SUPERAVIT N.º3

Data de submissão
23-12-2016
Data de aceitação
17-02-2017

Autor correspondente
Célio Gonçalo Marques
celiomarques@ipt.pt

Utilização de tecnologias móveis no turismo e na cultura
Mobile technologies for tourism and culture

Célio Gonçalo Marques

Departmental Unit of Information and Communication Technologies,
Polytechnic Institute of Tomar, Portugal
Centre for Public Administration and Policy, University of Lisbon, Portugal
Educational Technology Laboratory, University of Coimbra, Portugal

Resumo • Abstract

As tecnologias móveis estão cada vez mais presentes no nosso quotidiano, constituindo excelentes ferramentas de trabalho, aprendizagem e divertimento. Neste artigo apresenta-se um projeto que pretende promover o turismo cultural da cidade de Tomar através de serviços e tecnologias móveis, nomeadamente através da utilização de códigos QR (*Quick Response*) e de áudio-guias que poderão ser descarregados através de um website preparado para dispositivos móveis e ativados por coordenadas GPS (*Global Positioning System*) ou através de *audio spots*. O projeto nasceu na junta de freguesia de Santa Maria dos Olivais, mas considera-se ser de todo o interesse o seu alargamento a todo o espaço urbano da cidade.

Mobile technologies are increasingly present in our daily lives, providing excellent tools for working, learning and entertainment. This paper presents a project designed to promote cultural tourism in the city of Tomar through mobile technologies and services, namely, through the use of QR (Quick Response) codes and audio guides that can be downloaded from a website prepared for GPS (Global Positioning System) enabled devices or through audio spots. The project was born in the parish of Santa Maria dos Olivais, which is currently the largest parish in the city, but its extension to the whole urban area of the city is considered of the utmost interest.

Palavras-Chave • Keywords

Dispositivos móveis, património cultural, turismo, TIC.

Mobile devices, cultural heritage, tourism, ICT.

https://doi.org/10.26358/srgivol3ar39

1. Introduction

Tourism is responsible for 30% of total world exports of trade services and 6% of all exports of goods and services (Daniel, 2010). This economic sector represents 10% of national employment and is crucial for the development and investment on other sectors (Daniel, 2010). In 2015 hotels and similar establishments received about of 17.5 million guests and almost 50 million overnight stays, more than 16 million passengers landed on national airports and tourism revenues totalled over 11 million euros (Turismo de Portugal , 2016). According to the World Tourism Barometer, the year of 2016 will see record growth in the tourism sector (IPDT, 2016).

Like other business sectors, tourism should seek to keep pace with ICT developments by modernising the structures and creating distinguishing offerings in order to increase tourist satisfaction. According to Jesus and Silva (2009), in a highly technological era it makes no sense not to use available resources to improve the quality and quantity of tourist information. Among these resources are widely disseminated mobile devices: mobile phones/PDA's.

At the end of the third quarter of 2015 there were around 16.7 million active mobile stations in Portugal (ANACOM, 2015) and, according to IDC, 75% of the workforce will be mobile until 2018 (Internext, 2016). Nowadays, tourists bring with them a wide range of mobile devices like cell phones, smartphones, tablets, netbooks, MP3 players and GPS devices. For example, according to a study of Four Points by Sheraton, Brazilian tourists usually bring five or more mobile devices with them (ABEOC, 2012).

This paper refers to some mobile services and devices to promote cultural tourism and presents a proposal based on these services to promote cultural tourism in the city of Tomar.

2. The use of mobile devices and services to promote cultural tourism

High expectations on mobile devices have fostered the creation of websites for these devices and have reinforced the importance of technologies such as QR codes, audio guides, digital guides, and augmented reality.

Created in 1994 by the Japanese company Denso-Wave, the QR code is a two-dimensional code that has a much higher storage capacity than conventional bar codes, and therefore can be used to store text, hyperlinks, business cards, among other information. A QR code can store up to 7089 characters and accepts numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary digits and control codes (Denso-Wave, 2012). This code was first applied in the automotive industry, but quickly expanded to a wide range of industries, including tourism.

As Denso-Wave has not registered as a proprietor of the patent, the use of QR code is free and can be created in seconds through online tools such as Kaywa QR-Code Generator (http://qrcode.kaywa.com), GoQR.Me (http://goqr.me) or Delivr QR Code Generator (http://delivr.com/qr-code-generator). No specific equipment is required to read it, just free apps for mobile devices such as smartphones or tablets.

In Rio de Janeiro, the competent authority for tourism is using QR codes in sidewalk pavements to help tourists to get to know the city better, including the beaches and historic sites (Fig.1).

Figure 1 • QR Code in Rio de Janeiro (BBC, 2013)

In Manchester, the Manchester Art Gallery and Julian Tomlin launched the Decoding Art Project that aims to disseminate 20 artworks located in several points of the city making use of QR codes (Grimes, 2011).

This technology also is in numerous museums, among them, the Australian Museum (Fig. 2), the Brooklyn Museum, the Cleveland Museum of Art, the Derby Museum, the Grant Museum of Zoology, the Museo Civico Archeologico di Bologna, the Museo Civico del Risorgiment, the National Museum of Scotland and the National Naval Aviation Museum. Also the Château de Versailles, the Attingham Park National Trust and the Ding Darling National Wildlife Refuge joined the QR codes. Its use promotes learning and encourages dialogue between the spaces and the visitors.

Figure 2 • QR code at the Australian Museum (Cork, 2010)

Audio guides usually are MP3 sound files that can be downloaded from the Internet or specific hotspots using wireless technologies such as bluetooth. Some mobile devices already have the audio guides incorporated.

Audio guide machines can be turned on by the user or enabled by GPS technology. When the mobile device with GPS capability is on a specific location an audio file with detailed information about the place is automatically reproduced.

In Portugal Monsanto (municipality of Idanha-a-Nova) was the first location to use an audio guide system enabled by satellite technology. Through this system tourists are invited to visit 24 points of interest in the town (Furtado, 2009).

Nowadays this type of technology is becoming increasingly popular in the country. For example, the company toGuide developed an audio guide for walking tours around the city that can be downloaded from http://www.toguide.pt to be used in several models of Garmin GPS. This company also offers thematic routes (Ribatejo Wine Route and the Route of the Castles) and various tourist guides.

Like audio guides, tour guides on mobile devices and applications allowing tourists to create their own itinerary are becoming increasingly common. The scope

and level of detail of the information contained are diverse. There are tour guides of villages, towns, cities, regions and even countries such as the Argentina Travel Guide and the Peru Guide.

If you travel to Brazil from Porto or Lisbon airports you can download the application Brazil Mobile in the boarding areas via a bluetooth connection. This digital guide has information about a range of cities such as Belo Horizonte, Brasília, Florianópolis, Fortaleza, Manaus, Porto Alegre, Recife, Rio de Janeiro, Salvador and São Paulo.

In Portugal, there are also a number of apps in use: the YouGo guides (Leiria-Fátima, Lisboa, Lisboa e Vale do Tejo, Oeiras, Sintra, among other areas: Fig.3), and the Braga Digital, VPorto and VisitAlgarve guides.

Figure 3 • The YouGo Lisboa guide (YouGo, 2012)

The use of augmented reality services for mobile devices allows to provide tourists with additional information about what they are seeing. Among the applications with augmented reality based services available for mobile devices is the Mobile Augmented Reality Applications (MARA) developed by Nokia Research Center and the Wikitude Augmented Reality Travel Guide (WARTG), an application for Android with links to Wikipedia and Panoramio (Jesus, 2009).

This latter application uses GPS technology and compass sensors to determine position and orientation, then uses a database with more than 350,000 points of interest and displays graphic and textual information about the image that the camera on the mobile device is capturing, as well as the distance at which tourists are from that location and the altitude of the location (Fig. 4).

Figure 4 • Wikitude Augmented Reality Travel Guide (Mobilizy, 2009)

The use of augmented reality adds an extra dimension of reality, increasing the interest of tourists in visiting certain locations, helping them choose what to see and making it easier to create their own itineraries (Jesus & Silva, 2009).

3. Project Description

Based on the research question: "How to promote the dissemination and learning of the cultural heritage of the city of Tomar through mobile devices?" and the key objectives of disseminating the city's cultural heritage and increasing visitors' satisfaction, in 2011 we have initiated, in the parish council of Santa Maria dos Olivais, a project to create a website for mobile devices and the use of audio guides and QR codes.

The website started in 2011 as part of the research seminar within the Public Administration degree offered by the business school of the IPT (Pinto, 2012). The website is based on Joomla, an opensource Content Management System (CMS) (Fig. 5) and website adaptation to mobile devices was ensured by the Gantry template for Joomla.

Figure 5 • Website of the Parish Council of Santa Maria dos Olivais – Tomar

A QR code was created for each monument with hyperlink to the website where detailed information will be provided about the monument in question. Pinto (Pinto, 2012) proposed a model for the plaques identifying the monuments where information in Braille will also be added (Fig. 6).

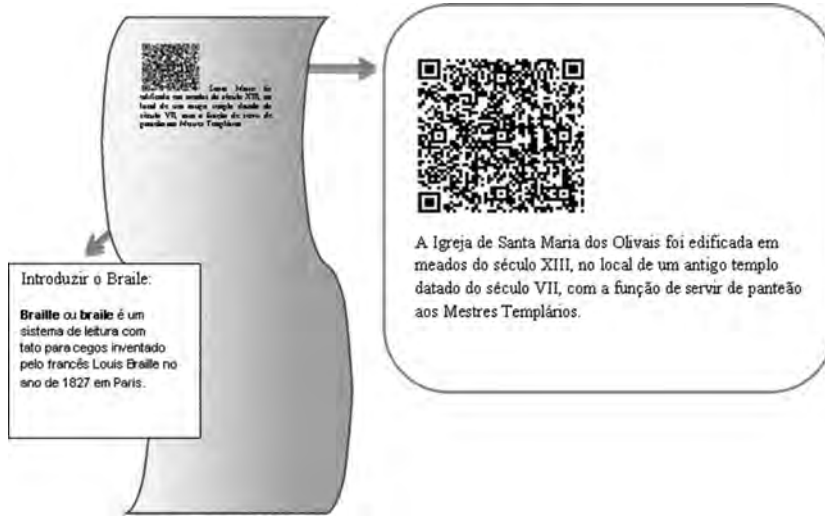

Figure 6 • Informational plaque with the QR code (Pinto, 2012)

The aim is to create an audio guide for every monument that can be downloaded from the website or in situ via bluetooth. Alternatively, you may download the audio guides grouped by tours that can be enabled by GPS technology or through audio spots.

With the implementation of Law No. 22/2012 of 30 May, which approves the legal framework of the territorial reform, the municipality of Tomar, then including fourteen rural parishes and two urban parishes, came to include only one urban parish: União das Freguesias de Tomar (São João Baptista and Santa Maria dos Olivais). With this administrative and territorial reform, the study came to cover the entire city area and not just the parish of Santa Maria dos Olivais.

Three tours have been proposed: the Monumental tour that included the city's most emblematic monuments; the Museum tour dedicated to museums; and the Nature tour which covered the heritage located within the city's parks. These tours were redesigned at the end of 2012 so as to cover the entire cultural heritage within the urban area.

The monumental tour includes the Templar Castle and Convent of Christ, the Church of Santa Maria do Olival, the Church of St. John the Baptist's, the Chapel of Nossa Senhora da Conceição, the Chapel of S. Gregório, the Santa Iria Convent, the São Francisco Convent and the Chapel of Nossa Senhora da Piedade. The museum tour includes the João de Castilho Municipal Museum and its three collections: Ancient Art, Naturalistic Art and Contemporary Art, the Museu Hebraico Abraão Zacuto (Abraão Zacuto Jewish Museum) and the Museu dos Fósforos (Matches Museum). The Nature tour includes the Mata Nacional dos Sete Montes and the Parque Mouchão (Fig. 7).

Figure 7 • Monumental Tour (left image), Museum Tour (center image) and Nature Tour (right image) (Marques & Santos, 2012)

The legal framework for the territorial reform and political changes did not allow to follow the pre-established plan, but it was only in 2016 that the project was resumed as part of the course Seminar II within the Master's degree in Digital Content Production offered by the school of technology of the IPT.

With the support of the Tourism and Culture Division (Tomar City Council), QR codes started to be created for the city's monuments. We opted for the creation of dynamic QR codes, thus allowing information to be updated without having to change the code. Through dynamic QR codes visitors have access to tourist and cultural information about the monument, the weekly agenda, the working hours and other useful information.

Audio guides are being created using Audacity and will be available on the city council's website. There was also the need to create audio guides for the city's museums and this was done using Audite. The audio guides will be available on the tool's website, as for other national museums such as the Museu Militar de Lisboa, Museu do Oriente, the Museu do Brinquedo or the Museu dos Transportes e Comunicações.

The city's council has also launched the application for mobile devices *Descubra Tomar* and created the website *Visita Tomar* (http://visitatomar.pt) which offers visitors the opportunity to take a virtual 360º tour of the city (Fig.8).

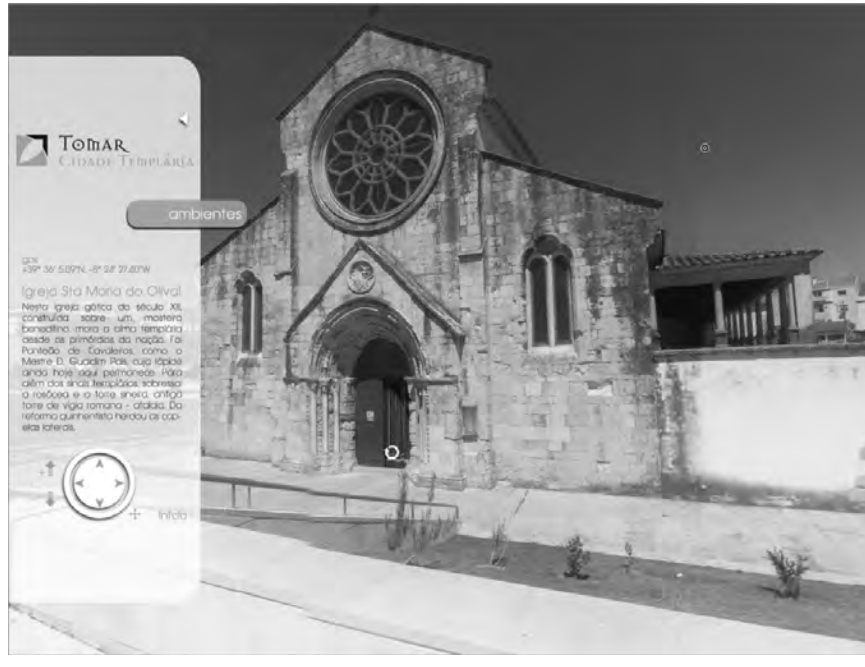

Figure 8 • Website: Visita Tomar – Igreja de Santa Maria do Olival

4. Conclusions

According to Costa (2005) "Tourism goes hand in hand with culture. Also from a market perspective, it is proved that the success of tourism business depends largely on the way cultural heritage is interpreted and managed". The use of information and communication technologies can improve existing services in this area, offer new services, provide more enriching experiences and, above all, meet the growing demands of tourists.

Making use of QR codes and audio guides and a website adapted to mobile devices we expect to promote cultural tourism in the city, contribute to disseminate the history of the city and the country, facilitate access to information by visually impaired people and foreign visitors (by providing a website and audio guides in foreign languages) and offer the visitors memorable interactive experiences, increasing their satisfaction and desire to return (Costa, 2005).

QR codes and audio guides will be validated by users and experts and questionnaires will be administered to residents and visitors in order to improve or redesign some aspect of the project.

The use of these resources in various recreational and pedagogical activities, including Geocaching, is also being explored, and a pilot activity has already been carried out as part of the Regional Education Seminar (Marques, 2016).

References

› ABEOC (2012). Turistas brasileiros tendem a usar cinco ou mais dispositivos móveis. *Associação Brasileira de Empresas de Eventos*. https://tinyurl.com/zmfr2qy (Retrieved September 5, 2012).

› ANACOM (2015). Serviços Móveis. Informação estatística. 3.º Trimestre 2015. *ANACOM*. https://goo.gl/oWtWG4 (Retrieved on February 28, 2016).

› BBC (2013). Mosaic QR codes boost tourism in Rio de Janeiro. *BBC News Technology*. https://tinyurl.com/a9ajo4v (Retrieved on January 31, 2013).

› Cork, J. (2010). QR Codes at the Museum. *Australian Museum*. https://tinyurl.com/zhfu62n (Retrieved on February 17, 2012).

› Costa, C. (2005). Turismo e cultura: avaliação das teorias e práticas culturais do sector do Turismo (1990-2000). *Análise Social*, vol. XL (175), pp. 279-295.

› Daniel, A. (2010). Caracterização do Sector Turístico em Portugal. *Revista Tékhne*. Vol. 14.

› Denso-Wave (2012). High Capacity Encoding of Data. What is a QR Code? *QR Code. com*. https://tinyurl.com/zm3t5u4 (Retrieved on October 30, 2012).

› Furtado, J. (2009). Aldeia de Monsanto com áudio guia por GPS. *Jornal Expresso*. https://tinyurl.com/jhroxae (Retrieved on May 23, 2012).

› Grimes, M. (2011). *Decoding Art: Delivering interpretation about public artworks to mobiles*. https://tinyurl.com/jckaedn (Retrieved on May 14, 2012).

› Internext (2016). IDC antecipa que 75% da força de trabalho será móvel até 2018. *Internext*. http://tinyurl.com/gwlzluj (Retrieved on April 10, 2016).

› IPDT (2016). *Barómetro do Turismo 2016*. Porto: IPDT.

› Jesus, C. (2009). *Serviços móveis baseados na localização com Realidade Aumentada. Proposta de uma análise das potencialidades para o sector do turismo: estudo para o caso português*. Dissertação de Mestrado. Aveiro: Universidade de Aveiro.

› Jesus, C., & Silva. L. (2009). Potencialidades dos serviços móveis de Realidade Aumentada aplicados ao Turismo. *Actas do 8º Congresso LUSOCOM*. pp. 2296-2314.

› Marques, C. G. C., & Santos, H. (2012). Promover a aprendizagem do património cultural da cidade de Tomar através de dispositivos móveis. In A. A. A. Carvalho, T. Pessoa, S. Cruz, A. Moura & C. G. Marques (Orgs.), *Atas do Encontro sobre Jogos e Mobile Learning*. Coimbra: Centro de Investigação em Educação, pp. 175-185.

› Marques, C. G. (2016). *O geocaching em contexto educativo: aprendendo em Tomar*. XVIII Seminário Regional de Educação. Tomar.

› Mobilizy (2009). Wikitude Augmented Reality Travel Guide. *Mobilizy*. https://tinyurl.com/5z8b23 (Retrieved on November 8, 2010).

› Pinto, T. (2012). *Gestão e Atualização do Website da Junta de Freguesia de Santa Maria dos Olivais*. Trabalho final da unidade curricular de "Seminário de Investigação" da Licenciatura em Administração Pública. Tomar: Instituto Politécnico de Tomar.

› Turismo de Portugal (2016). Turismo em Números – Janeiro 2016. *Turismo de Portugal*. http://tinyurl.com/hggc3k9 (Retrieved on February 28, 2016).

› YouGo (2012). YouGo Lisboa. *YouGo*. http://www.yougoplanet.com (Retrieved on May 14, 2012).