *I Cannot See Students Focusing on My Presentation; Are They Following Me?* Continuous Monitoring of Student Engagement through "*Stungage*"

ANONYMOUS AUTHOR(S)

ACM Reference Format:
Anonymous Author(s). 2018. Preparatory Study:: *I Cannot See Students Focusing on My Presentation; Are They Following Me?* Continuous Monitoring of Student Engagement through "*Stungage*". 1, 1 (February 2018), 4 pages. https://doi.org/10.1145/1122445.1122456

1 PREPARATORY STUDY

This section describes a preparatory survey for guiding us on the current picture of the online teaching systems as well as the pros and cons of the present setup. The detail follows.

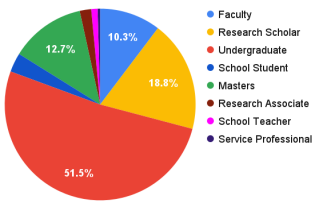
1.1 Method

For establishing the requirement of detection of student engagement during online teaching, we have conducted an online anonymous survey[1] of 466 teachers and students from different locations across the globe including India, United States, United Kingdom, Germany, Brazil, Switzerland, Greece, Indonesia, Pakistan, Iran, and Qatar have participated in this survey. The participants are from different designations including undergrad students (51.5%), masters students (12.7%), research scholar (18.8%), faculty (10.3%), and so on. The student details are shown in Figure 1a. The majority of the participants (81.5%) consider English as the professionally primary language.

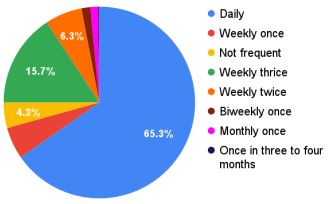
The survey aims to understand the current practices of online teaching. The questionnaire contains altogether 12 questions in two sections – (i) online teaching mode related 8 questions and (ii) presentation based teaching-related 4 questions. In the online teaching mode questionnaire section, we first ask the participants to report the frequency of attending the online class for understanding the class experience (**class attending habit**). We also ask them to give a comparison between the physical classroom and online teaching to figure out the difficulties that they are facing (**problem faced during attending online class**). For finding out the preferred online teaching mode, we provide a list of predefined teaching modes and ask the participants to rank them according to their preference (**preferred online teaching mode**). The different teaching modes such as presentation slide based with and without instructor view, board writing based with and without instructor view, and only instructor view are chosen from the online available MOOC videos. To know the acceptability of capturing the video during the lecture time, we ask the participants to rank different video streaming possibilities such as video feed direct share to all; video feed captured locally, and shared either the locally or the cloud processed information to all in either continuous or discrete intervals; and no video

[1] https://lnkd.in/e3T9F_d

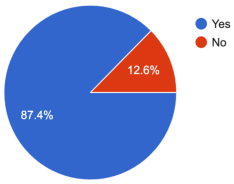
Manuscript submitted to ACM



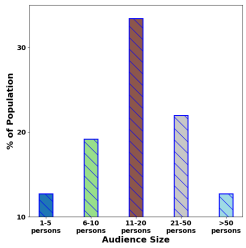
(a) Designation



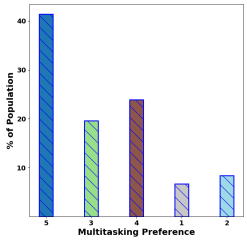
(b) Attending Class



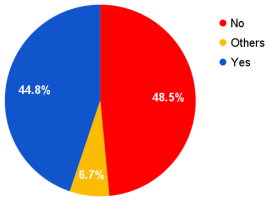
(c) The online class loses the charm of the physical classroom



(d) Audience size effect on video sharing



(e) Multitasking Preferences over the scale of 1 to 5



(f) Multiple object tracking in a slide

Fig. 1. Outcome of preparatory study

sharing at all (**acceptability of video sharing**). In addition to this, we also ask to determine the likeliness of switching on the camera in presence of different sizes of the audience. To understand the attendees' behaviour, the participants are questioned to rate the possibilities of multitasking during the lecture session (**expected attendee behaviour**). They are further asked to rate the likelihood of following simultaneously multiple objects. Finally, to identify the preferred presentation content style during the online lecture, we show the presentation template containing different content types such as animation, image, plain text, audio, and highlighted text, and ask them to rate the contents in the presentation-based teaching questionnaire section (**preferred presentation style**). We also ask to prioritize the contents in the presentation in terms of giving focus on the screen.

1.2 Observations

We analyze the quantitative survey data using descriptive statistics to compare the observations among the different groups. The responses from the open-ended questions are coded by the author using thematic analysis techniques for getting the insight. The majority of the participants (65.3%) attended online classes daily. Figure 1b shows the details of the attending online class statistics. This suggests that our studied population has experience in the online teaching system. Following are the observations from the survey.

1.2.1 Does online teaching lose the charm of the physical classroom? The majority of our studied population (87.4%) admit that the online class loses the charm of the physical classroom (Figure 1c). In an optional open-ended question that compared the online teaching with the physical classroom, the participants highlighted seven major missing components in the online teaching scenario. (1) The classroom environment is missing. (2) The involvement of the student is difficult to understand. (3) The classroom view with the full of the students is missing in the online classroom. (4) The students' interaction is missing. (5) Proper teacher-student interaction is missing. Therefore, if there is a lag

between the teacher's lecture and the students' understanding, that is undetected. (6) Competition among the students during responding question-answer is missing. (7) Teachers' gestures for demonstrating the physical properties and showing practical examples are restricted in the online teaching system. *The highlighted limitations state that there is a scope to work in this system.*

1.2.2 Does the teaching mode impact the teaching? One of the major missing components in online teaching is the absence of a classroom environment. While asking, we find that in the top 2 preference, the 76.0% of the participants prefer *Broad writing with instructor view* as an online teaching mode whereas 61.1% of the participants select *Presentation slide mode with instructor view*. Capturing instructor's board writing demands proper data capturing tool. In most cases, that infrastructure setup is absent. Therefore, *studying the preference of the second majority of the participants is a good option.*

1.2.3 Does privacy violate online teaching? We ask the participants about their comfort in front of the camera during the online teaching session. We find that in the top 2 preference, the majority of the participants (60.5%) support the video sharing to all whereas 30.1% of the participants completely disagree to share the video. In addition to this, 44.9%, 35.6%, and 50.7% of the participants' top 2 selection includes video extracted information sharing with varying video processing locations – continuous local processing, discrete interval local processing, cloud processing, respectively. Although the participants prefer video sharing to all, a deeper question (Figure 1d) reveals that the participants (65.6%) are comfortable sharing their videos when the audience size is small (within 20). Therefore, the result confirms that *irrespective of audience size, video extracted information sharing is preferable over either video sharing to all or not sharing at all, and video extracted information sharing is one of the most promising ways to pass on the audience information without violating the privacy.*

1.2.4 Does the continuous monitoring help in the student involvement detection? We further inquire on the chances of involvement of the other activities during the online teaching session. 65.3% of the participants strongly believe that multitasking is a common tendency during the online session (Figure 1e). On the other side, the majority of the participants are comfortable focusing on a single object while looking at the screen (Figure 1f). Both support that the continuous tracking of attention will not provide the actual student involvement in the class. Hence, the requirement of introducing the opportunistic event concept is established. This also supports *the discrete interval local processing of video extracted information-sharing schemes.*

1.2.5 Does the presentation content impact online learning? Finally, in our next set of questions, we mainly concentrate on the presentation content. While focusing on the screen, the majority of the participants (27.5%) highly prioritize the animations over the other objects like graphics, flowcharts, general image, video, plain text, highlighted text, and pointer movement. The plain text gets the lowest priority. For selecting the presentation content, we showcase four videos containing slides individually with images, animation, plain text, audio, and highlighted text. The ranking result discloses that animation is always the topmost preferable content followed by an image, highlighted text, audio, and plain text. The result suggests that *animation, image, highlighted text content are the possible candidate opportunistic points.*

1.3 Lessons Learnt

Our findings from the preparatory study point out the shortcomings of the current online teaching system and open up with a few ideas. (1) Due to improper instructor-student interaction and the absence of full classroom view in the

online class, understanding the students' learning space is a concern. Thus, student engagement detection in the online platform is a noticeable problem to work. (2) Presentation slide-based teaching is one of the popular teaching modes in the virtual classroom, where the animation, image, and highlighted text are the preferable presentation content. Thereby, the attentive students fixate on those contents. (3) The video extracted information sharing is preferable to direct video stream sharing. This demands to populate the student's dynamics during the class in a concise way so that the dynamics are easily shared with the instructor. Moreover, it is found that the attentive student prefers to fixate on the slide content. Therefore, gaze projection plays an important role in populating the student's dynamics. (4) Continuous monitoring of the student results in low attention when the attentive student is simultaneously taking notes while attending the lecture. Thereby, a movement from continuous to discrete computation is needed. This discrete computation involves the opportunistic events where the student fixates on the presentation. We process these ideas in the next to develop our student engagement detection system.