GSM-Based SMS Time Reservation System for Dental Care

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ABSTRACT

In this article we focus on the application of a mobile time reservation system for dental care. The specific application allocates cancelled dentist times to new customers and new customers are searched from a waiting list with Global System for Mobile Communication (GSM) Short Message System (SMS) messages. This article shows how standard, widely used technology—when used innovatively—can bring many benefits to many stakeholders with reasonable costs and changes in business processes. We present and analyze the function of an SMS message-based dental service appointment reservation system that has been implemented in Lahti, Finland. The analysis contains a description of the system’s function, as well as some assessment of the success from the service provider and customer point of view.

Keywords: patient registration systems; telecommunications technologies; transaction cost economies

INTRODUCTION

Internet technology is penetrating every aspect of modern life. We speak of e-commerce, e-learning, e-health, e-everything. Health care is one of the industries in current societies where information technology is being adopted very quickly. However, the industry was late in starting. So far, the development of information systems in health care has been several years behind the general development in most other industries (Ragupathi, 1997). Finland has been one of the pioneers in the development of mobile communication solutions (Aarnio, Enkenberg, Heikkilä & Hirvola, 2002). The environment in Finland is that of GSM (Global System for Mobile Communications). The GSM Association (2006) defines Short Messages Service (SMS), which are a core technology in our article, as follows: “Short Message Service; a text message service which enables users to send short messages (160 characters) to other users. A very popular ser-
vice, particularly amongst young people, with 400 billion SMS messages sent worldwide in 2002”. The user interface of an SMS is usually a mobile phone, but other solutions may also exist. SMS is a central application platform in the GSM system.

Several solutions have been tested, even in the health care sector. Mobile messages should improve the organization and delivery of care for the elderly in their homes (Epstar, 2003), and possibilities of getting drug information and prescribing drugs through a mobile interface have been studied (Han, Harkke, Mustonen, Seppänen & Kallio, 2004). In general, it is widely accepted that mobile solutions are increasingly being accepted, even in health care (Hameed, 2002; Porn & Kelly, 2002; Turisco, 2000).

Electronic communication in the health care sector in general has many advantages over traditional face-to-face meetings. Electronic communication is usually characterized as (MacDonald, Case & Mertzger, 2001):

- Informal
- Thoughtful
- Asynchronous
- Self-documenting
- Relationship enhancing
- Inexpensive

When it comes to SMS messages, they are usually very informal in the daily use by private people. The SMS messages in the system to be presented here are highly structured. They are always extremely thoughtful, and allow for asynchronous communication. They are relatively inexpensive and self-documenting. The aspect of relationship enhancing remains most open, especially if compared with face-to-face discussions.

Mobile communication made possible by the GSM and future UMTS technology is just one area of development. Big advances are being made alongside the Internet (Bakker, 2002; Klecun-Dabrowska & Cornford, 2000; Suomi, 2001). The application of mobile devices in health care is by no means new in health care settings, but so far we have not found any research reporting on how to perform interactions with customers via mobile phones in the dentist applications. In this way this study is of pioneering value.

Our research question in this article is:

*How can SMS technology lower transaction costs in health care appointment scheduling?*

The article is heavily oriented towards empirical research on the actual appointment reservation system implemented in Lahti. For that part of our research, the research question is:

*Is the SMS-based system for dental care appointment reservation in Lahti effective and is it eliminating transaction costs for the parties involved?*

Methodologically, our study is one of evaluation of a system. The approach contains both hermeneutical (Boland, 1991; Westrup, 1994) and grounded action research (Avison, Lau, Myers & Nielsen, 1999; Baskerville & Pries-Heje, 1999) elements.

Our article unfolds as follows. In the second section we discuss how the transaction cost approach can be used to structure and understand transactions and their associated costs. In the third section we introduce the actual system implemented in Lahti, and provide some results that have been gained from the evaluation of that system. Finally, in section four we draw conclusions.

**THE TRANSACTION COST VIEW OF APPOINTMENT SCHEDULING INTERACTIONS**

The literature is rich in articles about patient scheduling, mostly from a queue-theoretical point of view (Klassen, 2004; Rohleder & Klassen, 2000). However, other points of view have
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