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Report of the discussions on developing a research agenda for Open Educational Resources

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SUMMARY

This report summarises an online discussion conducted in March and April 2006 to brainstorm a research agenda for Open Educational Resources (OER). The agenda was expected to consist of key research questions categorized into areas on which to focus the attention of research activities. Over 500 participants from around the world provided a rich diversity of perspectives. Topics discussed included existing OER initiatives, current levels of use, collaborative authoring, technology, learning from other "open" initiatives, quality assurance, dissemination and access (in the broadest sense, covering searching and location, connectivity, cost, reusability, licensing, equality, socio-cultural factors, etc.). Participants put forward over 100 questions. The initial categorization was quite closely aligned with the aforementioned topics.

In addition, a number of activities were suggested during the discussion and the OER community will discuss some of them in the future. One key activity is explored in more detail – the proposed development of an online "Do-It-Yourself" (DIY) OER Portal.

In the end, a definitive research agenda was not produced. However, the depth and breadth of knowledge shared clearly indicated "strength in diversity" within the community.

The elaboration of a research agenda was redefined as an ongoing process of communication among those interested, to harness the diverse knowledge and experience of the community for effective collaborative research. Proposed actions have been split into two groups. Formal activities are defined as specific follow-up actions suggested in the discussions, while ongoing informal activities, powered by the enthusiasm and changing needs of the community, will ensure that we realise our shared vision of improved OER practice through global interaction.

1. INTRODUCTION

1.1 Report structure

- The Summary briefly outlines the broad objectives of the discussion, topics that were discussed, and indicates the outcomes.
- This Introduction (1) provides some background to the discussion and specifies its aims.
- The Discussion summary and Conclusion sections (2 and 4) provide an overview of the content, a brief synthesis and suggestions for the way forward.
- The original list of research questions identified by community members can be found in Appendix 1 (p.10). The priority list follows in Appendix 2 (p.16).

- Appendix 3 (p.18) gives more detail on the main discussion threads, while Appendix 4 (p.39 and separate file) represents those threads schematically in a *Conversations map*.

1.2 Background

The diverse nature, and scale and scope of many current OER initiatives present a considerable challenge to those who stand to gain the most from the movement: learners, researchers and educators in the developing world. Launching headlong into the relatively uncharted waters of the OER realm serves neither the learner, nor the researcher or educator. The potential result could be either to submerge learners and educators in a mass of information that may have little or no relevance to their situation, or to perpetuate the unequal participation already evident in the growing Open Educational Resources movement.

The promise of OER, then, resides not only in the resources themselves, but also in developing the conceptual framework and methodological approaches that organize, manage and ascribe meaning to them. This is the reason for seeking to develop a research agenda for OER: to support resource development and use in the most effective manner possible.

The IIEP Open Educational Resources Community was formed after a formal Internet discussion forum on OER in October and November 2005. At the end of that forum, participants were asked to identify the three most important issues to enable and promote OER. One of the issues frequently cited was to develop a research agenda for Open Educational Resources.

This report provides an overview of the discussions aimed at developing such an agenda. More than 100 questions were proposed and, from these, members were asked to identify their priority research questions. This proved more difficult than expected, either because many of the questions had significant and interdependent value for the many, very different members of the OER Community, or perhaps because there were too many questions from which to choose! After further discussions, an attempt was made at categorization of the questions. These categories may serve as a basis for the OER research agenda.

1.3 Discussion aims

The aim of the discussion was to produce a research agenda on OER, envisaged as a categorized and prioritised list of research questions. We expected important issues and challenges to surface during the debate on priority research areas.

The wide range of learners, educators and researchers from many different countries and circumstances brought a multiplicity of perspectives to bear on the research needs and the importance of OER, and provided an opportunity for global interaction and knowledge sharing.

2. DISCUSSION SUMMARY

The discussion opened with the facilitators asking participants to suggest priority research questions.

This section of the report summarises key issues raised, the types of questions put forward, the categorization and prioritization, selected discussions under each category, and some of the proposed actions. Appendices 3 and 4 provide more detail on highlights of the conversations, and actions suggested by the participants.

2.1 Research questions, categories and priorities

QUESTIONS AND CATEGORIES

During the first two weeks participants proposed a total of 107 questions, which were categorized initially by the facilitators as follows:

- Background research
- Economics
- Methodology (research)
- Creation
- Quality assurance
- Dissemination
- Finding
- Using
- Localization
- Interventions
- Scenarios
- Policy

The questions are presented in Appendix 1, listed under each category. They are also listed on the wiki where the list may be refined and enhanced by the community[1].

The categorization elicited some comment from the group and prompted one participant to suggest a possible alternative with only five categories[2]:

- *OER creation*: DIY, collaboratively, quality assurance, iterative processes and localization, interoperability/standards, and capacity building.
- *Organisation*: governance and management schemes, licensing, metadata, classification and searching.
- *Dissemination*: awareness and delivery, particularly for low bandwidth situations.
- *Utilisation*: mechanisms and business models for re-use.
- *Interventions*: methodologies, localization, best practices, learning patterns and scenarios.

A keen observer noted that "policy" seemed to be missing from this second system, and questioned whether any "interpretation" (through categorization) of the list, though reasonable to the interpreter, might take something essential away from the original.

This point notwithstanding, the questions and categories listed in Appendix 1 served as the basis of most of the discussions that followed.

PRIORITISING RESEARCH QUESTIONS

Following the initial development of the listing, participants were each asked to identify their top priority research question. This resulted in the "shortlist" of 25 questions in Appendix 2.

Very few questions received more than one vote, making it clear that there was no consensus on the priorities. All of the questions listed in Appendix 1 were proposed because they were important to someone, and it would be wise not to ignore any of them.

The non-emergence of clear priorities during the forum is indicative of the "strength in diversity" within the community – the wide range of backgrounds, perspectives and interests represented and expressed may make it difficult to achieve consensus, but it is precisely what makes this community

1 http://oerwiki.iiep-unesco.org/index.php?title=OER_research_questions_longlist
2 See Appendix 3 (p.20) for Nabil Sabry's complete alternative categorization.

so interesting and important. It is hoped that the process of defining the research agenda will therefore continue beyond the current discussion.

2.2 Alternative approaches suggested

Some participants expressed reservations with the approach adopted. These included the difficulty of selecting just one priority from so many, the fact that all the questions have significant places in the OER movement, and the interdependence among questions. Alternative suggestions included taking a more formal approach to identifying research questions, adopting a decision-making process similar to that used by the IMS learning technology standards group, splitting off into working groups to address each research category, and focusing on action and community building to address access issues (see the Research vs. Action thread in Appendix 3).

The suggestions all deserve further discussion and community members are free to take action. At the time, the facilitators agreed that it would not be a good idea to split the group at that stage.

2.3 Discussions by category

This section summarises the discussions and key issues raised in each category of the research questions list.

BACKGROUND RESEARCH

Discussions on this topic centred on what is already known about OER. The aim is to understand current OER practice: user needs, usage levels among various user groups, characteristics of organizations successfully using OERs, the importance of standards, describing and classifying OERs and OER initiatives, contextual factors (e.g. low bandwidth), effectiveness of OERs, learning from other open initiatives, etc.

ECONOMICS

Some discussion dwelt on how OER development could be financed in a sustainable manner. Participants recognised a need to define economic and business models for initial OER development, operational deployment and the evolution of a project, and made the following points:

- Although OER offers significant opportunities for innovation in education, there is a need for *long-term funding* to realise that potential.
- The developmental imbalance between developing and developed nations in the use of technology for education means that there is a need for economic models that promote *equality in access, production and use* of open content, irrespective of geography or social and ethnic background.
- OER provides an opportunity for open dialogue, where previously unheard voices can ask questions and break the restrictive moulds of traditional academic structures. *Social equity and open access* are therefore vital, but academic powers could seek to marginalise them in the name of economic protectionism.
- *Content development costs* are enormous for conventional textbook publication. Open textbook content would provide a cheaper option.

METHODOLOGY

Participants did not look at research methodology per se, but rather examined some of the characteristics of effective research. It was generally agreed that research should be orientated towards discovering what works, what does not work, and how to improve learning processes. What new features do OER need? Localization questions, collaboration, learner support, stakeholders and roles, best practices, and learning patterns and scenarios should all be considered.

The range of questions and research areas suggests a variety of research methods, which need to be considered carefully on a project-by-project basis. Surveys and traditional methodologies could play a major role in background research and in most of the areas listed. Anthropological research techniques, for example, could be especially well suited to studying OER communities and online collaborative initiatives, or cultural issues connected with adapting and using materials in new contexts. Research on interventions and scenarios, however, may require variations on action research, and/or design, development and constructive research.

CREATION

Insights on creating OER abounded throughout the discussions. A key part of this theme was an exploration of "collaborative authoring", the need to develop a culture that will promote collaboration and that is supported by appropriate licensing, formats and standards. Another debate focused on authoring by professional peers versus authoring by learners as both users and producers. Key aspects of these discussions are captured in Appendix 3.

The idea of a "Do-It-Yourself" (DIY) OER Portal was first introduced following a question on how to involve a wider range of OER stakeholders in the creation process. Much of the discussion on the creation of OER (as well as several other topics) had this DIY OER portal in mind. The portal idea is explored further below and in Appendix 3.

QUALITY ASSURANCE

Quality touches everything and is central to most research areas –OER creation, commons-based peer production, technology investigations, dissemination, learning patterns (use/practice), etc. It was noted that quality OER results from quality OER development processes, and that quality OER practice is a fertile area for research. The discussion touched on tools and methodologies to support quality OER development processes. Participants expressed a need for author guidelines that set out quality and interoperability criteria. Other topics included:

- *Finding ways of ensuring high quality translation of materials*: MIT indicated that they have set up a rigorous evaluation process for prospective translation partners. Quality and localization was a natural extension of this discussion.
- *Facilitating the discovery of good quality OER*: Participants observed that quality is subjective, and that quality standards for one situation might not be applicable to another. Relevance is therefore a key component of quality measures. There is a need for consistency in the way OER descriptions and metadata are formulated, so that users understand the original context of creation and use of a material, and can find and select the most suitable materials for use in their own situations.
- *Learning from FLOSS development and open/free content*: Participants questioned how easily the ideas that "many eyeballs tame complexity"[3], and that interaction among users and developers will eventually result in error-free code or encyclopaedia entries[4] could be applied to OER.
- *Assessing the expertise of OER contributors*: It was suggested that all contributors should have a verified level of subject matter or instructional design expertise. A review team would select the assessment criteria and place a submission approval form online. If the application is "self-selecting" in this way, only those with an effective background could be approved to submit content in each subject area. This process is rigorous but would be the best, over time, to assure quality content.

3 Raymond, E.S. 2001. *The cathedral and the bazaar*. Available at http://www.catb.org/~esr/writings/cathedral-bazaar/.

4 See http://en.wikipedia.org/wiki/Wikipedia:Policies_and_guidelines for Wikipedia policies.

DISSEMINATION

The main issues raised regarding OER dissemination were:

- creating awareness of OER;
- delivery methods, especially for low bandwidth communities.

FINDING OER

How do educators and learners access, identify and select OER that meet their needs, and what barriers exist to doing so? These issues were also raised in the context of quality assurance (see above). A key part of an OER portal could be to provide a resource for those looking for "quality assured" materials that are suitable for adaptation to their own teaching and learning environments.

LOCALIZATION

Translation and localization issues (i.e. adaptation of OER to new teaching and learning contexts) were discussed. Participants stressed that it is important to localize not only content but also the learning process. The work should be a collaborative effort between faculty and teachers, content experts, and learning scientists and instructional designers so that the resulting materials are enriched by expertise in the subject area and in learning design.

INTERVENTIONS

In the developing world there are many projects and initiatives to enable access to ICTs. Examples include installing computer laboratories in schools and access points in community centres. Participants identified a need for research on how best to add OER components to ICT interventions. The research on interventions would also be geared towards how open education resource initiatives are structured and the key decisions required for implementation. Suggestions included:

- building a *research programme around interventions to introduce ICTs*, including free/libre software and free/libre learning resources. The aim would be to develop a framework for research that is flexible enough to be tailored to local situations and projects;
- identifying *ICT training needs* (e.g. learning to use a mouse, keyboard, office software, e-mail, web browser, Course Management System, how to edit text and graphics, how to create and share multimedia resources, etc), effective approaches and success factors for such interventions;
- focusing on *activities related to the use of OER* (self study, enriching the learner experience, using OER to learn how to improve living conditions in a community, or to get a qualification for a job...), which may suggest new learning design patterns;
- engaging with *communities* (including learner communities), and assessing their needs and goals;
- establishing *multiple interventions at various levels* – in formal education systems and in informal learning contexts (i.e. at any place with access to ICTs and extending to reach those places without).

SCENARIOS RESEARCH

It was pointed out that research tends to focus on learning from past activities and that, as the future is likely to be different, the past might not have a great deal to teach us about effective OER practice in the future. This observation calls for approaches that engage with current OER practice to explore the possible routes that OER development could take. Approaches mentioned included scenario planning, conceptual modelling, action research and constructive research.

The discussions on future scenarios focused on developments that best promote and use the dynamic, interconnected and self-organizing aspects of OERs and OER practice, most notably social software and other technologies facilitating social interaction for knowledge exchange. The participants interested in scenarios research had a preference for activities in which learners are active in the design of curricula and syllabi and in the creation of knowledge. If users are to develop OER themselves, an interactive approach would be ideal. Technologies are available to facilitate this, such as Web2.0[5] technologies and the use of peer-to-peer (p2p) environments, where users can freely access a plethora of multimedia resources (text, video, audio, etc.).

POLICY

Although several policy issues emerged, the challenges with regard to intellectual property and licensing received the most attention.

Participants discussed the choice of licenses available from Creative Commons. It was suggested that OER projects should use the most open, "attribution" license[6], which places the fewest conditions on the user (most notably allowing commercial use). It was argued that this license ensures that materials make the broadest possible impact, unlike the Creative Commons licences carrying a "non-commercial" restriction, which are used by many OER projects[7]. For example, under the terms of the Attribution license, institutions can create books and CD-ROMs from online materials and distribute them to learners even, should they need to, charging a fee to cover costs. This is a key consideration for institutions operating in many parts of the developing world with limited Internet connectivity. In addition, materials can be used by institutions without having to pay or obtain permission from the content creator, and can be "remixed" easily with materials under other open licenses.

In defence of the non-commercial restriction, some participants argued that the potential licence compatibility problem is not insurmountable. Users just need to obtain permission to combine restrictively licensed and more open materials. The question is, is this an unacceptable level of friction and a significant disincentive to use and reuse of materials? Members were also reminded that the use of more restrictive licenses is far greater than that of the very open licenses; the non-commercial restriction in particular can be key to broad faculty participation in new OER initiatives. Therefore, is it better to have more materials published with at least some degree of freedom for users, or a much smaller body of truly open materials?

Finally, it was argued that although the Creative Commons "Attribution" license is undoubtedly "open", it cannot be considered as "free". Under the terms of the licence, there is nothing to prevent a third party from creating derived works (e.g. translations, adaptations) and releasing them under a closed license – in effect locking up the content and not respecting the spirit of freedom intended by the original author(s)[8]. With OER, the aim is to maximise impact through remixing and reuse, resulting in the creation of adapted or entirely new materials. For this reason, the "Attribution-ShareAlike" licence[9] may be the most appropriate choice, since it guarantees the freedom of future derived works, as well as avoiding licence compatibility problems.

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5 "Web 2.0" stands for the idea that the Internet is evolving from a collection of static pages into a vehicle for software services, especially those that foster self-publishing, participation and collaboration, such as wikis, blogs and social networking sites. For more information see http://en.wikipedia.org/wiki/Web_2.0.

6 http://creativecommons.org/licenses/by/1.0/

7 The Attribution-NonCommercial-ShareAlike licence (http://creativecommons.org/licenses/by-nc-sa/2.5/) is a particularly popular choice.

8 See http://communities.libre.org for a manifesto indicating "the spirit intended" and a definition of "libre resources".

9 http://creativecommons.org/licenses/by-sa/2.5/

2.4 Additional discussion topics

THE DIY OER PORTAL

The need for developing countries to become active participants in the OER world, adapting and using existing resources, and generating OER of their own, sparked a lively discussion regarding the possible creation of a "Do-It-Yourself" OER development portal. A DIY site could popularise and promote the effective use of OER, introduce freely available technologies and software, and share good practice, as well as practical information on how to set up new OER programmes and online "OER systems", and how to attract funding.

Considerable attention was given to the context of Africa, which is lagging behind the rest of the world both economically and technologically. A DIY approach to OER in Africa could enhance the potential for fundamental changes to post-colonial power and wealth imbalances. Such a portal could also have a positive effect on the OER movement: the portal's significant wider use in the developing world could promote acceptance of OER by even the most traditional institutions and could help break down barriers to knowledge sharing, promoting a truly democratic sense of access and ownership. Through this, participants argued, the OER movement could lead to significant changes in the global imbalances in economics, education and the applications of technologies and science.

FLOSS IN SUPPORT OF OER

Discussions were held with regard to the general "open" trend, including Open Source Software, Open Access and Open Educational Resources. It was suggested that these various open initiatives be explored for possible synergies. However, it was felt by some that if members were to start by drawing direct comparisons with other open initiatives, they would risk imposing false parameters on which the OER movement would be expected to thrive. In addition, despite the shared emphasis on collaboration in both OER and FLOSS development, it should not be assumed that what has worked for FLOSS should automatically work for OER. Instead, establishing a solid, research-based body of knowledge about OER would provide a better point of departure, before looking for synergies between the various "open" initiatives.

The argument for learning from other open initiatives attracted a lot of support, however, and the following areas of synergy were suggested:

- developing a knowledge-sharing culture – comparisons with the FLOSS communities;
- governance and management schemes for OER organization, including IPR and licensing issues;
- OER storage/portal mechanisms, tagging and metadata systems;
- classification methodologies, interoperability and searchability;
- implications of a collaborative development approach for human resources capacity building, productivity and workflow planning.

It was suggested that in fully "open" situations, where learners may be both users and contributors to OER production, the benefits and commonalities are greatest, and issues of scalability and sustainability are easily handled.

3. CONCLUSION

Throughout, the discussions were vibrant, well informed and extremely valuable. However, it was difficult to conclude that the aims were actually reached, in that the community did not agree on a specific research agenda. Further structured discussions would be necessary to produce a research agenda with specific priority areas and questions.

On the other hand, the community's "strength in diversity" was evident throughout the discussion – diversity in terms of the members, their perspectives, interests, activities, offerings and contributions. The dynamic[10] list of questions is a reasonable reflection of the research needs of the OER movement, and they were raised by people with a need for answers, or a desire to solve these issues. Rather than a final product, the agenda may therefore be defined as an ongoing process of communication and networking, to facilitate self-organizing, community-guided research and action, drawing on collective knowledge, guided by collective wisdom, and powered by the energy and enthusiasm in the community.

Whether the research agenda is viewed as "product" or "practice", the actions suggested during the discussion are relevant. Here we present some of them in a proposed structure consisting of "formal" and "informal" activities. Formal activities would require an individual or group to set aside resources to make them happen. Informal activities are ongoing support functions that would take place within the community.

Formal activities:

- Articulate a formal research agenda via a formal process.
- Conduct reviews of OER, FLOSS and Open Content research, with a synthesis indicating similarities, differences and mutual learning opportunities.
- Conduct a workshop for OER and FLOSS experts to brainstorm current and future learning opportunities, and publish the proceedings.
- Convene a joint discussion between the IIEP FLOSS and OER communities, and write up a report. This may include a discussion of the proposed OER, FLOSS and Open Content research reviews and inspire the DIY OER Portal design and development process.
- Explore the DIY OER Portal idea further.
- Identify champions to sustain the OER research community (perhaps) via the portal, wiki and discussion lists.

The *informal activities* boil down to community support and active participation in the formal activities. Informal activities are characterized as "just-do-it" and "libre learning" activities, whereby the community learns, functions, and adapts via unstructured, dynamic processes, using all resources available, and sharing knowledge freely to enhance global OER practice. For example, the OER community could be involved in the proposed research reviews via online discussions, participate in the joint FLOSS/OER discussion forum, contribute to the development of portal and wiki content, and generally continue to share and engage in community discussions with characteristic enthusiasm.

Without doubt, these initial discussions have made a useful contribution to the nascent OER movement. Ideally, the future activities of the OER community will expand on these ideas with the overall goal of improving global OER practice.

10 On account of being on the wiki – a living list of priority questions.

Appendix 1: OER research questions

KEY		
	BACKGROUND RESEARCH	**E**CONOMICS
	METHODOLOGY (RESEARCH)	**C**REATION
	QUALITY ASSURANCE	**D**ISSEMINATION
	FINDING	**U**SING
	LOCALISATION	**I**NTERVENTIONS
	SCENARIOS	**P**OLICY

Note: Some questions may be categorized under more than one heading. Where this applies, it is listed under its most obvious category; the other categories are indicated by appending the category's first letter after the question.

Background research

What do we know already? What can we learn from the past and present?

1. How would one go about doing a comparative analysis in terms of OER user advantages between the major search engines (Google, Yahoo etc.) in addition to operating systems such as Windows, Macintosh and Linux etc.?
2. Why isn't this [scale of Sourceforge, etc.] happening in the OER movement? What makes content different to software? What is different about the people involved?
3. Are standards necessary/sufficient? Which standards?
4. Understand the differences between FLOSS and OER (or FLO Content) towards quality. *Q*
5. Understanding the demand for OERs.
6. Which institutions tend to use OERs? *U*
7. Which types of OERs are used most frequently and how are they used? *U*
8. How may institutions with low/no bandwidth benefit? *D*
9. How are OERs disseminated and accessed (responding to Joyce)? *D*
10. What is the current level of use of OERs among instructors in higher education? *U*
11. Characterizing OER initiatives: the creation of OER models that provide a guided method for comparing and contrasting OER initiatives.
12. Research the roles of learners and educators in the development and use of OERs with reference to the FLOSS analogy.
13. Research why some parts of Africa and our larger world are not benefiting from the OERs currently available as a starting point. *D*
14. Why has Wikiversity failed to mirror the success of Wikipedia?
15. Survey the current level of use of OERs. *U*
16. Understanding the role and importance of standards.
17. Survey who is using OER, where they come from, how they are using it and why? Sharing experiences to reduce duplicate work.
18. Addressing connectivity: a project in Ghana – partners sought to test and evaluate the service. *D*
19. Establish a database of available OERs, including experts for authoring and evaluation.
20. What has been the experience of the teachers in using the OER? *U*

21. What evidence do we have that learners actually learn more by using OERs? Why do OERs work better? *U*
22. What are the main obstacles encountered when migrating to OER-based educational systems? How many of these migrations can we examine today? *I*
23. What are the characteristics of the organizations that drive the production and dissemination of OERs? Who funds them and why? How will we know these organizations are working effectively?
24. Research to determine how FLOSS methods can or cannot be applied to OER.

Economic analyses

25. How can OER development be sustainably financed?
26. Serious research is needed to define economic and business models for OER not just for development but for operational deployment and ongoing evolution.

Methodologies and processes

27. Strengthen the Learner Support System in ODL.
28. Look a little bit at organizations that are net importers of OERs and to start describing what are the qualities or organizations that support a culture of OER use. *U*
29. From a research perspective, we need to ask ourselves what this "emerging model" for the collaborative development of OERs is, and how can we consolidate it and at the same time disseminate it? *S*
30. Design, development or constructive research: long-term collaboration between researchers and practitioners focused on broad-based, complex problems critical to education.
31. Intervention methodology.
32. Research approach – identifying research questions: find out whether such schema can help us generate questions for research in addition to tapping our insights, experiences and serendipity.
33. How do we measure success for OER projects? How do we measure success for FLOSS projects? How and why are these measures of success different?
34. Free/libre and Open Research – applying the principles to our research.

Creation of OERs... tools, collaboration, best practices

35. How can we start to create our own resources?
36. What compels users all over the world to volunteer their free time to developing quality content? (C.f. social software.)
37. Understand how the community "gravitational pull" would develop – as it does for successful FLOSS projects. *S*
38. How can the power of social software be used for collaborative authoring of reusable OERs that are appropriate for developing society contexts. *L*
39. Research on packaging and tagging OERs – is it necessary to create Learning Objects etc. [full courses? reusable components? etc.]? *F*
40. Helping (e.g.) Nigerian unconnected universities to be able to produce their own resources and become contributors to global OERs. *D*
41. Social software and OER authoring – Wikipedia, Connexions, etc. *Q*

42. In addition to the “best way to collaboratively author OER” there should be some investigation regarding strategies for finding collaborators.
43. What are the advantages/disadvantages of closed group authoring before open publication versus a total open approach like a wiki environment?
44. Quality, relevance and localisation. *Q*
45. Analysing OER modularity and other characteristics indicating amenability to collaborative authoring.
46. Learners as authors – when does this work?
47. Assess the OER/FLOSS analogy: where does it hold up, and where do we need to think differently. *B*
48. Explore obstacles and challenges to the use of the same models as FLOSS and Wikipedia for production, quality assurance and use of OERs. *QU*
49. How can a community of professional peers be created around OER development and reuse – a community of co-producers and users?
50. Research is needed to explore how different approaches (e.g. MIT OCW vs. BC) affect OERs and their reuse. *DS*
51. Systems theory and indigenous social authoring, in particular how distributed networks can enable collaborative knowledge creation and dissemination. *DS*

Quality assurance

52. Research the community QA processes. *C*
53. How do we determine Quality Assurance criteria and develop minimum academic standards for OER initiatives?
54. Research quality requirements and relevance in different contexts: content, flexibility, multi-media applications, learner level, technology level, etc. Survey question: What would be the categories by which you would rate an OER? *C*
55. Exploring the quality issue: subjective quality assessment, e.g. course evaluation: OECP (www.edutools.info – mechanism for assessing OERs for fit to institution or individual). *F*
56. A set of “guiding principles” can be developed and shared that provide criteria for authors to use so that quality and interoperability are ensured. *BC*

Dissemination of OERs

57. In what ways do (or could) educators and learners make their own original OERs or derivative works available for reuse?
58. How are we going to address the issue of connectivity of developing nations as part of the OER research objectives?
59. Understand the difficulties for users of OER (even with copyleft resources): (1) recontextualising for local audiences (often stored in formats that are difficult for teachers to change easily); (2) packaging for interoperablity or alternative delivery (e.g. export to SCORM/IMS for use in a LMS, CD-ROM, printed, etc.). *L*
60. What can we do to make it easier for educators to recontextulise OERs for their own classes in ways that facilitate multiple delivery alternatives? *L*
61. Innovative strategies for dissemination: share solutions of coping with the lack of infrastructure and devices.

62. Outreach to communities to give them a glimpse of the connected world [similar to “innovative strategies for dissemination”].
63. How can we annex and implement the contributions of developers who may not have the necessary infrastructure to upload their resources?
64. Solutions/innovations they have developed or used to improve infrastructure/access issues, e.g. m-learning. *S*
65. Connecting schools in rural Africa – sharing experiences, and “how-to’s”.
66. Research ways of reducing bandwidth costs, and share the knowledge.
67. Publication of the materials as a possible option so that hard copies could be used?

Finding OERs... research on tagging, metadata, search

68. How do educators and learners access, identify and select OERs that meet their needs, and what barriers exist to doing so?
69. The ability of educators in Africa to access, identify and select suitable OERs remains a key issue.
70. Tagging educational resources (e.g. for Google) with educational processes and learning outcomes.
71. How OER collections are organized and managed in such a way as to support educational processes, rather than overwhelming them (which is a risk currently)?
72. An easy access information database that can guide smaller schools in the selection of affordable options would be a great help to many schools that have limited funds and infrastructure.
73. Explore existing and new ways of finding educational teaching/learning content. *S*

Use of OERs... research on effective use of OERs

74. In what ways do educators and learners they use OERs, what modifications do they make to resources to support these uses, and how effectively do the resources meet user needs?
75. The issue of appropriate use (and re-use) of OERs.
76. Are OERs currently being utilized in such a way as to create an exchange that is sustainable, inclusive, and that generates maximum benefit for all involved?
77. What makes individuals and organizations good users of OERs?

Localisation

78. There is no comprehensive and appropriate mechanism for contextualizing (modifying) resources.
79. Moving the interoperability and recontextualisation agenda forward. *D*

Scenarios research

80. Evaluate the role of Web 2.0 technologies, social software, etc. – scenario planning, futures research, conceptual modelling and foresighting techniques.
81. What are the addictive properties of social software and how can these be replicated for education? (A global scenario planning exercise on future alternatives with regard to OERs.)
82. How the community “gravitational pull” would develop.

83. What motivates people to invest their energy and time in the creation process? Can we expect educationalists to follow the same pattern that social software participants do in terms of their mode of participation in the creation of OERs? Should we have these expectations? *C*
84. Scenario planning approach might be a good way of qualitatively addressing some of the demand-side dynamics.
85. Research the production models: product/contract vs. commons-based peer production. See Benkler's work.
86. What are the barriers that inhibit the freedoms of educators to teach (with OERs)? *U*
87. On what do we focus when we design the ecology of open education resources? Consider human activities related to the use of OERs (self study, learning how to improve living conditions in a community, to get a qualification for a job, seeking to enrich the learner experiences...). Learning design patterns research.
88. Companies, many of them large companies, are profiting from FLOSS projects. Will companies, large and small, also profit from OER projects?
89. Research on pedagogical patterns: validate existing and develop new. *I*

Policy

90. Policy/ethics/licensing research (see Adelphi Charter and creativecommons.org).
91. Social/anthropological research on the values and aspirations of target communities. Are we really improving quality of life on their terms? *I*
92. Policy support and integration of OERs therein – helping policy/decision makers adopt OERs as a sustainable part of their public education mandate (rather than relying on donor funding).
93. What can we do to break down the barriers of educational and learning freedom? *D*
94. What are the barriers that inhibit the freedoms of learners to learn (with OERs)? *D*
95. How are we as the OER community going to challenge the present status quo scenario where money is poured into developing nations to pay for the expertise of expatriates on ICT projects that are designed symptomatically rather than inclusively?
96. How do we promote interoperability of OER initiatives? *D*
97. Assess pedagogical challenges and legal difficulties associated with the mix and match problem between different copyleft licenses. *S*
98. Policy issues relating to stimulating creativity, innovation and knowledge that should be free for societal good: patents and copyright, versus creative commons and copyleft, etc.

Interventions... research on

99. The methodological issue is how early can we involve local communities in the intervention? How early is as early as possible?
100. How are OER initiatives structured and what are the key decisions required for implementation?
101. Defining and understanding the different actors (users and producers) that are involved. That would also allow us to focus on the specific constraints of different types of actors (for example those in low-/no-bandwidth areas).
102. What options do they have for OER for the community of learners from places where access to Internet is not available or is difficult? *D*
103. How do OERs affect the things that students really care about? For example, the Indiana University Centre for Postsecondary Research has developed a five-dimension system to measure

the things that students care about (http://education.indiana.edu/pprcenter.html). How do OERs affect these things?

104. Research the social/organisational/technical processes and describe the best practices and pedagogy when introducing ICT and/or OERs.
105. For each intervention, at various stages, ask what worked, what did not work, how do we improve the process, what new features are needed in OERs? Consider localisation questions, anthropological perspective, learner support, people and roles.
106. Describe the role(s) of OERs in diverse and changing contexts – short term and long term.
107. Communities of Interest: needs-driven, learning by doing, in a virtual environment (e.g. Moodle), leveraging the knowledge available for practical advantage.

Appendix 2: Priority research questions

This shortlist of 25 priority questions, sorted into focus area, was selected through a polling of community members. The numbering is that of the original "longlist" (Appendix 1). The number of votes is indicated for all questions receiving more than one vote.

Background research

2. Why isn't this [scale of Sourceforge, etc.] happening in the OER movement? What makes content different to software? What is different about the people involved?

5. Understanding the demand for OERs.

10. What is the current level of use of OERs among instructors in higher education?

12. Research the roles of learners and educators in the development and use of OERs with reference to the FLOSS analogy.

19. Establish a database of available OERs, including experts for authoring and evaluation.
2 votes

21. What evidence do we have that learners actually learn more by using OERs? Why do OERs work better?
2 votes

Economic analyses

25. How can OER development be sustainable financed?

26. Serious research is needed to define economic and business models for OER not just for development but for operational deployment and ongoing evolution.
2 votes

Creation of OERs... tools, collaboration, best practices

35. How can we start to create our own resources?

49. How can a community of professional peers be created around OER development and reuse – a community of co-producers and users?

Quality Assurance

53. How do we determine Quality Assurance criteria and develop minimum academic standards for OER initiatives?

54. Research quality requirements and relevance in different contexts: content, flexibility, multi-media applications, learner level, technology level, etc. Survey question: What would be the categories by which you would rate an OER?

56. A set of "guiding principles" can be developed and shared that provide criteria for authors to use so that quality and interoperability are ensured.
2 votes

Finding OERs... research on tagging, metadata, search

68. How do educators and learners access, identify and select OERs that meet their needs, and what barriers exist to doing so?
3 votes

Use of OERs... research on effective use of OERs

74. In what ways do educators and learners use OERs, what modifications do they make to resources to support these uses, and how effectively do the resources meet user needs?

Localisation

78. There is no comprehensive and appropriate mechanism for contextualizing (modifying) resources.

Scenarios research

80. Evaluate the role of Web 2.0 technologies, social software, etc. – scenario planning, futures research, conceptual modelling and foresighting techniques.

87. On what do we focus on when we design the ecology of OER? Consider human activities related to the use of OERs (self study, learning how to improve living conditions in a community, to get a qualification for a job, seeking to enrich the learner experiences...). Learning design patterns research.
2 votes

Policy

90. Policy/ethics/licensing research (see Adelphi Charter and creativecommons.org).

91. Social/anthropological research on the values and aspirations of target communities. Are we really improving quality of life on their terms?

92. Policy support and integration of OERs therein – helping policy/decision makers adopt OERs as a sustainable part of their public education mandate (rather than relying on donor funding).

95. How are we as an OER community going to challenge the present status quo scenario where money is poured into developing nations to pay for the expertise of expatriates on ICT projects that are designed symptomatically rather than inclusively?

97. Assess pedagogical challenges and legal difficulties associated with the mix and match problem between different copyleft licenses.

Interventions... research on

100. How are OER initiatives structured and what are the key decisions required for implementation?

105. For each intervention, at various stages, ask what worked, what did not work, how do we improve the process, what new features are needed in OERs? Consider localisation questions, anthropological perspective, learner support, people and roles.

Appendix 3: Conversations

This section provides the gist of some of the discussions that took place with reference to Appendix 4 *Conversations map* (p.39), which provides an interpretation of the structure and interrelationships. The map page headings in Appendix 4 are the same as the section headings in this appendix. And index to the map page is included at the start of Appendix 4, so that users may match the conversation threads below with their corresponding map pages.

1. ALTERNATIVE PROCESSES

1.1 Finding and prioritising research questions

Participants did not appear to have any difficulty in raising important research questions, and the first stab at categorising them seemed to be fairly well accepted with only a few variations offered. However, prioritising the questions proved challenging. Most of the questions could fit in more than one category, and the inter-dependencies confounded some attempts to select "the one most important research question". Suggestions included choosing an area and selecting a question within that area, or simply to select and focus on an area. Participants also cautioned against going with the majority vote, and to take a broader approach using the categories to group people with similar interests.

As an alternative to our approach of eliciting relevant collective knowledge through the discussion, one suggestion was to adopt a formal methodology. D.Raja Ganesan has been interested on the generic question of whether there is or are general road maps for finding problems for research across disciplines since 1979:

> I found in 1984 an article in Review of Educational Research an article, Questions for research by J.T. Dillon, Professor of Education, University of California, which provided a three tier schema of questions that seemed to promise topic hunt in from the scratch in any field. He was trying to build upon Erotetic Logic. Recently a research student of mine found that Dillon's schema needs to be complemented by schema for applied fields and she has identified one most appropriate for her chosen focus, Fullerene, in the field of Chemistry.
>
> Suggestion:
>
> find/develop a scheme
>
> My suggestion is that we must also try to use and find out whether such a schema can help us generate questions for research in addition to tapping our insights, experiences and serendipity.
>
> pool and organise the questions
>
> It will be useful if, at the end of this forum, an attempt is made to pool and organise the questions for research stemming in a discrete way from our insights into a pattern - maybe, a scaffold that already exists, a new one, or one that requires modifications and adaptation of an existing one that also evinces the best fit. It may prove to be a more versatile and enduring contribution.

This approach has merit, and interested participants are welcome to take this up in their own research. It will be interesting to compare the approach and results with the informal method used here.

The request to prioritise certainly got people thinking. The next few sections touch on some of the recommendations on how to proceed: the IMS standards development process as a source of

experience in a similar exercise, working interest groups, a reduced agenda, and to focus on action rather than research.

1.2 The IMS experience: standards development processes

Fred Beshears suggested that the current discussion on designing an OER research agenda is prompting the same sorts of questions as learning technology standards groups posed in the early days, for example:

- What should the scope of the research agenda be?
- What should the results of any research efforts look like?
- How can the group ensure that any eventual product represented the consensus opinion of "all" community members?

It may therefore be sensible to leverage the experience of other groups that have gone through a similar process, for example IMS – which sets learning technology interoperability specifications.

Fred posted the following notes on the organisation of IMS:

- IMS makes their specifications open to the public on their public website[1].
- They also have a members only website, which contains discussion boards, draft specifications etc.
- Organizations have to pay to become a member. Smaller ones pay less that bigger ones (see details on the IMS public site).
- The revenues from membership dues go towards staff salaries, travel expenses, etc.
- Most of the work of developing specs goes on online. However, IMS does organize quarterly face-to-face membership meetings. Project teams also organize F2F meetings as well. IMS members pay to send their representatives to these F2F meetings, so that adds to the cost of participation.
- IMS staff facilitate the development of specs (and in some cases they do a good deal of the "heavy lifting"). However, technical experts from member organizations also do a good deal of heavy lifting as well.
- As for governance, there's a board of directors that makes high-level policy decisions. They also hire/fire the CEO. Then, there's a "technical board" that does all the heavy lifting of specific development. Also, the technical board votes on charters and draft specs.

While this is not necessarily an organizational structure that the IIEP OER community would wish to (or could) adopt, there are perhaps lessons that can be drawn out of it. The sub-sections following add some detail, introducing the IMS experience, indicating its relevance, and highlighting some aspects of the discussion.

IMS POLICIES AND PROCEDURES[2]

The figure in Appendix 4 (p.5) provides a concise outline indicating public access to the specifications, the members-only web site with discussions on drafts etc., structures and governance – reiterating the points made above. There is certainly much we can learn from this experience.

1 http://imsglobal.org/

2 For more information see the IMS Technical Board Policies and Procedures overview (http://oerwiki.iiep-unesco.org/images/f/f8/PPOverviewDraft_%282%29.pdf) and document (http://oerwiki.iiep-unesco.org/images/8/8b/Imstb_policyv3p0c_%282%29.pdf).

PERTINENT QUESTIONS RE IMS AND ALTERNATIVES

In line with the experience of the IMS, we should define our scope, specify the sorts of research outputs to expect, and decide how to ensure these represent a strong consensus in the community.

PROCESSES IN FLOSS AND OPEN STANDARDS DEVELOPMENT

It was suggested we look at alternatives to the IMS process to augment our thinking. Examples came from FLOSS development and other open standards development processes including those of the Apache Foundation, Mozilla, the World Wide Web Consortium, OASIS-OPEN, etc. These suggest that perhaps a more "agile" approach would be better. We are not trying to specify enduring standards that require consensus across the whole community, but rather intend to catalyse a process of on-going knowledge sharing towards best practices in the changing world of OERs in diverse international contexts.

IMS APPROACH: COMMENTS

In general, the IMS approach was favoured on account of its close relationship to this community, its self-organising feel, the fact that it is driven by ideas, activity, collaboration and a consensus/peer-review approach to decision making – an approach in tune with the dynamic, bottom-up, "distributed" collaborative approach characteristic of many FLOSS development processes.

1.3 Working interest groups

It was pointed out that further discussion would be needed than is possible in this forum under the time constraints, and it was suggested that we establish working interest groups on each area where there is a critical mass of interested participants. This remains an open option; some of the areas may be discussed in future on the IIEP mailing list, and the community is encouraged to initiate such discussion.

Karen Garcia pointed out that "the attempt to reach 'consensus' by a majority vote is not ideal for clarifying and truly identifying a common interest" and that more discussion would be needed:

> "I think that instead of identifying research questions, we can form groups around the 12 categories that emerged. Each group could then look at all questions and related information offered in the discussion (documents, URLs) and submit a synthesis for the examination of the larger group. By forming interest teams we can in addition further develop working relationships within the group … It seems that the depth of interest and commitment in open source education deserves a longer road."

1.4 Reduced agenda

Originally, twelve areas were identified, which seemed a few too many. One proposal from Nabil Sabry was to reduce this to five:

A: Issues regarding the way OERs are created
- A.1. Creating one's own OER
- A.2. Social software phenomenon, collaborative development
- A.3. Quality assurance in OER creation
- A.4. Iterative processes for OER creation, re-creation of OERs via localization
- A.5. Contextualization and translation of existing content
- A.6. Interoperability and compliance to standards in the creation of OERs
- A.7. Human resource capacity development

B: Issues regarding the way OERs are organized
    B.1. Governance and management schemes for OER organization
    B.2. IPR and licensing issues
    B.3. OER storage/portal mechanisms, tagging and metadata systems
    B.4. Classification methodology, searchability

C: Issues regarding the way OERs are disseminated
    C.1. Awareness
    C.2. Delivery methods particularly for low bandwidth communities

D: Issues regarding the way OERs are utilized
    D.1. Mechanisms for using/re-using content
    D.2. Sustainability/business modelling for OER use and re-use

E: Issues relating to OER interventions
    E.1. What worked, what did not work, how do we improve the process
    E.2. Localization questions, anthropological perspective
    E.3. People and roles, collaboration, best practices, learning patterns and scenarios

This suggestion prompted participants to make the following points:

- Interpretation in the categorisation process may lose the essence of some of the questions.
- It might be useful to include the original classifications alongside the new in this reduced agenda.
- Policy seems lost in the reduced agenda, and perhaps deserves a category of its own.
- Support for the working groups suggestion above.

Together, the reduced agenda and votes on prioritised research questions suggested a reduced set of issues and needs to Patrick McAndrew:

- Set up a database of OERs and experts.
- Establish whether OERs actually enhance learning.
- Research economic and business models for sustainability of OERs.
- Develop guiding principles for authors in terms of quality and interoperability, access and search.
- Focus on human activities when using OERs (for classification and search, etc.).

1.5 Voting and the wiki

Notwithstanding the vibrant discussion, achieving consensus and summarising the discourse proved challenging. Although the range of questions posed cover the entire OER space, the number of contributors to both generating questions and voting on priorities may not be representative. A wiki was set up to enable community members to re-introduce themselves and share links, resources and insights in an alternative manner. At the time of writing, this resource was under-utilised, but remains a venue for further discussion and sharing beyond the bounds of this discussion period, and may serve as a precursor to the proposed DIY OER portal (below).

On the working groups suggestion, as indicated earlier, the facilitators regarded that splitting the forum at this stage would be counter-productive.

1.6 Research vs. action

For some of the participants, all this talk about research was amiss amidst calls for urgent action in some developing countries. Discussions ensued on prioritising action over research vs. blending research with action (i.e. action research).

> " ...Meaning and action are intertwined. As we generate meaning together we create the future"[3].

Our hope is that the seeds of action are sown in these discussions, and that the effectiveness of these actions is enhanced via the knowledge and resources shared in the community. The proposed DIY OER portal would be a first step in this direction.

2. WHERE DO WE FOCUS?

In addition to the question of process above, there was some debate over where to focus. Learning from Open Initiatives was a popular area with some concerns raised about the similarities and differences between FLOSS/Open Content and OER. Should we select a few, narrowly focussed questions, starting with OER and later broaden the discussion to include comparisons with other "open initiatives"? Should we focus on lessons learned or consider future scenarios in a world that will inevitably be different from the past? Or, should we focus on action and research what we are doing? All these perspectives are elaborated below. The decision was to keep the agenda open to allow ideas to flow freely in all directions. There is room for all perspectives and there are clearly research needs in all areas.

2.1 Learning from Open Initiatives

For all intents and purposes, "Open Initiatives" refers to the FLOSS and Open Content (OC), though some would like to broaden it to include open technologies (e.g. community-owned wireless networking, etc.). The significance of FLOSS/OC to this debate was highlighted in terms of lowering access barriers, scalability, sustainability, community empowerment, and creating an education commons. Similarities and differences in development and practice among FLOSS, OC and OER were discussed at length, with some keen insights shared among experts in all these fields. The discussions covered FLOSS research[4], tools and methodologies, business models, licensing preferences, and collaboration practices.

In a nutshell, there is clearly much these initiatives can learn from each other. The trick is to understand the similarities and differences to be able to make informed judgements as to when cross learning may apply.

2.2 Narrow focused questions

Some participants felt we should start with narrow, OER-specific questions to establish a solid knowledge base for the OER movement, and later look at synergies with open initiatives and interesting areas such as self-organisation, etc. There was some agreement on this, with a cautionary note not to be too narrow in terms of imagining solutions, and to keep in mind the supporting environment around OER. To some extent, this was a conservative reaction to a most inspiring discussion on future scenarios (below).

2.3 Lessons learned vs. future scenarios: the risk of focusing on the past

The future will be different from the past, and the risk of researching the past is that we may end up doing more of the same, entrenching the past, and loosing sight of new opportunities (Wayne

3 Ken Gergen on the Taos Institute website, cited in Watkins and Mohr (2001), *Appreciative Inquiry*, San Francisco: Jossey-Bass/Pfeiffer.

4 See, for example, http://flosspols.org.

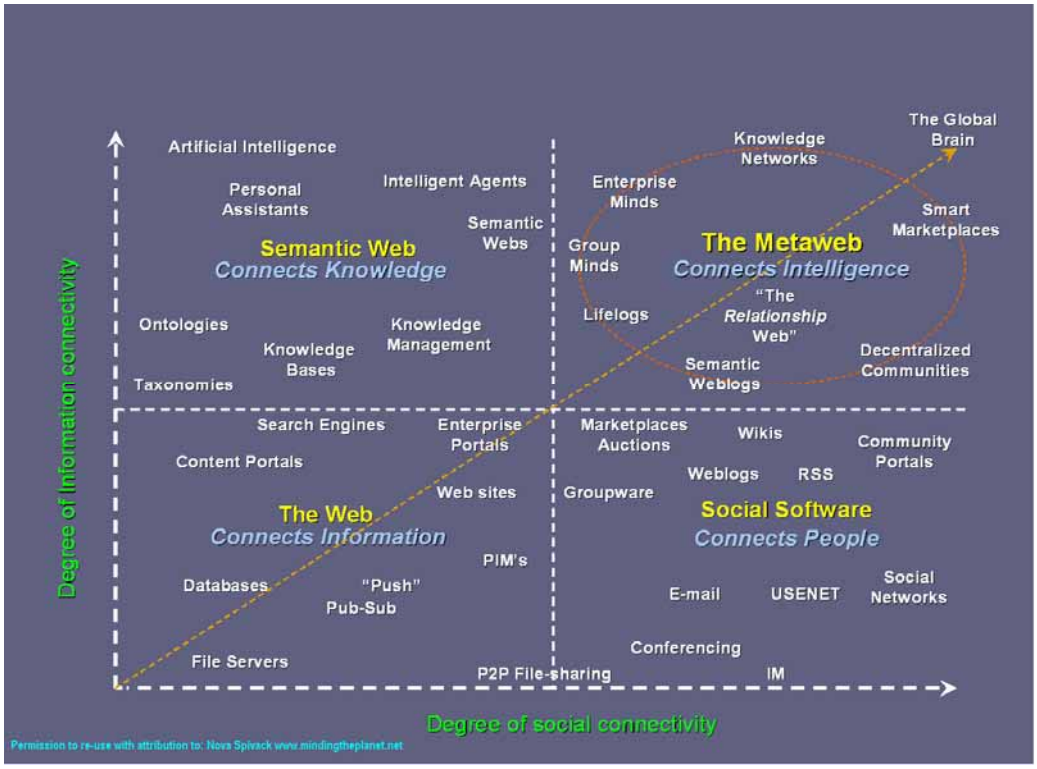
Mackintosh). The discussion continued to discuss methodologies and approaches to researching the future (conceptual modelling, foresighting, scenario planning, etc.), and variations on action research.

RESEARCHING THE FUTURE: METHODOLOGIES

Researching the future is not easy and comes with risks of its own, but there are some rational approaches to help us understand the future and the fundamental assumptions that influence current decision making: scenario planning, conceptual modelling, foresighting, etc. To some extent, we should "just do it" and embrace new technologies and approaches as they become available to us (viz. Wikipedia), researching the process if resources allow. The challenge here is to design a research agenda capable of keeping pace with change. Figure 1[5] below was offered as one perspective on the future of the web (the dominant environment for OER use via connected devices), suggesting a wide range of research opportunities spanning current and future scenarios. The figure highlights the importance of technical (information) connectivity and social connectivity, both of which are already foremost in the minds of OER researchers and practitioners.

The figure was generally favourably received as a thought tool. Reservations were expressed (again) about researching the future, and concerning large-scale scenario planning exercises, with a preference for small-scale illustrations, reminiscent of the adage "think big, start small, scale fast".

Figure 1 Metaweb



RESEARCHING THE FUTURE: RECOMMENDATIONS AND QUESTIONS

This thread on future scenarios concluded with some recommendations and research questions:

- First, to include a category of research questions called "Scenarios, foresighting or conceptual modelling, etc.; we settled on "Scenarios research".

5 From Nova Spivack's blog: http://novaspivack.typepad.com/nova_spivacks_weblog/2004/04/new_version_of_.html.

- Second, consider conducting a global scenario planning exercise, and possibly tailor the forum to gather the required building blocks.

Research questions arising from this discussion concerned understanding the motivation of volunteers in contributing to FLOSS and open content development, and replicating the addictive properties of social software in OER production. Part of the solution lies in the observation that social software, enabling person-to-person communication is very easy to use.

2.4 Evidently we should focus on…

Commenting on the discussions and some of the weaknesses of our approach, Nabil Sabry summarised the areas to focus on as follows:

- easy creation of OERs;
- collaborative development tools and methodologies;
- context-aware translators, and
- standardisation, searchability and quality.

In the time available, it was not possible to attain consensus on one categorisation and set of prioritised questions, though there appears to be some overlap and agreement on important areas and how they interrelate. The intention is to move forward by encouraging and facilitating communication, collaboration and shared learning, to consolidate understanding as research activities continue.

2.5 Action research etc.

As mentioned earlier, several participants highlighted the need for urgent action on dissemination and accelerated use of OER to address serious knowledge divide issues in the developing world. Related topics include the idea of playing “developing world catch-up”, access, localization and relevance, equality and best practices, all of which need attention if we are to do the right thing the right way with OER in the developing world. Here we discuss research approaches that might enable balance and synergy between research and action.

First, there are many initiatives in the developing world to enable access to ICTs. How can we collaborate on such initiatives and enhance their efforts by disseminating OER to help bridge the knowledge divide? How do we engage the beneficiaries from the outset so that they understand needs and develop relevant local solutions? Participants emphasised “bottom-up”, unstructured, learn-by-doing approaches, coupled with action, development and/or constructive research. Places where OER would make a difference to learning range from libraries, to schools, communities and one-on-one interactions with mentors and peers. Guidelines on accessing, identifying and selecting OERs would be useful, and the research could investigate how innovative educators and learners make use of what is available to meet their needs, and what barriers exist to their doing so.

The arguments in this discussion were quite persuasive. The needs are great and there are opportunities for research and action. Hopefully, a significant portion of this community will be inspired in this direction.

3. CREATION

Discussions on OER creation emphasised collaboration – among professionals, peers and learners.

3.1 OER creation by professional peers

OER creation is a special skill requiring knowledgeable collaborators. Can we find such skilled collaborators easily? It is not uncommon for experienced educators to state that their students produce the best OERs. When does this apply? An understanding of the various actors (users and producers) and their circumstances may help our understanding.

3.2 Towards a culture of collaborative OER creation

Apparently, collaborative OER creation is not the norm (yet), though collaborative localization may be different. The following issues were discussed:

- How do we create a culture of collaboration in OER production – with a view to achieving the kind of success seen with Wikipedia?
- To what extent are the challenges confined to campus-based teaching?
- Do we have tools that facilitate collaborative creation, modification/localization and exchange of OER?
- Are prevailing licensing practices unduly restrictive (to the users)?
- What can we learn from the FLOSS development world about local development with global collaboration?
- How can collaborative development be sustainably financed?
- How do we build communities around OER development and re-use?

A number of these issues are being addressed and others may be in the near future as a result of being highlighted here. Creating a receptive culture may be accelerated by raising awareness, demonstrating value, and highlighting success stories. Some of the challenges are “non-issues” in that collaborative learning is already taking place among learners in the connected world. On licensing, we should look to Wikipedia, the GNU Free Documentation License and the Creative Commons “Attribution Share-Alike” license, which encourage sharing and derived works – moving towards “libre learning” via “copy-modify” or the emerging “rip-mix-burn” culture.

LICENSING, FORMATS, STANDARDS

This thread was inspired by the analogy of source code in the FLOSS world. Jimmy Wales, founder of the Wikimedia Foundation, with a vision to make knowledge freely accessible to anyone, anywhere, has stated that free knowledge requires free/open data formats – i.e. open, standards-based formats that are not restricted in terms of use or access via proprietary software. The discussion touched on user behaviours and preferences with regard to working with various formats. How many users of FLOSS actually look at the code? How many OER users would want to look at the underlying XML and other formats? The conclusion was that all OER should be developed in a way that facilitates modification and sharing (via open standards). These challenges are being addressed by the implementers of most LMS and tools for authoring and packaging of OERs. Specific reference was made to the efforts of the Commonwealth of Learning on supporting eXe and WikiEducator.org.

POLISH BEFORE RELEASING FOR CO-CREATION?

Wikipedia's success lies in the ability of small communities of interested individuals to collaborate on producing content (encyclopaedia entries), continually incorporating new insights and correcting any inaccuracies. Often the entries are initially fairly minimal, incomplete and imperfect, but in a short space of time many evolve into something that can be considered good by anyone's standards.

In the academic world, educators tend to prefer to perfect their work before releasing it to their students (never mind to the whole academic community!), depriving the community of participating in the co-creation process. There are many reasons for this, but the question of whether to polish one's work before releasing it led to an interesting discussion on social software, Wikipedia and OER environments such as Connexions[6], which make such collaboration easy. The question that emerged was: what are the advantages/disadvantages of closed-group authoring before open publication versus a total open approach like a wiki environment?

3.3 Technology for OER creation

The technology discussion was inspired, to some extent, by the depiction of the future of the web in Figure 1 (p.23). The technologies discussed referred to ILOs (Intelligent Learning Objects) and technologies associated with Web 2.0. The take-home message here is to "just do it": embrace the new technologies as far as possible, be involved in the communities at whatever level (from coding to conceptualisation), and be prepared for the new pedagogies already in operation.

4. DISSEMINATION

Discussions on OER dissemination highlighted the importance of understanding demand for materials, encouraging the use of OER, packaging and distribution, and learner support.

4.1 Understanding the demand

How prevalent is the actual use of OER? Is the demand really there? Several participants in this and other threads of discussion, emphasised the need to identify and respond to actual needs, rather than addressing the supply issues which seemed to dominate the discussions. Several questions surfaced with this in mind: What are the qualities of organizations that are net importers of OER? What factors support a culture of OER use? What makes organizations and individuals good users of OER? Which types of OER are used most frequently, and how are they used? … A scenario planning exercise might unveil some of the demand side dynamics (Ken Udas).

4.2 Encouraging use of OER

Advocacy needs to occur at all levels and from multiple angles – from education and education technology specialists, to learners and policy-makers – leading to research and capacity building initiatives (Sushita Gokool-Ramdoo). Approaches suggested for encouraging use of OER included raising awareness, focusing on small-scale use, offering OER as an alternative to textbooks that students cannot afford, and a financial incentives model (Fred Beshears). There is also a need to investigate actual usage levels among educators, learners, libraries, etc. (Joe Hart). What are the barriers to use?

4.3 Packaging and distribution

The challenges of packaging and distribution are greatest in developing countries. Possible solutions include distribution via Ministries of Education, via networks of "OER scouts/pioneers" in specific knowledge areas at known locations, and via an OER web site with links to resources (e.g. a DIY OER portal). Ideally, distribution mechanisms should be close to (if not directly used by) the authors, and there is a need for tools to make it easy for authors to package and disseminate OER (Volodja Vorobey, responding to Steve Carson). eXe[7] is one such tool, gaining in popularity, designed with the developing world in mind, and addressing these challenges. Indeed, innovation for "next generation

6 http://cnx.org/
7 http://exelearning.org/

pedagogy" is likely to come from the developing world, on account of the deeper understanding of the challenges faced there (Wayne Mackintosh).

4.4 Learner support

The most important question is to strengthen Learner Support Systems in Open and Distance Learning (ODL). This issue, as well as the related one of OER user support – be they educators or learners – must be addressed seriously (Dhaneswar). See also Section 10, *Towards best practices* (p.36).

5. QUALITY

Concern was expressed about quality, most often in the context of Wikipedia-type collaborative authoring where almost anyone can contribute. The discussion focussed on three areas (although quality issues came up frequently in other contexts).

5.1 Tools to support a quality OER development process

Quality support needs to be built into the entire OER content development cycle. There is a need for tools to support both pedagogical frameworks (learning design, editing various forms of content, reviewing, localising, packaging...) and the actors involved (authors/educators, reviewers, users, etc.). Resource tagging should be simplified to enable people to find relevant and appropriate materials. Learning Management Systems should accommodate learning styles and preferences, learner characteristics (educational level, motivation, personal characteristics), and be sensitive to context (Teobaldo Rivas et al). Variations of FLOSS tools, such as CVS (Code Versioning System for collaborative development), and the type of "edit-review-publish" workflow found in content management systems should be considered to manage quality.

5.2 Standards and relevance

As mentioned earlier, it is not always easy to find "qualified" content developers, and OER development most often occurs in a closed manner. Concern was expressed about the quality and relevance of the resulting products, released in a "think global, act local" knowledge society. How do we determine Quality Assurance criteria and develop minimum academic standards for OER initiatives (Felix K. Olakulehin)?

5.3 Quality is subjective

This thread expanded on the insight that quality is subjective and context specific (Zaynab D'Elia). The development of composite quality measures was proposed. These measures would cover content, flexibility, multimedia applications, learner levels, technology requirements, etc., all of which would help people find relevant OERs of sufficient quality for their context. Reference was made to the OECP course evaluation project[8], which explores an approach to enable users to discern which OER are relevant to an institution or individual.

6. ACCESS

The term "access" is used here in a broad sense, which enables us to build on some of the other threads in this discussion. Potential users need more than physical access (power, PCs, Internet connection) for effective use of (and true access to) OER. Resources need to be findable and relevant to user needs (necessitating translation and localisation). Here we briefly discuss some of the issues,

8 See http://www.edutools.info.

barriers and challenges, including connectivity, cost of textbooks, licensing, re-use, searching and equality.

SCALE OF THE ACCESS PROBLEM

Four of the world's six billion people are under-served by current education systems. Solving this requires a global collaborative effort. Addressing this challenge involves understanding the implications of globalisation, global diversity and socio-cultural variables, localisation and re-usability issues, reaching the unreached (e.g. those in remote areas without power and connectivity), the (sometimes conflicting) interests of stakeholders, and challenges faced by learners (Wayne Mackintosh, K. Madhavan, Alessandra Talamo, Sabu K.C. and others).

6.1 Connectivity

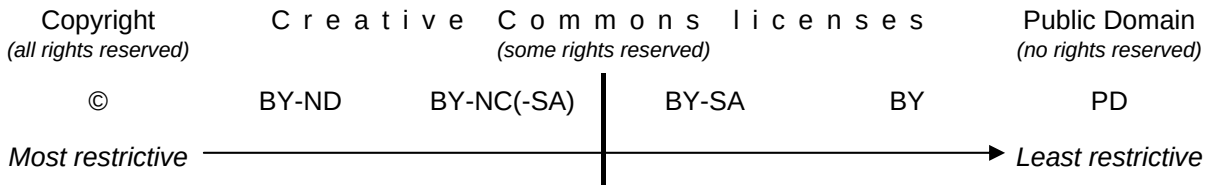
Several participants reflected on the lack of connectivity in various developing countries – Ghana, Brazil, Malawi, India, Nigeria, Sierra Leone, etc. The forum provided an opportunity for some participants to exchange experiences of the challenges and share knowledge on solving some of the problems. Although the situation seems almost impossible with respect to use of OER in some areas, there is clearly a high degree of innovation and the situation is improving. The community is motivated to collaborate on meeting the challenges and conduct research on how best to do this.

6.2 Cost of textbooks

For locations lacking ICT infrastructure and connectivity, textbooks remain the dominant medium for delivering education. However, the costs involved are high, from development and design, through to printing and distribution. This may act as an incentive to explore strategies to reduce costs, including bulk buying, automatic translation and using second-hand and on-line texts, as well as digital OER. The key is to convince faculties to plan for the use of more affordable sources, including OERs where applicable. The discussion branched into topics such as understanding needs and supply-side dynamics, models to encourage adoption of OERs, and leverage existing resources such as Creative Commons textbooks and Open Content and Open Courseware initiatives. There was some debate around use of open texts vs. online activities and the relationship between re-usability and pedagogy. A combination of all these strategies will probably be needed according to the context of the interventions.

6.3 Licensing

Derek Keats joined the discussion just as members were being asked to add their details to the community member listing on the community wiki[9]. Keen to contribute, he went to the wiki, only to discover that the license on the wiki (Creative Commons Attribution-NonCommercial-ShareAlike) was “non-free”, due to the “non-commercial” restriction and thus unacceptable. A very interesting discussion ensued on the pros and cons of various license options, with particular focus on the non-commercial restriction. Derek showed how the different license options may be placed on a “spectrum of rights”:



9 http://oerwiki.iiep-unesco.org/index.php?title=Community_member_list

The spectrum also highlights license compatibility issues: material licensed to the right of the central vertical line (representing the "compatibility gap" cannot be mixed with more restrictively licensed material and vice versa. For many OER stakeholders coming out of the FLOSS community, the only Creative Commons license that may be regarded as "free/libre"[10], the equivalent of "copyleft" and therefore acceptable, is Attribution-ShareAlike. (If a second arrow representing "freedom" were to be added, the "freedom peak" would coincide with BY-SA on the spectrum.)

6.4 Re-use

A fascinating collection of discussion threads ensued around the re-use of OER:

- *The inverse relationship between pedagogy and re-usability:* "The more pedagogy we build into an OER, the less re-usable it becomes" (Wayne Mackintosh) vs. "A resource's re-usability is strictly a function of its internal context, whereas pedagogy is only partly a function of context" (David Wiley). After some interesting discussion, the parties concluded that pedagogy and re-usability are complex phenomena, and we need to accept and recognise this complexity.
- *The transferability of OER and adaptability of offline resources to virtual environments* (Karen Garcia et al): If OERs are to be transferable (thus remaining useful), what fundamental elements do they need? This has implications for production of content, construction on the basis of reusable components, OER development by learners, rubrics for categorisation and retrieval of materials, spontaneous and self-directed use.
- *Open standards and interoperability:* Although it may not always be necessary to package learning resources as standardised Learning Objects (Farnaz Haghseta), we should make it as easy as possible to share components (Wayne). There are, of course, challenges (e.g. pedagogical – see the first bullet point above, and license incompatibilities, discussed in Section 6.3).
- *Software development and re-use:* Developing for re-use is practised only by companies whose core business is to produce (and sell) reusable components. In general, the idea is to "do-the-simplest-thing-that-could-possibly-work" to get the job done – in the case of OER, to effect the learning. Perhaps the emphasis should be on tools to streamline collaborative production of OER (or tools to support collaborative activities to reach learning outcomes)?
- *Localisation:* There was an interesting discussion on issues of language and translation, relevance (needs-driven activity), reconfiguration and re-contextualisation. In urging action, the importance of locally driven initiatives was provocatively highlighted – by the people, for the people with the needs.

6.5 Searching

This discussion started with the question of the effectiveness of search engines for discovering relevant OER (Paul Silva). Problems with search engines were outlined (Joe Hart) – although Google is apparently planning to implement search of LORs. Research questions emerged from the discussion on how learners and educators access, identify and select OER that meet their needs (Steve Carson). What barriers exist to their doing so?

6.6 Equality

A distinction was made between "traditional" and "non-traditional" education. In essence, the basic underlying difference between the two methods of education is that the traditional system is institution-oriented while the non-traditional system is learner-oriented (Roger Haw). The discussion became quite heated at times on issues of:

10 See http://communities.libre.org for definitions.

- distortions of taking a “market-oriented approach” to OER advocacy;
- institutional jostling for control;
- imposed perspectives;
- post-colonial power/wealth imbalances;
- striving for equality in access, production and use irrespective of geography, race or colour;
- quality, standards and arrogance;
- philosophical perspectives;
- impact questions – quality of life, etc.;
- local ownership;
- opening dialogue to address imbalances;
- redefining people as human beings (rather than consumers);
- recognising talent in developing countries;
- working together for positive change.

(Paul Silva, Roger Haw, Fatima Lasay, Lillian Strabinas, Mary Halliday, Tim Unwin, and others.)

7. LEARNING FROM FLOSS/OPEN CONTENT

Participants engaging in this strand of discussions explored synergies and mutual learning across three open initiatives: open source, open content and OER. The following sections outline some of the topics that they discussed.

7.1 Open Initiatives: background and significance

Fouad Riaz Bajwa highlighted the significance of this discussion by pointing out that the “open” movement lifts access restrictions, enables unrestricted use of ICTs for sustainable socioeconomic development and catalyses the education commons. He indicated that FLOSS (plus Open Content and OER) should be the first and only option for learning and education. The approach highlights action for community benefit, although we need to consider how to avoid “developing world catch-up” in OER development in developing countries (Brendan Barrett). There is clearly an intriguing macro-level trend towards “open”, and we should explore synergies, though be careful not to be distracted from OERs.

7.2 Comparing FLOSS, Open Content, OER

GNU/Linux, the quantity and range of projects on SourceForge and FreshMeat, and Wikipedia are inspirational with respect to open collaborative development of software and content. Why are they so successful? And how can we achieve such success with OER?

Richard Wyles stated some of the characteristics of FLOSS projects and the nature of developing software as opposed to content. Prime among these are strong leadership of successful FLOSS projects, and the tendency for software to aim for refinement of source code and to evolve by distillation, as opposed to content where the result is more likely to be proliferation of material. The discussion touched on developers as users (developers “scratch an itch” – they develop something to solve their own problems) and learners as OER developers, modularity and commons-based peer

production[11], the gravity of successful FLOSS projects, and ways of meeting the challenges (Richard Wyles, Richard Baraniuk, Wayne Mackintosh, Peter Schmidt, and others).

DON'T ASSUME TOO MUCH

Tony Bailetti struck a cautionary note – that we should be careful not to assume too much. We are addressing two very different domains. FLOSS projects produce lines of code that tell computers how to perform the functions we want – machines process the resulting code to perform functions. With OER we are dealing with people (not machines) who process natural language (in the form of statements/pictures/animations…) that are the outcomes of OER projects, in order to learn about things and to learn how to do things. The research questions we might ask should therefore be more people orientated. For example:

- How does OER affect the things that students really care about[12]?
- What evidence do we have that learners actually learn more by using OER?
- Why does OER work better?
- How do we measure success for OER projects?
- How do we measure success for FLOSS projects?
- How and why are these measures of success different?

BUT WHAT CAN WE LEARN?

There was agreement that the research agenda should not be FLOSS-dominated, and that OER practice can learn from many domains, but the community was keen to discuss the comparisons further. Some insights on this specific point (learning from FLOSS/OC) included the following:

- "When it comes to use of ICT in the collaboration to produce and use things, I think FLOSS (and Wikipedia which is based on the same thinking) are the best practices we currently have. They can be made better and there probably are obstacles and challenges to use the same models for production and use of OERs, but still I would rather start from that than from any other starting point." (Teemu Leinonen)
- Where collaborative development of content works, e.g. Wikipedia, we find modularity; a community forms around a cluster of terms (Yochai Benkler[13], Logan Utah, 2005). Wikibooks is not so successful because the community needs to manage continuity across multiple chapters – it is not easy for an individual to pitch in and add value to a small component (Florence Devouard, Wikimedia Foundation). Some OER may be sufficiently modular that communities may form around clusters of them (e.g. according to subject/topic and educational level).

WHAT IS OER?

The discussion raised the question of the definition of OER. For the purposes of this discussion, a broad definition[14] was assumed:

The term "Open Educational Resources" was first adopted at UNESCO's 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries funded by the William and Flora Hewlett Foundation. Open Educational Resources are digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research. Open Educational Resources include:

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11 http://www.benkler.org/CoasesPenguin.html
12 See, for example, http://education.indiana.edu/pprcenter.html (determining what students care about).
13 See http://www.benkler.org/ and http://www.benkler.org/CoasesPenguin.html.
14 See http://en.wikipedia.org/wiki/Open_educational_resources.

- *Learning Content*: Full courses, courseware, content modules, learning objects, collections and journals.
- *Tools*: Software to support the development, use, re-use and delivery of learning content, including searching and organization of content, content and learning management systems, content development tools, and online learning communities.
- *Implementation Resources*: Intellectual property licenses to promote open publishing of materials, design principles of best practice, and localization of content.

This broad definition encouraged some participants to share experiences on various needs-driven, self directed initiatives illustrating use of FLOSS and Open Content, and raising relevant research questions.

7.3 FLOSS research, tools and methodologies

FLOSS development and use is an active and growing research area. We were directed to the FLOSSPols project, investigating (among other things) the motivations of volunteers. Brendan Barrett provided some insights into what motivates people to get involved with FLOSS:

- Why do people use FLOSS?
  - total cost of ownership is lower;
  - better performance;
  - more flexibility;
  - localization is easier and allowed.
- Why do developers participate in FLOSS communities?
  - Skills development opportunities.

It was suggested that the above might provide a model for maximising the benefits for those involved in OER. It also prompted the following questions:

- Why is this not happening in the OER movement?
- What makes content different to software?
- What is different about the people involved?

In terms of tools and methodologies, the applicability of the following was queried (with a view to developing/using equivalents for OER development):

- CVS – a Code Versioning System which allows multiple developers to work on components of a system under development simultaneously;
- the workflow found in Content Management Systems (edit-review-publish... retract..., etc.);
- testing tools, and
- “agile” methodologies and practices such as working in pairs, continuously integrating and testing components, etc.

Perhaps this may be discussed further in the proposed combined FLOSS/OER discussion.

7.4 Business models

The economics of OER was discussed with reference to models in the FLOSS world[15], although it was also touched upon in other threads. Here we list just a few points raised in the FLOSS/OC/OER comparison discussions:

- We need to understand the value propositions from multiple perspectives (faculty, students, institutions, government, etc.), and how different approaches (e.g. BC vs. MIT: users may modify content vs. may not) affect OER and its re-use (e.g. in African contexts).
- International challenge funds make it easier for educators, provide incentives for producing and sharing quality OER, and offer rewards on the basis of usage.
- There is a strong emphasis on service-based (as opposed to product-based) business models in the FLOSS world.
- Pump-priming and award schemes: FLOSS contributors are generally geeks who gain much for their professional careers by their involvement in a development project. OER producers are generally teachers for whom the rewards are less obvious apart from the altruism inherent in teaching. There is a need to provide incentives (not necessarily financial) for OER production.

MIGRATION

The question of migrating from an environment using proprietary educational resources, to one using OER was raised, leading to a discussion of issues involved. Issues and questions of interest included why and how to migrate, success factors for OER practice, investigating return on the investment in proprietary resources, sustainable business models for production and use of OER, organizational structures and OER quality.

It is interesting to note that migration to FLOSS is quite a hot topic. When one does so, typically all the staff are affected and change management becomes the most important component of a migration process. One of the participants mentioned the importance of considering migration from the learners' perspectives. Current OER practices have implications for both teachers and learners – in particular because of changing roles and a shift in the perceived responsibility balance. Change management will be important.

7.5 Standards, licensing, preferences and practice

How important are standards, openness and freedom? What do people actually do with FLOSS? Do most choose to download the source code or do they prefer the pre-compiled binary? Do we have an obligation to educate users about the implications of using open and free technologies?

These are the types of questions raised in this conversation. In general, the conclusion was that open standards are important for sharing, and to make this happen it is important to be aware of the implications of free and open technologies, and act accordingly – by taking the plunge and using open technologies such as OER and free software, and participating in community processes.

8. INITIATIVES

There was some discussion on the structure and classification of OER initiatives. Classification is important for directing searchers to the initiatives that best meet their needs. For example, if one is looking for OER collaborators, attributes such as licensing, technology, funding and business models might be important. On the other hand, a user might prefer to search on attributes such as learning

15 For some insightful writing relating to FLOSS and economics, see http://perens.com/Articles/Economic.html.

outcomes, target educational level, topic, etc. The associated research work would involve defining a set of attributes for comparison[16].

The discussion on "structure" considered success factors for OER initiatives, as well as key decisions for successful implementation.

8.1 Initiatives mentioned

During the course of the discussions, several initiatives were mentioned, illustrating the diversity of activities in this community, the variety of challenges faced and innovations in problem solving. A few examples are listed below, unclassified and in no particular order, with a brief note on some aspect which drew our attention. Consider what the global community can learn from these – via research, or by simply telling the stories (and perhaps recording them on the proposed DIY OER portal).

- *UN Food and Agriculture Organization and World Health Organization AGORA and HINARI programmes*[17]: free access to academic journals on agriculture and health; developing tools and recommendations for dealing with low bandwidth and intermittent connectivity including a low cost e-mail service not dependent on any infrastructure (solar power and satellite communications) (Chris Wilson).
- *The Regional Agricultural Information Network (RAIN) of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)*[18]: institutional assessment of policies, and the status of human resources with respect to their availability, competence levels, and training needs in almost all member countries of ASARECA (Rainer Zachmann).
- *Farmers' Needs*[19]: a joint project by the Commonwealth of Learning (COL), International Institute of Tropical Agriculture (IITA) and Oke-Ogun Community Development Network (OCDN) on agricultural information and accessibility in sub-Saharan Africa, combining the "high-tech" ICT of Internet connection (VSAT) at the InfoCentre with the "low-tech" ICTs of village notice boards and weekly farmers' meetings. The project's success seems to come from the appropriate blend of technologies, sensitivity to the ways that the local community works, and a mixture of face-to-face interaction and ICTs (Pam McLean)
- *The School of the Future*[20]: a completely self-sustaining interdisciplinary laboratory, maintaining a staff of over seventy people, investigating how new communications technologies can help improve education in Brazil. There are currently fifteen projects under way, reaching a total of some two million "users" in efforts like telecentres, virtual learning communities, involving students and teachers in primary and secondary schools, and a digital, online, multimedia library for learning Portuguese (20,000 daily users from eight under-served countries). Their experience suggests that there are no real global solutions to access issues, although awareness of the existence of (and desire for) useful OER can create champions and result in innovative ways of accessing resources. They have also learned that localization is key, and in the non-formal, no course structure arena, a revolution is already in progress (Fred Litto).
- *Use of OER for technical and vocational education and training (TVET) in Gaza*: UNRWA (UN Relief and Works Agency for Palestinian Refugees) runs TVET centres in 180+ schools. They have installed computer labs at each of 115 locations, plus a couple of mobile computer stations per school. They are planning to establish wireless connectivity within schools and set up Wireless Area Networks between schools. Existing OER in Arabic are already being shared, while creation and sharing of their own OER is due to start soon (Arthur Shears).

16 EduTools (http://www.edutools.info/) is one approach to doing this.
17 See http://www.aidworld.org/emailservice, http://www.aginternetwork.org/en/registration.php and http://extranet.who.int/hinari/en/registration.php.
18 Report available via http://www.asareca.org/rain.
19 http://www.farmersneeds.org/
20 http://www.futuro.usp.br

- *The development of OERs in bandwidth-challenged Nigeria – Teachers Talking (about ICTs)*: a section of this course is called "NC3" (the No-Computer Computer Course), whose name speaks for itself. This represents a small-scale local initiative in rural Nigeria, which has its eyes firmly on OER as its long-term mechanism for replication and growth (Pam).
- *Research regarding the localization and use of OER by China Open Resources for Education (CORE)*: faculty from various Chinese universities are analyzing the usability and adaptability of MIT OCW course materials. Analysis is complete for forty MIT OCW courses; another sixty courses will be analysed by the end of this year. Although these reports speak specifically to OER localization at Chinese universities, hopefully common themes will emerge and contribute to this important area of research (Farnaz Haghseta).
- *MobilED*[21]: designing learning environments that are meaningfully enhanced with mobile technologies and services. The point here is that access to mobile phones is much more common than access to computers and the Internet. Research on m-learning is therefore a high priority (Teemu Leinonen)
- *WirelessAfrica*[22] – *COIN*: a project to enable connectivity within communities and access to the Internet via "community-owned networks". Note that this is open technology (FLOSS and open hardware specifications). At a relatively low cost, communities may become networked for internal knowledge sharing, and one connection to the Internet may be made available to anyone in the "mesh".
- *Open University (UK) Open Content Initiative*[23]: a significant initiative and change for the OU, who plan to release material available under an open licence. The aim is to develop a route for providing content direct to learners with tools for them to work with it, and a route for people to take and reuse the content, again with suitable tools. The stated research interests[24] include: "enhanced knowledge and understanding of open content delivery, how it can be effective, and the contribution it can make to the further development of e-learning", and "enhanced understanding of sustainable and scalable models of open content delivery". This implies having to split research into two strands: "learner experience" and "provider experience" (Patrick McAndrew).
- *EduTools*[25]: a collection of projects covering various aspects of OER. EduTools came up in conversations relating to quality and classification of OER and learning management systems. For example, OECP looks at course evaluation. There is a need for ways of helping people find relevant resources – a need which some of the projects within EduTools aim to address.
- *Connexions*[26]: Connexions combines free authoring, course building and publishing tools with an open-access content repository. The team has been actively trying to address several of the points that have come up often in the discussion, including openness, flexibility, community building, quality control and the digital divide (Richard Baraniuk).

9. "DO-IT-YOURSELF" OER PORTAL

As mentioned earlier, there was a tension between research and action, with "action research" featuring strongly in the research agenda. One of the action items with strong support was the idea of exploring the establishment of a DIY OER Portal. Here we list proposed features and some points in the discussion.

21 http://mobiled.uiah.fi/
22 See http://www.meraka.org.za/wireless.htm and http://wirelessafrica.meraka.org.za/wiki/index.php/Main_Page.
23 http://oci.open.ac.uk
24 The OU highlighted several of the questions identified and summarised their interest as: "we want to know how people learn using OERs, and how best we can provide the things (tools, content, community) to support them do it.
25 http://www.edutools.info
26 http://cnx.org

- The idea is aligned with the objectives of UNESCO and the IIEP support this part of the discussion.
- First, let's consider what portals and tools exist already (and that our community members are involved in), to avoid reinventing the wheel:
  - *LeMill*[27]: a web community for authoring and sharing learning resources. Tools for collaborative content creation are under development[28]. For example, *ImaNote* is a collaborative image annotation tool.
  - *EduCommons*[29]: an OpenCourseWare management system designed specifically to support OpenCourseWare projects like MIT and USU OCWs. It will soon include a guide to getting started guide for OpenCourseWares[30].
  - Our very own OER wiki[31]!
  - *Africa Virtual and Open Initiatives and Resources (AVOIR)*[32]: a portal with Kewl[33] (Knowledge Environment for Web Learning) as the high-profile learning environment.
  - *Connexions*: outlined in the section on initiatives, above. It is built on the free software, *Rhaptos*[34].
- Further discussion and research will be required to evaluate all the options out there and consider how best to proceed.
- Suggested required features:
  - A repository of (global) stories and case studies to add to the collective experience and inform "best" practices.
  - Tools facilitating interactions among experts.
  - Database of OER and relevant links to repositories, software, people (experts, authors, volunteers...), etc., classified to depict the diversity of resources and aid navigation and searching.
  - Search tools.
  - Multi-lingual support.
  - Social software supporting community processes, with self-organising capability so that the community may use the resources in a flexible manner.
- Finally, it is important to have a clear common vision of what we as a community are trying to do to keep the community moving in the same direction. Suggestions included to: "enhance OER practice globally through sharing", and "facilitate local collaborative OER practice with global interaction" (Paul Stacey).

10. TOWARDS BEST PRACTICE

The purpose behind developing this research agenda is essentially to suggest global OER best practices. Here we highlight the threads that spoke to this purpose more directly: learning patterns, the product vs. practice debate, and learner focus.

27 http://goedel.uiah.fi/projects/calibrate/wiki/LeMill
28 http://goedel.uiah.fi/projects/
29 http://sourceforge.net/projects/educommons/
30 http://cosl.usu.edu/projects/start-an-ocw
31 http://oerwiki.iiep-unesco.org/index.php?title=Main_Page
32 http://avoir.uwc.ac.za/
33 http://kewl.uwc.ac.za
34 http://rhaptos.org/

10.1 Learning patterns

The learning patterns topic emerged in the context of warnings to not be too influenced by FLOSS and Open Content, and to be aware that we could learn from other disciplines and communities of practice. In architecture, for example, patterns and a pattern language have been identified and developed to describe aesthetically pleasing and structurally robust designs[35]. The language enables architects to discuss their designs (or "combinations of patterns") at a high level, which was not previously possible. Experience is embedded in these patterns and knowledge sharing takes place through patterns-enhanced discourses. The approach has been extended to software design and architecture[36], among other fields. It was suggested that this could be considered as a line of research for the IIEP community: to develop a language/vocabulary to describe patterns (and anti-patterns) of learning and OER practice. The idea has, in fact, already been taken up in the education field[37]: The approach looks at the forces and tensions in a system and recognises common patterns describing structures, designs and processes, etc.

The discussion also served as a reminder of related approaches and issues: systems theory and indigenous authoring, and developing guiding principles for quality assurance and interoperability (Ruth Rominger).

10.2 Product vs. practice

It was evident[38] that this forum and other on-going OER initiatives are establishing a new practice in education[39]. A "product" mind set seemed prevalent in the earlier discussions. But the two are, of course, linked: quality products result from quality OER development practices. There is therefore a need to define quality OER practices.

Claudius Soodeen proposed extending the definition of open practice to include "open thinking" – about the world, our work, learners, knowledge, information etc. "Open thinking" is the impetus that compels/propels a person to consider their creation to be a "free resource". However, quality assurance with regard to "ways of thinking" is tricky. It is hard enough with regard to products: is this document (and the postings to the list) of high quality? What/who decides? There was also a slight tension between those advocating formal quality assessment of OER (as products), and those intent on maximising the learning opportunities and using OER to enhance learning (process/practice). Those in the latter category tended to promote focusing on learner objectives, rather than on educators as OER creators.

10.3 Learner focus

Finally, the requirement to focus on learners was emphasized (e.g. Tony Bailetti, Patrick McAndrew, Pam McLean, Boniface Uheme, Kallie De Beer) in many contexts – the idea being to ensure a match between real needs and what is actually provided. Pam referred us to a relevant piece of research presented at a workshop last year at the UK OU[40], which brought together researchers and practitioners from a variety of disciplines. The research related to top-down and bottom-up information flows, how they meet and how they miss. It analysed things like key players, who enable information flows to come together effectively, areas of difficulty, and so on. The suggestion was that

35 See http://en.wikipedia.org/wiki/Pattern_language for more information.

36 See, for example, Martin Fowler's work, at http://www.martinfowler.com/eaaCatalog/ (patterns of enterprise application architecture). Also http://hillside.net/patterns/.

37 http://www.pedagogicalpatterns.org/

38 At least from the discussion between Boris Vukovic, Claudius Soodeen, Pam McLean and others on this topic.

39 Fred Heller and Teemu Leinonen were quick to point out that open practices (or "libre" norms) have been around for centuries, and flourish today in many places. See, for example, http://flosse.dicole.org/?item=thriftiness-is-a-virtue-in-learning-and-education-as-well.

40 http://kmi.open.ac.uk/events/ci2005/pmwiki.php/Profiles/StephenMusgrave

this research might provide some useful pointers as we consider OER research, most especially on the issue of inclusion of “bottom-up” players, such as the learners.

APPENDIX 4: Conversations map

The conversations map represents the discussions outlined in Appendix 3 in schematic form, allowing users to see the links between different threads.

Due to the large file size, it has been made available separately. You may either download it from the wiki[1], or request a copy from virtual.university@iiep.unesco.org. Alternatively, it can be viewed as a mindmap[2] using Freemind[3].

1 http://oerwiki.iiep-unesco.org/index.php?title=OER_research_agenda
2 Available on request from ktucker@csir.co.za.
3 http://freemind.sourceforge.net