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DEVELOPING 21ST CENTURY SKILLS THROUGH COLEARNING WITH OER AND SOCIAL NETWORKS

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Introduction

In little over a decade, Open Educational Resources (OER) have opened up access to knowledge through hundreds of projects and open content repositories, open practices and, more recently, Massive Online Open Courses (MOOC). However, OER lie at the heart of the Open Education movement, which advocates that communities and individuals should have access not only to repositories, but also to open technologies and methodologies. Since 2006, innovative OER initiatives such as OpenLearn (McAndrew et al., 2009) have been providing both open content and knowledge media environments (e.g. LabSpace by OpenLearn) for users to create their own open resources, courses and practices. Currently, it is possible to observe that an increasing number of open learning projects has been moving beyond the provision of repositories to offer social personalised platforms for collaborative open knowledge construction. These initiatives (e.g. OpenScout, 2010; weSPOT, 2013) offer opportunities for users to organise their social networks and co-create resources, courses, methodologies, inquiries and best practices.

The aim of this paper is to discuss the potential of online collaborative learning to support the development of 21st century skills. It draws upon an on-going virtual ethnography that aims to investigate colearning – collaborative open learning – with Open Educational Resources (OER) and social networks. The research focuses on COLEARN, an open research network constituted by communities of educators, students and researchers who have been participating in various OER projects, including OpenLearn (2006-2009) (Lane, 2012), OpenScout (2010-2012) (Okada, 2014) and weSPOT(2013-2015) (Mikroyannidis et al., 2012). A large data set that has been collected in the course of activities revolving around the creation of the book *Open Educational Resources and Social Networks* (Okada, 2013) is currently being treated. This project has been conducted for over four years and includes a variety of open digital data from multifaceted social settings in different platforms used during the co-authoring process of three editions of the book.

The process has involved 113 educators, students and researchers from thirty research groups in 21 different universities and 5 countries, who co-authored, initially, 30 chapters that draw upon their mainstream research. Each chapter was specifically designed to make it more

reusable and understandable for a broader target audience. Amongst the activities developed, 7 open web conferences were organised with research groups responsible for each chapter, who discussed their work with readers on Facebook and FM webconference application. COLEARN's fieldwork includes both quantitative and qualitative sources. Thus, a variety of open digital data were co-produced from multifaceted social settings in different project platforms, such as digital productions, discussion forums, wikipage reflections, videoclips about the process, web-videoconferences, virtual focus groups, social media comments, social network dialogue and online surveys.

Colearning and 21st century skills

The term colearning in the digital age (Okada, 2013) is grounded on Freire's principles (1987) and originally cited by Smith (1987) in the book "Joining the Literacy Club". The concept was used to emphasize the importance of changing the role of, respectively, teachers and students from dispensers and receptacles of knowledge to both colearners – collaborative partners on the process of sensemaking, understanding and creating knowledge together. Colearning contributes toward student-centred learning (Brantmeier, 2005) through a more genuine 'community of practice' (Wenger, 1998) grounded on dynamic and participatory engagement for the collective construction of knowledge.

The concept has recently become more popular due to the rapid advances of Web 2.0, which allows the creation and exchange of user-generated content, information sharing, interoperability, user-centred design and social networking. Learning platforms have been changing to social networks and personalised environments with more interactive interfaces such as: social media, blogs, wikis, RSS feeders, webconferences, mapping tools, learning analytics and mobile applications. The rapid advances of digital technologies and Open Education have been contributing to enrich collaborative open learning by allowing colearners to recreate, readapt remix, revise and redistribute their OER in their social networks. Students and educators have been playing important roles as colearners, such as social network managers, new technologies practitioners, co-investigators, co-authors, co-evaluators and peer reviewers (Okada, 2013).

All these roles played by colearners create new opportunities for them to practice and develop their key skills for the 21st century and digital age. Recent studies (Okada et al, 2014; Correa et al., 2014; Calonego et al., 2014) based on the "C" Model (see session 4) developed by colearners – educators, students and researchers (Okada, 2014) highlight seven key skills:

- Entrepreneurs: being able to plan their learning, goals and self-management;
- Technical: being able to use new technologies, various platforms and interfaces;
- Proactive: being able to share different types of information, through a diversity of networks;
- Interactive: being able to manage their networks as well as actions and interactions in different levels;

- Reflexive: being able to elaborate critical and creative thinking both individually and collectively;
- Scientific: being able to develop research, productions and products through scientific methods;
- Innovative: being able to create new practices and influence derived work.

The COLEARN network

COLEARN is an international community of educators, students and research groups engaged in the use of technologies for collaborative open learning as well as for co-authorship. Grounded on colearning approach, in which students and educators are all collaborative learners and knowledge builders, COLEARN's participants started their research projects in Brazil in 2001, in the Institute led by Paulo Freire. Our aim was to foster studies on educational uses of technology based on emancipatory education. This community has grown into an open research network including a flexible number of groups and communities in Brazil, the UK, Portugal and Spain. CoLearn's interactions and productions have been most significant in three projects (Table 1), which supported the network to co-author three editions of the book "Open Educational Resources and Social Networks" (oer.kmi.open.ac.uk):

- **OpenLearn** is a large scale online environment supported by Hewlett Foundation with the aim to provide UKOU OER as well as a LabSpace platform and tools for any users to create OER;
- **OpenScout**, supported by the EU, is a social platform focused on "skill based scouting of open user-generated and community-improved content for management education and training";
- **weSPOT**, also funded by the EU, is a working environment with social, personal and open technologies for colearners to build their own inquiry-based learning space.

Table 1: Colearn – practices, projects and productions during International OER projects

Projects	weSPOT (2013-2015).	OpenScout (20010-2012)	OpenLearn (2006-2009)
Environment	Open massive environment for recreating, reusing, remixing and redistributing inquiry as OER	Social Network platform for recreating, reusing, remixing and redistributing research as OER	LMS for recreating, reusing, remixing and redistributing OER
Platform	Elgg, social media, Widgets, learning analytics, mobile interface, sensor data collection openbadges	Elgg, Wordpress & social media (Facebook, Twitter, Youtube, Wikimedia)	Moodle with FM web conference application and Compendium mapping tool
Colearn Participants	2013 – 25 co-investigators	2010 – 200 colearners 2011 – 113 coauthors 2013 – 9,526 visitors p/month	2006 – 50 users 2013 – 3500 members
Colearn Profile	Coordinators, postgraduates, undergraduates, researchers, lecturers and supervisors	Research groups, supervisors, lecturers, research students and OER designers	Online course authors, learning designers, educators and HE students
Colearn Coauthorship	Period of 6 Months 14 inquiry projects, 80 skills mapped, 150 literature papers reviewed, 6 papers, 10 events, 4 videos, 1ebook	Period of 1 and a half years 48 tools details/ 84 images 20 videos, 100 maps, 20chapters, 1 e-book, 2 books, 12 conference presentations	Period of 3 years 30 papers, 90 maps 70 webconferences 15 OER – LabSpace units, 10 Colearn Journal papers
Colearn Collaboration	Collaborative action research, coinquiry, learning analytics, network analysis with gephi, nodeXL and TouchGraph	Collaborative research for developing chapters, tool descriptions, peer review and OER production	Collaborative discussions, content design, forum facilitation and activity support

Table 1 summarises COLEARN's practices, projects and productions during three International OER projects. It also shows the different numbers of colearners participants engaged in 3 these projects, their increasing productions (coauthorships) and opportunities for collaborations during a decreasing period of time. Information about Colearn coauthorship as also considered in the data analysis.

Methodology

This qualitative research based on virtual ethnography focuses on the process of colearning during the production of the book "Open Educational Resources (OER) and social networks". This book started with a key research question, which was discussed during the whole writing process: How can we, as academic researchers, make our work more accessible and reusable for any interested reader to recreate and innovate it? In other words, how can readers become co-authors?

A hundred and thirteen coauthors from thirty research groups of different universities and countries co-authored thirty-three chapters that draw upon their mainstream research and redesigned the content to make it more reusable and understandable for a broader target audience. Some groups reused their best scientific papers, which were already presented in peer-reviewed conferences and journals, or that were available in their academic repositories and readapted them under a three-stage review process.

The majority of the co-authors, who are leaders of research groups in their institutions, invited colleagues, students, lecturers and researchers to provide feedback. In some groups, the most active readers were invited to participate in the chapter rewriting it by adding new media components such as images, video clips, and knowledge maps, glossary, learning objectives and activities, key questions, social media for further discussions as well as suggestions of how other readers might be able to reuse the content.

The role of students, postgraduates and undergraduates as co-authors has been pivotal, and their contribution has been varied, ranging from technical support for the use of technology to create media components, to establishing connections between content and tools as well as participation in discussions that helped to reshape the material for the intended audience as well as increasing its reusability.

This book was created under the auspices of the European OpenScout project. The second and third editions were extended with new chapters including one that was developed in the weSPOT environment, which describes the "C" Model for analyzing competences for colearning and co-inquiry in the digital age (Okada et al., 2014). The first draft of "C" model was created with the collaboration of 70 members from the 21st century Education event organized by Telefonica Foundation in a massive open environment. This model was improved by a group of 25 people who registered in weSPOT platform to create some collective inquiries to apply this model in different case studies.

Figure 1 shows this "C" model applied to analyse the colearning process in the coauthoring of the book. This open visualization can be accessed online through the map view "C" model applied to the OER book production.[1]

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[1] To visualise the map, go to
http://labspace.open.ac.uk/blocks/compendium/browsemaps.php?context=&id=1456
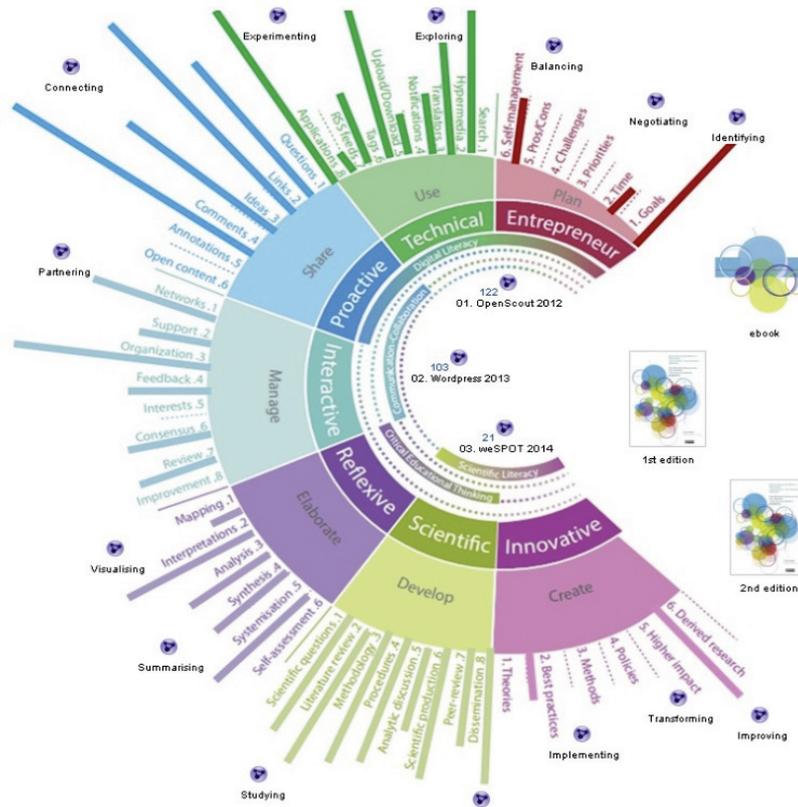
Figure 1. "C" Model Visual analytics for analysing key competences for colearning and co-inquiry

The research fieldwork comprises a large variety of both qualitative and quantitative sources within the three projects platforms as described in Table 1. These data comprises digital productions, discussion forums, wikipage reflections, videoclips about the process, web-videoconferences, virtual focus groups, social media comments, social network dialogue and online surveys.

Thus, the data presented in Figure 1 shows evidence of 11 skills that emerged as the most significant ones in the network of colearners–coauthors of the book. Therefore, online collaborative learning potentially supported the development of the following key skills:

- identify individual and collective goals,
- negotiate time, challenges and deadlines,
- balance self-management and group self-management,
- explore hypermedia, translators and notifications,
- experiment new applications,
- connect and share new ideas and connected comments,
- partner and expand their network interactions,
- visualize and create visualizations,
- study and review literature,
- expand dissemination events,
- implement best practices,
- transform their own practice,

· improve ongoing colearning through derived work.

Discussion and Key Findings

The "C" model infographic was developed based on the surveys and notes developed during the process. The icons in the map show the qualitative content analysis and interpretation of the most significant data from the perspective of the users and community. From both analyses, it is possible to summarize seven groups of skills described below:

1. PLAN: goals, time and self-management.
   Data in the C model shows that all the contributions and interactions were based on voluntary participation. Groups and all participants had to plan common objectives and other requirement to achieve their expected and unexpected outcomes during the process.

2. USE: various tools – search engines, hypermedia, translators, notifications, upload/download, tags, RSS feeds and applications.
   Data in the "C" model shows that all co-authors registered in the OpenScout Tool Library and used the platform, some of them contributed by sharing, searching and aggregating content as well as their best practices with the platform.

3. SHARE: questions, links, ideas, comments, annotations and open content.
   Data in the "C" model shows that participants who were interested in contributing to the OER book design, reusability as well as OER peer-review, had opportunities to be more active by sharing a diversity of files, messages and wiki pages in the platform.

4. MANAGE: networks, support, organisation, feedback, interests, consensus, review and improvement.
   Data in the "C" model shows that participants who were leading the content of the chapter and were the main editors, had opportunity to manage all contributions. This was also extended to the leader assistant who was supporting management tasks.

5. ELABORATE: mapping, interpretations, analysis, synthesis, systematisation and self-assessment.
   Data in the "C" model shows that each chapter was designed based on an OER design template which included interactive and multimedia components whose content was outcome of a creative and reflective process of elaboration.

6. DEVELOP: scientific questions, literature review, methodology, procedure, analytic discussion, scientific production, peer-review and dissemination.
   Data in the "C" model shows that various research groups had opportunity to improve their research content through a scientific framework and interfaces offered by the projects' platform.

7. CREATE: theories, best practices, methodologies, policies, higher impact, derived research.
   Data in the "C" model shows that some research groups had opportunity and interests in disseminating and exploiting their research work. This included obtaining more

feedback from their communities, enriching their curriculum with the materials, creating new publications as derived work as well as proposals for new research funding.

Final remarks and Future work

This study shows a group of skills that emerged in the COLEARN network during the production of the book "OER and Social Networks". The coauthoring process which was based on colearning approach with OER and social networks, contributed to increase opportunities for different groups of colearners to develop a different group of skills based on their interests, actions and knowledge developed during the process.

A global overview of individuals' and groups' skills were integrated to show the COLEARN network' skills. The instrument for analysis applied in this research was the "C" model analysis created by the community itself for identifying and representing these skills. The data analysis developed by the authors was shared with all colearners members who contributed to the book production in different stages. Our next step is to obtain the community feedback about this research and findings.

The limitation of this research has currently been discussed with colearners participants in order to get deeper analysis with more data and subject's different interpretations. The study on skills for 21st century learning may be of great importance to the development of new skills such as critical-creative thinking, communication and collaboration as well as scientific literacy through collaborative inquiry-based learning. Educators play an essential role in supporting students to build better information search strategies. Additionally, working environments with social personal open technologies such as weSPOT might be useful for educators and colearners to develop investigations on individual and collective issues, conduct efficient searches on the web, and construct knowledge collaboratively.

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