

# Using Internet of Things to Support Teachers to Enhance Social and Classroom Interactions

Elena de la Guía, Vicente López, Teresa Olivares, Luis Orozco

Albacete Research Institute of Informatics (I3A), Spain

{mariaelena.guia, vicente.lopez, teresa.olivares, luis.orozco}@uclm.es

## ABSTRACT

In previous works we developed an educational system based on Internet of Things and designed to improve the motivation, collaboration and learning in primary school [2]. The system is composed of three main components: *The main screen (multimodal user interface)* shows the educational task, activity, feedback, results, etc; the unobtrusive *wearable devices* are worn on the wrist; and the *smart objects*, that is, educational common objects that integrate NFC sensors. In order to interact with the system, the students must look for the right educational smart object around the classroom and bring it closer to the wearable device. The interaction sends the multi-sensory results through main screen and wearable device [1][2][3]. However, for teachers is a challenge to maintain the classroom control. In order to improve the use of the system, we have included new functions and data accessible to teachers through a web application. The data collected in each class enables teachers to derive deeper insights from their classroom. The teacher through a multi-platform application (smartphone, tablet, laptops, etc.) can interact in real-time with the system and the students. Depending on student's behavior, teacher can send real-time messages to maintain the control, increase the participation and motivation, and encourage the collaboration between students. The system has been tested and the preliminary results are very positive. 100% of the students obeyed and reacted from positive way to the real-time messages.

## CCS Concepts

Human-centered computing → Human computer interaction (HCI) → Interaction techniques

## Keywords

HCI, Internet of Things, Wearables, NFC technology, Education

## ACM Reference format:

E. de la Guía, V. López, T. Olivares, L. Orozco. 2018. Using Internet of Things to Support Teachers to Enhance Social and Classroom interactions. In ACM womENCourage 2018. October 3-5, Belgrade, Serbia, 1 page

## 1 IOT TO SUPPORT TEACHERS

The interaction through smart objects and wearable devices have a great potential to support learning due to hands-on engagement, enabling the collaboration and role to be played by each student. They also eliminate technological barriers making even possible the integration of children with special needs in the classroom [1][2][3]. However, using the system is a challenge for the teachers. Sometimes the teacher does not know the use of the technology, loses control of the class and attention of the students.

In order to improve the use of the system, we have included new functions and data accessible to teachers through a web application. The teacher through a multi-platform application (smartphone, tablet, laptops, etc.) can interact with the system and the students.

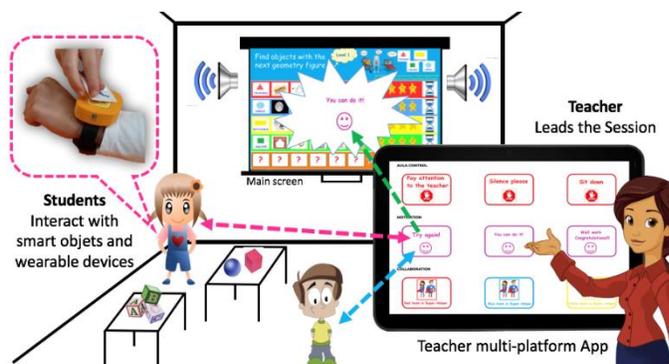


Figure 1 Educational system based on Internet of Things

There are three types of messages: *Classroom control*: in order to control the class, the teacher can send messages to the main screen or wearable devices such as: 'Pay attention to the teacher', 'Sit down', and so on. These are displayed on the screen visually and are accompanied by loud sounds and strong vibration (wearable devices). *Increasing the student's participation*: in order to increase participation and motivation teacher can select motivational messages with a pleasant sound. *Increasing the student's collaboration*: in order to increase collaboration teachers there are messages encouraging them to help other classmates.

## 2 RESULTS AND CONCLUSIONS

A preliminary study was conducted to test the student's and teachers' perception and reaction using the functions for teachers. 40 students of 9-12 years of age participated in this study and 5 teachers. This study took place in two classrooms from a Spanish school. The results have been very positive. 100% of the students responded positively to the multi-sensory messages sent by the teacher. The motivational ones were perceived in a positive way and at the same time they participated more actively. When the teacher selected the control messages, 100% of the students obeyed the instruction "pay attention to the teacher, silence please. The messages of collaboration were accepted in such a way that the students helped their classmates. Our user studies have shown that the system enhances teachers' capabilities. From our evaluation interviews, we have analyzed that the system is easy-to-use and support to the teachers in the classroom.

## REFERENCES

- [1] Guía, E., Lozano, M. D., & Penichet, V. M. (2015). Educational games based on distributed and tangible user interfaces to stimulate cognitive abilities in children with ADHD. *British Journal of Educational Technology*, 46(3), 664-678.
- [2] de la Guía, E., Camacho, V. L., Orozco-Barbosa, L., Luján, V. M. B., Penichet, V. M., & Pérez, M. L. (2016). Introducing IoT and wearable technologies into task-based language learning for young children. *IEEE Transactions on Learning Technologies*, 9(4), 366-378.
- [3] Guía, E., Lozano, M. D., Penichet, V. M., V. López, L. Orozco-Barbosa, Camacho, V. L., Orozco-Barbosa, L., & Luján, V. M. B. "Digitalizing Real Environments to Improve Learning" In ACM Celebration of Women in Computing womENCourage 2016. Linz, Austria on September 12th to 13th.