

Internationalization Processes for Open Educational Resources

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Abstract. Internationalization and globalization impact the work in knowledge-intensive environments dramatically. By that, internationalization has become an important factor for educational institutions and their stakeholders as well. A promising starting point for initiating international educational collaborations are open educational resources. Thus, the participants of a variety of initiatives has made their learning and teaching resources public available. But up to now, the process to use, share, and adapt such resources is still not clearly structured or even well established. The main focus of this paper is to take first steps to construct a high level process model for global educational settings that can be used as a framework to structure the adaptation process regarding internationalization of open educational resources and to identify influence factors to the corresponding processes. The framework can support the extraction of concrete process flows for specific context and scenarios.

Keywords: Open Educational Resources, Adaptation, Internationalization

1 Introduction

The goal of this paper is to develop a process model and to identify influence factors on the educational processes, in particular for the use of Open Educational Resources (OER). We present a process model for internationalization of resources related to the most important influence factors.

Internationalization and globalization impact the work in knowledge-intensive organizations dramatically, e.g., through workforce mobility, offshoring and collaboration across borders [1]. In particular, internationalization has become an important factor for educational institutions and their stakeholders. Open Educational Resources can play a crucial role for this internationalization process, for example by:

- Using shared resources in collaborative teaching settings, e.g., organizing common international study programs
- Re-use and adaptation of materials in international settings: working with common course materials in different locations
- Export of study programs, resources and services: Establishing internationally accessible programs or commercializing resources / services internationally

A promising starting point for initiating international collaborations are Open Educational Resources. A variety of initiatives has made their learning and teaching resources openly available to the public, such as the MIT Open Courseware Initiative¹, the UNESCO OER Initiative², OpenLearn³, Ariadne⁴, Gateway to Educational Material⁵, Merlot⁶ or the JISC Collections⁷.

However, the process to use, share and adapt resources is still not clearly structured or well established. The key research question therefore is: *how to structure internationalization activities using open educational resources?* Therefore, we aim at developing a basic process model to structure the internationalization process and to identify key influence factors.

To clarify the embedding of these research focuses, it is important to understand the research framework and related problems. In our research model (Fig. 1) for international knowledge-intensive settings, we analyze the dependencies and impact of the following components:

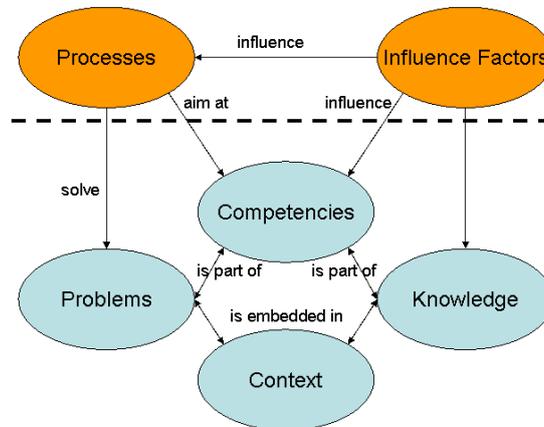


Fig. 1. Research Model.

¹ <http://ocw.mit.edu/>

² <http://oerwiki.iiep-unesco.org>

³ <http://openlearn.open.ac.uk/>

⁴ <http://www.ariadne-eu.org>

⁵ <http://www.thegateway.org>

⁶ <http://www.merlot.org>

⁷ <http://www.jisc.ac.uk/index.cfm?name=coll>

The figure shows the main concepts related to our research question:

- **Processes** structure the educational steps and denote activities and tasks.
- **Influence factors** influence processes, tasks and activities.
- **Competencies** describe knowledge, abilities, skills and attitudes which enable actors to solve unknown **problems** within a certain **context**.

In this paper we mainly approach the problem solving process, i.e., how to structure such a process by specifying its main tasks and steps and pointing out the importance of influence factors. Influence factors are directly related to competency aspects in international settings – competencies are needed to perform processes and to solve certain problems. Consequently, from the processes in combination with the influence factors, we can derive necessary competencies for the addressed settings.

In this paper, we therefore introduce a generic process for the use and adaptation of OER. We focus on a specific internationalization scenario: adapting OER with collaborators around the globe. For this scenario, we specify key processes and influence factors. We conclude with an outlook on future research.

2 General OER Model

A general process model for global educational settings should take several distinct processes in to account. Such a process model should consider business aspects as well as processes from the view point of the learners, teachers, instructors or lecturers. With regard to the main objective of our paper – describing a high level model for global education – we studied existing classifications in the field of technology-enhanced learning. As an example, the Prolix-project has identified different learning designing processes on organizational level [2]. The classification is not entirely usable in its own since it included detailed activities that are not relevant for our approach. A similar process model was done by the ICOPER-project [3]. This classification had a better level of abstraction identifying three main stages of activities of needs analysis, planning and design, and learning provision that could be implemented for our model. Thus, these two classifications were combined for learning design processes from instructor's point of view. When constructing a model for global educational settings, different stages of business collaboration need to be described. As the aforementioned classifications included business aspects only partially, they are identified and extended from ICT-supported unified process model of offshore outsourcing [4]. The offshore outsourcing processes are relevant for our model since the cooperation steps on a high level can be adapted to fit the technology-enhanced learning domain.

Our general model for global educational settings consists of four main high level stages: **business and collaboration, needs analysis, planning and design, and learning provision**. Each of the high level stages includes several activities that are not necessarily sequential but can be used to identify specific process flows. The stages with different activities are presented below.

The **business and collaboration** stage incorporates activities for business cooperation. These activities present on an organizational level different cooperation phases of educational units. One possible cooperation of businesses could be a project

working to improve distance education. These activities include cooperation establishment, analyzing and modeling business processes, building awareness of the partners, planning collaboration procedures, planning budgets and time usage, executing the collaboration, and sharing experiences.

The **needs analysis** stage identifies the initial activities regarding instructional design. Starting from analysis of different actors involved in the learning process, modeling the outcome for the learning, analyzing learner's competency needs and what a learner should learn and how much effort that includes, planning the evaluation of the learning process and improvement of the needs analysis.

The **planning and design** stage identifies steps regarding design of instructional activities on a high level. These activities include planning learning outcomes, designing teaching methods, planning the contents to involve and tools to be used, plan the re-use and adaptation procedure of resources and set assessment indicators.

The **learning provision** stage identifies the last steps of instructional design with the execution of learning activities, assessment of the learning activities and evaluating the whole learning development process. It should be noticed that the student perspective is only partially included in our generic model. Under learning activities and further extension can be relevant to apply the model for specific learning settings.

Even though this general model is on a high level it can be used as a framework to identify several process flows related to national or international collaboration, teaching design matching specific curriculum, or to localization of open educational resources.

With regard to the main objective of this paper, we elaborate a case study and a concrete example of implementing this model for cultural adaptation process regarding internationalization of OER. For this purpose an extension to the above listed activities is required covering aspects of cultural adaptation and localization efforts. For this purpose, we have used a specific model: the cultural awareness learning model from the COSMOS-project [5]. This model describes activities of learning and teaching in international working and learning settings. Besides, the model includes the activities (five phases) of the learning teams that consist of students with the supervision by teachers [5].

Phase 1 – **awareness building** – includes the activities of regarding the introduction to the topic by the teacher, learners' discussion of their objectives, expectations, barriers and success factors as well as about cultural differences.

Phase 2 – **cultural profiling** – includes activities identifying cultural attitudes, teaching and learning methods of students' own cultures, comparison of the factors and identification of possible opportunities.

Phase 3 – **elaboration** – includes building of groups, assignment to certain tasks and projects, seeking of information, discussion and collaboration and identifying how the materials already found should be re-used to fit local curriculum or needs of a student.

Phase 4 – **content enrichment** – consists of the localization of the materials, discussion of the usefulness and finally re-publishing of the new materials.

Phase 5 – **experience exchange** – describes the learning process and also the evaluation of the whole process done by the teacher. The extension of culture

awareness learning model will be included as the model is applied for internationalization in the next chapter.

This chapter created and identified a basic model for global education consisting of activities related to business collaboration as well as to instructional design and learning provision. To illustrate the use of the model, an example will be given and the next chapter describes how the model can be applied to a process model regarding cultural adaptation.

3 Application of the Model for Internationalization

In the following, we describe how our OER process model is refined for internationalization purposes. As different cultural backgrounds are considered crucial for internationalization scenarios [6], we integrate these for creation, preparation and delivery of OER exemplary. The OER process model (section 2) will be detailed by two additional levels: one level which takes the cultural aspects into account and one level which describes the operational level and the implementation of cultural aspects in OER. Thereby, these two new levels can be seen as detailing of the entire model specifically for the case of cultural aspects. It should be noted that the general process model is applied in a specific setting and that in different application scenarios the process flow can vary.

The whole process – focusing on cultural aspects – is depicted in Figure 2 and is described in detail in the following. The arrows represent the sequence and the flow of information which is transferred from one activity to another.

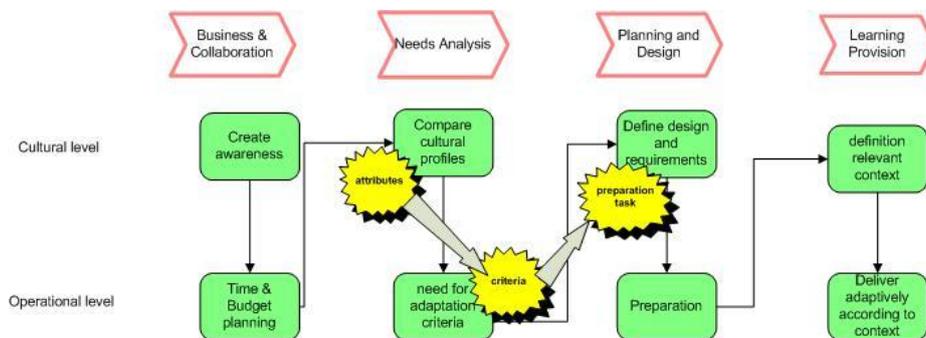


Fig. 2. Cultural adaptation process model.

Awareness about cultural issues is critical for knowledge transfer in international settings and can be seen as important prerequisite [7]. Thus, provisions which create and continuously improve awareness for cultural aspects should be defined in the beginning on the stage of **business and collaboration**. On the operational level the planning for these provisions should be performed as well as the planning for further activities in the following stages. One approach could be to create cultural profiles in order to investigate existing cultural differences [6]. It should be noted that cultural profiles on individual levels are much too detailed in the context of

internationalization settings. Rather, aggregations or profiles for larger user groups, like organizations are needed.

Then, the **needs analysis** should be performed, taking into account the characteristics of individuals which are relevant for accessing the knowledge such as competencies and preferences stored in user models. The differences between the user groups should be investigated and considered for creation and preparation of OER. In the case of culture, the characteristics describing users' cultural backgrounds are stored in their cultural profiles. Thus, differences between user groups can be investigated by comparing available cultural profiles. Due to the fact that cultural profiles consist of several attributes, such as communication style or preferred media type (see [8] for more) differences can be expressed using these set of attributes. On the operational level, these differences identified from the comparison should be formulated as requirements for the preparation of contents. Therefore, adaptation criteria which describe aspects to which contents can be prepared for an adaptive content delivery, such as presentation preferences or device requirements (see [9] for more) could be used. Mapping attributes from the cultural profiles to the adaptation criteria can be a proper way to translate the detected cultural differences into a need for content preparation. This step seems crucial as differences detected in the comparison of the profiles can be narrowed down to aspects which relate to content preparation tasks.

In the stage of **planning and design**, OER which can be reused are selected and the need for the adaptation criteria is used to plan concrete design activities for the selected resources. Due to limited resources, not all investigated needs for content adaptation can be realized and consequently the most promising have to be selected. For this purpose the adaptation criteria provide a good approach to structure the decision problem. However, to each relevant adaptation criterion identified before, a preparation task should be formulated. On the operational level, preparation tasks are implemented and the OER are prepared in order to suit the learner's cultural context. In the last stage of **learning provision**, the context in which the prepared OER should be provided to the learner has to be defined. In the case of cultural aspects the target group of the resource has to be defined and described in the OER's metadata. On the operational level, rules have to be defined which ensure that the prepared resource is delivered only to those users which fulfill the requirements defined in the metadata.

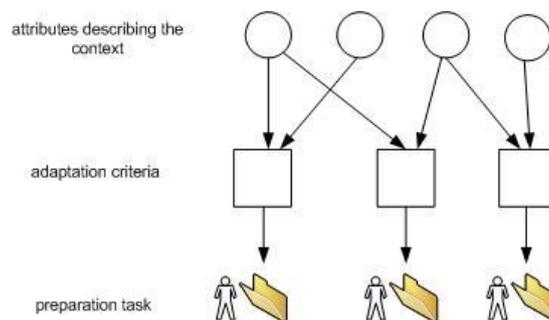


Fig. 3. Relationship of the factors.

The aspect of mapping the contextual factors to the adaptation criteria and their relationship to the preparation task is crucial and is presented in Figure 3. Due to the fact that a huge variety of context parameters influence internationalization scenarios they need to be investigated profound. However, a first set of context factors based on a comprehensive literature review can be found at [8].

Context factors can be mapped to adaptation criteria in order to express a certain need for content adaptation. Thereby, a context factor is mapped to one or more adaptation criteria. For example, frequently used icons in a cultural setting can be directly related to presentation preferences or the ability of self motivation can influence interaction preferences, presentation preferences, content preferences as well as the preferred learning style. Specific preparation tasks can be formulated in order to realize the required cultural-initiated adaptation of OER. For each adaptation criterion, templates which describe typical preparation scenarios could be used to speed up the design process. Furthermore, this template can also be used to estimate the effort needed for the preparation task. This might be relevant in particular for scenarios in which not all aspects can be realized due to limited resources. In principle, the preparation can be realized automatically, for example by using transcoding [10] or manually by human actors which prepare the OER by using authoring tools [11]. However, the preparation task depends on the adaptation criteria, the attributes describing the cultural aspects and the resources which should be prepared.

4 Outlook and Conclusions

In this paper we introduced a high level process model for global educational settings. Our main objective was to create awareness for processes in international settings using OER and to develop supportive approaches which facilitate the creation and reuse of such resources. Starting from the presented OER model (section 2), different and diverse individual process flows can be identified for different application scenarios. We outlined this exemplary for cultural adaptation but still more research is needed. In the next steps we will study and verify these processes regarding existing similar models and an empirical investigation of real world settings.

One main future target is to find recommendations and adaptation mechanisms for to performing and supporting re-use in international settings by using OER. These recommendations should include organizational aspects, like process patterns or guidelines, ICT support aspects, like tools and services and also integration aspects, like standardization issues.

As seen in the early stage of the intended application case, the support of the functions by tools and services will be a crucial factor. We assume that barriers to create, modify and adapt OER will be reduced if processes are known and supported adequately by ICT. Thus, we will analyze which kinds of tools are suitable to support the identified processes and their functions as well. Due to the high distribution and involvement of many human actors in international collaborations social software and recommender systems could be suitable for support [12].

In the scope of intra-organizational and international collaboration in particular, standardization is still a big issue. Hence, we will also analyze which standards are needed in these processes (specifically for exchange, e.g., profiles and OER) and which kind of additional requirements for standardization appear from an international collaboration using OER.

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