

TOWARDS PRIVACY ISSUES IN PERSONAL LEARNING ENVIRONMENTS: A CONCEPTUAL MODEL OF PLE PRIVACY

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Introduction

Higher Education has been enriched by an increasing diversity demanding inclusive practices (Kaur, Noman, & Nordin, 2016), among which technology enhanced learning (TEL) has emerged as paramount for more student-centred (personal) learning. This personal learning involves changing the nexus of power and control from institutions and teachers to learners, e.g. students being able to orchestrate the different educational tools, resources and content (Buchem, Attwell, & Torres, 2011). It occurs causally in informal learning settings, and can be connected to parts of the formal learning process. The learning happens in an open and social environment of the web -social media, social networks and community of practices- and contributes to expanding the possibilities of personal learning to collective and social learning (Camacho & Guilana, 2011). Personal Learning Environments (PLE) as an approach to technology enhanced learning emphasizes the shift of control and ownership from the educator or the designer of a learning environment to the user or the learner, bestowing decision making and choice upon the learner, especially the choice of the learning tools and the use of these tools for learning (Buchem, Tur, & Hoelterhof, 2014). According to the PLE approach each learner designs a unique learning environment to support and enhance individual learning, collecting a wide variety of personal data related not only to the private life, but also to the student learning profile. Especially young people share their private lives online, providing huge amounts of data while older generations are fighting to keep private, among others because they do not fully understand the public nature of the Internet and its implications (Barnes, 2006). While more and more private data is created and shared on the Internet, more and more enterprises, government agencies and marketers are collecting personal data. Barnes (2006) names this situation "a privacy paradox" since many users and learners are not aware of how their private data is used or misused and they are not taking steps to protect their personal data from being used by others. At the same time, it is possible to use the data created and shared on the Internet for educational purposes, for example by means of learning analytics and recommender systems to support individual learning processes.

The term *data* can be defined as meaningful information that can be stored and recorded for further processing (Data Protection Act, 1998) and also as representation of information that includes a personal identifier (Woo, 2010). The term personal data is related to the data used for identification of individuals (Data Protection Act, 1998). Personal data contains any opinion expressed by individuals or expressed by other individuals towards the first ones. Personal data can be divided to ordinary and sensitive. Ordinary data presents the main information about any individual like: name, address, phone number and sensitive data describes person from political, ethnic, religious, criminal, etc. point of view, including biographical information, facts, opinion (Data Protection Act, 1998). In the context of PLE, sensitive data includes also learning background, student's profile, progress, shared documents or opinion. The unauthorised disclosure of personal data is normally considered a breach of privacy, although what is personal data and hence data privacy is a matter of dispute in an online context. Sociological theories consider privacy as part of social life. In the past people experienced social life in relation to small, often local communities, while with the advent of the Internet social life is becoming increasingly networked with access to much larger, distributed and more loosely defined social connections (Rainie & Wellman, 2012). From this perspective, the practice of personal information sharing can be considered as part of social participation and social learning.

By addressing the problem of privacy in Personal Learning-Environments in this paper, we are focusing on privacy of ordinary and sensitive data in context of digital, social learning. The emerging research questions are:

- What kind of personal data is required to support organisation and management of learning in a Personal Learning Environment?
- What kind of personal data should be shared and with whom to support learning achievements and personally successful learning?
- How can student's data privacy be guaranteed in PLEs, if it is to be connected to analytical tools applied for educational purposes?

This paper discusses several issues related to privacy in different types of PLEs such as: informal Web 2.0 / Social Media PLEs, mobile PLEs, ePortfolio-based PLEs, badges-driven PLEs, PLEs connected to formal learning process in higher education in the context of self-regulated learning. This is a first attempt to identify the relationship between privacy and PLEs and between privacy and students' learning control. A conceptual model of privacy in PLEs is developed to present current factors influencing on privacy.

Web 2.0 / Social Media PLE

The conceptualisation of PLE has been carried out through two main strands of research as observed by Fiedler and Väljataga (2010; 2014). The main one has been about its technical nature, and the second one, has been about the pedagogical aspects that need to be addressed when implementing PLEs in different learning contexts. The former integrates diverse issues such as the ones arisen through Web 2.0 / Social Media based PLEs; the latter is mainly based on the self-regulated aim (Dabbagh & Kitsantas, 2012). In the context of social media, the PLE

approach is addressed to tackle the lack of student control and sense of ownership observed in institutional VLEs, such as traditional Learning Management Systems (LMS). Thus, social media has been observed to give students the opportunity to control and own not only the tools as tangible elements but also the processes or the intangible ones (Buchem, 2012; Buchem, Tur, & Hölterhof, 2014). Therefore, Web 2.0 / Social Media based PLEs, and especially where social networks have a predominant role, become environments where learners can bring together individual, group and multiple communities learning spaces. In these spaces, multiple levels of publicity and privacy can be established, considering a more comprehensive approach that takes into account the fact that there are common aspects in the way people perceive the privacy of their information (Razavi & Iverson, 2007). Hence, a PLE can contain collective spaces, accessible only to collaborators, specific people or open publicly, and private individual spaces and other individual spaces, which are accessible to certain people or completely public (Coll & Engel, 2014). However, challenging as it may be, privacy has not given much attention in either of the two strands of the PLE research, although it has been discussed as a critical issue in the context of Web 2.0 / Social Media studies. Especially Social Networking Sites (SNS), such as Facebook and Twitter, create privacy problems that may make users more self-consciously (Blank, Bolsover, & Dubois, 2014). Pew research for example shows that in 2013 50 percent of Internet users were worried about the information available about them online, compared to 30 percent in 2009 (Rainie et al., 2013). The other types of PLEs present many of the privacy issues related to Web 2.0 / Social Media, since they integrate some of its elements.

PLE and Higher Education

There are different good practices of PLEs usage in Higher education - as bridge between formal and informal learning. iPLE environment is proposed in Salinas and Marín (2016) consisting of Learning Management System (LMS), Web 2.0 tools and ePortfolio. Students have possibilities to take advantages of these three elements to construct their PLEs. The opinion of students reveals problems with organisation of personal data. Another study reports successful connection between social LMS and PLE using bookmarking tools for knowledge creation and sharing (Hölterhof & Heinen, 2014). The study from Saz, Engel, and Coll (2016) reports on an iPLE experiment with the Elgg platform that brings together academic and social environments. Two directions for knowledge transfer are possible: from LMS to PLEs and from PLEs to LMS. Then the emerged question is related to the private data flows in these two directions - what and where data is shared, stored and processed. A specially developed social media platform Graasp for university students is introduced in Benson, Morgan, and Tennakoon (2013) with features for arrangements of collaborative spaces, recommendations in context and management of privacy. Mechanisms for privacy management are introduced to protect users from unauthorised access to the social shred items. Users express their need to control the privacy in spaces and their profile.

ePortfolio-based PLE

Web 2.0-based ePortfolio has been an interesting educational implementation of research aimed at incrementing students' awareness of their PLE (Gewerc et al., 2016). In this context, social media has been argued to impact the ePortfolio construction – see for example, implementations based on blogs (Tur & Castañeda, 2016) or social networks (Gewerc et al., 2016) – and its open nature has been observed both as a potential and a limitation (Tur & Urbina, 2014). In parallel, it has also been claimed that in order to maximise the learning effect of the use of an ePorfolio-based PLE, the student's personal space requires having some proprieties as privacy, property and permanence (Rodríguez Ilera et al., 2014). Privacy in the case of PLE is related to the control that the learner has on the publication of the content. E-portfolio users can store their own artifacts and evidences in a private way until they decide to publish the content on the web or provide access to the teacher. However, privacy issues have not been addressed in the exploratory studies on ePortfolios, in which learning is enhanced by an open environment for collaboration and peer-feedback.

Mobile PLE

Further development of the PLE approach has been carried out with the use of mobile technology (Attwell, Cook, & Ravenscroft, 2009; Conde, García-Peñalvo, Alier, & Piguillem, 2013; Humanante-Ramos, García-Peñalvo, & Conde-González, 2015). Mobile devices have been recently claimed as powerful tools for contextual and ubiquitous learning. The development of geolocalisation, navigation and communication apps has empowered the possibilities for learning everywhere. However, this has an important drawback derived from privacy issues, since these apps capture personal data during browsing, trace Web habits, look into contact lists, and gather phone numbers and the unique ID number of the personal phone, among others. Currently, this aspect is becoming an increasing topic of concern since many businesses take advantage of the information obtained through mobile apps.

Open / Badges and PLEs

Recently, the question related to educational badges used in learning has emerged. Educational badges have been used to increase learning motivation. Different types of badges can be designed and issued according to the student profile, e.g. based on the background, prior and current knowledge, learning activities and learning performance (Abramovich, Schunn, & Higashi, 2013). Open Badges may be used to support (a) recognising skills, achievements, experiences, practices, memberships, engagement on individual, peer and community levels, (b) assessing learning including summative, formative and transformative assessment, (c) motivating learning and providing orientation, (d) studying learning based on the information contained in a badge such as what the badge represents, criteria, evidence, issuers, earners (Buchem, van den Broek, & Lloyd, 2016). Since issuing and earning of badges includes tracking of student progress, participation activities, learning outcomes, learning systems may be designed to process data related to the personal profile of every learner, including personal data. This learner-related data opens new opportunities but also creates new questions about data privacy.

Learning Analytics and PLE

Learning analytics could be used to improve learning through the information that can be obtained, but more importantly in the PLE context, it can also provide learners with recommendations in their learning based on earlier learning activity (Fournier, Kop, & Sitlia, 2011). For that purpose, not only data from a formal learning context is required, but more importantly, information from the outside of the institutional context, where learners are in an informal and personal learning context (PLE). This new context involves using distributed services across multiple learning scenarios and, consequently, new methods of data collecting and interpretation, for instance, Social Network Analysis (Casquero, Ovelar, Romo, & Benito, 2014; Fournier, Kop, & Sitlia, 2011). Evidently, these learning analytics methods can raise uncovered data of privacy issues related to the gathering of information that the learner is creating and sharing across multiple learning scenarios.

Privacy Model in PLE

Based on the different types of PLEs and their specific privacy issues, we propose the PLE privacy model to conceptualise privacy on different levels. Figure 1 summarises the main factors that have impact on privacy in PLEs. The model includes two levels of privacy control - learner-driven and institution-driven privacy control. Learner-driven privacy control is especially relevant in Web 2.0 / Social Media PLEs as well as in mobile PLEs, which are usually applied to support informal learning. Informal learning with PLEs gives more flexibility to learners to organise and control their private data. At the same time, learners in informal learning context are at a higher risk of disclose and misuse of private data, such as using default privacy setting in registration to Social Media, posting risqué pictures or excessive sharing of own and other users private data. In contrast to that, institutional PLEs limit learners' possibility to control their privacy, but instead of that they protect learners from impropriate usage of their private data, e.g. by introducing certain regulations, such as Social Media Guidelines or keeping private data locked in an LMS. In the centre of the model, ePortfolio-based and badges-driven PLEs connect informal learning and formal learning contexts and require a both learners and institutions to apply common data privacy principles. An important question here is related to the connections between data privacy in formal and informal learning contexts and in data permeability.

Privacy control by students						Privacy control by institutions			
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Ir	nformal learning]	Da			.5	Formal learning	3
		Personal Data Publicity High Scenario and context of data usage Low							
								Low	
								usage High	
		High	Fre	edor	n of ider	ntity cons	truc	ction Low	
		Management of private data High Organization of personal data High Processing for learning analytics purposes Low						ita Low	
								ata Low	
								purposes High	

Figure 1. The PLE Privacy Model

The proposed PLE privacy model shows that the data privacy could be controlled more or less by students as well as by the training institutions. The main factors that reflect on the data privacy are extracted from the above described PLEs different implementations and they can be explained using a scale from low to high. The meaning of the factors is summarized as follows:

- Publicity: Publicity in PLEs means how much information is shared by students and universities and it is available for public usage outside the purposes of the educational process. It can be seen that Web 2.0 and Mobile PLEs are characterized with high publicity, because of the nature of the web and mobile applications which usage drives students to generate content sharing information, communicating is social networks, annotating, etc. In contrast of that, when the personal learning process is organized in LMS, the shared information is closed in the training institution and the publicity is low.
- Scenario and context of data usage: PLEs organized in the web utilizes learning scenarios consisting of learning in open groups of interests, learning in community of

practices, learning in social networks that leads to the low level of privacy and usually it is a self-directed learning. PLEs that are part of the formal learning space are more closed just to the pointed learning groups by an educator and the PLEs are used in support of formal learning in well-defined educational scenarios according to a given course curriculum.

- Freedom of the identity construction: The possibility for students' identity construction is higher in the PLEs which purpose is to facilitate informal learning, because the students have freedom to prepare their own profile according to the specific learning interests and used tools/applications/services. This possibility is lower in the institutional PLEs, because the students' identity is forming from their participation and achieved results during given classes.
- Management of private data. The private data are with high possibility for management in Web 2.0 and mobile PLEs where students decide how to arrange the personal information. In university PLEs such freedom of private data management is not allowed, because of the strongly regulated principles and rules of the institutional learning environment.
- Organization of personal data: What kind of personal data will be hidden, shared or stored, kept or deleted, it depends of the students' understanding and this data organization is controlled by students. In the university settings the organization of personal data is low controlled by students, this process is typical for educators.
- Processing for learning analytics purposes: The control on the personal data usage for the purposes of learning analytics is low in web-based and mobile PLEs, because the students' data are utilized in many cases without their permission. In contrast of that, the training institutions have policies for personal data delivery to the third parties or applications where such data are analysed.

Conclusions

This paper provides an overview of existing PLE types in the context of data privacy to reveal several problems related to data privacy. The model summarizes the current situation of personal data usage in PLEs and could be used in the form of a recommendation tool explaining the possibilities for personal data sharing, organization and management and the influence of this fact on the data privacy. As learners need more tools to organise and control private data, there is a need for more research related to data privacy in Personal Learning Environments. One of the key directions in this emerging research may be the question of effective mechanisms for a responsible use and sharing of own and others private data in different media, learning systems, services and applications to enhance self-regulated learning in the context of growing diversity in Higher Education.

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