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A Review on Google Glass Feedback Using Augmented Lectures Feedback System

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***Abstract*—The use of Augmented Reality to aid learning has been extensively researched, but its use to aid teaching practise has only recently begin to be investigated. We describe a communication system that uses a pair of Google Glass to provide a constant and confidential flow of information about the students' current knowledge to the teacher in this study. The suggested approach allows students' information to overlap with the teachers' live vision of the class via their mobile phones. Unlike previous feedback systems such as clickers or backchannel systems, this AR prototype does not require teachers to divert their sight or interrupt the class in order to get the students' feedback. This allows for continuous monitoring of any comprehension issues that might otherwise go unnoticed. We conducted two experiments in which the system was deployed in real classroom settings in order to gain insight into the teachers' and students' perspectives on the system. Both research' findings imply that the AR system could provide benefits in terms of improved communication between students and professors, as well as a more appropriate class rhythm. Furthermore, the usage of the AR system in the classroom does not always imply that it will distract and disturb instructional activities.**

Keywords*— *ALF Technology, AR Technology, Google Lens, S Augmented Reality; Computer-mediated communication

I. INTRODUCTION

Assuming that educational experiences can be improved by augmenting the physical environment with digital information in a variety of ways, Augmented Reality (AR) is envisaged as a potential valuable resource in teaching and learning. The majority of current research focuses on examples of AR being used to support certain learning processes as well as AR's unique learning affordances, such as its ability to study in realistic situations and enable kinaesthetic learning or face-to-face communication in collaborative learning. In this study, we look at the opposite side of the coin: using augmented reality to supplement the teacher's view during a lecture. In the classroom, feedback devices such as clickers and backchannels are utilised to improve and speed up communication between students and teachers. In this study, we propose using augmented reality (AR) technology, notably AR glasses, to overcome some of the limitations of current feedback systems. This type of device can be used to supplement the teacher's view by superimposing the student responses as symbols or graphs on top of the teacher's view. This magnified perspective allows teachers to see the input they've gotten from their pupils without having to look at a computer or smartphone screen.

This could be especially effective for backchannels, because the information students send at any moment during an explanation is available to the teacher right away, making it more impossible to overlook. Furthermore, AR technology allows teachers to get feedback confidentially, as opposed to other systems' implementations that publicly display responses on the classroom projection screen, potentially influencing students' reactions and facilitating misuse situations.

II. PROPOSED METHODOLOGY

Augmented reality (AR) is an interactive experience of a real-world environment in which real-world items are supplemented with computer-generated perceptual information, sometimes spanning many sensory modalities such as visual, aural, haptic, somatosensory, and olfactory.

The introduction of augmented reality (AR) technology might strengthen the feedback loop between students and professors. Students' fear of embarrassing themselves in front of their classmates might stymie bidirectional dialogue between instructor and learners. To address this issue, a method is presented in which teachers get quick and confidential feedback that is both customised for each student and aggregated for the entire class. With that purpose, the teacher, who is equipped with a head-mounted AR display, can visualise symbols that represent the status of the students using private devices in relation to the lecture content. In

order to explore the possibilities of this approach, an experience was conducted in a lecture on a university course. Augmented reality is the process of superimposing visual, audio, or other sensory information onto the actual environment in order to improve one's experience. Retailers and other businesses may utilise augmented reality to advertise their products or services, develop new marketing initiatives, and gather unique user data.

Fig 1: AR Technology

A. ALF SYSTEM

The ALF Glass system extends the prior ALF system's functionality to Google Glass. This device's ergonomic design allows it to be used in a classroom setting. However, unlike other AR glasses that augment a large portion of the user's field of vision, the Google Glass only augments the upper right corner of the user's vision. Because of this constraint, the latest version of the ALF system summarizes the data acquired from pupils in the form of diagrams rather than displaying it separately. This data could correspond to feedback regarding students' degree of knowledge of the teacher's explanations, as well as answers to the teacher's questions, as in prior versions of the system. The system is composed of three modules: ALF Mobile, for collecting the students' feedback and responses, ALF-G Teacher, for visualizing the information in the glasses and controlling the system, and ALF-G Server, which man-ages the communication between the different devices and stores the feedback in a database.

Fig 2: ALF System

The Fig.2 depicts a screenshot of the ALF-G Mobile app. This module was implemented as a Web application so that it can be used without installing any software in the students' cell phones. As shown in the picture, the app is composed of one single page divided into two areas. The uppermost area allows students to select their level of comprehension on the current explanation. Students can indicate whether they are lost (red cross symbol), whether they understand the explanation (green check symbol) or whether they have questions to ask (question mark symbol). The activation of this last symbol would indicate to the teacher that she should stop at some point to deal with the questions the students might have.

III. RESULT

In this section, we describe and present the results of the research carried out with the aim of investigating the perceived benefits and weaknesses of the system. More specifically, considering the research focused on three specific potential benefits: improvement of the communication of students' difficulties; improvement of the adaptation of the pace of the class; and, improvement of students' engagement. Concerning potential drawbacks, two aspects were analysed: the capability of the technology to distract students and to disrupt the teacher's activity.

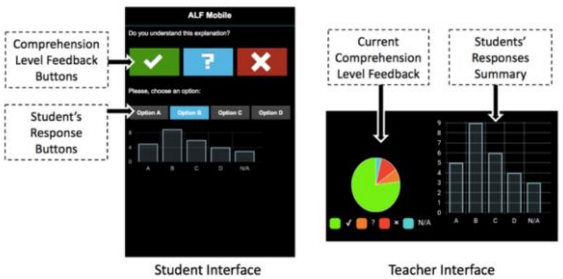

Fig 3 : ALF_G Mobile app

The lowermost area is only displayed upon the activation on the teacher‘s side. The information collected from the students is stored in the ALF-G database. This module also generates and updates two data charts, a feedback chart and a responses chart that are displayed in the teacher’s Google Glass. The feedback chart is a pie chart permanently displayed on the glasses that summarizes the students’ status. The responses chart is only displayed when the teacher activates a question swiping backward (yes or no question) or forward (multiple choice question) on the touch located on the side of the glasses. Tapping on the touchpad makes the responses chart disappear again and resets the feedback chart.

Fig 4 : Teacher’s View

In the Fig. 4 depicts the teacher’s view of the class through the glasses. Faculty can view whether they are lost (red cross symbol), whether they understand the explanation (green check symbol) or whether they have questions to ask (question mark symbol). The activation of this last symbol would indicate to the teacher that she should stop at some point to deal with the questions the students might have.

IV. LIMITATIONS

There are some limitations to the studies presented here that should be addressed. To begin, it is important to note that the two studies are concerned with the opinions of participants, whether they are students or teachers. We believe that this is the best way to evaluate subjective perceptions such as the adequacy of the class's rhythm or the willingness to participate. In any case, collecting and comparing the number of student interventions with and without the system may help to confirm some of the presented conclusions. In addition, the difficulty of controlling the wide range of variables that can influence the results of experiments conducted in a classroom setting should be acknowledged. For example, the perception of the class's rhythm may have been influenced by the section of the course in which the system was used, as by the end of it, the students may have grown accustomed to the subject difficulty and the teacher's personality. In any case, it is important to note that the results obtained in both studies are consistent, and even the students' perceptions confirm the opinions gathered from teachers in the first study, who all agreed that the system was beneficial for improving communication and class adaptation.

Furthermore, the opinions gathered in the first study correspond to teachers who used the system in a single class, so incorporating the system into a full course may yield different results. In addition, the participants in the second study, who were engineering students, could have influenced their positive attitude toward that system. In any case, the results are encouraging, and they suggest that augmented reality (AR) could improve current classroom communication system implementations by providing a more seamless way of delivering student feedback to the teacher.

V. DISCUSSION

The attendance Managing extension is designed for instructors who have had to make a quick shift to online classrooms and want a simple solution to take attendance during a Google Meet. You may provide a list of expected invitees when you begin your Meet, and the extension will automatically detect who joined the call and how long they lasted. Multiple class lists can be saved.

The addon keeps track of which students attended, when they came, and how long they remained, all of which is shown in a neat HTML report. The most recent version release includes a completely new user interface for managing student information, including the option to include student-specific comments in reports, as well as a much more flexible and extensible architecture for future developments.

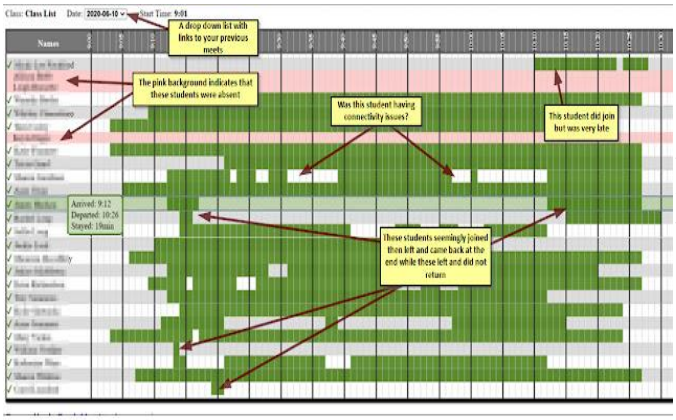

Fig 5: Attendance Tracking

The following information will be included in the attendance report:

1. When does attendance tracking begin?
2. Attendance tracking comes to an end at a certain point.
3. The total number of people that attended the meeting
4. Total class time

In the attendance graph, for example, there is a green horizontal bar in front of the attendee's name, followed by a massive white horizontal bar, indicating that the attendee has departed the meeting after attending for a time.

The highlighted areas in the accompanying figure are highlighted in yellow.

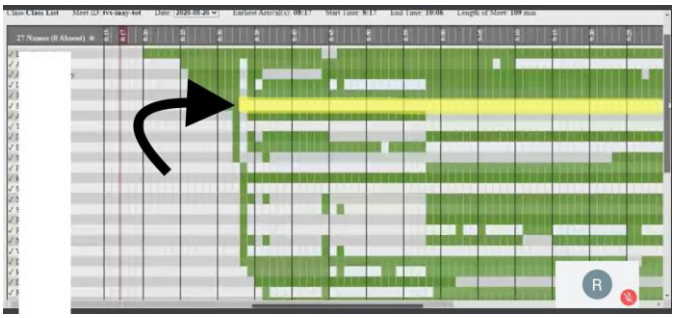

Fig 6: Student absent during the Session

VI. CONCLUSION

We have presented a novel configuration of a communication system for the classroom that makes use of AR technology. As opposed to other backchannels and ARS systems that require the teacher to periodically check the responses of the students on a computer screen or to publicly display in them on the classroom display, the ALF-G system makes it possible to visualize the feedback overlapping digital information to the teacher's view of the classroom. This provides a constant and private flow of information on the students' level of comprehension of the explanations which would be difficult to achieve by other means. The results of the study suggest that this could report benefits in terms of better communication between students and teachers and a more adequate rhythm of the class. Also, that the use of the system in the classroom does not necessarily constitute a distraction from or and disruption of educational activity.

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