

HANDING OVER OWNERSHIP OF SCHOOLS TO LEARNERS

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Abstract

Education is not only about the interaction that happens in class between the learner and the teacher, but also about producing a holistic citizen. This can be achieved none other than through a constructivist approach to learning. Constructivism is a theory that says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. In the classroom constructivism usually means encouraging students to use active techniques such as experiments and real world problem-solving to create more knowledge.

This research is about taking a business approach to the management of schools through adopting technology and a constructivist approach. Learners are encouraged to participate in the management of their schools. They participate in the management of the state of the infrastructure, availability of resources, discipline, maintenance of school grounds, etc. They report on these management issues to a central database which can be accessed by school inspectors in the Department of Basic Education (DBE) for decision-making. This gives them a sense of ownership, grooms responsible citizens and gives them a sense of loyalty to their schools.

This technology is based on integrating the Mobicents platform, Ushahidi platform and cell phone technology. The learners take photos of management-related events that require improvement in their schools, such as the poor state of infrastructure, lack of resources, unhygienic state of facilities, incidences of indiscipline, poor maintenance of grounds, etc. using their cell phones. These photos are forwarded to the Ushahidi server for access by school inspectors in the DBE. The Ushahidi is a crowd sourcing platform that uses social media and mobile communications to collect information which is then placed on Google Maps to give a visual picture of the state of affairs.

This research develops the client software that enables communication with the Ushahidi server for the information to be made available to DBE inspectors. For anonymity and removal of cell phone numbers, a CSIR server acts as a proxy for the content to and from the learner

Keywords

Mobicents, Constructivism, Ushahidi, Education, Learner, crowd sourcing, school management

1 Introduction

Education is not only about the interaction that happens inside the classroom between the teacher and learner but other factors as well that are external to the four walls of the classroom and impact on what is happening inside the classroom. The proper management of the school is an important factor in the development of a quality learner. Reduced levels of bullying, increased availability of teaching and learning resources and proper maintenance of infrastructure are but a few of the aspects that play a big role.

This paper is about enabling learners to participate in the management of their schools. Through an easily available technology in the form of their cell-phones learners are able to make a difference by taking pictures which are uploaded to a server that can be accessed by decision makers

The next section of this paper is on the methodology adopted in this research. The next section thereafter gives an overview of the technologies that play a role in this school management system. The following section describes the architecture of the technology. The last part is a discussion section.

2 Methodology

This research is in the area of systems design in a laboratory set-up.

2.1 Purpose of study

The paper reports on the design of an architecture for a system that enables learners to participate in school management.

The question that this research answers therefore is:

“What technology can make it possible for learners to participate in the management of their schools?”

The objective therefore would be:

To design an ICT system that integrates various technologies and is based on a constructivist / learner-centric approach to schools management

2.2 Process

This research developed an architecture to a technology that enables learners to report issues of infrastructure, availability of

resources, discipline, maintenance of schools grounds, etc to the relevant authorities. The architecture integrates readily available technologies, and applies them in the education environment. The underlying technologies include the Mobicents platform, the Ushahidi platform and cell phone technology.

3 Background and related work

The next subsections of the paper describe constructivism / learner-centric approach, the Mobicents platform and the Ushahidi platform

3.1 Mobicents

The Mobicents communication platform is an open-source architecture to create, display and manage services and applications integrating voice, data and video across a range of Internet protocols (IP) and communication networks [1]. It is an implementation of the JAIN/SLEE architecture for building applications in Java technology [8]. It is made up of service building blocks (SBB), the event engine Service Logic Execution Environment (SLEE) and resource adaptors (RA) as shown in Figure 1.

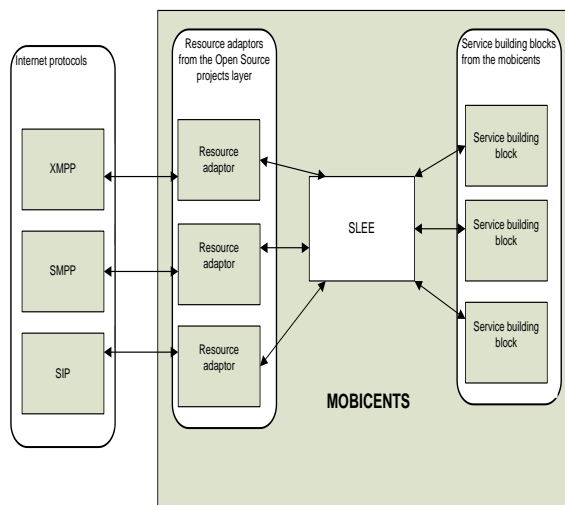


Figure 1: Communication in Mobicents

The IP is a method by which data is sent from one computer to another. Extensible Messaging and Presence protocol (XMPP) [5] is an open technology for real communication which powers a wide range of applications including instant messaging, multiparty chat and voice and video calls. Short Message Peer to Peer protocol (SMPP) [6] is a telecom industry protocol for exchanging SMS messages between SMS peer entities such as short Message Service Centres (SMSC). Session Initiation protocol (SIP) [7] is a signalling protocol used for establishing session in an IP network.

The RAs translate a protocol into a language that can be understood by Mobicents in the form of events that trigger responses from the SBBs. An RA can therefore be described as a system-level software driver that a Java application uses to connect to an enterprise information system.

The SLEE specification is an event-driven engine that allows popular protocol stacks such as SIP and the Web to be plugged in as resource adaptors. The SBBs are the various services on offer such as billing, administration, call control, user provisioning, etc.

3.2 Constructivism

Constructivism is a theory that says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences [2]. When people encounter something new, they reconcile it with their previous ideas and experiences, in the process changing what they believe and creating their own new knowledge. In the classroom, constructivism usually means encouraging students to use active techniques such as experiments and real world problem-solving to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing.

Social constructivism views each learner as a unique individual with unique needs and backgrounds. It encourages the learner to arrive at his or her version of the truth, influenced by his/her background, culture or embedded worldview [3]. Social constructivism emphasises the importance of the learner being actively involved in the learning process, as opposed to the responsibility resting with the instructor. Motivation for learning depends on a learner's confidence in his/her potential for learning. This belief emanates from first-hand experience in problem-solving. Through successful completion of challenging tasks, learners gain confidence and motivation to embark on complex challenges.

Instructors, in constructivist learning, adopt the role of facilitators and not teachers. A facilitator provides guidelines on how a learner should arrive at his or her own conclusions. In traditional learning, the learner plays a passive role, while in constructivism they play an active role. Learners with different skills and backgrounds should collaborate in tasks and discussions to arrive at a shared understanding of the truth in a specific field. They should be constantly challenged with tasks that refer to skills and knowledge beyond their current level of mastery. This is in line with Vygotsky's zone of proximal development [3], which describes the distance between a learner's developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving.

3.3 Ushahidi

Ushahidi is a non-profit software company that develops free and open source software for information collection, visualisation and interactive mapping [4]. Ushahidi (Swahili for “testimony” or “witness”) has a website that collects eyewitness reports and places sent in via email and text messages using mobile phones and web interfaces and places them on Google Maps. The organisation uses the concept of crowd sourcing for social activism and public accountability, serving as a model for what is coined “activist mapping” – the combination of social activism, citizenship and geospatial information. It uses social media and mobile communications to collect information from the people at the scene of significant events.

4 The architecture of the proposed system

The architecture that this research proposes is based on Ushahidi, Mobicents and cell phone technologies. In its simplest form, the architecture of the system is as shown in Figure 2.

The learners take photos of management-related events in their schools, such as the poor state of infrastructure, lack of resources, unhygienic state of facilities, incidences of indiscipline, poor maintenance of grounds, etc. using their cell phones. These photos are forwarded to the Ushahidi server for access by school inspectors in the DBE. This research develops the client software that enables communication with the Ushahidi server for the information to be made available to DBE inspectors.

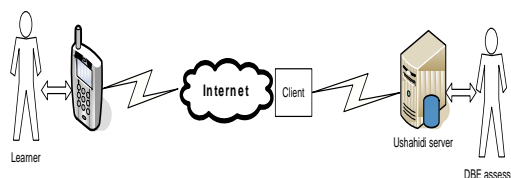


Figure 2: Simplified architecture of system

The reason why the research is based on learners taking pictures is so as to eliminate the possibility of abuse of the reporting system by learners. It is also meant to eliminate possible victimisation of learners, should their identities be known. For anonymity and removal of cell phone numbers, a CSIR server is a proxy for the content that is coming from the learner. Follow-up messages are sent back to the learner to show progress on their report, and so that they do not send the same message repeatedly. These follow-up messages also pass through the CSIR proxy server as shown in Figure 3.

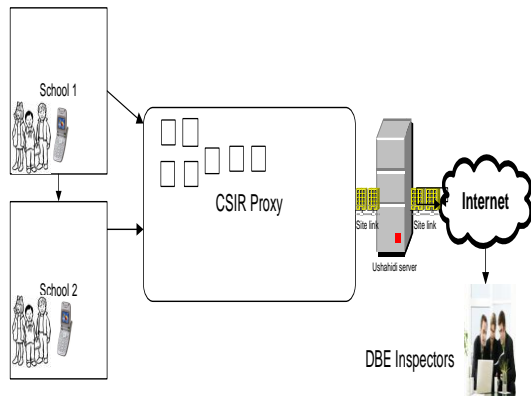


Figure 3: Position of CSIR proxy in the architecture

The internal structure of the CSIR proxy is as shown in Figure 4.

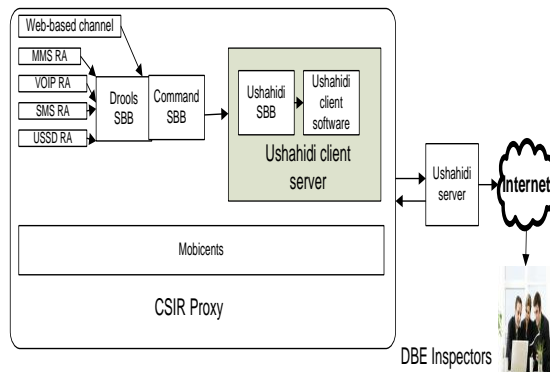


Figure 4: The CSIR proxy

The RAs in the architecture may be SMS, USSD, VoIP, MMS or a web-based channel. The Drools SBB is the brain of flow in the proxy server. When a message comes in from learner’s cell phone, the Drools SBB gives the rule of flow of what needs to happen. A keyword, for example, picks up a specific Drools application to execute. It can, for example, give an instruction on how the MMS received is to be forwarded to the Ushahidi server. For each of the Drools blocks, a command is generated and sent to the Command SBB. The Command SBB may, for example, say, “insert the record into Ushahidi server”.

The Ushahidi client server consists of client software and an SBB. The Ushahidi SBB talks to the client software and the client software in turn talks to the Ushahidi server. The client software is like a proxy server because it takes a message and translates it and passes it to the Ushahidi server. The Ushahidi server in turn can be accessed by DBE inspectors through a web browser.

5 Discussion

The research is about:

- Developing RAs for the various protocols
- Developing a client software to enable communication between the CSIR proxy and the Ushahidi server.
- Coming up with an architecture of a technology to enable learners to report on their schools

This product is based on open source software called Mobicents. Mobicents is obtained under a General Public Licence. The licence ensures that developers have the freedom to freely distribute software copies as long the product is not commercial. It also uses Ushahidi which is a technology that is already available. Therefore the system is a low-cost appropriate technology. Development of appropriate low-cost technologies is important for a developing country environment like South Africa.

Cell phone coverage in South Africa is fast approaching 100%. Therefore irrespective of where the school is based, the learners are more likely to have access and use the system developed. This is about bridging the digital gap in access to technology.

A constructivist approach to learning produces a hands-on individual and a creative thinker too. This system therefore contributes to that sort of product. This is about creating activists, who are conscious of their environment and have a sense of ownership.

Schools management is normally left in the hands of those that are appointed to those positions. Rarely do we think of giving opportunities to our future leaders; to groom them into the field. This system gleans into the issue of schools management from that angle.

6 Conclusion

This paper reports on an architecture that integrates Mobicents, Ushahidi and cell phone technology to produce a learner-centric schools management system. The systems makes the work of education officials easy in that information that they would otherwise have ha to seek outside their offices is made readily available through learner efforts. The system is based on the premise that low-cost technologists can support a constructivist approach to learning. Also, to produce a future conscienscious citizen, the learners should be given the opportunity to participate in schools management from an early age.

7 References

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