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Communicative Learning for Activity with Students Aided by Augmented Reality within a Real Time Group HCI

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Abstract

Communicative learning progress in industry and educational areas must gain more focus and stronger commitment otherwise innovations efforts by new technologies and recent researches will not produce wide and enough results. In time will create gaps in quality and efficiency due to lack of ideas assimilation, matter that we have noticed. Therefore, we need to discourse that is important to explore about the platform that serves as a communication medium between professor and students, or instructor and participants. The project objective is to implement a Human-Computer Interaction (HCI) group activity where is to be crucial to display the key program contents of the course through Twitter. The inputs of the tool are goals and targets related to the task of the course schedule for a session. The messages are used by the students in the classroom to execute related activities. These communications are deployed with the basic schoolroom equipment (projector, speakers, laptops, Wi-Fi). A case with new .EXE code is developed containing the main commands and objective of the activity aided by Augmented Reality (AR). This paper alludes to some of the architectures of data structures, communication layers, and configuration of the system.

Keywords: Communicative learning; Augmented Reality (AR); Human-Computer Interaction (HCI); visualization.

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1. Introduction

Some comprehensive designs for Augmented Reality (AR) like the Oceanus application outline the technologies used in implementing a project. It serves as a communication medium where Neira et al.¹ describe the architecture of the data structures, communication layers, and configuration of the system and explain the interactions between the end users of their application, the external and internal interactions between the application and the system, and administration users managing the system mentioned by Barrera et al.².

It is convenient to establish a nomenclature to agilely manage various terms and concepts.

Nomenclature

AR	Augmented Reality
HCI	Human-Computer Interaction
.EXE	executable code
LED	light emission device
Unity	animation multiplatform motor from Unity Technologies available for MS Windows

It is important to see about a platform which serves as a communication medium between professor and students. This paper alludes to some of the architectures of the data structures, communication layers, and configuration of the system. It describes the interactions between the end users of the application, the external and internal interactions between the application and the system, and administration users managing the system Barrera et al.²

2. Operation

The Twitter Archive web application is used to the purpose of searching, filtering and archiving tweets for later retrieval by a consumer application for displaying. An administrative user will be able to log into the system, set up “feeds” consisting of twitter searches, and then monitor results for those feeds. The user selects what tweets are filtered and therefore approved, and those tweets are archived to a SQL Server database for later retrieval by the consumer application. A diagram is proposed to illustrate the operation is exhibited in Figure 1.

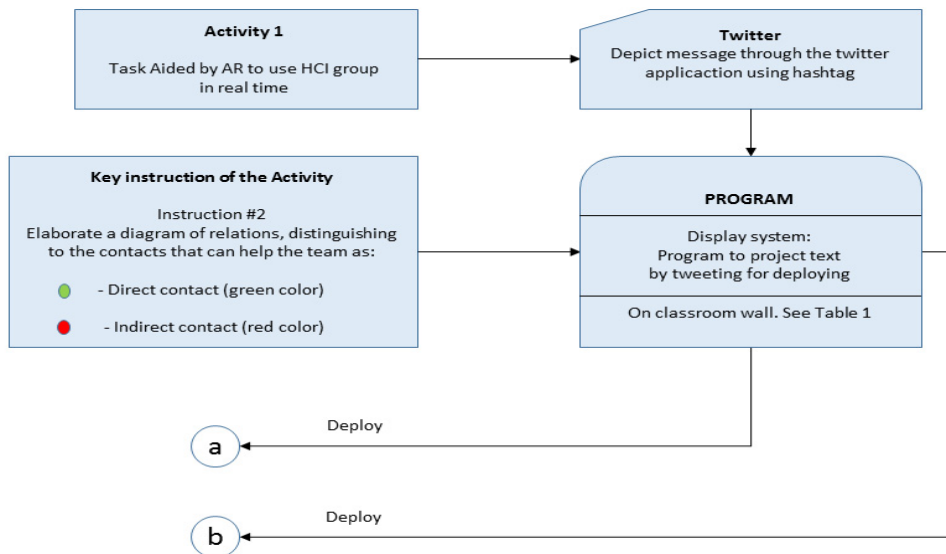


Figure 1. Diagram of the operation for a communicative learning for the Activity 1 of a course.

Note: a = main objective of the Activity; b = key instruction.

Source: DPIN, Programa de Innovación y Emprendimiento en Ingeniería. EITI, Tecnológico de Monterrey 2015

In this case, there is (a) a main objective consisting in generating consciousness about problems, necessities and opportunities (see table 3, row 4) of the society and remarking the use of social networks, and the (b) main instruction is to elaborate a diagram of relations (conceptual map) for the contacts that can help the team.

These (a) and (b) items are to change respect to Activities 2, 3, 4, 5 and 6 of the academic program course but follow the same pattern.

A practice of sending tweets to the led screen is outlined and exhibited. In Table 1 a proposed process is exposed designating steps, servers and subhead.

Table 1. Process of sending tweets to the led screen

Steps	Servers (<i>t</i>)	Subhead (<i>t</i>)
Hashtags and Keywords: the selection on the current topics are sent to the server are located thught a code number thar refers to the images in AR. As soon as we locate the number the image will be display.	Audience is registered through the internet and smart phones and send tweets through the tags and keywords associated with the search. Students in the classroom send tweets to relate to the topic through hashtags and then filter the most common selected by the students.	Images are shown on the screen in the appearance of the AR painting style. The four categories become whirlpools of hash tags from Twitter followers.
Filer profanity (Filters)	Search for inappropriate expressions primarily by using a program then use human volunteers as a secondary filter.	
Select tweets	Once tweets pass the filter those approved will be chosen at random to be displayed.	
Express tweets	Tweets are expressed in the selected LED area.	Many images appears and write tweets in the ink painting style in screen area.

This process can be show at the beginning of session 1, using the figure 2 for representing the preview introduction to the group.








Figure 2. Diagram of Communicative Learning

The communicative display process has 5 major parts: Database connection, Opening Topic, Displaying Topics and Messages from the Database/Archive, Filter the received message, Display Images and Closing Scene.

Making an effort to order ideas, a data arrangement that includes the cognitive (learning) elements of a typical session is presented in Table 2.

Table 2. Learning elements of an activity with students in a HCI group

Elements	Image	Teacher note
Previous knowledge (before taking a class)		Student read before
Required material (to carry to class)		See next required material
Instruction (mandatory)		See activity
Main Objective (s)		Target
Homework		According to Activity outlines.

This understanding serves for obtaining guidelines to lead students to targets, materials, key instructions and task requirements to go ahead for getting an associated knowledge.

3. Results and discussion

Herein we present a disclaimer note due to albeit it is possible to realize a pilot course or a sample planning to introduce the concept of this work to a group, we do not make this action yet in this first paper but when we develop a continued article of this work in progress. It is convenient to consider not only measurements of learning times (that reveal efficiency) but also number of errors (which reflects quality).

As we shown on Figure 2, Faculty can use a large number of topics that users can select and participate in the classroom. This number of topics depends on the interest of each user (according to the learning element Table 2). It is important to identify the common interest of students by these subjects. Thought the use of the software that was created we can tweet messages from the classroom to a main server; here we will have a repository. Here the system will filter the most common numbers and shown according to the numbers the figures and images on the LED in AR display.

The Activity 1 (and so on respect to Activities 2, 3, 4, 5 and 6 of the course with students we are working on) was aided by AR and then we prepared the correspondent scene with its content.

It was not necessary to develop a smart phone application since any phone with access to twitter worked. Since the Twitter feed anytime, the content was continually updated and was not grow stale. The final output was fully functioning Unity scenes for each experience and design documentation, as well as music for experiences.

The outcome interactions that are displayed generate a unique end user experience engaging the audience toward the depth core of the topic.

This project is a one year, 4 quarter project developing interactive experiences for the classroom group. One of the main advantages of this concept is to increase the effective transmission of the learning activity propose using a combination of AR technology and HCI. See Figure 3.








Figure 3. Project work flow

It is expected to get a better group interaction among the participants because they achieve a funny environment by fostering that the instructor can appreciate the reaction of the student in a more rapid way to respond to corresponding necessities of learning.

An interesting outcome is produced when the contents of Activity 1 are exemplified. Consequently it is appropriate to derive Table 3 by putting in the 3rd. column of a new Table with the same first two columns, the particular cognitive (learning) elements of Activity 1.

Table 3. Learning elements for the Activity 1 in the pilot course with students in a HCI group

Elements in general	Image	Element in Activity 1
Previous knowledge (before taking a class)		None
Required material (to carry to class)		<u>Cardboards</u> (next session)
Instruction (mandatory)		Select one of five actual generated problems or necessities justifying by saying why this situation is a trouble including related information and draw a <u>conceptual map</u> of the contacts of the team which can give help to the group
Main Objective (s)		Make consciousness about necessities as opportunity areas of the social problems
Homework		Elaborate an investigation about planning of a project including: 1. Introduction, 2. Description and development, 3. One example of <u>Graph of Gant</u> , 4. Conclusions, 5. References

Besides five images in Table 3, among particular elements in guidelines (in case of Activity 1) such as social problems, cardboards, conceptual map and The Graph of Gant are items that can be modeled and texturized to construct AR contents for arrange the animation scenes in order to illustrate a better way of reaching know-how for making activities and homework, according to Castro³ and Rios et al.⁴.

It is expected to achieve productivity and quality at the same time as a benefit by undertaking an activity aided by AR technology.

4. Conclusions

It was not necessary to develop a smart phone application since any phone with access to twitter worked. Since the Twitter feed anytime, the content was continually updated and was not grow stale. The final output was fully functioning Unity scenes for each experience and design documentation, as well as music for both experiences.

Among jobs of Human-Computer Interaction (HCI), it has seen that respect to one of those is possible to admit as a communicative learning for an activity with students aided by Augmented Reality within a real time group HCI.

It is possible to realize a pilot course or a sample planning to introduce the concept of this work to a group. And it is recommendable to measure the new learning times for comparing with those elapsed by traditional method. Also it is convenient to estimate de new error number (which reflects quality) to compare with the errors generated using traditional method.

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