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## Special Session OER: Integrating OER and Instructional Design – Towards a more holistic view

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**Key words:** *Open Educational Resources, Instructional Design*

### Abstract:

*Instructional Design (ID) has been introduced as a fundamental approach to design learning environments with a strong focus on media usage. In this regard, recent transformations in the realm of ICT have gained an increasing influence on learning and teaching practices, thus challenging conventional methods. Advocators of sophisticated web-based tools such as Weblogs, Wikis, or e-portfolios which are at the heart of the “Open Educational Resources (OER)” movement proclaim a new dimension of learning which is solely dependent on the individual thus repelling ID. Despite such movements, this paper argues for a sustained integration of OER and ID since appropriate application of new learning tools demands certain conditions both on the side of the learner (e.g. competences) and on the side of the situation (i.e. design). A set of ID-OER rules will be introduced that are targeted on overcoming current limitation of OER.*

## 1 Introduction

„If I give you a penny, you will be one penny richer and I’ll be one penny poorer, But if I give you an idea, you will have a new idea, but I shall still have it, too“(Albert Einstein)

„The world’s knowledge is a public good and technology and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge“. (William and Flora Hewlett Foundation)

These two quotations concisely summarize the fundamental principle of Open Educational Resources (OER). Open Educational Resources (OER) can be described as a movement which grounds on the simple but powerful idea that the world’s knowledge is a public good and that technology in general and the World Wide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge. This idea has been put forward by the William and Flora Hewlett Foundation and has been soon to be known as the Open Content Initiative or the Open Educational Resources (OER) Initiative. For the past five years, this foundation has been one of the leading sponsors in the area of OER, i.e. high-quality digitized educational materials offered freely and openly for anyone with Internet access. These materials are available for use as is, or for re-use as appropriate. Since 2001, the Hewlett Foundation has made grants in excess of \$40 million to support institutions and organizations that develop and provide online access to open educational content. Among them are:

[1] MIT OpenCourseWare – publish course materials from virtually all MIT courses

[2] Creative Commons – to offer innovative copyright solutions that allow for more open access of creative work and scholarly materials online

Meanwhile, a euphoric spirit has been developed from the movement of OER containing tremendous promises. What those promises entail will be discussed in the next section.

## 2 The claim of Open Educational Resources (OER)

### 2.1 What are Open Educational Resources?

Open Educational Resources are conceived of educational materials and resources offered freely and openly for anyone to use and under some licenses re-mix, improve and redistribute. However, it should be noted that an authoritatively accredited definition does not yet exist. Experts who understand OER as a means of leveraging current educational practices and outcome propose definitions that are based upon the following core attributes:

- that access to open content (including metadata) is provided free of charge for educational institutions, content services, and the end-users such as teachers, students and lifelong learners;
- that the content is liberally licensed for re-use in educational activities, favourably free from restrictions to modify, combine and repurpose the content; consequently, that the content should ideally be designed for easy re-use in that open content standards and formats are being employed;
- that for educational systems/tools software is used for which the source code is available (i.e. Open Source software) and that there are open Application Programming Interfaces (open APIs) and authorisations to re-use Web-based services as well as resources (e.g. for educational content RSS feeds).

There are some ambiguities concerning the central descriptions “open” and “resources”. Downes [1] states that it remains unclear what “open” actually refers to. There are a lot of resources offered by non-commercial enterprises such as academic papers published by learned societies which are nonetheless not openly accessible. They require payment of a subscription fee for access. On the other hand, many resources and services offered by commercial companies such as Google search are widely and freely available without constraint. Thus, the concept of “open” should basically contain no cost to the consumer or user of the resource.

The second crucial term, “resources” also accounts for some airiness. Although the specification “educational” has been added, it does not actually narrow the domain. Therefore, it is worthwhile to clarify this issue.

In a position paper, Hylén [2] refers to the following types of resources:

- Open courseware and content;
- Open software tools (e.g. learning management systems);
- Open material for e-learning capacity building of faculty staff;
- Repositories of learning objects; and
- Free educational courses

Another attempt is to define resources according to their function in learning. Johnstone [3] lists the following aspects:

- Learning resources - courseware, content modules, learning objects, learner support and assessment tools, online learning communities

- Resources to support teachers - tools for teachers and support materials to enable them to create, adapt, and use OER, as well as training materials for teachers and other teaching tools
- Resources to assure the quality of education and educational practices

At present, it seems that there are two main categories of such taxonomies [1]: Types of resources and resource media. Resources contain software tools such as learning management systems, papers, monographs, animations, simulations, games etc. The resource media entail typical aspects of ICT such as web pages and Internet services which are now being referred to as “Web 2.0”.

However, within the last years these developments have gained even more influence which culminated in buzzwords such as “Ne(x)t Generation Learning” or “E-Learning 2.0”. The last term builds on “Web 2.0” and is targeted on the impression of the birth of a new generation of Internet [4]. Since the focus has shifted from the consumption of content created by experts to the participation within various projects, we will advocate the term “social-participative applications” to refer to this new form of multimedia. It includes applications such as Wikis, Weblogs, e-portfolios, social-bookmarking etc. all of which have a great deal in common: (1) technology takes a back seat, (2) usage impacts information (collaborative filtering), (3) content and meta-data are created by communities, and (4) everybody can take part in it.

When it comes to learning there is the assumption that these sophisticated tools will effectuate a “new learning”. In this regard, Downes [1] uses the expression “E-Learning 2.0” to refer to the current transformations that affect both learners and teachers.

## **2.2 Current initiatives and approaches**

Since OER has now become a highly dynamic movement, there has been a need to summarize ongoing developments in order to substantiate its claims. In this regard, the Open e-Learning Content Observatory Services (OLCOS) – in which the FernUniversität in Hagen is one of the six partner organisations – is of especially importance.

As a Transversal Action under the European eLearning Programme, OLCOS objectives are to make available information and learning services that will foster and support the creation, sharing and re-use of open e-learning content in and among the European member states. In order to achieve a dynamic growth in open e-learning content, OLCOS provides organisational and individual end-users with practical information required to create, share and re-use such interoperable content. In the realisation of these objectives, OLCOS emphasises that Open Content besides employing appropriate licensing schemes is essentially about collaborative e-learning practices that add value to open e-learning content (for example, through use cases, best practices, and lessons learnt).

The OLCOS information and learning support services offers practical information, advice, and guidance for the following key target groups of end-users: Students, teachers, trainers and tutors, both as learners and promoters and mentors in the creation and use Open Content for a variety of learning settings and processes. The main environments where these target groups are, or will become, active are schools, pedagogical academies, pedagogical institutes (teacher training) and other vocational training centres, (e-)universities and other distance learning institutes.

The main activities are:

- To provide organisational and individual e-learning end-users in Europe with orientation, perspective, and useful recommendations in the form of a medium-term open content roadmap;
- To offer to the end-users easy, but intelligent access to practical information and support services in the creation, sharing, and re-using open e-learning content (tutorials, guidelines, best practices, and specimen of exemplary open e-learning content),
- To establish a larger group of committed experts throughout Europe who not only share their expertise with the project consortium, but also steer networking, workshops, and clustering efforts,
- To foster and support a community of practice in open e-learning content know-how and experiences

Expected results and outputs are:

- A European Open Digital Educational Content Roadmap
- A Web-based Knowledge Map offering interactive and user-friendly access to the information and learning services
- The opportunity to participate in a Community of Practice in open e-learning content and practices
- 4 Workshops and 1 major Conference

At the beginning of 2007, OLCOS published the “Roadmap 2012” to bridge the gap between traditional educational practices and current innovations of OER. It entails several practical recommendations that are target on educational policy makers, educational institutions, teachers, students. Following are two explanatory recommendations for teachers and students. They can illustrate what tremendous expectations are being attached to OER.

Teachers should devise processes that engage students in active, constructive engagement with learning content, tools and services. Rather than concentrating mainly on transferring subject-based knowledge, they should coach students in how to identify and study real world problems, assess the quality of information sources, and critically discuss results of their studies. In open educational practices, such as collaborative study projects, teachers should also advise students to document and reflect on their study progress (e.g. in an e-portfolio) and to share learning experiences and results with others.

Learners should demand that educational institutions and teachers help them in acquiring the competences and skills to participate successfully in the knowledge society. They should ask for educational approaches that ensure that learning experiences are real, rich and relevant, for example through addressing real world problems, working collaboratively, using new tools and information services, and critically discussing content and study results. Moreover, learners should set up and develop their own e-portfolio for documenting and reflecting on the progress and results of their study work.

### **2.3 How can Open Educational Resources make a difference in teaching and learning?**

OER are perceived of adding significant values to educational practices. It is assumed that learners will be given a greater variety of educational resources and a better participation in the use and production of materials. However, the key issue with respect to OER is whether or not they are useful and effectively used in equipping students with the competences and skills

for personal and professional achievement in the current and emerging knowledge-based societies and economies.

Moreover, the traditional model of teaching has been criticised by many educational experts and practitioners. OER-initiatives such as OLCOS assume that an educational revolution is needed and could be stimulated through the use of e-learning methods, new educational tools and Web-accessible media rich content. Such a revolution has not occurred so far.

Antecedents of such a revolution are given by social-software applications such as Wikis, Weblogs and E-Portfolios; tools that are regarded to foster life-long learning. Richardson [5] precisely describes such expectations. "The good news for all of us is that today, anyone can become a lifelong learner. (Yes, even you.) These technologies are user friendly in a way that technologies have not been in the past. You can be up and blogging in minutes, editing wikis in seconds, making podcasts in, well, less time than you'd think. It's not difficult at all to be an active contributor in this society of authorship we are building. As usual, many of our students already know this."

## **2.4 Limitations and challenges of OER**

OER have been introduced to bring about tremendous transformation in current educational practices. However, there are also some challenges that need to be addressed before real benefits can be unfolded.

One major challenge pertains to the sustainability of OER. Since its "birth", OER mostly depends on external sourcing such as those given by the William and Flora Hewlett Foundation. In a similar vein, OCLOS roadmap places the quest for new business models on top of the agenda although it is acknowledged that this might be very tricky.

Another challenge consists of finding ways to fully integrate OER into educational institutions (schools, universities) and to ensure its utilization within educational practices. However, there is a remarkably thin conceptual base that promotes such integrations. Such a base is highly needed in order to provide designers and users of OER formal descriptions, rules, and strategies. We believe that Instructional Design (ID) exactly addresses these demands. In the next paragraph we will lay out general assumptions of ID, show its value for OER and introduce a set of rules of validated ID-principles which serves as a guideline for learning effectively with OER.

## **3 Instructional Design: Valuable tools for the systematic design of learning environments**

### **3.1 Defining Instructional Design**

Simply providing learners with information is not enough; it does not necessarily mean that people learn from the occasion. Informing people does not involve instruction [6]. Although for sure, people can learn informally and learning does not always mean intentional learning, to us Open Educational Resources have a mean, and that is offering education. For that learning resources have to be designed to fit the learners needs and take into account their weaknesses and strengths. This is an opportunity for the (traditional) field of instructional design (ID).

Instructional design models offer a systematic approach to develop and design learning materials. In general its goal is to support an intentional learning process. Therefore, it takes into account and covers the total and complete process of teaching, instruction and learning (holistic perspective). Instruction, in this view means, (...) a set of events external to the learner designed to support the internal processes of learning [7, p. 194]. As said, traditionally ID means more than 'teaching' and 'learning'. It provides also guidelines and strategies for, among other things, the selection of learning materials or for the evaluation of the learning processes. Hence, ID is not (only) a field for teachers but also for educational technologist, who often develop learning materials.

ID origins from World War 2; at that time American soldiers had to be trained and educated quickly and well. It was Robert M. Gagné who had the idea to develop 'mean and lean' learning processes and taking as a starting point 'learner's needs' and 'boundary conditions' [8]. Throughout the years ID's theoretical and empirical knowledge grew and adjusted to the modern society of today (including new technology). But the essence remains the same: 'searching for explanations and developing strategies with what (material) and how (what has to be done) to reach predefined learning goals'.

### **3.2 Improving OER with the knowledge of ID**

We believe that learners, teachers and all 'creators of OER' can greatly benefit from the knowledge of the ID community and that some serious shortcomings of OER on the educational level can be repaired by ID. Nevertheless, we want to underline and advocate the many advantages attached to OER: It is free (or cheap), many individuals participate and it can be an active learning process, i.e. people can create learning resources themselves. However, we see that many learners just want to learn from these resources, without being actively involved in the creation of materials (e.g. for that you often need more experience and knowledge in a topic). These learners often do not know what kind of information they need for their own learning and therefore have problems judging pieces of information available within OER. We therefore want to argue that although the use of OER is self-directed by the learner there must be some system support.

To illustrate this we just want take a quick look at Gagné's classic concept "Nine Events of Instruction" [8] describing the mental conditions of learning. The events are: (1) gain learners' attention, (2) inform learners of learning objects, (3) stimulate prior learning experiences (associate new learning with prior learning), (4) present the learning material, (5) provide learner guidance (give examples), (6) elicit performance (practice), (7) provide feedback, (8) assess and (9) transfer to the situation. Basically, these events encompass the whole learning process and therefore aim at ensuring high quality outcomes.

In this regard, it becomes apparent that just giving learners OER makes no sense because there is a great need for accompanying guidance and support. That may be all nine events, but may also be less. Yet, there is at least one critical issue: Especially novices do not have a mental model to process new information effectively and they also do not have volitional competencies that allow them to sustain their motivation and to stay on task. Therefore, they need help and guidance. We propose a systems view that is based on ID theory as well as on current motivational and volitional theories and define some basic rules for effective learning with OER.

## **4 Integrating OER and Instructional Design: Towards a more holistic view**

#### **4.1 OER-ID system rules**

When learners are looking for relevant learning materials they scan available OER on their appropriateness. This means that, first of all learners want to know whether the OER-material that is presented is suitable for their current situation (e.g. gives them an answer to a learning question or learning goal). In our opinion, to do this, OER-material has to emphasize the context in which the presented information is needed. For that we introduce the ID-concept of authentic learning tasks [9, 10] that postulates that learning materials are to be shown in their authentic/daily context in which they are needed. This approach also partly responds to what is called the localization problem of OER. Materials should be 'culturally portable' or should at least give insight in which this information fits. For most OER nowadays that is not the case yet. That makes a description of the situatedness even more important. Therefore, we suggest rule number 1.

Rule 1: OER material should provide context information.

Learners can work independently, i.e. at their own pace. Their knowledge grows whenever they learn and utilize OER materials. In our opinion that is an important issue that has to be supported. This can be done by referring to the ID-concept named scaffolding. The scaffolding principle means that at the beginning learners get a lot of system support and in the end no support at all. Overall, there is a constant withdrawal of guidance and support. We consequently formulate the second rule.

Rule 2: OER materials have to take into account the growing insight of learners and have to be developed around the scaffolding principle.

To realize the scaffolding principle OER has to be split into 'whole chore experiences' (similar to Van Merriënboer's whole tasks experience, [11]) meaning that information that logically only makes sense together is presented in one piece. We call this a learning chunk. OER exists of many 'learning chunks'. As aforementioned, learning chunks are to be organized in accordance to the scaffolding principle in order to ensure learning to take place. At first a learning chunk is provided that gives all knowledge to the learner on a basic level, i.e. all information are explained and all related questions are worked out in detail (we call this a worked out learning chunk). Secondly providing information in which knowledge can be described and the explanation is shallow and learners may have to partly draw conclusions on their own or may have to see relations for themselves (a completion learning chunk). And thirdly providing plain information in which learners have to make up their mind and value the information (a no-support learning chunk). This no-support learning chunk in the end serves as a self-assessment opportunity (see Figure 1).

The idea of these scaffolding via learning chunks is grounded in sound ID-models like Van Merriënboer's Four Component Instructional Design Model [11]. In our opinion it may also have value in the OER movement.

Rule 3: OER material provides learners with worked out-, completion- and in the end no-support- learning chunks.

All learning chunks are collected and stored in a knowledge base. Educational technologists, teachers and learners can add chunks to the knowledge base. In our opinion, templates should be available (e.g. to standardize the lay-out of the learning chunks and to assure the quality) in which 'creators' answer questions to the situatedness and label information as worked out, completion or no support chunk. They also label the information according to media formats.

This process of labelling is called ‘providing meta-information’ and leads us to the fourth rule.

Rule 4: Creators have to provide meta-information on learning chunks in a predefined template.

To make the creation of learning chunks more easy, tools should be provided to link information, create media files on themes etc. To make OER richer and create a knowledge base that involves a media mix, creators should be enabled by free-to-use tools (open source software).

Rule 5: Support creators with free-to-use tools to develop OER.

In addition to that, we postulate a meta-rule which concerns the integration of volitional-design and management.

Meta-Rule: Equip learners with volitional strategies to ensure goal-oriented learning with OER.

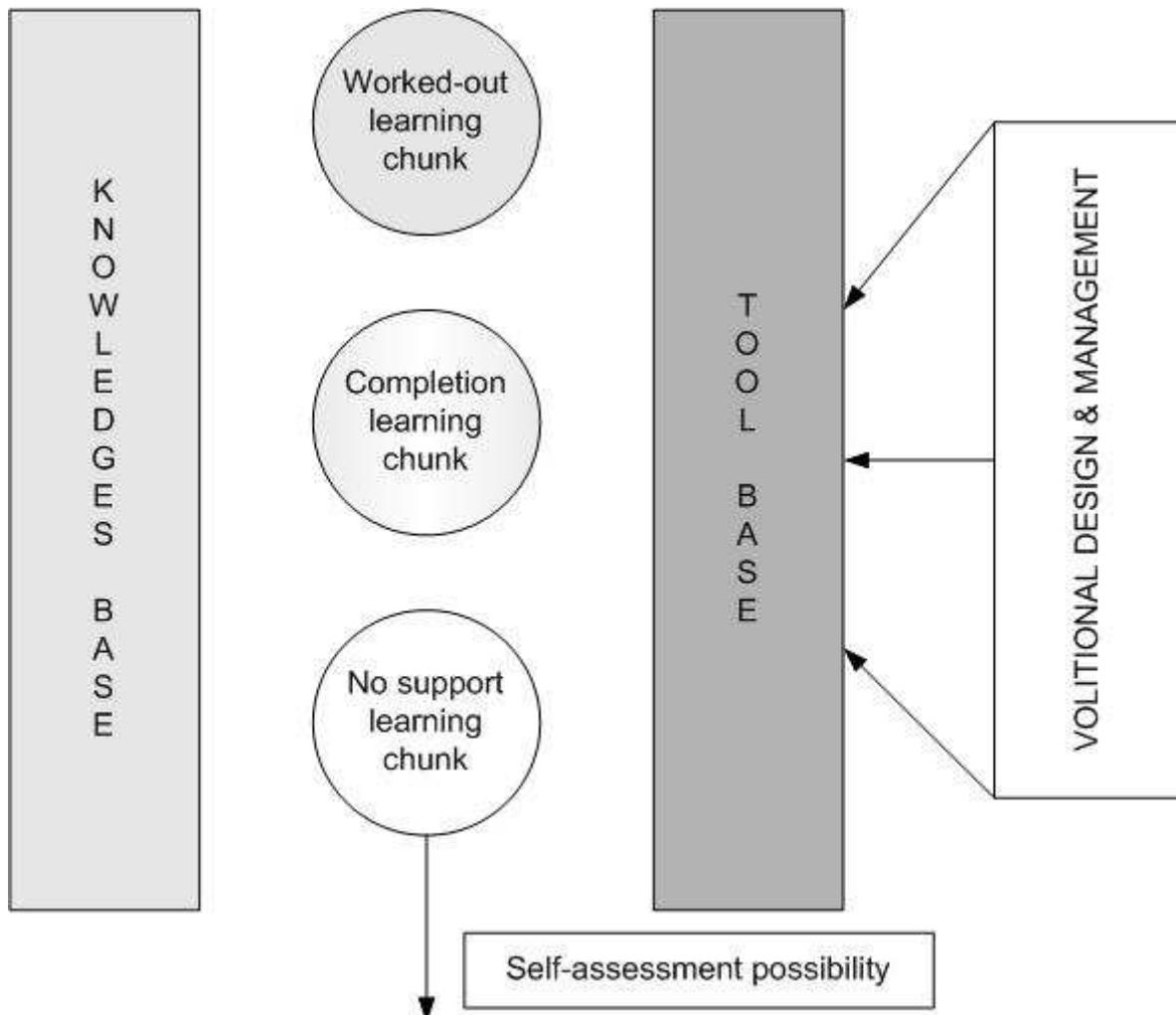


Figure 1: OER-ID system rules

Volition can be defined as “the ability to maintain and enact an action tendency the organism is committed to despite the impulsive nature of competing action tendencies” [12, p.344] and

it assumed that as soon as the current motivation gets endangered by competitive intentions certain strategies comes into play. These are called action control strategies and entail for instance motivation control or selective attention. Numerous empirical studies have demonstrated the postulated mechanisms [13]. Recently, Deimann [14] has developed the Volitional Design Model that provides a theoretically-sound integration of basic principles of ID and current motivational and volitional approaches. Moreover, it suggests a systematic procedure for designing learning environments with special attention being paid to volitional requirements of the learners. The volitional design process is highly valuable for OER since it is targeted at typical problems learner face during the learning process. Learning with OER, or speaking more general, learning with multimedia learning environments oftentimes becomes complex due its very nature. There are some phenomena such as “Lost in Hyperspace” or cognitive overload that have been widely reported in the literature to disadvantageously affect the learning process. Consequently, learners’ attention gets distracted (e.g. by a fancy animation) and his motivation wanes. Therefore, we postulate that learners need to be equipped with volitional tools and strategies. This is to be seen on a meta-level since it is targeted on the whole process and can occur virtually at any given moment.

## 5 Conclusion

Although we know that the description of all the postulated rules is short and probably can be explained more in detail we are hoping to clearly stress the assumption that systematic approaches from ID theory can be worthwhile in the field of OER. Openness in OER has to stand to the availability of resources and the possibility to add knowledge. Openness in OER must not mean ‘it remains open whether you have learned valuable lessons and it remains to be seen what the quality of the materials was’. In a similar vein, it is important to adjust learners’ attention and motivation to OER in order to avoid “Lost in Hyperspace” or cognitive overload. Based on our introduced rules we are confident that the OER-movement will truly unfold its benefits.

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