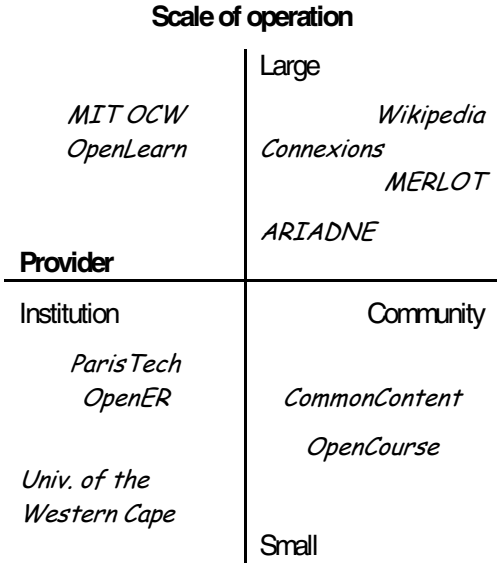
The number of non-course OER available – articles, individual curriculum units, modules and simulations – are also growing at a terrific rate. Math World contains 12 600 entries. In January 2007 Rice's Connexions project hosts more than 3 759 modules and 199 courses available for mixing and matching into study units or full courses. The University of California at Berkeley offers over 150 videos of course lectures and symposia, in total more than 250 hours, free of charge through Google Video. Textbook Revolution contains links to 260 freely available, copyright-cleared textbooks. MERLOT (see Box 3.2) offers almost 15 800 resources; the Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE) Foundation for the European Knowledge Pool offers links and federated searches in several networks and repositories. UNESCO's International Institute for Educational Planning hosts a wiki containing a listing of "OER useful resources" with links to portals, repositories and open content projects. Even more difficult than listing the number of initiatives would be estimating the quantity of available resources, even with a narrow definition of OER. On top of the resources accessible through initiatives such as the ones listed above, many more can be found by using search engines such as Google or Yahoo!.

At the moment it is not possible to give an accurate estimate of the number of ongoing OER initiatives. What can be offered is a preliminary typology of different repositories. As already mentioned, there are both large-scale operations and small-scale activities. It is also possible to distinguish between types of providers – institution-based programmes and more community-based bottom-up activities. In both cases there are all kinds of in-between models, as shown in Figure 3.2.

In the upper left corner of the figure, large-scale and institution-based or supported initiatives are found. Good examples are the MIT OCW programme and OpenLearn from the Open University in the United Kingdom. Both are large in terms of the financial funding provided. They are entirely institution-based in the sense that all materials originate from own staff although OpenLearn will also provide an experimental zone for downloading, remixing and sharing. In the upper right corner, large-scale non-institution-based operations are placed. The best example is probably Wikipedia, one of the Internet's real success stories and a good example of a large-scale community-based operation. Wikipedia is large in terms of content – it has more than 3.5 million articles in the ten largest languages – but small in terms of staff as would be expected for an initiative totally dependent on voluntary contributions. Other examples would be MERLOT, Connexions and ARIADNE. In the bottom left corner of the figure, three examples of small-scale institution-based initiatives are listed. The University of the Western Cape, South Africa, has launched a "free content

and free open courseware strategy". OpenER, launched by the Open University of Netherlands, has released a website of 400 hours of materials in Dutch for non-formal learners. Finally, in the bottom right corner are examples of small-scale community-based initiatives. OpenCourse is a "collaboration of teachers, researchers and students with the common purpose of developing open, reusable learning assets (*e.g.* animations, simulations, models, case studies, etc.)". Another example is Common Content, a repository of information about works made available under licences from Creative Commons, or in the public domain.

Figure 3.2. Categories of open educational resource providers



A third dimension to consider is whether the repository provides resources in a single discipline or is multidisciplinary. There are examples of single disciplinary programmes, such as Stanford Encyclopaedia of Philosophy and the Health Education Assets Library (HEAL) but the multidisciplinary approach seems to be more common at the moment.

Use, users and producers of open educational resources

Not much is known about who actually uses and produces all of the available OER. Of course, institution-based initiatives, such as the opencourseware programmes at different universities, use their own staff to

produce their material and some, such as MIT, try to continuously learn who their users are. Overall, however, very little is known about the users and producers. To correct this deficiency, the OECD project launched two web-based surveys during spring 2006, one targeting institutions and one aimed at individual teachers and researchers. The first received a very small number of answers, although over 1 800 e-mails were sent to universities in the 30 OECD member countries. The e-mails were sent to the rector/vice-chancellor's office and the poor result may be a sign that OER is still mostly a grass-roots phenomenon, in which the managerial level of the institutions is not involved and is unaware of such activities in research groups or as initiatives by individual faculty members.

The survey of individuals was answered by 193 people from 49 different countries throughout the world (see Figure 3.3 and Table 3.1). The geographical spread is interesting, although there is a clear bias towards teachers from English-speaking countries. This may be due to the fact that the questionnaire was only available in English. The small number of replies also calls for great caution in interpreting the results. The majority of respondents worked at institutions with up to 10 000 students and about one-third at institutions with 11 000-50 000 students. More than half of the respondents worked in the area of education, and two out of three represented publicly funded institutions. A small group (12 people) worked in private for-profit universities.

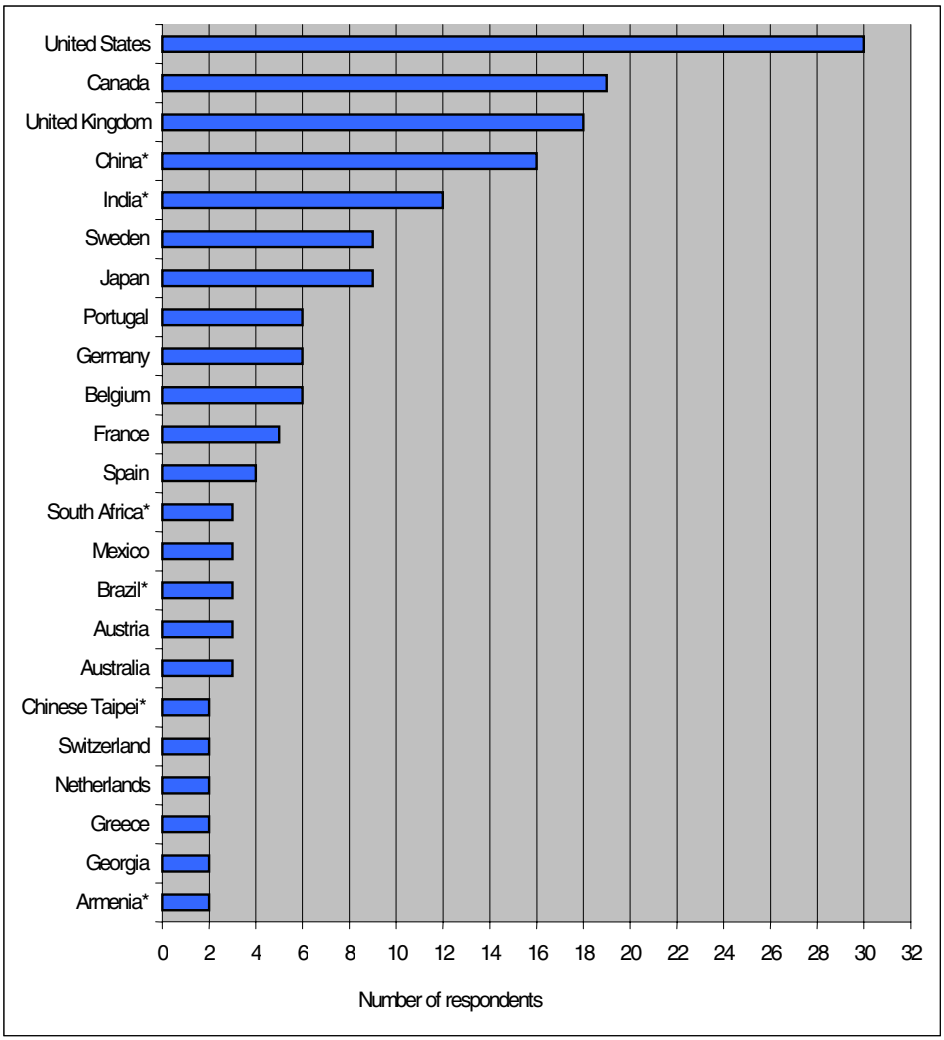
Table 3.1. Countries with one entry to the OECD questionnaire

Argentina*	Finland	Mauritius*	Sudan*
Belarus*	Ghana*	New Zealand	Togo*
Colombia*	Iceland	Nigeria*	Trinidad and Tobago*
Czech Republic	Iran*	Pakistan*	Turkey
Dominican Republic*	Italy	Philippines*	United Arab Emirates*
Egypt*	Kyrgyzstan*	Romania*	
Estonia*	Malaysia*	Slovakia	

* = Non-OECD countries.

Source: OECD.

Figure 3.3. Countries with two or more respondents to the OECD questionnaire



* = Non-OECD countries.

Source: OECD.

A majority of the respondents said they were deeply involved in OER activities, mostly as users of open content and only slightly less as producers. About half experienced good support from management in their use of open content, somewhat less support for producing content and using open source software. About one out of four felt they had good support from

management for their production of open source software. Most respondents said they were engaged in some sort of co-operation regarding production and exchange of resources, at the regional, national or international level. Overall there were no or only small differences in the replies from the respondents from OECD and non-OECD countries.

As a part of an extensive study on the use and users of digital resources in California 13 OER providers were interviewed (Harley, 2006). All sites were developed for educational purposes with broad intentions, *e.g.* to provide supplementary materials for students, to assist instructors in teaching, or to provide general course materials to support any type of learning. All of them target post-secondary instructors as their primary audience, together with students and the general public. Although most interviewees claimed that their resources are intended to reach a broad audience, even those sites with broad outreach missions recognised that their materials are often most useful for faculty preparing new courses. Although good usage data is rare, anecdotal evidence suggested that the actual audience varied significantly from the target audience in only a few cases.

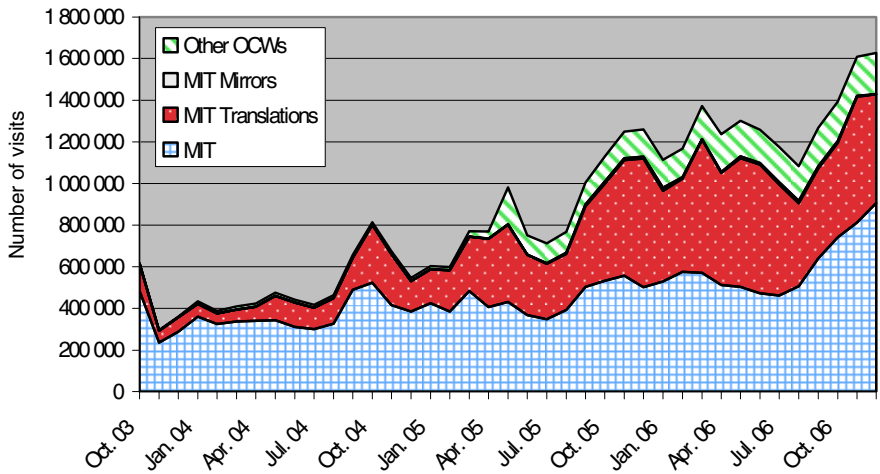
Other findings regarding OER users come from individual projects. According to Carson (2006a), 8.5 million visits were paid to MIT OCW content during 2005, an annual increase of 56%. The traffic seems to be increasingly global – 57% were non-US visits, with 21% of visitors from western Europe, 15% from East Asia and 6% from South Asia. The remaining 15% of the traffic originated from eastern Europe, the Middle East, Africa, the Pacific, Central Asia and the Caribbean. Carson (2005) reports that self-learners, typically with a bachelor's or master's degree, seem to make up the bulk of traffic (47%), followed by students (32%) and educators (16%). Higher percentages of educators use the site in developing regions, such as East Asia, Latin America, eastern Europe, the Middle East and North Africa. Self-learner percentages continue to be highest in North America, East Asia and western Europe.

On their website Tufts OCW reports that 59% of their visitors from June 2005 to January 2007 were from North America, 14% respectively from northern Europe, western Europe, and Asia and Pacific Islands. Half of the respondents to their user survey identified themselves as self-learners, while 43% were faculty members or students; 25% held a doctoral degree or equivalent, over 30% a master's degrees or equivalent and 26% a bachelor's degrees or equivalent (Phelps, 2006b). Taken together, over half of the users had a master's degree or higher (Tufts, 2006).

Johns Hopkins University's Bloomberg School of Public Health started an OCW initiative in 2005 and reports that the number of visitors grew by 111% during the first year. Among the visitors, 19% indicated their status as

healthcare professionals, 23% as self-learners and 7% as educators. A total of 13% reported that they were students, 3% of them Johns Hopkins students. In all 64% of the visits were from the United States (Phelps, 2006a).

Figure 3.4. Overall traffic to MIT OCW materials, October 2003 to December 2006



Source: MIT.

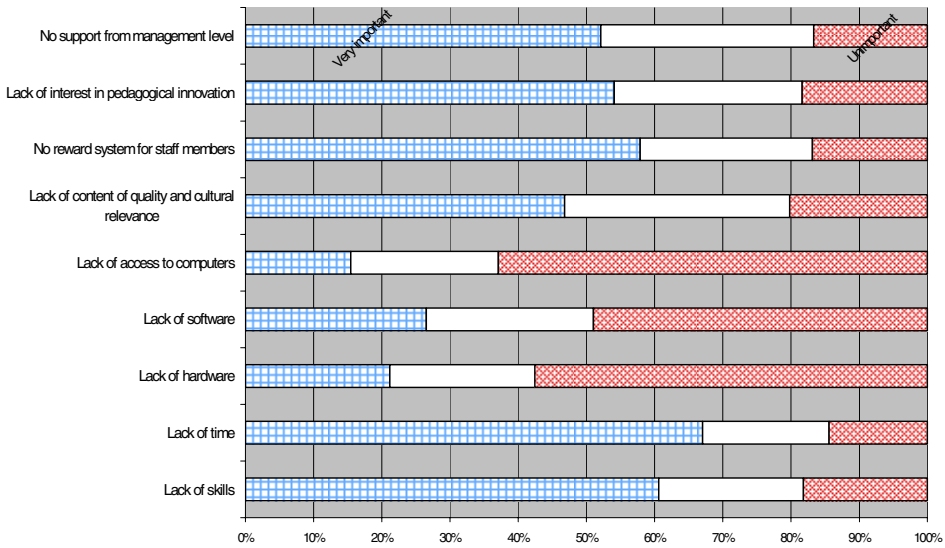
In January 2007 Connexions reported that it is accessed by more than 1 million people from 194 countries (*http://cnx.org*). In January 2006, the number of unique visitors was over 500 000, in comparison to over 264 000 in January 2005 (*http://cnx.org/news/2006-02-07*).

An increase of resources in different languages seems to result in an increase in the number of visitors to a site, and also has an impact on where the visitors come from. MIT OCW translation affiliation sites account for the most dramatic increase in traffic during the last year, with 3.4 million visits recorded to their four translation sites during 2005. ParisTech OCW, offering resources mostly in French, reports 30-35 000 unique visitors per month (Hylén, 2006). Of these, two-thirds are from Europe (predominately France), about 10% from Africa and 5-6% from North America. The case study from Japan OCW Consortium reports an average of 8 000-12 000 visitors a month and increasing, at each member university (Kobayashi and Kawafuchi, 2006).

About two-thirds of the respondents to the OECD questionnaire said they were involved in the production of open content, to either a large or a small extent. When asked to value nine possible barriers for involving other colleagues, the most significant barriers were said to be lack of time, followed by the lack of a reward system to encourage staff members to devote time and energy to producing open content, and a lack of skills (see Figure 3.5). A perceived lack of interest for pedagogical innovation among colleagues was also an important factor. It can be noted that pedagogical innovation is not prominent among reasons for individuals or institutions to participate in OER projects (see Chapter 4). The least significant barriers were said to be lack of access to computers and other kinds of hardware and lack of software.

When asked what licence they use for resources they have produced, more than half of respondents said that they did not use any licence. One-quarter used some kind of Creative Commons licence, and the rest other open licences. Although the use of Creative Commons licences is growing, this finding indicates a need for more awareness-raising activities regarding copyright and open licences, a conclusion that is strengthened by several observations made during the series of site visits carried out as a part of the OECD study.

Figure 3.5. Barriers for colleagues to use open educational resources

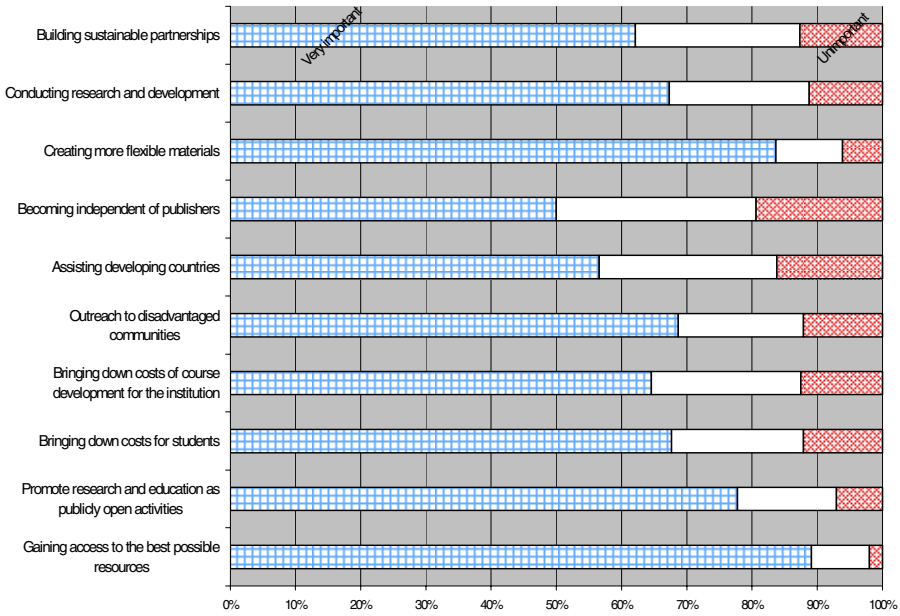


Source: OECD.

Furthermore, results from the survey suggest that instructors view OER as a high-quality complement to other learning resources. Other goals for using these resources are to make their own materials openly available even if they include third-party content, thus making materials more flexible and promoting openness (see Figure 3.6).

Two-thirds of respondents said that they used open content to some or a limited extent in their teaching. Also, it seems as if smaller chunks of learning material are used more than larger ones. Almost eight out of ten said they used learning objects or parts of courses rather than full courses in their teaching. More than half of the respondents said that they used content they have produced themselves. Four out of ten used content produced within their own institution, three out of ten used resources originating from co-operation with other institutions and about one-quarter used content produced by publishers.

Figure 3.6. Goals for using open educational resources in own teaching

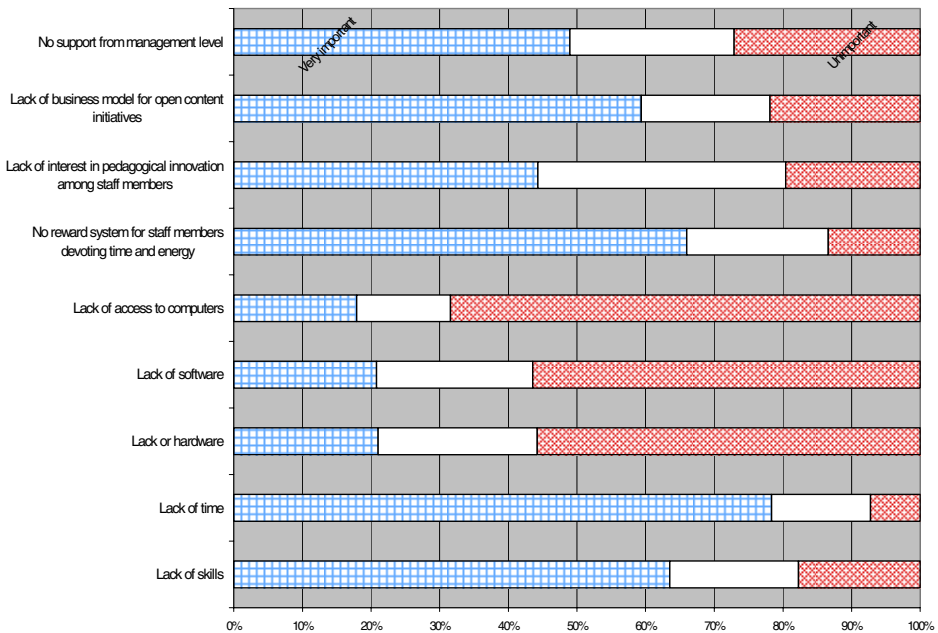


Source: OECD.

The respondents were asked to consider why more colleagues are not involved in open-content production. Figure 3.7 shows that the most significant barriers is "lack of time" followed by the "lack of a reward

system for people devoting time and energy to producing open content" and "lack of skills". The same factors were ranked as most important among teachers in both OECD and non-OECD countries although lack of skills was perceived as most significant in the latter and lack of time in the former. The lack of cost recovery models for open content initiatives is also perceived as an important negative factor. The least significant barriers are said by respondents both in OECD and non-OECD countries to be lack of access to computers and other kinds of hardware and lack of software, although a larger proportion in non-OECD countries considers lack of hardware, software and access to computers as a problem.

Figure 3.7. Barriers to producing open educational resources



Source: OECD.

The Macquarie E-Learning Centre of Excellence (MELCOE), Australia, is a different kind of producer of OER. It is specialised in developing open source software tools and open standards for e-learning. Among other things it has developed the Learning Activity Management System (LAMS) which now has a growing number of users (see Box 3.3).

Box 3.3. Macquarie E-Learning Centre of Excellence (MELCOE), Australia

MELCOE is a research centre established specifically for research and development (R&D) in e-Learning, including the development of free software and standards to facilitate e-learning and IT infrastructure for the education sector. MELCOE is formally established at the university level, with the majority of funding to date received from Australian federal government grants. While research at MELCOE involves a number of other universities and interested commercial partners, the R&D is predominantly based or directed at Macquarie University. The two main areas of production of open source software within MELCOE are the LAMS (Learning Activity Management System) and MAMS (Meta Access Management System) projects.

LAMS provides a system to help educators build and use sequences of learning activities. These sequences can be thought of as workflows for educational tasks. It also provides a structure for students to progress through the educational sequences, and engage in collaborative online learning and discussion. Sequences of activities can be designed to complement tutorials, for independent learning contexts, or for external students to participate in class-based exercises. LAMS is designed to be easy to use for educators to create and implement a wide range of flexible learning activities. It is open source software which provides intuitive visual tools to create sequences of activities, the infrastructure for students to progress through those sequences, and a management interface to direct and evaluate student participation. The release of LAMS as free software was instituted on a university level – a high-level decision was made to release LAMS as free software for the public good. It is hoped that LAMS will transform the process and development of online learning, and releasing it as free software is designed to increase its uptake in the educational sector.

LAMS is licensed under the GNU General Public License (GPL). Non-GPL licences can be negotiated for institutions who wish to build upon LAMS without an obligation to redistribute modifications (for example, a closed source learning management system that wishes to bundle and distribute LAMS), but to date no "dual licensing" of LAMS has occurred. All current users of LAMS acquire the software under the GPL licence. The GPL was chosen because it was the most common licence. This is seen as important in order to encourage community support and development. The copyleft GPL was specifically chosen over other OSI-approved licences because of the opportunities it afforded for potential dual-licence commercialisation.

The MAMS project aims to provide a middleware component to increase the efficiency and effectiveness of Australia's higher education research infrastructure. MAMS was funded by the Australian federal government under the Systemic Infrastructure Initiative "Backing Australia's Ability". MAMS addresses the need for middleware to enhance access to information and services, such as scholarly information and journals, large datasets and grid computing facilities. The MAMS project is designed to provide infrastructure for cross-institutional authentication and authorisation, combined with additional technical services for basic digital rights management, search and retrieval, and metadata management.

MAMS provides core infrastructure designed to increase the sharing of information between higher education research institutions. MAMS software is released under the Apache licence. The Apache licence is used because the MAMS software sits on top of Apache-licensed software called "Shibboleth" (not the Apache web server itself). The MAMS software is directly shared among approximately 50 partner institutions.

Source: Suzor (2006a).

Conclusions

To sum up, there is a great need for more information regarding who the users of OER are and what kind of use is most common. With the scattered data available, one can only paint only a very general picture of users and producers of OER. The majority of producers of resources and OER projects seem to be in English-speaking countries in the developed world. The institutions involved so far seem to be well-reputed internationally or in their countries, rather than unknown or low-status institutions. Both small and large institutions are involved, as well as campus-based and distance teaching establishments. About half of the institutions seem to be involved in some kind of established co-operation for sharing resources with others.

Most have educators in post-secondary institutions as their primary target group, although students and the general public are also often mentioned audiences. The users of OER appear to come from all over the world. Many seem to be well-educated self-learners, but educators are probably also prominent users.

Most repositories or sites have chosen not to have any log-in procedure for users. Also web statistics and other data are diverse and difficult or sometimes impossible to compare as a result of different evaluation methodologies and the diversity among both resource providers and types of resources. The resulting lack of information might be overcome, to some extent, by more co-ordinated gathering and analysis of web statistics and user surveys, although such activities are expensive and time-consuming, particularly for small and voluntary initiatives. In order to build a better knowledge base on the OER movement, grant-giving parties should be open to requests for funding of evaluation activities. An encouraging initiative is taken by the OCW Consortium to develop a common evaluation framework for all consortium members. This will of course build on specific circumstances pertaining to opencourseware projects – such as only delivering courses, always being institution-based, etc. – which might not be fully applicable to other OER projects, but it will most certainly establish a good basis for others to build on.