The QRcode Format as a Tool for Inclusive, Personalised, and Interdisciplinary Learning Experiences

Sabrina Leone
Università Politecnica delle Marche, Italy

INTRODUCTION

Inclusive education is an essential component of lifelong learning; it is concerned with an individual's effective participation in society and with the achievement of his/her full potential. The affordances of new educational technologies can enable the development of ubiquitous learning (uLearning) environments and of multimodal learning contents that foster inclusion, personalisation and interaction, provided that a learner-centred and technology-enhanced approach is adopted.

This work aims to illustrate the *QRcode* format, a framework that supports uLearning by the integration of paper-based and digital learning material through Quick Response (QR) code. The format was devised within the research project *Learning4All* (2009-2012) and has been validated by several learning experiences of English as a foreign language (EFL) for different clusters.

BACKGROUND

Internationally, inclusive education is increasingly understood more broadly as a change, in a holistic approach, that supports and welcomes diversity (in race, economic status, social class, ethnicity, language, religion, gender, sexual orientation and ability) amongst all learners (UNESCO, 2009).

The ultimate aim of inclusion in education consists in an individual's effective participation in society and achievement of his/her full potential.

Since learning takes place in many contexts, formal, non-formal and informal, inclusive and quality education become synonyms and are vital for the development of more inclusive societies.

Specifically, quality learning is characterised by two important components: the learner's cognitive development, and the promotion of values and attitudes of active citizenship and/or of creative and emotional development.

An inclusive curriculum is based on the four pillars of education for the 21st century – learning to know, to do, to be and to live together (Delors et al., 1996). Promoting inclusion means stimulating discussion, encouraging positive attitudes and improving educational and social frameworks. This involves changes in content, approaches, structures and strategies in order to provide all learners with flexible and personalised learning to meet individual needs, abilities and learning styles.

uLearning, supported by the growing diffusion of wireless technologies and institutional policies, is becoming more and more a modality of flexible and participatory learning to be adopted in and out of the classroom exploiting smartphones, tablets, sensor network nodes, contact-less smart cards, RFID (Radio Frequency Identification) (El-Bishouty, Ogata, & Yano, 2007) and QR codes.

Thanks to this technological growth, a personal learning environment could be embedded in everyday life (Ogata & Yano, 2004) and become a Computer Supported Ubiquitous Learning (CSUL) environment, characterised by permanency, accessibility, immediacy, interactivity, situatedness and adaptability (Curtis, Luchini, Bobrowsky, Quintana, & Soloway, 2002; Leone & Leo, 2011a). Learning theories for CSUL are authentic learning (Brown, Collins, & Duguid, 1989), situated learning (Lave & Wenger, 1991) and learning by doing (Schank, 1995).

It is widely acknowledged that information and communication technologies (ICT) enrich the learning experience (UNESCO, 2012). Anyhow, the

focus has to be placed on learning, rather than on technology in itself. In a technology-enhanced learning approach, the advantages arising from the integration of ICT in the learning curriculum have to be assessed within the learning experience, the usefulness of learning and its enhancements (Leone, 2008; Leone & Leo, 2011a).

Pedagogical and psychological researchers have debated for decades on a common understanding of "effective learning." According to recent literature (Bulu & Yildirim, 2008; Calvani, 2006; Ellis, 1999; Wasson, 2007), social interaction among learners is a major element of the learning process, indeed, it can decisively impact on learning outcomes (Agostinho, Lefoe, & Hedberg, 1997).

Cooperation is an essential factor in the construction of an "effective learning" environment since it engages students in knowledge construction through interaction and negotiation with their peers. Cooperation enables learners to discuss, argue, agree and reflect on ideas, principles and knowledge. In the design of a suitable – situated, real – learning environment prior attention has to be paid to knowledge construction and effective learning, that is to learning relevant for learners (Johnson & Johnson, 1994).

In the field of foreign language learning, Web-Based Training (WBT) offers live, media-rich, authentic and situationed content in a layout allowing self-directed and self-paced learning (Warschauer, 1996; Leone, Leo & Chen, 2010), and the enhancement of the four language skills (listening and reading - comprehension, passive skills -, and speaking and writing - production, active skills) (Leone & Leo, 2011a). Paper and traditional books have been used as basic tools in developing knowledge-intensive tasks and learning (Chao & Chen, 2009). However, a paper textbook can be combined with ubiquitous technologies in a whole to deepen reading comprehension and to enrich it with audio, video and grammar, vocabulary and cultural/technical/professional in-depth contents.

Paper-based learning material has been successfully enhanced by multimedia contents in experiences on annotation conducted through digital pen (Chao & Chen, 2009; Lai, Chao, & Chen, 2007). More recently, practitioners and researchers have shown growing interest for the potential of QR code as ubiquitous learners' tool, and several learning experiences have been conducted in different contexts: outdoor

education (Lai, Chang, Wen-Shiane, Fan, & Wu, 2013; Law & So, 2010) and outdoor students' assessment specifically (Conejo, Perez de la Cruz, Barros, Galvez & Garcia-Viñas, 2013); integrated paper-based and digital learning materials to enhance listening comprehension in foreign language learning (Law & So, 2010), to enhance reading comprehension (Chen, Chia-En Teng, & Lee, 2010;), to provide support in maths homework (McCabe & Tedesco, 2012), to convey directions to English language learners and recordings for students who have difficulty in reading (Shumack, Lewis, Simmons, & Carpenter, 2013), and to encourage students' interaction during face-to-face lectures (Law, 2013). Most common uses include access to web sites with course information and study materials (Bobeva & Hopkins, 2012). Nevertheless, little literature (Leone & Leo, 2011a; Leone & Leo, 2011b; Leone, 2012) is available about the principles of instructed learning in the use of paper-based learning material integrated with digital material through QR code within a definite learning format or model.

Thanks to its two dimensions (vertical and horizontal), the QR code can store greater amounts of information and services (i.e., website addresses, text, contact details) (Ramsden, 2009; Savarani & Clayton, 2009) that learners can readily, anywhere and anytime, decode by a mobile device with an embedded camera and code reading software installed. Besides fostering flexibility of provision, the integration of QR codes with paper-based learning material also offers personalisation of learning because different learning styles and approaches to the use of ICT for learning can be accommodated.

THE *QRCODE* FORMAT

QRcode is a technology-enhanced learning format that was devised within the research project *Learning4All* (2009-2012). The project investigates on how an aware adoption of ICT can contribute to improve the quality of teaching, in particular for students with special needs (UNESCO, 2009). *Learning4All* includes seven research units: Politecnico di Milano - coordinator -, IMATI CNR di Genova and the Università di Bari, di Bologna, di Perugia, del Salento e Politecnica delle Marche (UNIVPM).

8 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/the-qrcode-format-as-a-tool-for-inclusive-personalised-and-interdisciplinary-learning-experiences/112679

Related Content

Estimation and Convergence Analysis of Traffic Structure Efficiency Based on an Undesirable Epsilon-Based Measure Model
Xudong Cao, Chenchen Chen, Lejia Zhangand Li Pan (2024). *International Journal of Information Technologies and Systems Approach (pp. 1-25).*
www.irma-international.org/article/estimation-and-convergence-analysis-of-traffic-structure-efficiency-based-on-an-undesirable-epsilon-based-measure-model/332798

The IT Evaluation and Benefits Management Life-Cycle
Judy McKayand Peter Marshall (2001). *Information Technology Evaluation Methods and Management (pp. 44-56).*
www.irma-international.org/chapter/evaluation-benefits-management-life-cycle/23667

Measuring Low Carbon Supply Chain
Muhammad Shabir Shaharudinand Yudi Fernando (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 5446-5455).*
www.irma-international.org/chapter/measuring-low-carbon-supply-chain/184247

An Efficient and Simple Algorithm for Matrix Inversion
Ahmad Farooqand Khan Hamid (2012). *Knowledge and Technology Adoption, Diffusion, and Transfer: International Perspectives (pp. 21-28).*
www.irma-international.org/chapter/efficient-simple-algorithm-matrix-inversion/66932

Interactive TV as Part of Crossmedia Systems in Order to Enhance Informal Learning: The eiTV Case Study
Alcina Prataand Teresa Chambel (2021). *Handbook of Research on Multidisciplinary Approaches to Entrepreneurship, Innovation, and ICTs (pp. 224-256).*
www.irma-international.org/chapter/interactive-tv-as-part-of-crossmedia-systems-in-order-to-enhance-informal-learning/260560