The development of a new methodology for knowledge sharing in the interface between university and society — An example from the meat sector

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ABSTRACT

Design science research was used for the generation, use and evaluation of a model for knowledge sharing in the user community through open educational resources (OER). The focus of interest was on the development process of a model for knowledge sharing that emphasizes the characteristics and the needs of the user community; the empowerment and democratic issues of openness; the collaboration between institutions and dialog with society; and the consideration of quality and sustainability issues. Initially, the community needs were analyzed through surveys and workshops, and the findings used, through negotiations, to formulate the development process. An open-training platform served as an infrastructure and included a repository with OER, a wiki and a discussion forum. The purpose of this article is an attempt to provide universities with a plan and template for integrated knowledge sharing that responds to societal needs. Usability and usefulness has not been evaluated.

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1. Introduction

The communication between university and society has traditionally been one-way but in contemporary society a more dynamic and network-based relationship is under development and therefore we experience changes in research and educational practices (Nowotny, Scott, & Gibbons, 2001). In research a collaborative tradition exists whereby researchers build upon each other's work, conduct research together in big projects and discuss their findings with fellow researchers in order to get a shared understanding, write articles together and get them peer-reviewed. In teaching a similar interactive tradition is gaining momentum through the open educational resource (OER) phenomenon (Iiyoshi & Kumar, 2008), which also opens communication between university and society. But, how can we design models for interactive knowledge sharing in the interface between university and society?

OER refer to "digitized material offered freely and openly to educators, students and self-learners for use and reuse for teaching, learning and research". The resources are accumulated digital assets (including learning content, software tools to develop, use and distribute content, and implementation resources such as open license), which can be adjusted and provide benefits without restricting the possibilities for others to enjoy them (OECD, 2007). Until recently, most digitized

teaching material has been locked behind passwords, but the OER movement, which is often community based, is counteracting these barriers.

Communities of practice can be described as groups of people who share a concern or a passion about a topic and who deepen their knowledge by interacting (Wenger, 1998). Communities of interest bring together stakeholders from different communities of practice (Fischer, 2001), and in the interface between university and society the establishment of such a community can be important for the design process.

The society is increasingly more engaged in concerns for food, and specifically issues related to the meat sector. Animal welfare and sustainability related to the production of meat, and health and safety issues related to the consumption of meat are concerns of high priority to many consumers and citizens all over the world, and thus for industry and students in a global context.

From a more practical view-point there are a number of arguments for the development of a methodology based on OER within the meat sector: 1) it was anticipated that an open online educational approach would be most appropriate for sharing of knowledge and mutual learning when targeting industry and higher education institutions in a global context; 2) because traditional meat science is a subject area of decreasing interest, OER in meat science could be a way to attract more students; 3) sharing of aggregated knowledge is of benefit for other teachers in the same content area, in particular those in small research groups who have no possibility to develop resources of high quality standard. This is added value on taxpayers' money; 4) sharing of knowledge through information and communication

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technology (ICT) is moreover beneficial to scientific articles in that it can include multimedia; and 5) scientific articles that arise from research, have a lag time before publication and the more speedy output of an OER using an online educational approach would therefore complement a later publication.

The learning philosophy underpinning the use of OER is grounded in the work of Dewey on inquiry-based learning (Dewey, 1916). He emphasized the importance of learners being active explorers of their environment and teachers facilitating learning by providing materials and guiding the learning path. Another source of influence is Vygotsky's theorizing on learning and development. Vygotsky (1978) argued that learning fundamentally is socially and culturally situated and the importance of other people (i.e. parents, teachers, peers) in guiding and scaffolding the learning process of the individual. Building on "root ideas" of Dewey and Vygotsky, contemporary educational theory argues for the importance of learners participating in collaborative learning activities and performative learning efforts (cf. Koschmann, Hall, & Miyake, 2002) and the design of learning environments that offers opportunities for such learning (Thomas & Brown, 2011). OER, then, is designed and developed for learner engagement, taking in consideration local adaptability by the following four steps: understanding the context, determining social commitments, reifying understandings and commitments into design, and scaling up to multiple contexts (Barab, Thomas, Dodge, Squire, & Newell, 2004). The construction of the OER utilizes multimedia and was also influenced by the work on cognitive overload by Mayer and Moreno (2003).

The primary objective with this text is to describe how we developed a community and an infrastructure, an open-training platform, which comprises a structured collaborative space to share experiences and resources between teachers, trainers and trainees (Barrett et al., 2009). A secondary objective is to describe the empowerment process, to promote the information contained in the OER for non-commercial teaching and training and research purposes (Kanwar, Balasubramanian, & Umar, 2010). A third objective is to describe how we made higher education responsive to society through a dialog on the model and the content of the OER. An additional objective was to discuss quality and sustainability issues. To achieve these objectives it is necessary engage the user in order to design for online learning by the alignment of technology, learner needs, pedagogy, content and context. The assumption was that the OER could then be adapted and used by a multitude of existing teaching and training programs, and because they were multi-modal, videos could complement the content and be shared without any translation.

In educational sciences, design research is a research area for developing and refining theories about how people learn, and design-based research is a series of approaches, with the intent to produce new theories, artifacts and practices that impact learning and teaching in naturalistic settings (Barab & Squire, 2004).

Design science research is an established tradition that in general aims at producing and evaluating design guidelines and frameworks that inform the design of artifacts addressing a certain class of problems (Hevner, March, & Park, 2004). The methodology used for knowledge sharing via OER has similarities with design science research (Simon, 1996) in that both are characterized by relevance and novelty and require a systematic research structure: 1) defining the problem, 2) demonstrating that no adequate solution exists, 3) development and presentation of a novel ICT artifact (construction of models and methods) that addresses the problem, 4) evaluation of the IT artifact enabling the assessment of its utility, 5) articulation of the value added to the IT knowledge-base and to practice, and 6) explanation of the implications for IT management and practice (March & Storey, 2008). In other words, design science research focuses on the construction of situated artifacts and the evaluation of artifact performance following construction (Vaishnavi & Kuechler, 2008).

The purpose of this article is to describe how design science research methodology was used for the development and use of open educational resources as an ICT artifact for knowledge sharing. Furthermore, we describe the output of the design research as a model including a virtual community (a group of people that primarily communicate and interact via Internet), a repository (an archive containing digital content), and more than ten OER for knowledge sharing. It should be emphasized that this paper addresses only the design process; the impact evaluation is not covered.

2. Material and methods

A multi-disciplinary EU-project with the goal to improve the meat quality for the consumer was conducted 2007–2012. This project comprised a number of research areas; such as animal welfare and health, sustainability and chain management, and meat quality and safety. The project was an industry–academia partnership involving 62 partners of whom 20 were universities, 15 research institutes, and 27 enterprises and organizations. A segment of the EU project, focused on the development of a novel solution addressing the problem of global knowledge sharing responsive to society.

In the design science research approach, the definition of the problem was facilitated by the use of surveys and workshops, and the development of a novel solution was based on the negotiation between university and society for modeling of the OER and the infrastructure.

2.1. Surveys

Three electronic surveys were conducted during the first year of the project to obtain information about the level of development in teaching and training as well as the demand on future training needs. One survey was sent to over 250 teachers and trainers in all the countries involved with the project, soliciting details of currently used teaching and training methodology and about their interests and needs of various educational approaches and resources. Two surveys detailing training needs in industry were sent to trainers and to potential users of training material.

2.2. Workshops

Two half-day workshops, with invited participants, followed the surveys. One addressed industry demands for knowledge transfer. This workshop had 12 participants, which were mainly from industry organizations. The areas of interest were discussed first in a broader context and later as more detailed topics.

The second workshop on teaching methodologies had 8 participants from different European universities and vocational training organizations, and the following topics were discussed: Sharing of knowledge between institutions and in dialog with society, Virtual Community, on-line training of trainers, delivery models and the use of a repository.

2.3. Negotiations to establish OER

Fundamental to this project was the establishment of close ties to industry partners with the intention to have close dialog and interactive exchanges on issues facing the industry. A reference group (n =16) was established with a minimum of one from each of the research areas in the project. Based on the results from the workshops this group suggested potential OER to address demands for training in industry and for teaching at university level. Rather than develop a new academy of learning modules, they suggested OER that were stand-alone complements to traditional teaching activities with the possibility for users to add-on comments and recommended additional reading materials and secondary to make commitment with teachers and trainers in different curricula about the use of OER. In addition, the reference group provided an opportunity to test the learning resources.

An ICT-based infrastructure for the collaborative activities was discussed after the workshops. Key components of this infrastructure