Smart classroom content delivery for pervasive devices using context awareness and Wi-Fi networks

Submitted to

Research Conference organized by University of Sunderland, UK and INtel College, Nairobi.

On 6th November 2015

Presenters

Kevin Gogo
Chuka University
kotieno@chuka.ac.ke

Dr. Elisha Opiyo
University of Nairobi
opiyo@uonbi.ac.ke

Contents

- Introduction
- Problem statement
- Broad objective
- Methodology
- Expected outcomes
- References

Introduction

- There is big educational data that is being generated and stored
- The education data is stored in educational databases
- Few mechanisms are in place to select relevant educational data
- Learners are overwhelmed with big educational data selection, hence time consuming
- This research proposes a mechanism for selecting relevant educational data for learners
- Linking the relevant educational data to pervasive devices

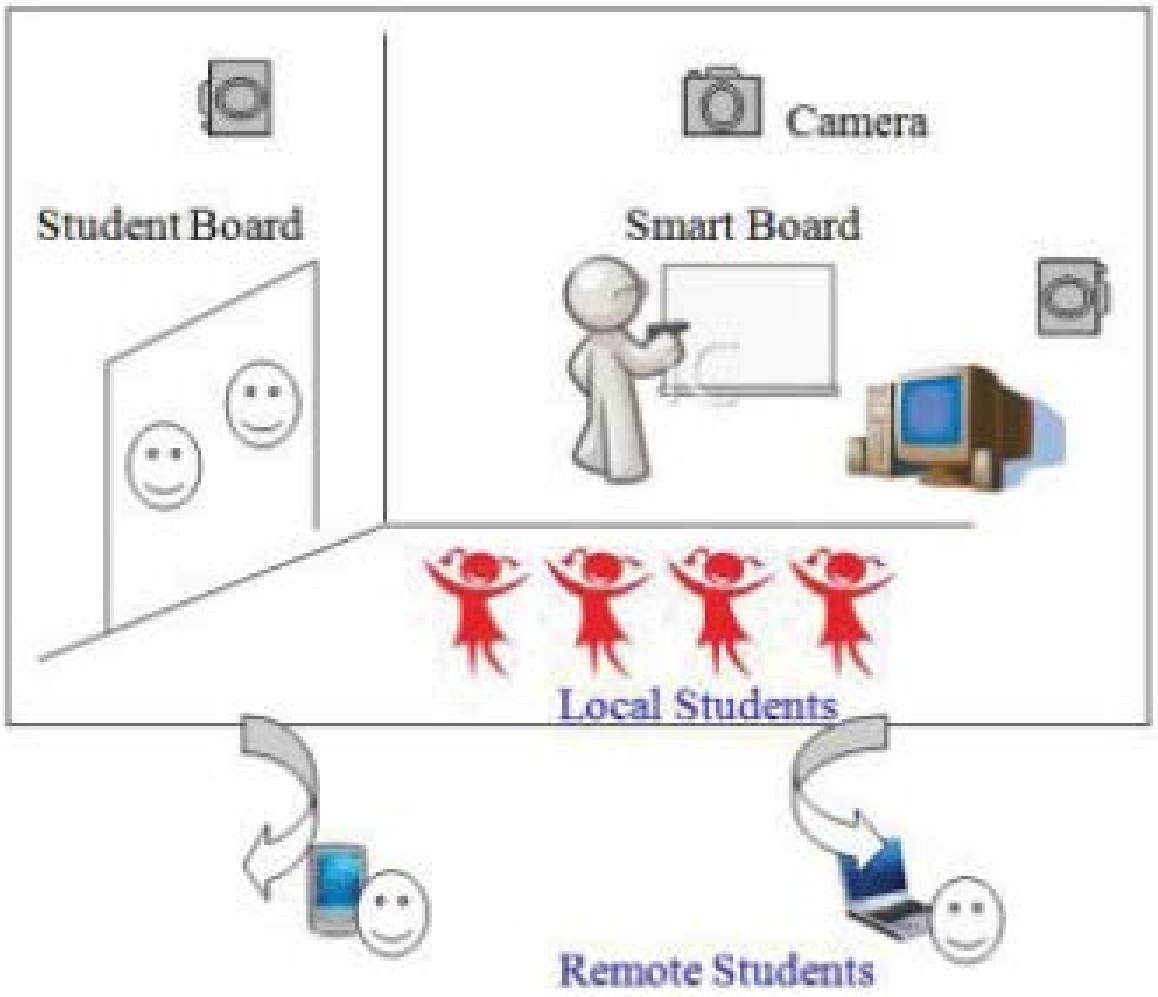
Problem statement

- Students manually search for relevant data which is time consuming
- Educational data is not readily and automatically available for pervasive devices
- Automatic location of student device with regard to the closest classroom

Broad objective

- To develop a smart classroom content delivery for pervasive devices platform, through which learners could access and share relevant education data with regard to their profession using their pervasive devices

Smart Classroom Model Scenario - 1



Smart Classroom Model Scenario - 2

Methodology

- **Collect, digitize, code, and store educational data**

Education data digitizing and coding

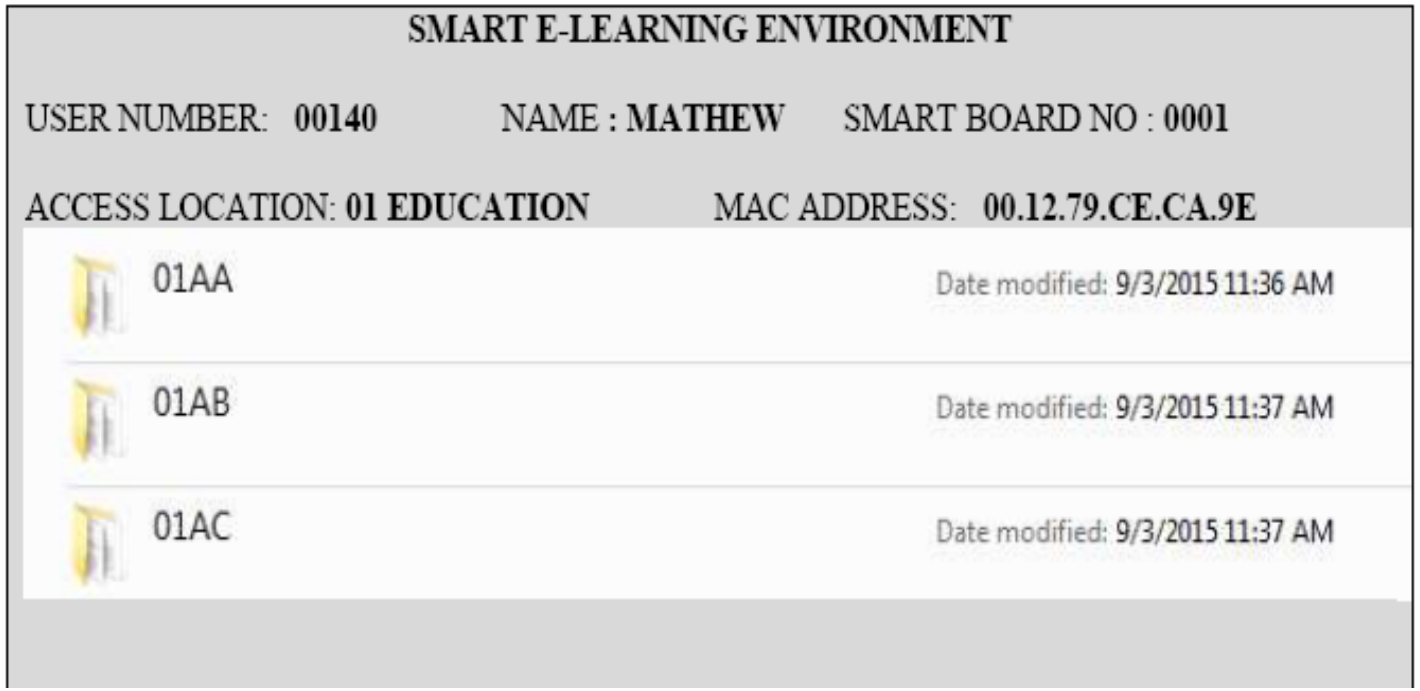
Subject	**code**
Education	***01***
◦ Early childhood	01AA
◦ Adult learning	01AB
◦ Child psychology	01AC etc
Computer science	***02***
◦ Networking	02AA
◦ Artificial intelligence	02AB

System design and implementation

Context awareness and Wi-Fi design

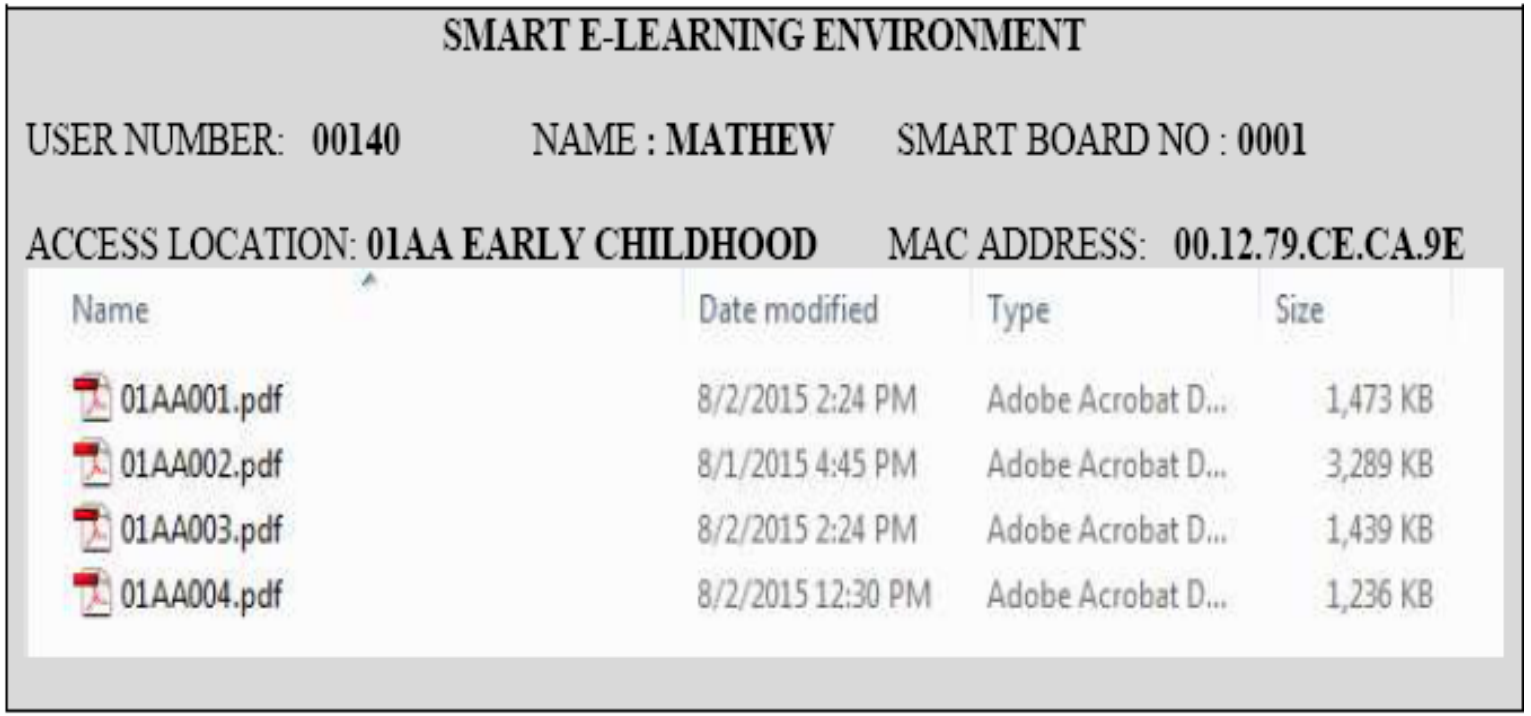
- We developed a Wi-Fi network around each of the e-learning centres
- The Wi-Fi was expected to collect the MAC address of the pervasive devices, and relay to smart boards
- Context awareness RFID were used to collect location of the pervasive devices
- The smart board linked to the server on fast network and automatically linked pervasive devices to server smartly
- Server stored educational data

Expected Output (access step -2)



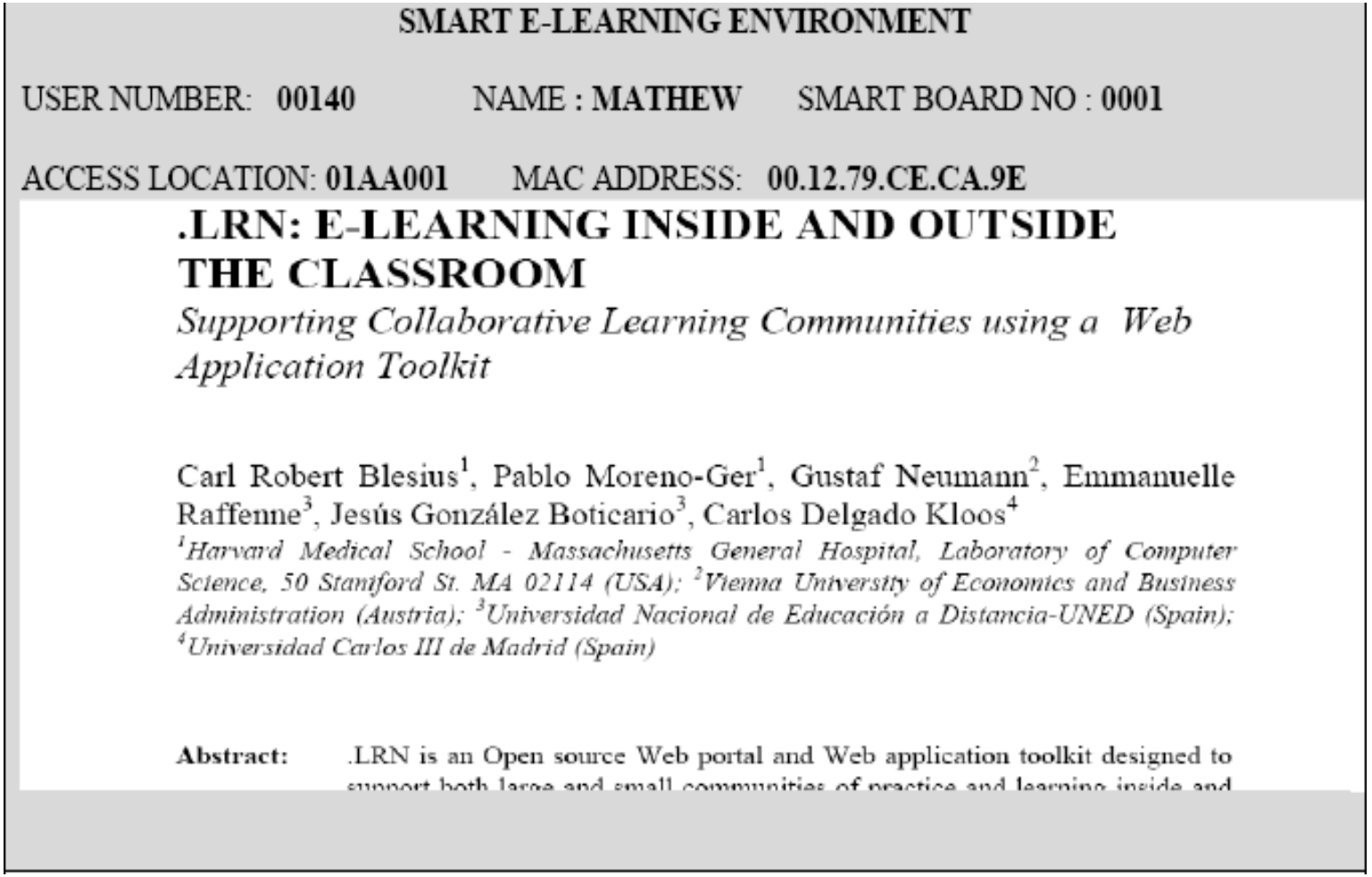
Having logged in, and automatically redirected to education access location (this is a learner who is in education)

Expected Output (access step -3)



Having selected Early childhood - code 01AA , from education access location, several early childhood files available

Results (the real content)



SMART E-LEARNING ENVIRONMENT

USER NUMBER: **00140** NAME : **MATHEW** SMART BOARD NO : **0001**

ACCESS LOCATION: **01AA001** MAC ADDRESS: **00.12.79.CE.CA.9E**

.LRN: E-LEARNING INSIDE AND OUTSIDE THE CLASSROOM

Supporting Collaborative Learning Communities using a Web Application Toolkit

Carl Robert Blesius[1], Pablo Moreno-Ger[1], Gustaf Neumann[2], Emmanuelle Raffenne[3], Jesús González Boticario[3], Carlos Delgado Kloos[4]

[1]Harvard Medical School - Massachusetts General Hospital, Laboratory of Computer Science, 50 Stanford St. MA 02114 (USA); [2]Vienna University of Economics and Business Administration (Austria); [3]Universidad Nacional de Educación a Distancia-UNED (Spain); [4]Universidad Carlos III de Madrid (Spain)

Abstract: .LRN is an Open source Web portal and Web application toolkit designed to

Having selected file 01AA001 from Early childhood - code 01AA , the file is now open and can be read

Conclusions and future work

Conclusions

- We developed a model, and as we were not able to access the services of a smart board, we used tablets as our smart boards
- The model was able to link learner (test data) automatically to their relevant educational content with 80% precision, based on their registration details that were kept with the smart e-learning central database
- We anticipate the growth of learners and educational data

Recommendations

- There is need to link servers to offer big storage and accessibility services
- Develop standard code to be used in nationwide education data coding for the education data across Kenya
- Develop nationwide education network, instead of using commercial internet carriers to link servers

References (some)

- Angham, A., Sabagh, A., and Al-Yasiri, A. (2013), *GECAF: a framework for developing context-aware pervasive Systems,* Springer-Verlag Berlin, Heidelberg Computing Sci Res Dev 30:87–103
- Aztiria, A., Izaguirre, A., and Carlos Augusto, J. (2010), *Learning patterns in ambient intelligence environments: a survey*, Springer Science and Business Media, Artificial Intelligence Rev 34:35–51
- Chen, C., et al (2013), *Real-time Smartphone sensing and recommendations towards context-awareness shopping*, Springer-Verlag Berlin Heidelberg, Multimedia Systems 21:61–72
- Chia-Chen C., et al (2015). *Real-time Smartphone sensing and recommendations towards context-awareness shopping*, Springer Verlag
- Choi, K. & Lee, D. (2013), *A study on strengthening security awareness programs based on an RFID access control system for inside information leakage prevention*. Springer
- Cohen, L., Manion, L., & Morrison, K., (2007), *Research methods in education* (6th Ed.), London: Routledge Falmer.
- Cook, D, and Das, S. K. (2012), *How smart are our environments? An updated look at the state of the art* Pervasive and Mobile Computing, Volume 3, Issue 2, Pages 53-73
- Dengpan Y. et al (2015), *Mobile crowd-sensing context aware based fine-grained access control mode,* multimedia tools application. Springer
- Hervás, B., J., et al (2007), *Towards the Everyday Computing in the Classroom through RFID* in Computers and Education, E-Learning, From Theory to Practice, Springer pp 143-154
- Hossain, M. et al (2014), *Developing and validating a model explaining the assimilation process of RFID: An empirical study*. Springer

Thanks for listening