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Andreea Molnar

Brunel Univeristy, London, United Kingdom, Andreea.Molnar@brunel.ac.uk

Vishanth Weerakkody

Brunel Univeristy, London, United Kingdom, vishanth.weerakkody@brunel.ac.uk

Ramzi El-Haddadeh

Brunel University, London, UK, ramzi.el-haddadeh@brunel.ac.uk

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DIFFUSING PUBLIC SECTOR SERVICES THROUGH HIGH DEFINITION VIDEO

Andreea Molnar, Brunel University, Kingston Lane Uxbridge, Middlesex UB8 3PH, UK,
Andreea.Molnar@brunel.ac.uk

Vishanth Weerakkody, Brunel University, Kingston Lane Uxbridge, Middlesex UB8 3PH,
UK, Vishanth.Weerakkody@brunel.ac.uk

Ramzi El-Haddadeh, Brunel University, Kingston Lane Uxbridge, Middlesex UB8 3PH, UK,
Ramzi.El-Haddadeh@brunel.ac.uk

Abstract

The adoption of public services that have been delivered electronically are not necessarily uniformly accepted. This paper argues that the diffusion of high definition video communication as a complimentary mechanism for service delivery could not only alleviate this existing gap in adoption and diffusion of government services but also significantly improve services and save cost for governments. This paper introduces a holistic perspective on how video technology could be integrated in existing services using examples of health, education, and municipality services. This paper introduces a taxonomy of criteria that characterises high definition video communication for diffusing public services by examining the associated benefits, cost and risks.

Keywords: electronic services, video, adoption, diffusion, public services.

1 Introduction

Electronic government (e-government) aims to create services for citizens that are more efficient, transparent, available anytime anywhere, and personalised (Affisco & Soliman, 2006; Bekkers & Homburg, 2007; Dunleavy et al., 2006; Gupta et al., 2008). However, although some of these services were successful in their public adoption, others failed to achieve initial expectations (Chadwick, 2009; Cordella & Contini, 2012; Ferro & Molinari, 2010). To improve the adoption and diffusion of these services, other channels of delivery have been explored such as mobile applications (Abdelghaffar & Magdy, 2012; Irani et al., 2010) and digital TV (da Silva et al., 2012). Although they have shown positive results in pilot stages, a broader scale study has yet to be performed.

Among the problems identified in previous research with e-government services is that citizens perceive them as distant and impersonal (Pavlou, 2003). Often no assistance is offered to citizens when they have problems using them (Sahari et al., 2012). In this research, we propose to address these two aspects by enhancing existing city experience and education services with high definition video. Video communication can be used regardless of the delivery channel. Moreover, it has the potential to offer more personalised services and facilitate the assistance of citizens that have problems using the service. For example, a citizen could discuss her problems, regardless of her location or device, with a person from the city experience service, if s/he does not like to use the traditional electronic service offered. If the citizens use the existing service, but s/he gets into problems while using it, a video communication channel can be established with a person that is able to help.

Moreover, this paper proposes to enhance emergency services with video communication channels between the ambulance crew and the hospital. Currently, when the paramedic found in an emergency decides that he needs support from a specialist, the specialist is contacted through a phone call (Patton & Thakore, 2012; Phillips et al., 2012). This has several drawbacks, as the specialist cannot see the patient, or if any analyses are performed, s/he cannot see the results. Using video to communicate with the specialist would allow him to have a better overview of the situation, and hence, provide the patient with a better diagnostic. In critical situations, this could also involve saving someone's life.

In this paper we will look at the criteria necessary to facilitate these services by focusing on the benefits, costs and the associated with them. The next sections present the state of the art on technology adoption. This is followed by a description on how high video can be used for diffusion of public services. The paper continues with presenting the benefits, costs and risks associated with complementing public services with high definition video delivery. Finally the paper summarises material presented in the paper.

2 Background

The increasing availability of the Internet parallel with the rapid development of Information and Communication Technologies (ICT) has made electronic service delivery government an attractive solution for delivering public services. Several benefits are mentioned in the literature as motivational factors towards this adoption: increasing efficiency and decreasing the cost of providing the service, availability anytime and anywhere, being able to provide more personalised solutions that put citizens in the centre, and providing more transparent and accountable services (Affisco & Soliman, 2006; Bekkers & Homburg, 2007; Dwivedi et al., 2012; Dunleavy et al., 2006; Gupta, et al., 2008).

It is considered that for e-government services to be successful, they have to be adopted by citizens (Yonazi et al., 2010). However, despite the above claimed benefits, and although being introduced over a decade ago (Dwivedi et al., 2012; Rada et al., 2012) e-government adoption has not reached the desired expectations in terms of adoption (Chadwick, 2009; Cordella & Contini, 2012; Ferro & Molinari, 2010). Moreover, very few studies have tackled e-government adoption (Dong et al., 2011). Among these, in the research literature, trust (Gilbert et al., 2004; Srivastava & Teo, 2005; Teo et al.,

2008), security (Colesca, 2009), and transparency (Marche & McNiven, 2003), information quality, time and money (Gilbert et al., 2004) as well as socio-cultural factors (Bhuiyan, 2011) have been identified to play an important role in government adoption.

To improve the adoption and diffusion of these services other channels of delivery have been explored such as mobile applications, m-government (Abdelghaffar & Magdy, 2012; Irani et al., 2010; Trimi & Sheng, 2008) and digital TV, t-government, (da Silva et al., 2012; Sapio, 2012). M-government has the potential to engage citizens regardless of their location, and to offer contextualised services (Irani et al., 2010; Kushchu & Kuscum, 2003; Trimi & Sheng, 2008) that are relevant to the user at the given time. On the other side, e-government has the potential to provide services to a larger group of people that do not have Internet or the skills to use it (Sapio, 2012).

However, the literature shows that what impedes citizens from using these services is that they are often perceived as being distant and impersonal (Pavlou, 2003). Furthermore, for the citizens that attempt to use them there is no help provided if they encounter problems (Ahmad et al., 2012; Venkatesh et al., 2011). Although some of the above presented solutions have the potential to alleviate these problems (m-government has the potential to offer more personalised solutions making use of contextualised services), we propose to use video communication to provide both personalised services but also to offer help for citizens that have problems using current e-government services. The advantage of this approach is that it is independent of the delivery channel.

3 High Definition Video for Public Sector Services Diffusion

Although video communication has been used in some public services through applications such as Skype, they have been constrained by Internet infrastructure limitations. These limitations can affect video delivery leading to image buffering for users, lack of synchronisation between video and audio content etc., therefore leading to poor user experience and frustration. In this respect, there is a need to alleviate some of the problems the current infrastructure poses in order to utilise high definition video delivery (Goncalves et al., 2012). The aim of this paper is to provide a holistic perspective of the potential of video services for facilitating the delivery of public services. With this aim, three different types of public services will be covered: health, education, and city experience services.

3.1 Health Services

The usage of online health services “can help to provide better citizen-centred care as well as lowering costs and supporting interoperability across national boundaries, facilitating patient mobility and safety” (EU, 2008). This is especially important in the present economic climate where there is a pressure towards reducing the cost of health services (Martin-Moreno et al., 2012). In this paper, two types of health services are presented that could be improved by using video: emergency or monitoring or consulting patients when they have a health problem. During an emergency situation, sometimes the paramedics need to communicate to a specialist either for being helped with the patient treatment or to decide the best hospital to which the patient can be sent. Currently communication in emergency services is done through either radio or mobile phone call (Patton & Thakore, 2012; Phillips et al., 2012). Although useful, as only voice is possible this communication has several drawbacks. The specialist cannot see the patient or the results of the analysis performed in place. Therefore the view of the situation is limited, and not all the information is available for the specialist to provide an appropriate advice. In emergency situations, this information could be critical. In this situation, instead of using only radio and mobile voice, the service could be improved by using data and video. The paramedic could a camera installed on the ambulance and a mobile one attached to his equipment and stream images to the specialist to provide a better overview of the situation.

Another scenario in which video can be used is to monitor patients’ treatment. In many treatments problems could appear if the patient is not conforming to the treatment (e.g. glaucoma), and the patients have to commute to the hospital to check the conformance with the treatment and further steps

have to be taken. This could be avoided if a video communication channel can be established between the patient and the medical staff.

3.2 Education Services

Connecting students from different locations has the potential to foster cultural awareness, improve understanding and respect towards other (Lee & Hutton, 2007), while collaborative learning has been shown to improve learning achievements and learner experience (Gokhale, 1995; Johnson & Johnson, 1986; Zha & Ottendorfer, 2011). Moreover the usage of high definition media, as is the case here, has the potential to improve the online social presence (Cui et al., 2012). Therefore, in education, high definition video could be used to facilitate collaborative projects between schools in different locations or even to facilitate communication between student and teacher regardless of their location.

3.3 City Experience Services

One problem faced by municipal services (i.e. applying for a permit to set up a new business venture) is that they are perceived as being impersonal and no help is provided when citizens have problems using them (Pavlou, 2003; Sahari et al., 2012). We posit that by using video communication citizens will not lose the personal feeling they have when a face-to-face communication takes place. In this way, they could be helped with their problems and also access the service regardless of their location. Moreover video could be used to enhance the citizens' experience with a city, such as improving the museum visitors' experience. Museum experience could be enhanced by allowing visitors from different museums to explore the other museum, or to play collaboratively games related to the museum content.

4 A Taxonomy for Public Services Diffusion through High Definition Video

Although video communication has been used in some of these services, the technology behind the approach we propose here is new, and it is aimed at facilitating high definition video. This is also supposed to deliver the user with video that is not affected by the poor network performance.

To enable the interested stakeholders in using video to facilitate public services, Table 1 presents the key benefits, costs and risk associated with using high definition video. These are presented for each service in part, as each service has its own characteristics, and hence different ways of being impacted by video communication.

Services	Benefits	Monetary Cost	Risk
Health	<ul style="list-style-type: none"> • can help save lives and speed recovery by providing a more informed diagnosis • improve quality of life by allowing the patient to be consulted regardless of their location • avoid litigations due to mis-diagnosis 	<ul style="list-style-type: none"> • saving cost by better allocating staff • avoiding for an ambulance to get to a full hospital and then be re-routed to another one • reduce litigations due to wrong diagnostic • reduce cost of personnel as a result of speedy recovery as a result of a better diagnosis • reduce tax-payers money on medication, treatment and compensations 	<ul style="list-style-type: none"> • technical problems due to network failure leading to no video or poor video connectivity • problems with the system design that may lead to the equipment being hard to manipulate hence leading to delays in using it <p>Technical problems these can be mitigated by having available the voice services currently in use.</p> <p>Usability/design problems can</p>

			be avoided through testing and simulations before having the equipment in use.
Education	<ul style="list-style-type: none"> • learning to work in a team by collaborating with students from different schools • foster cultural awareness and respect towards others by interacting with people from different cultural backgrounds • richer educational experience • improve education standard 	<ul style="list-style-type: none"> • reduce the cost of transportation as the students from different locations communicate through • lowering the cost of learning and teaching through sharing of teachers and resources across various locations 	<ul style="list-style-type: none"> • technical problems due to network failure leading to no video or poor video connectivity
City Experience	<ul style="list-style-type: none"> • better adoption municipal services by offering a similar personalized experience as face-to-face communication and providing help for the citizens who have problems in using the services • a more engaging citizen experience with municipal services, museums etc. by allowing them to interact with them • enhancing cultural awareness by disseminating information about cultural heritages in other country 	<ul style="list-style-type: none"> • reduce the cost of traveling to the municipality for a given service • reducing the cost of travelling for tourism purposes 	<ul style="list-style-type: none"> • network failure and poor video quality affecting the delivery of the service

Table 1. *A Taxonomy of Benefits, costs and risks associated with facilitating public services with high definition video*

As it can be seen from Table 1, facilitating public services with high definition video has the potential to provide valuable monetary and social benefits. These are important, especially in the current economic climate, when we have a pressure on government to reduce the costs, affecting different public services (Lane, 2011; Martin-Moreno et al., 2012; Whitfield, 2012).

5 Summary

The adoption of electronic services delivery in the public sector has failed to reach the initial expectations due to various reasons such as perceived lack of trust, lack of help when the citizens got problems in using them, etc. This paper argued that using video as a way to complement existing governmental services has the potential of providing more user friendly and personalized services. Furthermore, emergency services can be improved by providing a complement to current audio

connections between the emergency crew and the specialist with a video connection to allow for a better overview of the patient and hence providing a more informed diagnosis. To improve the current video delivery and to alleviate the problems that currently appear when the video is delivered over the network (e.g. delay, poor video quality, unsynchronised audio and video content) this study proposes the use of a technology over Internet infrastructure that will allow for delivery of high definition video. A good video quality can be critical, especially in the ambulance scenario when suffering delays in video delivery or having a poor image quality could impede in providing a rapid and correct diagnosis of the patient. Furthermore, in all these services, poor quality leads to user frustration and giving up on using the service. This paper also presented how health, city experience, and education services can benefit from using video. For each of these services the key features for success, divided into benefits, risk, and cost associated with the existing service are presented.

The economic viability of using high definition video to deliver public services lie primarily in the proposition of exploiting the public Internet infrastructure as the network for communicating and transmission the video. Therefore, there is no added cost to public agencies as they will not incur costs associated with having to lease a dedicated line to diffuse video based services. Rather, by using video, public agencies can complement electronic government services by adding an application on top of exiting electronic government services to combine data with voice and images. For citizens, the costs are no more than that of engaging with public agencies through the use of e-government services (i.e. though public infrastructure and personal equipment such as a computer or mobile device). Nonetheless, from a technical and infrastructure perspectives, the provisioning of HD V2V platform requires careful consideration. In this respect, the appropriate management of network-related issues including Quality of Service (QoS) and Service Level Agreements (SLAs) are notably critical to the successful integration of such platform within existing public Internet infrastructure. Additionally, privacy and security and associated risks became increasingly important not just in the ability to hide such public information, but also the ability to control its sharing among agencies and other relevant stakeholders. In this context, this might particularly be critical given such services are made available to a wide range and diverse stakeholders whom might be for example novice in the use of technology. The authors acknowledge that the arguments presented in this paper has only alluded to the concept of using video as an alternative and complementary mechanism for delivering public services and not discussed the technical details of how this will be facilitated. However, the technical aspects of how high definition live video will be facilitated on public infrastructure are outside the scope of this paper and this aspect is currently being researched in the context of the LiveCity project, which is funded under the European Commission's Framework Seven - ICT policy support programme.

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