Tao, Y.-H., Transforming the interactive response system to a cloud voting service, *SAINT2010 Workshop on IT enabled Services*, Seoul, South Korea, July 19-23, 2010.

Transforming the Interactive Response System to a Cloud Voting Service

Yu-Hui Tao  
Department of Information Management  
National University of Kaohsiung  
Kaohsiung, Taiwan, R.O.C.  
ytao@nuk.edu.tw

Abstract—The paper describes a new business model for a cloud voting service, which shifts focus from selling specialized equipment and installation to providing Internet services through personal mobile devices. This incremental innovation only requires existing technologies such as general Internet service facility and web/mobile system development. The new cloud voting service frees itself from the limitations of specialized equipment and physical location, and thus expands its applications from classrooms to conference rooms in business organizations, as well as to public events in any location with WiFy/WiMax or 3G Internet access. The potential benefits and business model of this new Internet-enabled service are briefly discussed.

Keywords-interactive response system; cloud service; voting system; business model; clicker

I. INTRODUCTION

Although interactive response systems (IRS), otherwise known as classroom/people/student/audience response systems, electronic voting systems and many other names, are increasingly used in classroom teaching, business training, and game show activities, the applications of this technology are still limited by physical location due to the requirement of specialized equipment. Internet technologies have been maturing and have achieved a stage where many innovative, insightful, and interesting applications are more feasible. Each technology not only has specific strengths and applications, but also maximizes its potential for creating new emergent applications with other technologies.

Davila et al. [1] classified innovations as incremental, semi-radical, and radical. One possible incremental innovation of IRS is freedom from its fixed physical locations. IRS is an ideal candidate for transformation into a more widely used voting service. Instead of specialized clickers, the personal mobile devices (such as cell phones, personal digital assistants (PDAs), or notebook computers) of the audience/voters are used. This transformation potentially opens up the service to all the synchronous or asynchronous group activities with voting needs.

With the integration of existing technologies, new IT-enabled services may be quickly created to meet the criteria of this incremental innovation.

II. CURRENT VOTING SYSTEMS AND ISSUES

How does an IRS work? Figure 1 gives a graphical sketch of the IRS classroom environment by HaBook [2]. The instructor displays a question on the interactive white board or regular screen by using her clicker, and the students respond to the multiple-choice question using their own clickers. The teacher can immediately show the statistics on screen and all the answers are then stored in the IRS server.
The interactive white board is not required in the classroom question-and-answer (Q&A) scenario. In game show or business-oriented voting, simple Q&A with related statistics may be adequate. However, in classroom settings, the teaching activities need to incorporate various learning instructions to achieve better learning effects and performance.

Applying IRS in college classrooms has been very popular in the West since it was first used in a Physics course at Harvard University. In the East, its popularity has grown in recent years. In their paper, Kay and LeSage [3] summarized IRS literature with other three IRS review papers [4,5,6] and identified 13 benefits in 3 categories, as well as 12 challenges in 3 categories, of applying IRS in classrooms.

The issues presented by these papers motivate this study. First, most IRS facilities require the students to have clickers of their own, which may be purchased by the school and distributed to the class, or purchased/rented by the students themselves. These options are neither convenient nor cheap [7] for the schools and the students. Second, the clickers and receivers are usually infrared-based, which many studies have found to be unreliable, necessitating an upgrade to Radio Frequency Identification (RFID)-based devices [8]. Owing to the limitations of infrared- or RFID-based clickers, the questions are limited to true-or-false or multiple-choice questions [9]. Third, operating and debugging the IRS are extra burdens upon the teachers [10]. Fourth, many IRS servers and receivers are installed in fixed locations. Thus, the technology is not applicable to general classrooms or other locations, as commonly experienced in Taiwan.

III. CONCEPT OF CLOUD VOTING SYSTEMS

IRS would be more useful if it can be used in any place and any time without being constrained by fixed locations. This leads to the concept of Web-based, online, or Internet-enabled cloud services.

In many countries, nearly every person above 15 years old has a cell phone. Many students and professionals have notebook computers; many professionals also have PDAs. Meanwhile, Wi-Fi/WiMax and 3G networks are common in developed countries, as well as in some developing countries. Based on the observations in many developed countries, the use of personal mobile devices in Wi-Fi/WiMax or 3G accessible environments can transform the traditional IRS into cloud voting services.

In Taiwan, a developing country, although students rarely have PDAs, almost all have cell phones, and some have notebook computers. Access to IRS servers via wireless connections is immediate, enabling students locate the question and click on the answers using their own personal mobile devices in real-time. This is also true for teachers who usually have notebook computers and overhead projectors to display the questions and show the statistics in general classrooms. Before and after answering the questions, the teachers can lead peer discussions or teacher-student interactions to facilitate pre-designed instructional activities.

Outside of classrooms, the majority of the college campuses in Taiwan have wireless connection built into every building. These connections can facilitate the voting services using Wi-Fi cell phones/notebooks or 3G cell phones. This new, unprecedented scenario widens the application scope of voting services in campus activities.

For large business organizations, the environment is more mature than campuses. For small and medium enterprises (SME) that may not have Wi-Fi capability, 3G cell phones remain the most feasible channel. In fact, while these services may have been previously inaccessible, many SMEs can begin using such voting services in public buildings or stores/shops such as Starbucks or 7-11.
Another potential application of cloud voting service is public events. Whether large or small, indoor or outdoor, audience voting in public events has become a trend. For example, New Year countdown shows, concert performances, political gatherings, or governmental-held events usually last for hours and are attended by large crowds of audiences. Occasional audience interaction via cloud voting using their personal cell phones creates an innovative and entertaining atmosphere within the event. Figure 2 illustrates the cloud voting service. As shown, the IRS system and database are hidden behind the cloud of Internet services geared towards teachers and students with computers or mobile devices in an Internet-accessible environment (such as Wi-Fi or 3G telephone network).

IV. REQUIREMENTS FOR CLOUD VOTING SERVICE

Cloud voting implies the installation of an IRS server and the use of wireless mobile devices. Accordingly, a cloud voting service requires an Internet-accessible IRS server and online voting systems that can be located by the users.

Since this voting service needs to be accessed through mobile devices of individual users, the user interface should be automatically adjusted to the devices of the clients. In addition to ensuring compatibility with regular desktop computers with regular monitors in computer classrooms, the service should be flexible in providing various user interfaces adaptable to cell phones, PDAs, and other mobile devices, such as digital game machines or a digital dictionary with wireless connection capability.

In most situations, a browser-based environment will function in cell phones, PDAs, and notebooks. Therefore, existing technologies can easily support such cloud voting services. However, the services may require substantial programming efforts in order to adapt them to as many mobile devices as possible, even with an insignificant incremental user base.

V. BUSINESS MODELS

The general business model for cloud voting services will be any company who can provide such a service for fees. The infrastructure and the voting system can be self-developed or outsourced since it requires no challenging technologies and capabilities to implement. Therefore, the most critical element will be the profit model related to marketing and pricing of such services to schools, business organizations, and the public.

Promoting such services should be directed not only to IRS adopters but also to potential users who want to avail of but previously could not afford, did not need, or did not know of its existence. A successful marketing campaign will capture more adopters, creating a larger market. It can be as successful as the soybean sauce marketing campaign in Taiwan twenty years ago, which created a new barbecue tradition for the Taiwanese during the Mid-Autumn Festival. Similarly, the marketing campaign by department stores to celebrate Christmas instead of Memorizing the Constitution Day in Taiwan on December 25 created a big market for Christmas shopping.

To attract potential users, the pricing strategies need to be sufficiently flexible to accommodate a variety of users with different needs. Taking the school as an example, the license pricing can be at school-level, unit-level, or individual-level. The pricing can also be rated to accommodate different usage patterns. Pricing can be a flat rate, based on frequency of usage and time frame of usage (such as one semester per year), or on a pay-per-use basis. The pricing strategies for the business corporations or the public can be just as flexible.

In Taiwan, there are currently only two local IRS suppliers who can easily adopt this new business model in order to transform their product and expand their service market. However, this business model can also be easily adopted any corporation that wish to participate in the cloud computing marketing, including brand-name notebook companies such as ACER; telecommunication companies such as the ChungHwa Telecom, the largest in Taiwan; Web portal companies such as Yahoo and Google; and high-tech companies such as FaxConn or Quanta.
VI. CONCLUSIONS

In this article, an incremental innovation of IRS has been described as an achievable, short-term technology integration for potentially profitable business opportunities. Although cloud voting service is just one specialized service, it demonstrates how technologies can enable the transformation of a traditional product or service into a new business model. Furthermore, its influence can be sufficiently significant so as to change the instructional design or classroom practices in different levels of the educational system, or sufficiently wide to be popularly used in many business routines that would have never before considered using such a service.

REFERENCES