Deliverable D4.2S

Policy advice for OER uptake in schools

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Contents

Executive Summary & Policy Recommendations

POERUP is part funded by the European Commission's Lifelong Learning Programme. The overall aim of POERUP is to provide information which will support the development of effective policies to promote the uptake of OER, especially across the EU, in all main educational sectors.

Findings

1. There are relatively few national OER policies explicitly targeting the schools sector

2. OERs have been an important component of two of the Commission's most significant policy initiatives with regards to education (specifically including K-12) *Opening Up Education* and *Rethinking Education*

3. There appears to be some confusion surrounding the (Commission's) message concerning the availability (or otherwise) of K-12 OER

3. OER have the potential to be a valuable element in policy responses to austerity

4. OER have the potential to improve the learner experience in the school sector

5. Inequities of the ICT in education infrastructure across European Union will severely hinder schools' ability to exploit the potential of OER

6. It appears that there are "millions" of European OERs which are potentially appropriate for K-12 education

7. A significant proportion emanate from the "cultural sector" (museums, galleries, archives, national broadcasters)

8. Across the research there is a broad based consensus regarding the most commonly perceived, and reported, Barriers and Disincentives to using OER.

OER Policy Recommendations

Based on our understanding of current OER policies and initiatives, we make the following recommendations for policy:

Communication and awareness raising

1. **The Commission** should clarify its position with regards to the abundance, or scarcity, of appropriate resources currently available and should communicate clearly this message.
2. **The Commission** should continue to promote to educational users (leaders, practitioners, students and guardians) the availability and accessibility of open resources created through its cultural sector programmes. The Commission should encourage and support Member States to promote these resources within the context of their sovereign educational aims and objectives.

3. **The Commission** should encourage Member States to do likewise for their domestic cultural sector programmes, to make these available across the European Union and ensure that future programmes do not have unintended legal impairments to cross-border sharing.

4. **Member States** should promote (within the context of their sovereign educational aims and objectives) to educational users (leaders, practitioners, students and guardians) the availability and accessibility of open resources created through their respective cultural sector programmes.

5. **The Commission** should encourage **Member States** to promote the benefits of making resources available to schools (especially publicly funded schools and federations of schools) under an appropriate open license.

6. **Member States** should promote to schools (especially publicly funded schools and federations of schools) the benefits of making resources available under an appropriate open license.

Funding

7. **Member States** should ensure that budgets for digital educational resources are flexible enough to support the development (and maintenance) of openly licensed materials.

Copyright and licensing

8. **The Commission** should ensure that any public outputs from its programmes are made available as open resources under an appropriate license. (e.g. a Creative Commons open license - see http://creativecommons.org/licenses).

9. **Member States** should ensure that any public outputs from their respective national research and teaching development programmes are made available as open resources under an appropriate license. (e.g. a Creative Commons open license- see http://creativecommons.org/licenses).

Quality and accessibility

10. **The Commission** should ensure that access and accessibility are central tenets of all its OER programmes and initiatives.

11. **The Commission** should seek to exploit its considerable investment in Repositories to help inform greater understanding of the success/fail factors behind OER Repositories and OER – particularly the influence of the various approaches to quality assurance.

12. **Member States** must require (within reasonable expectation) OER to meet (disability) accessibility standards and ensure that accessibility is a central tenet of all OER programmes and initiatives.

13. Where **Member States** have Quality Assurance or materials approval processes they should ensure that OER are allowed to be included on approved instructional materials lists.

14. **Member States** should consider establishing and funding an OER evaluation and adoption panel. This panel should include lead teachers, content experts and accessibility experts.

15. **Member States** could consider establishing a specialist OER function/post to undertake an in-country cost-benefit analysis to assess the potential savings (or otherwise) which might be achieved through implementing an OER strategy.

Continuing professional development

16. **Member States** should establish (and adequately fund) a professional development programme to help teachers and administrators understand the benefits and uses of OER and open licensing.

Infrastructure

17. **The Commission** should continue its focus on improving the ICT in education infrastructure in members states (and levelling out disparities of access) so that they are able to exploit potential pedagogical and financial advantages of OER.

18. Member States should continue their focus on improving the ICT in education infrastructure (and levelling out disparities of access) so that they are able to exploit potential pedagogical and financial advantages of OER.

19. Where **Member States** (or institutions) are providing digital devices they should ensure that all considerations have been taken to maximise the effectiveness (economically and pedagogically) of devices, support and strategy with regards to OER.

Further research

20. **The Commission** should develop its understanding of how new modes of learning (including online, distance, OER and MOOCs) impact on quality assurance and recognition.

21. **The Commission** should fund research into the verifiable benefits and disadvantages of OER, with greater efforts to integrate such analyses with its ongoing research on distance learning, on-campus online learning, and pedagogy; and recommend the same to **Member States**.

22. Future K-12 OER research should explicitly embrace Repositories, Federations, Portals and Tools and should consider off-campus learning (both institutional – virtual schools – and self-directed or home-tutor led).

23. Specifically, **the Commission** should support extant or future research which seeks to inform greater understanding of the success/fail factors behind OER Repositories and OER – particularly the influence of the various approaches to quality assurance.

24. **The Commission** should foster research into potentially sustainable business models for OER, integrating this with its ongoing research on distance learning, on-campus online learning, and pedagogy; and recommend the same to Member States.

25. **The Commission** should explore the means by which closer, *enduring* collaboration can be fostered between Higher Education researchers and the schools sector with the objective of increasing the research evidence-base concerning K-12 OER and developing a culture of two-way discourse and sharing across the sectors.

1.   Introduction

1.1   About POERUP

POERUP is part funded by the European Commission's Lifelong Learning Programme. It builds on previous OER initiatives, such as OPAL[1], OLnet[2] and OERtest[3], produces country reports, case studies investigating the communities behind OER activities, and policy papers. The overall aim of POERUP is to develop policies to promote the uptake of OER, especially across the EU, in all main educational sectors. The project is led by a consortium of institutions and organisations in Europe and Canada. Partners are the University of Leicester (UK), Sero Consulting (UK), Open University of Netherlands (Netherlands), University of Lorraine (France), EDEN (UK/Hungary) and Athabasca University (Canada).

POERUP started in November 2011, and is funded to June 2014. The project has already created an inventory of more than 500 OER initiatives worldwide which are documented on the project wiki[4] and shown on interactive maps[5]. POERUP put substantial effort into understanding the state of play of OER in a range of countries, within the policy context and as part of the wider development of online learning in these countries. The project has produced more than 30 country reports, each covering individual countries and overall summaries of initiatives in Latin America, Asia, Africa and North America (though the USA report is less comprehensive than the others, given its dominance of the OER landscape)[6]. Each report provides an overview of the educational system, internet policy and provision, state of e-learning, copyright law, and major OER initiatives in that particular country.

1.2   The context for this document

The context for this set of policy recommendations is fourfold: POERUP research and analysis of notable existing OER initiatives (Chapter 2); the current policy landscape for ICT in education across Europe (Chapter 3); the opportunities for enhancing educational, economic and social progress through the expansion of OERs (Chapter 3); and the barriers towards expansion and policy constraints (Chapter 3). Chapter 4 describes the framework for policy recommendations and lists them, divided into "Recommendations to the Commission" and "Recommendations to Member States".

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[1] http://www.oer-quality.org/ THIS IS NO LONGER OPAL – it is a p/w website

[2] http://www.olnet.org/

[3] http://www.oer-europe.net/

[4] http://poerup.referata.com/wiki/Countries_with_OER_initiatives

[5] See https://mapsengine.google.com/map/edit?mid=zYG2prGO09jE.kdZ-SJFcZEoM

[6] http://poerup.referata.com/wiki/Countries

2. Notable OER initiatives and policies

The inventory of more than 500 worldwide OER initiatives was refined into a list of 120 *notable* initiatives and these were categorised and analysed in POERUP D2.3 *Report on Comparative Analysis of Transversal OER Initiatives.* The first issue of this report (July 2013) has now been extensively updated (June 2014).

Although some initiatives cover more than one education sector (and several ISCED levels) and include resources for lifelong learning and adult education, the notable initiatives are concentrated in higher education (ISCED levels 5A and 5B) and in schools (ISCED levels 2 and 3).

2.1 Notable (school-level) OER policies and initiatives from European countries

National and Regional Policies e.g.

- **Wikiwijs** (http://www.wikiwijs.nl/task/international.psml)

  Wikiwijs was launched by the Dutch Ministry of Education in 2008 as a national OER initiative with its initial focus on Primary, Secondary and College education but with a view to supporting the whole Dutch education system up to and including Higher Education. Wikiwijs is intended to encourage OER production, use and reuse and has a strong focus on teacher professional development and engagement. Wikiwijs consists of a Repository of OERs and a Referatory to digital education resources plus support to end-user teachers. The trial phase covered only Maths and Dutch language but the offer has now been extended. All supporting documentation is on (sic) Dutch.

- Ouluma (Finland) http://ouluma.fi/

  Ouluma is a regional portal and collaboration between the University of Oulu region and regional schools. It is designed primarily to support natural sciences, mathematics and science teaching and learning. The portal provides access to digital teaching resources and support for teachers' professional development.

- NDLA (Norway) http://ndla.no/

  The Norwegian Digital Learning Arena (NDLA) provides access to free digital learning resources for secondary schools across Norway.

- Digital School Programme (Poland)

"Digital School" is a national programme (partially funded by the EU) dealing with the use of ICT in Polish schools and raising ICT competences. The programme has four strands:

  - e-school (infrastructure and equipment for schools),

  - e-teacher (teacher training),

  - e-student (ICT equipment for students) and

  - e-resources (creating open textbooks, redesign of Scholaris, the national platform for educational resources, and production of ICT tools for school management).

  56 million Polish zloty (13 million Euro) has been allocated for the creation of new resources.

- Portal das Escolas (Portugal)
  https://www.portaldasescolas.pt/portal/server.pt/community/00_inicio/239

  Portal das Escolas is one element of a broader national schools portal with general information etc. Relatively few resources (approximately 1,000)

- Open Access Project (Sweden) http://www.kb.se/openaccess/

  The Open Access Project is a National Library venture which aims to raise awareness and accessibility of OER . It is not school specific but has relevance to the school sector.

- ZUM-wiki and ZUM-Grundschulwiki (Germany)
  (http://wikis.zum.de/zum/Hauptseite and
  http://grundschulwiki.zum.de/wiki/Hauptseite)
  ZUM-wiki is an open and free platform for the creation and sharing of learning materials across Primary and Secondary school-levels (ZUM-Grundschulwiki being the dedicated Primary platform). ZUM-Wiki is led by a non-profit body and financed by donations, grants, partnerships and advertisement. Materials can be uploaded, freely used and changed by users under a CC BY-SA 3.0 DE licence.

2.2 Notable (school-level) OER policies from non-European countries

Recent research for ODS (ODS Unpublished a) listed a selection of K-12 OER initiatives to illustrate developments (primarily from the US) in this area. Below we reproduce an edited version of the ODS text.

Open Culture (http://www.openculture.com/)

Open Culture has a growing K-12 resource bank from (kindergarten through to high school students) aimed at students, parents and teachers. There are currently some 200 resources specifically aimed at K-12 but these are supplemented by many more resources aimed at other levels of education or which are not level-specific and include significant libraries of Online Courses and Certificate Courses/MOOCs.

K-12 Open Ed (http://www.k12opened.com/index.php)

K-12 Open Ed is essentially an advocacy organisation for OER in the compulsory school sector and receives some support from the William and Flora Hewlett Foundation. However, K-12 Open Ed is also acting as a hub for collecting and curating sources and resources.

Curriki (http://welcome.curriki.org/)

Alongside WikiEducator, Wikimedia Commons and Wikibooks Curriki is one of the higher profile global OER collections with over 46,000 resources and over 360,000 members. Acess to Curriki reources requires registering as a Member but this Membership is free. All resources have been peer reviewed for quality and organised for ease of use.

Wikimedia Commons (http://commons.wikimedia.org/wiki/Main_Page)

*"Wikimedia Commons is a **media file repository** making available public domain and freely-licensed educational media content (images, sound and video clips) to everyone, in their own language. It acts as a common repository for the various projects of the Wikimedia Foundation." Wikimedia Commons currently contains over 16.5 million files.*

Wikibooks (http://www.wikibooks.org/)

Wikibooks...encompasses Wikijunior which offers access to a wide range of free textbooks and manuals. Wikibooks contains over 130,000 modules (not books) across a number of langauges including English, German, Spanish, French, Portuguese, Dutch, Italian and Polish. All content is covered by the Creative Commons Attribution-ShareAlike 3.0 licence.

WikiEducator (http://wikieducator.org/Main_Page)

WikiEducator is a community project supported by a financial contribution by the Commonwealth of Learning (COL) to the Open Education Resource Foundation[7] which aims to develop and provide a free version of the education curriculum by 2015. Athabasca University hosts the project servers.

Free Reading (http://www.freereading.net/index.php?title=Main_Page)

Free Reading is a US initiative aimed as it is pre-school and primary children. Free reading is

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[7] The OER Foundation is an independent international non-profit head quartered at Otago Polytechnic in New Zealand (see http://www.otagopolytechnic.ac.nz/)

> *the first free OER curriculum resource which has been approved for state-wide adoption by teachers and schools (in Florida).*
>
> **NeoK-12** (*http://www.neok12.com/*)
>
> *NeoK12 is a large bank of educational videos, quizzes, images, interactive diagrams and games across a comprehensive range of curriculum areas from pre-school through secondary. Resources are reviewed for relevance and safety and are supported with tools such as School Presentation – a mashup of Flickr and Wikipedia. NeoK-12 claims to have 500,000 visitors each month, of whom over 200,000 are teachers.*

2.3 Repositories, federations, portals and tools: national and EU policy and support

The OER landscape at compulsory school level is very different to that at HE level. Apart from the phrase "OER" being less widely recognised in schools (see for example Richter and Ehlers 2010 consultation with German teachers[8] which is confirmed with internal research for the ODS project – see below) the sources of OER differ greatly from those in Higher Education. In Higher Education there has been (in some countries such as England through Jisc) a concerted effort to centrally fund OER production and development by partnerships and networks of universities or at single institutions. At Higher Education level it is also far from unknown for an institution to fund tutors and lecturers to produce and share OERs - even if this is may be at a small scale. Both of these are extremely rare at K-12 level (Wikiwijs for example being a notable and highly visible exception). However, this does not mean that OERs do not exist at school level and are not shared. Instead, one has to look away from the phrase Open Education Resources and look instead to Repositories, Federations, Portals and Harvesting Tools. These are all too often over-looked, missed or dismissed by those researching school OER - in all likelihood because they are not "OER" repositories. They may contain closed-free resources, open-free resources, chargeable-proprietary-closed resources and more recently there has been a growth of open-chargeable resources although, as yet, these would seem to be limited to being accessible through the proprietary platforms i.e. bundled-in.

There are hundreds of examples of these Repositories, Federations, Portals and Harvesting Tools in Europe, many of some significance. A large proportion have been part, or fully, funded by the European Union and/or national governments. Whilst some repositories are, at the most basic level, little more than online *catalogues* of resources, most contain

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[8] Richter, T., Ehlers, U.D. (2010) Barriers and Motivators for Using Open Educational Resources in Schools http://openaccess.uoc.edu/webapps/o2/bitstream/10609/4868/6/Richter_editat2.pdf

resources, data and metadata (EdReNe 2005). To attempt to quantify the number of active repositories etc in Europe would be extremely difficult since there are so many and they are so diverse. In addition to the large national school repositories (e.g. in Greece, Norway and Latvia) there are countless single subject repositories (often regarding science-based subjects e.g. Cosmos or Mathematics e.g. Intergeo) and numerous "cultural sector" repositories provided by museums, galleries and archives (Pathe, BFI, Openarchives, the Swedish Digital Museum) or sometimes national broadcasters (BBC, YLE, NBC). EdReNe (Educational Repositories Network) is an attempt to bring some order to this often previously fragmented landscape.

"A gap exists between users, who ask "where are the learning resources" and the content providers, who ask "where are the users". Repositories address this missing knowledge about opportunities and resources. They are key disseminators of information of available learning resources. In repositories users search or browse for relevant resources (text books, websites etc.) among the vast supply on the market. Therefore, in many countries ministries of education/authorities or professional organisations have established national repositories of educational resources."

"The objective of this Thematic Network is to bring together these web-based repositories of learning resources with content owners and other stakeholders within education in order to share, develop and document strategies, experiences, practices, solutions, advice, procedures etc. on the organisation, structuring and functionality of repositories."[9]

This paper does not seek to provide an inventory of these Repositories but below we select some key initiatives which illustrate the scale, the difficulty of defining them as OER or "not OER" and the difficulty of making OER policy for them or more importantly *without* them.

Europeana[10] is a cultural sector based initiative to make available and easily accessible several millions of resources from *"...a range of Europe's leading galleries, libraries, archives and museums. Books and manuscripts, photos and paintings, television and film, sculpture and crafts, diaries and maps, sheet music and recordings..."*. Amongst the participating institutions are the British Library, The Rijksmuseum and The Louvre.

Europeana's Strategic Plan 2011-2015 (Europeana 2011) listed four strategic developmental tracks:

1. *Aggregate – to build the open trusted source for European cultural and scientific heritage content;*
2. *Facilitate – to support the cultural and scientific heritage sector through knowledge transfer, innovation and advocacy;*
3. *Distribute – to make heritage available to users wherever they are, whenever they want it;*

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[9] http://edrene.org/about/index.html

[10] http://www.europeana.eu/portal/aboutus.html

4. *Engage – to cultivate new ways for users to participate in their cultural and scientific heritage.*

Europeana is not an OER repository. But it does contain OER. Europeana offer contributors a menu of four "Rights Statements" from which to choose for their content:

1. Objects that are not protected by copyright and can therefore be freely re-used must be marked as being in the public domain by applying the Public Domain Mark.

2. When the data provider is also the rights holder and wants to make the digital object available for re-use (or has been authorised by the rights holder to do so) the data provider can apply a Creative Commons Licence or the CC0 1.0 Universal Public Domain Dedication.

3. When the data provider is also the rights holder and wants to make the digital object available without authorising re-use by third parties (or has been authorised by the rights holder to do so), the data provider can apply one of the three standardised Rights Reserved statements developed by Europeana.

4. Objects with a copyright status that is unclear (for example because no rights holder could be identified) can be marked with an 'unknown' copyright statement. This should only be used if absolutely necessary.

Europeana is clearly relevant to this element of the POERUP study and any policy considerations since schools are at the core of its target constituency and there is a longstanding Commission commitment through its eContentplus and ICT PSP (Information and Communications Technologies Policy Support Programme) funding.

A more recent initiative is the Open Discovery Space[11] (ODS). Once again demonstrating a significant (50%) commitment from the Commission, through the ICT PSP funding programme, this € 15.32m project describes (our bold) its objective as

*"... to serve as an accelerator of the sharing, adoption, usage, and re-purposing of **the already rich existing educational content base**."*

In order to achieve this

"Firstly, it will empower stakeholders through a single, integrated access point for eLearning resources from dispersed educational repositories. Secondly, it engages stakeholders in the production of meaningful educational activities by using a social-network style multilingual portal, offering eLearning resources as well as services for the production of educational

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[11] http://www.opendiscoveryspace.eu/project

activities. Thirdly, it will assess the impact of the new educational activities, which could serve as a prototype to be adopted by stakeholders in school education."

ODS represents a collaboration of repositories, federations, portals and tools to provide a single point of access to an estimated 1.5million resources. The great value to this strand of the POERUP study is that ODS has undertaken, and continues to undertake, significant research into the content it is making available, external trends and business models.

As with Europeana, ODS is not developing an "OER" repository. But one can say with some degree of confidence that ODS has a large library of OERs. In its study "Review of Open Learning Content Requirements" (ODS Unpublished b), which was calculated on a statistical basis of over 600,000 ODS resources[12], it was found that more than 50% of the resources are provided under the CC BY-NC-SA Attribution-Non Commercial-ShareAlike licence and less than 1% of the resources are copyright protected.

An earlier initiative (predating ODS) and one which again combines national and European Commission policy and funding was the Learning Resource Exchange (LRE) for Schools. LRE was established by the European Schoolnet partnership. Whilst the LRE was initially created to meet national Ministries desire to make "open content" more widely and easily accessible, it also offered the potential to support commercial content.

"The LRE has resources on virtually every curriculum subject and includes those directly produced by or for MoE and other public bodies, as well as resources developed by teachers themselves. Some private sector organisations are also contributing content that can be freely used in schools."

And the "vast majority" of LRE content was made available under Creative Commons licences.

"All LRE content can currently be thought of as 'open educational resources' or educational materials that are offered freely and openly for anyone to use and in some cases they can also be adapted and redistributed."

Whilst it should be noted that several partners were common to both ODS and LRE and there is, thus, a risk of "double-counting" resources, taken together and particularly taken together with Europeana they surely illustrate the Commission's view that the priority is to make existing resources easier to locate, use and reuse. This would seem to strongly imply that the Commission did not consider resources to be particularly scarce. Somewhat confusingly then a recent Commission report surmised that

"... there may be some complacency arising from a belief that an abundance of digital resources already exists." (Aceto, S. et al 2013)

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[12] At the time information was available for 22 of the ODS repositories or federations.

Of course, there will never be complete coverage of all age and ability levels, curricula or languages. And this may be the meaning of the MATEL quote. However, it is not immediately apparent from the document and elsewhere that there are references to the existence of significant quantities of available K-12 digital resources, most notably quoting the Horizon study which stated that (the)

"Abundance of resources (and broadband infrastructure) challenges us to review our role as educators".(Ibid)

The Commission's own iTEC research programme also repeated the Horizon quote with regards to abundance of resources and reaffirmed this in the analysis of iTEC provided in support of the ODS project (ODS Unpublished c).

"An increasing number of learning resources are available digitally. The saturation of information, and ubiquitous access to such information, are becoming a challenge for many students who don't know how to deal with such complexity and abundance."

If the initial MATEL statement concerning the complacency with regards to the quantities of resources which exist is indeed correct, then this would appear to raise some questions about the advisability of investing in repositories, portals, tools and federations. There are, of course, possible explanations but there is also some blurring of the message and potential contradiction between the assertions of possible *"complacency arising from a belief that an abundance of digital resources"* and the *"increasing number",* not to say *"abundance",* of resources.

In summary, much OER policy at the K-12 level is integrated into wider Technology Enhanced Learning (TEL) policy and specifically Repositories, Federations, Portals and Tools. OER libraries are often developed and offered alongside non-OER resources. It is clear that there are (accessible via the repositories, federations, portals and tools listed above) literally millions of potentially K-12 appropriate open resources within Europe. The blurring of OER and non-OER sources somewhat mirrors the hybrid business models which are now emerging.

3. The policy contexts

3.1 Schools: some background

We take the construction of schools to be ISCED 1 to 3 or the widely recognised US K-12 (whereby the meaning is from, kindergarten "K" through to Grade 12) which corresponds with Primary and Secondary or age 4-5years through to 19 years in Europe. Clearly there are national variations to this within Europe and, in some cases, a blurring with Tertiary sector. For the purpose of the POERUP study there has been a concentration within this of ISCED 2 and 3 although ISCED 1 has been noted for the sake of completeness.

3.2 The European Union: priorities for schools

Educational policy is typically developed in response to prevailing concerns. As such it is obviously fluid. However, beyond the "permanent" issues such as literacy, numeracy and languages, the European Commission has identified a number of specific, persistent challenges and priorities which apply variously to the schools sectors across Member States. Amongst the most enduring and widespread are the following:

- Reducing early school leaving

- Supporting migrant children and families (particularly host nation language deficiencies)

- Improving Science Technology Engineering and Maths (STEM) education,

- Developing Key competences

- Increasing the involvement of women and girls in ICT

- Improving Digital literacy and skills

- Matching (youth) skills with emerging labour market demands

3.3 The ICT in Schools in Europe landscape

The 2013 Survey Of Schools: ICT in Education (European Commission 2013a) reported an improving picture in terms of the ICT infrastructure in European schools:

"There are now between three and seven students per computer on average in the EU; laptops, tablets and net-books are becoming pervasive, but only in some countries...More than nine out of ten students are in schools with broadband, at most commonly between 2 and 30mbps on average in the EU. Most schools are connected at least at basic level...between 25 and 35% of students at grades 4 and 8, and around 50% of students at grade 11, are in highly equipped schools, i.e. with high equipment level, fast broadband (10 mbps or more) and high connectedness. The percentages of such schools differ enormously between countries."(Ibid)

Broadband is reported as almost ubiquitous across the European Union's schools with laptops, data projectors and interactive whiteboards used extensively and a notable trend towards the deployment of smaller and more mobile devices. Students in many countries are increasingly bringing their own technologies to use at school. However, the survey also reported that teachers and head teachers felt insufficient ICT equipment was an impairment to ICT use in schools.

Whilst there has been a general improvement in access to ICT there are still considerable disparities across grades and even more significant inequities across European Union Member States.

The majority of students today (75%) are taught by teachers experienced in the use of ICT in the classroom. However, only a minority of students are taught by teachers for whom ICT training was compulsory. The survey also notes:

"The low use of digital resources and tools is a concern. Digital textbooks and multimedia tools are the resources most frequently used. However, only 30% of students use them once a week or almost every day, but more than 50% of students at all grades never or almost never use such resource".

There is little substantial and/or longitudinal research into patterns of spending on ICT in K-12 education. As such it is difficult to be confident as to the impact of the widespread austerity measures applied across the EU 28. However, trends identified in US research would seem instantly recognisable to policymakers and practitioners in many countries.

Research for the Commission's Open Discovery Space (ODS unpublished c) noted the relevance (to OER policy development) of some of these:

"...the drive to reduce printing costs could open the way for significant increases in the use of digital content... "monetising successes" might push some schools to create and share content...a reduction in support staff may mean teachers look outside for resources but equally may mean they are simply less likely to engage in any activity which might require technical support."

3.4   The current OER policy landscape

There are now 94 OER policies currently in the Creative Commons OER Policy Registry.[13] However, only 16[14] relate to EU Member States – and closer examination shows that a significant number of these are policy **proposals,** rather than operational policies. More than half of the policy registry concerns US polices. These are of interest and relevance to this research since a significant proportion of these concern K-12 education. By comparison

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[13] As of June 2014 - see http://wiki.creativecommons.org/OER_Policy_Registry

[14] Note that this includes policy development in Scotland and Wales as separate to that of England or the UK.

with the HE sector there are relatively few OER policies concerning schools in Europe. The *number* of policies may be misleading: institutional policies are much more common in the HE sector education than the schools sector but regions and nations (and, in the US, "states") across the globe are showing interest in exploring strategic approaches to OER at K-12 level; some of the K-12 policies are of much greater scale than many of the Higher Education policies. Whilst the OER Policy Registry (wiki) is a useful reference point it is far from exhaustive and does not include several of the "notable" school-level policies we list below. **As we discussed above in section 2.3 the OER landscape in the compulsory education sector differs dramatically from that in Higher Education and, possibly as a result, the many repositories, federations and tools which are common in the schools landscape do not feature in the OER Policy Registry.** It should also be noted that a significant section of US K-12 policies concern free digital text-books and are, as such, relatively limited in their scope and ambition. Some might even argue that large scale digital text-books strategies are the opposite of the Commission's OER philosophy in that they potentially result in a severe contraction of quality learning resources used in schools. If all levels throughout a state, region or nation are supplied with the same (respective) curriculum digital text-book there may be some reluctance amongst teachers and leaders to invest valuable time and money sourcing additional materials. The result is said to be the proliferation of a *single version* of any given subject and a lack of heterogeneity. Similar fears have been noted both for the widespread deployment of devices with vendor content "bundled-in" and, indeed, for MOOCs from "blue-chip" institutions.

Whilst acknowledging that there are differences between countries, in their 2012 analysis of national responses to the OECD Country questionnaire, Hylen et al (Hylen et al 2012) noted that OER may be more common at school level than is initially obvious.

"Primary, lower secondary and upper secondary education are about as involved in OER as tertiary education. In post-secondary non-tertiary education, the level of activity seems to be slightly lower. Most countries have simultaneously initiated activities in several educational sectors. Some, like Austria, Greece, Mexico and the Netherlands, are active over the full spectrum, with the exception of International Standard Classification of Education (ISCED) sector 4. Others have chosen to focus either on young children, like Belgium (Fl), the Czech Republic, Portugal, and Spain, which are the most active in ISCED sectors 1 to3..."

However, it should be acknowledged that Hylen et al also reported the difficulties in making an accurate assessment of "OER" activity. Many countries did not know, or preferred not to estimate, the *"...percentage of learning materials partially or entirely produced or paid for by public expenditure are available in digital format"* or the percentage offered as OER. Further to that Sweden specifically pointed out that many initiatives are still small scale and, thus, difficult to identify and the Netherlands pointed out that some materials are developed for teachers to use within their own classroom. Whilst this would exclude these

materials from being considered OER it illustrates the complexity of the situation and the multiple challenges when attempting to quantify activity.

3.5 EU OER policy work involving schools

3.5.1 Opening Up Education

In September 2013 the Commission launched a major initiative with regards to ICT in Education and the most explicit and detailed yet concerning Open Educational Practices and Resources: Opening Up Education (European Commission 2013b).

Describing the need for a new initiative the Commission stated:

"Digital technologies are fully embedded in the way people interact, work and trade; yet they are not being fully exploited in education and training systems across Europe. A recent study on the state of digital provision in schools in the Union revealed that 63% of nine year olds do not study at a 'highly digitally-equipped school' (with appropriate equipment, fast broadband and high 'connectivity'). While 70% of teachers in the EU recognize the importance of training in digital-supported ways of teaching and learning, only 20-25% of students are taught by digitally confident and supportive teachers. Most teachers use Information and Communication Technologies (ICT) mainly to prepare their teaching, rather than to work with students during lessons."

Whilst this survey (European Commission 2013a) (Survey of Schools: ICT in Education - the "recent study" in the Commission's text above) provides useful pointers and adds to the existing body of evidence, some of the generalisations concerning the European Union as a whole may be open to question. Unfortunately, response rates from four nations (Germany, Iceland, Netherlands, UK) were so low as to leave them significantly under-represented in the final figures. That these countries were amongst those generally seen as at the higher end of ICT in education infrastructure might suggest that the final analysis tends towards the pessimistic.

However, it is undoubtedly true that there are significant disparities between (and in some cases perhaps even within) Member States in terms of students access to technology and teacher skills. The study cites Sweden, Finland and Denmark as having the best-equipped schools while the accompanying press release[15] summarises the opposing perspective *"...students in Poland, Romania, Italy, Greece, Hungary and Slovakia are most likely to lack the right equipment."*

 Without further research it might be a mistake to assume that the best infrastructure and the most competent teachers go hand-in-hand since there is some (largely anecdotal at this point - but see experiences of the Open Discovery Space project) evidence that in some of the less well-served regions, teachers *have* to innovate, and indeed collaborate, more than

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[15] http://europa.eu/rapid/press-release_IP-13-341_en.htm

they might do elsewhere. Indeed the press release states *"...skilled and confident teachers are more important than the latest equipment to delivering digital skills and knowledge"* and also more generally *"some countries with the highest use of computer equipment are the ones with the lowest scores on equipment provisions (e.g. Bulgaria, Slovakia, Cyprus and Hungary)."*[16]

Opening Up Education proposed many actions at both EU and national levels. Below we reproduce the relevant headline actions and where OER is specifically mentioned we present the appropriate text. At the end of each of these is the Commission's apportioning of responsibility for that specific action[17].

Actions under Opening Up Education
Open Learning Environments: opportunities to innovate for organisations, teachers and learners
Open Educational Resources: opportunities to use open knowledge for better quality and access
Ensure that all educational materials supported by Erasmus+ are available to the public under open licences and promote similar practices under EU programmes; **Commission**   *Use the new programmes Erasmus+ and Horizon 2020 to encourage partnerships between creators of educational content (e.g. teachers, publishers, ICT companies) to increase the supply of quality OER and other digital educational materials in different languages, to develop new business models and to develop technical solutions which provide transparent information on copyrights and open licenses to users of digital educational resources;* **Commission**   *Launch the Open Education Europa portal linking it to existing OER repositories in different languages and bringing learners, teachers and researchers together, in order to improve the attractiveness and visibility of quality OERs produced in the EU;* **Commission**   *Stimulate open access policies for publicly-funded educational materials;* **Member States and education institutions**   *Encourage formal education and training institutions to include digital content, including OERs, among the recommended educational materials for learners at all educational levels and encourage the production, including through public procurement, of high-quality educational materials whose copyrights would belong to public authorities.* **Member States and education institutions**
A concerted effort to seize the opportunities of the digital revolution

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[16] Ibid

[17] Opening Up Education explains *"Even though the key for success depends foremost on Member States, the EU also has a role to play. It can promote best practices and support exchanges across Member States. It can deliver benefits from economies of scale and interoperability, thus avoiding fragmentation. It can support the deployment and availability of digital technology and content through financial support, public-private partnerships and recommendations."*

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The accompanying Staff Working Document (European Commission 2013c) is perhaps even more forceful and clear in its enthusiasm for OERs.

"Acquiring knowledge through Open Educational Resources: Digitised materials offered freely and openly for educators, students and self-learners are not only driving change in the access to content for everyone but also widening its diversity and changing the educational practices. Re-use and sharing of open educational resources (OER) increase the quality, reduce the costs and the time lag between production and use of resources. Learning becomes more personalised, interactive and collaborative"

3.5.2   Rethinking Education

Prior to *Opening Up Education* (and previewing it to some extent) the Commission released *Rethinking Education* which was far broader in sweep and was essentially designed to resolve the disjuncture between young people's skills and the needs of the labour market *(Rethinking Education: Investing in skills for better socio-economic outcomes). Rethinking Education* nonetheless contained observations, recommendations and actions specific to ICT in education and OER.

"Digital learning and recent trends in Open Educational Resources (OER) are enabling fundamental changes in the education world, expanding the educational offer beyond its traditional formats and borders. New ways of learning, characterised by personalisation, engagement, use of digital media, collaboration, bottom-up practices and where the learner or teacher is a creator of learning content are emerging, facilitated by the exponential growth in OER available via the internet. Europe should exploit the potential of OER much more than is currently the case."

Citing the 2011 Eurydice Report *Key Data On Learning And Innovation Through ICT at School in Europe 2011* (Eurydice (2011) *Rethinking Education* states

"Recent research shows that disparities persist in the availability of ICT-based educational tools and content. ICT-based assessment is often recommended but it is rarely indicated how it should be applied."

In particular, the Eurydice report cited noted shortages of Mathematics and Science resources. Without questioning that this is still the case it should be noted that the Eurydice Report is itself citing the TIMSS (Trends in International Maths and Science Study) Report of 2007 and the situation with regards to the availability of digital content is surely fluid and dynamic. However, *Rethinking Education* continues

"The quality of education relies on a mix of different educational materials. To achieve this, wider access and use of OER needs to be accompanied by clear quality standards and mechanisms to assess and validate skills and competences acquired through it. Education and training institutions which have not yet integrated OER should also seek cooperation with technologically more advanced educational providers in order to meet the expectations of digital-born learners."

"The educational marketplace is being transformed. There are growing numbers of non-commercial OER providers alongside technological advances such as open access, internet file-sharing and open source, and educational publishers and the wider industry continue to adapt to these changes. They are already revising their business models in order to profit from new commercial opportunities."

Whilst a case can be made that several recommendations have indirect relevance to OER policy, by far the most pertinent concerns creating and supporting the infrastructure and environment in which the effective use of OER can flourish.

"Scale up the use of ICT-supported learning and access to high quality OER. Key actions are modernising the ICT infrastructure of schools, supporting ICT-based teaching and assessment practices, promoting the transparency of rights and obligations of users of digitalised content, establishing mechanisms to validate and recognise skills and competences acquired through OER and supporting education and training institutions to adapt their business models to the emergence of OER."

Which in turn gives rise to one key action:

"Analyse the impact of providing EU support to upscaling access and use of OER and ICT, establishing quality parameters and certification processes for OER, developing ICT-enabled teaching practices and creating a EU dimension for online education. The results of this preparatory work will pave the way towards a new European initiative on "Opening up education"."

3.6   Business models and barriers

3.6.1 Business models

The *Report on Comparative Analysis of Transversal OER Initiatives* identified a range of business models for developing and sustaining OER initiatives. The Trend Report: *Open Educational Resources 2013* (SURF 2013) concludes that OER have reached the peak of the initial hype. However, it should be noted that this report was heavily (although not exclusively) focused on OER in the Higher Education sector where it is suggested that platforms have been created, large quantities of resources have been developed, MOOCs are being offered, certification systems are being piloted (and, in some cases, discontinued) and OER appear to be entering the next stage of their development and maturity. In the initial stage, the majority of OER initiatives were funded in the form of projects with either external or internal funding or both. In the schools sector (at least at European level) the majority of identifiable funding has been external. An ongoing challenge faced by these initiatives is what business models might be appropriate to make them sustainable in the longer term. Several initiatives have in fact now ceased or are reduced to 'tick-over' level.

Downes (2007) categorises nine different funding models for OER initiatives, which are described as follows:

1. Endowment models: The initiative receives base funding.
2. Membership models: Each partner organisation contributes membership fees.
3. Donation models: The initiative receives donations.
4. Conversion models: Fee payments are made by users/consumers.
5. Contributor-pay models: The contributor pays for the cost of maintaining the contribution and the provider makes it freely available.
6. Sponsorship models, such as commercial advertising.
7. Institutional models: The initiative is funded internally by the institution.
8. Government models: The initiative receives direct funding via government agencies.
9. Partnership or exchanges: The focus is on sharing and exchanging resources.

Research for ODS (ODS Unpublished c) identified thirteen OER and MOOC business models which have been deployed to varying (although largely unimpressive) degrees of success:

1. Give away to reduce costs
2. Digital for free, print for fee
3. "Give away the recipe, open a restaurant"
4. Tuition free but pay for registration, pay for examination/accreditation
5. Give away to generate increasing enrolments
6. Subscription
7. Advertising
8. "Course In A Box"
9. Donations and Memberships
10. Analysis and sale of Data
11. Peer to peer sales
12. Sponsorship
13. Job placement services

Most OER projects start up with external funding, and then move to an alternative model once that initial funding finishes. Therefore, the majority of POERUP initiatives fit in well with Downes's No.1 endowment model, where the project obtains base funding from foundations, commercial companies, institutions or a combination of different sources. At schools level – where there has traditionally been far less investment from the commercial sector and, at the very least, less visible investment from institutions – the role of the European Commission has been pivotal in providing significant endowments for repositories, federations and tools.

However, as noted above there has been substantial funding made available by some national governments to drive school level OER development. Examples of large-scale government-funded school level OER initiatives in Europe include the *Wikiwijs* programme involving €8 million public funding in the 2009-2013 period in the Netherlands – although its

continuation funding is to be targeted towards HE, rather than schools (Schuwer 2013) - and the ongoing €13 million **Digital School Programme** in Poland.

There are a variety of business models currently being trialled for the development and sustainability of OER initiatives, (though none has been proven yet) and a mix of business models is likely to be used in the near future. The big challenge now is that the scale of investment, especially from governments is unlikely to continue. Lack of government support has already been reported by several countries in POERUP, including the UK, Canada and Italy, as a major factor in limiting further development of OER.

The current economic crisis affecting many countries has led to a decrease in government investment in education and innovation. This has weakened the already challenging situation concerning the promotion of OER in some countries, such as Italy, where OER were considered risky even before the crisis. As a result of the economic and financial situation, some national programmes have declined, downsized, or not even started. For example, in England, there seem to be few OER activities in schools, and activities in higher education institutions are inhibited by the cessation of almost all OER-related funding from the government since 2012. However, there is a persuasive counter argument which suggests that austerity and cutbacks have actually accelerated some teaching and learning policy changes (OER amongst them) as institutions, regions and nations seek cost savings.

For this reason, the endowment model of funding is not likely to be sustainable and new business strategies and models will need to be developed in response to the challenges and new contexts in which educational institutions operate in. In the US, the Khan Academy[18] and the Saylor Foundation are said to be working with "sustainable funding", but these "sustainable" initiatives are the exception rather than the rule. And, of course, even these are currently almost wholly reliant on donations from founders and/or others who may see fit to invest for altruistic - or perhaps even "strategic"- reasons. Note also that unlike the United States, the role of foundations in funding educational developments is minimal in Europe.

It should also be noted that in the Higher Education sector a key driver of the broader OER movement has been the desire to reduce the cost burden placed on students by the requirement to buy course text books. The applicability of this approach to the schools sector is far less obvious. Phillips (2014) observed that:

"...they (schools) may simply have decided that there are other priorities far more pressing than clarifying the legal status of the teacher as content producer (e.g. copyright) and encouraging the sharing of materials. It is fair to say that in HE the drive towards OER and particularly Open Textbooks has been inspired partly by the desire to reduce the

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[18] See https://www.khanacademy.org/about/our-supporters

considerable financial burden that the purchase of set texts places on students (and, in some cases institutions) with figures of $900US per year (in 2010) being quoted. Costs are said to be rising rapidly and in some cases preventing students from accessing Higher Education or driving them away from it. In most countries the model in schools is such that neither they nor their students face such a burden."

3.6.2. Emerging commercial and hybrid business models

ODS research (ODS Unpublished c) noted that:

"Somewhat inevitably commercial publishers have not been slow to recognise that OER and MOOCs represent both a threat and an opportunity. Pearson has made possibly the most significant moves in this field through articulating a keen interest in MOOCs and also the announcement in 2012 that it would release a huge tranche of its commercial content (90,000 raw images and 48 classic titles from 31 authors including the Brontë sisters, Oscar Wilde and Thomas Hardy) for "open" use . Given Pearson's purchase of the Connections K-12 Academy chain of virtual (cyber) schools this could be an important development in the compulsory school sector. "

Again the situation differs from that in the HE and VET sectors. Perhaps driven by the lure of standardised national curricula and aggregated (centralised funding) commercial publishers have (in many countries) traditionally provided the bulk of K-12 digital educational content. It is, therefore, not surprising that the threat to this privileged position and the opportunity to exploit the back catalogues should lead them to investigate how it might counter or collaborate with the OER movement. This is in turn leading to a clouding of the free, open and commercial models (although 'pure' free and open models still survive).

"There appears to be an increasing willingness amongst the commercial sector to offer a menu of products and services – in some cases down to fine levels of granularity. Whether this is a response to constricted spending power of educational purchasers in the face of austerity (and purchasers demanding greater value), the emergence of new products and paradigms such as OER and MOOCs or simply a natural evolution is difficult to identify." (ODS Unpublished c)

3.6.3 Barriers and disincentives to using OERs

Across the research (e.g. Stacey 2012, Clements & Pawlowski 2011) the most commonly reported and perceived barriers and disincentives to using OER in the schools sector are as follows:

- National and institutional strategies and initiatives are often oriented towards infrastructure and seldom encourage the development of educational content;

- Lack of awareness of educators about the availability and opportunities;

- Confusion (and fear) concerning intellectual property rights;

- Confusion (and fear) concerning appropriate pedagogies;

- Quality assessment and assurance;

- Lack of reward and/or incentivisation by institutions

- Lack of knowledge sharing culture and re-use

- Infrastructure insufficient in some countries

- Need for OER to be contextualised (particularly – but not solely – language issues)

- Inability to engage with educational taxonomies (unfamiliarity with metadata and vocabularies).

    Many of these also apply to a greater or lesser extent to the VET and HE sectors.

The Commission funded Open e-Learning Content Observatory Services (OLCOS) 2012 Road map counselled

"...that delivering OER to the still dominant model of teacher centred knowledge transfer will have little effect on equipping teachers, students and workers with the competences, knowledge and skills to participate successfully in the knowledge economy and society." (OLCOS 2012)

Unusually for an OER research publication, OLCOS directs advice and guidance specifically to the schools sector strongly recommending that any OER initiatives aimed at schools should ring-fence a "considerable" proportion of the overall budget for supporting teachers. Support should concentrate on in-house training.

In respect of section 2.4 above regarding Repositories, Federations, Portals and Tools it should be noted that OLCOS reports teachers are also apprehensive about using *repositories* – unconvinced that the times spent searching for and integrating appropriate content will yield a commensurate return.

There are also concerns at a more macro-level. Hylen et al (Hylen et al 2012) reported that:

"Germany has raised a number of fundamental objections to the idea of OER. They question whether a lack of digital content prevents learning, particularly in the case of people with low qualifications, and whether well-educated people will benefit the most from OER. Furthermore, they ask if there are any sustainable business models for OER and suggest that there are questions of standards, quality, technical interoperability, and legal questions concerning copyright that have not yet been solved. The issue of copyright is widely discussed in Germany in reference to the ongoing Open Access debate."

Whilst the German position may seem the most entrenched it is difficult for the objective observer not to conclude with these concerns. However, there is a growing amount of OER activity in Germany, in spite of the continuing national caution.

3.7   The case for policy interventions

The 'Roadmap' makes a strong case for policy interventions at a European level, offering three options, graduating from Option 1 (do nothing) through to Option 3 (an interventionist strategy).

3.7.1 Where should the focus be for policy interventions?

The EU administration and national ministries expect policy recommendations from an expert group (POERUP is *not* a lobby group for OER, it is a team of analysts looking at OER) to take into account the following factors:

- the strength of the evidence base for the assertions
- the importance of the problems the policy interventions are aimed to alleviate
- the relative importance of these interventions compared with other interventions
- the existing policy thicket for education, ICT in education and related issues (such as open access)
- the socio-economic situation – in particular the potential funding available.

So where should one focus policy interventions linked to OER?

Not surely, at OER only – in reality almost no European countries other than England (not the rest of the UK) and Netherlands have had a substantial state-funded HE programme of OER and in one of these (UK) it has finished and for the other (Netherlands) there has only recently been a renewal of funding – together with a change of direction – for Wikiwijs[19]. In contrast, open access (simplistically OER for postgraduate students and research staff) is much more embedded. Given that there are virtually no national policies across Europe towards OER alone (with the recent exception of Wales[20] and Slovenia[21]) for any educational sector, it seems sensible to link OER policy recommendations to wider ICT policies. A number of countries have made aspirational statements about OER and open access to resources (e.g. Scotland[22] and Wales, where a multi-sector policy statement is imminent) and policy recommendations can add impetus to aspirations, where they can be seen to be evidence-based.

OERs have been an important component of two of the Commission's most significant policy initiatives with regards to education. The *Opening Up Education*[23] initiative has a theme of developing tools and indicators for measuring institutional application of *e-learning* and this

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[19] http://www.slideshare.net/robertschuwer/wikiwijs-a-national-initiative-on-oer

[20] http://www.jiscrsc.ac.uk/wales/news/2013/september/welsh-universities-commit-to-upload-lectures-and-research-online.aspx

[21] See http://www.k4all.org/openingupslovenia/

[22] See http://blogs.cetis.ac.uk/lmc/2013/07/04/open-scotland-report-and-actions/ and http://openscot.wordpress.com/2014/01/

[23] See http://europa.eu/rapid/press-release_IP-13-859_en.htm and http://ec.europa.eu/education/policy/strategic-framework/education-technology.htm

can be expected to incorporate OER: it therefore makes sense to map our policy recommendations against the Key Transformative Actions described. We also take note of the Horizon 2020 agenda[24]. In making recommendations, it is important to remember that each EU Member State is responsible for its own school education policies[25] and recommendations to the Commission need to match the language of *Opening Up Education* and 'encourage' Member States to take actions. The sovereignty of individual Member States also operates in the areas of copyright and licensing: even though the EU has been trying to develop common policies for more than ten years.

3.7.2 Policy constraints – the evidence base for OER

This is our snapshot of the situation in spring 2014. We focus just on the situation as it is likely to affect policy interventions.

1. Across Europe there is increasing discussion of OER. However, this would appear to be more common at HE level than at school level and among TEL researchers and a small number of "activists". Yet as the POERUP and other projects' OER country reports show, there are still many EU countries where OER is little seen (or, at least, barely *visible*) in schools. Europe is not alone in this.
2. There are some significant national school –level OER policy initiatives such as those in the Netherlands, Norway and (arguably) Poland but these are the exception rather than the rule.
3. There are already millions of OERs existing which are likely to be appropriate for use in K-12.
4. OER are most likely to be found via Repositories, Federations, Portals and Tools.
5. Repositories, Federations, Portals and Tools are typically "mixed economies" providing access (or the potential to access) to open-free, closed-free, closed-chargeable, open-chargeable resources.
6. A very significant proportion of these resources emanate not from the schools sector but from the cultural sector.
7. The Commercial sector has responded and is developing a menu of offers from traditional buy-outright and licensing through to hybrid commercial-OER models.
8. MOOCs are little known in school circles. However, there is some evidence emerging (e.g. Big History http://www.bighistoryproject.com/Home) that they are prompting school policymakers and leaders to rethink current use of technologies and blended learning paradigms.
9. The endless "angels on a pin" debates about licenses make it clear that EU-wide decisions on appropriate licenses for public content would be of great benefit.
10. The impact of OER on teaching outcomes has so far generated very few papers. The situation is even more acute for the school sector. It should be noted that the equivalent literature on the impact of ICT on teaching outcomes is now very large and at least 20 years in duration, but only recently are meta-level conclusions emerging.

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[24] https://ec.europa.eu/programmes/horizon2020/en/area/ict-research-innovation

[25] See http://europa.eu/pol/educ/index_en.htm

11. There is high activity in quality of OER among some projects and OER enthusiasts but this is not at all integrated with the European-level and member state quality bodies and with existing experts on quality in online learning.
12. The business case for OER repositories in schools is not proven yet. However, the Open Discovery Space may yield some evidence to further knowledge in this area.
13. There is considerably greater traction of *open access* at EU level and in several Member States.

3.7.3 Policy recommendations or actions?

Given the policy constraints listed above, it is worth considering the potential effectiveness of **policy recommendations** as against simply **descriptions of actions** which could promote the uptake of OER. Actions are most likely to promote change if they are bottom-up; it is the teachers and resources staff who will be the drivers of changes in practice. However, commitment from the top is important: national government giving the lead to agencies, regional and local government and school leaders. Policies should facilitate, nurture, accelerate, support and, crucially, not inhibit. The current paucity of sustainable business models suggests that resources need to be allocated, either directly or indirectly, to OER initiatives and these need to come from the top.

4. Policy recommendations

From our research and analysis, it seems clear that policy recommendations need to address the following key themes:

• the regulatory framework for resources which can support learning;
• improving the quality and transferability of education and training across Member States;
• improving teacher, lecturer and trainer awareness and use of OER;
• promotion and advocacy of the benefits of OER;
• obtaining best value for money.

Taken together, the recommendations can all enhance, and be embedded in, existing EU initiatives. They can all be aligned with the Option 2 scenario for the 'Roadmap' for *Open Education* and includes elements of Option 3 as well.

Our recommendations are grouped under nine headings:

• **_Communication and awareness raising._** Evidence suggests an urgent need for additional communication and cross-fertilisation.
• **_Funding_** is always a major issue with learning technology developments and is usually directed, understandably, towards infrastructure. For OER to flourish, it could usefully be directed towards devices.
• **_Copyright and licensing:_** *The Communication From The Commission: On content in the Digital Single Market*[26], issued in December 2012, sets out a series of actions on copyright harmonisation leading to possible legislation in 2014. In this document the Commission urges industry to deliver innovative solutions for greater access to online content[27]. The Commission document covers all online resources: it is important that all online resources should be addressed (i.e. OR), not just those seen more narrowly as 'educational' (i.e. OER). The first months of 2014 have been considerable Commission activity in pursuit of copyright reform[28] and we hope that OER will be included in the ongoing discussions.
• **_Reducing regulatory barriers_** and (where appropriate) developing common syllabi which are achievement- and not time-based. There are recommendations for VET and Higher Education, but since school education is a matter for individual Member States, there are none specifically for schools.
• **_Quality._** Assuring quality is essential to the credibility of OER, but need not be a cumbersome process. Innovation funds could operate at Europe-wide and country-wide

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[26] http://ec.europa.eu/internal_market/copyright/docs/copyright-infso/121218_communication-online-content_en.pdf

[27] http://ec.europa.eu/internal_market/copyright/index_en.htm

[28] http://ec.europa.eu/internal_market/copyright/news/index_en.htm (retrieved on 6 June 2014)

levels and also within institutions and even the commercial "hybrid" producers. The creation of appropriate pathways to credentials is as important as the development of resources themselves – although this is less relevant to K-12 than it is to the post-K12 sectors.

- ***Teacher training and continuous professional development:*** these are crucial in exploiting the benefits of OER.

- ***Certification and accreditation.*** Certification and accreditation are still too parochial, especially with an increasing number of learners crossing national boundaries. . There are recommendations for VET and Higher Education, but since school education is a matter for individual Member States and/or regions, there are none specifically for schools.

- ***Infrastructure issues:*** As acknowledged in recent reports cited in this paper, IT infrastructure is still uneven across and within Member States.

- ***Further research.*** Further research should be particularly focused on sustainable business models. This recommendation has three strands. First, there is a quality case to be made for the benefits of OER in opening up a wider range of learning resources to learners at all levels, There is some evidence from recent research studies[29] [30] that with the increased availability of OER, individuals can learn more material in shorter time with equal learning gains, but further research is needed, particularly given the fairly sceptical attitude in the past towards OER in some Member States, notably Germany, though the climate there may now be changing.[31]

The second strand concerns the development of sustainable business models for OER. Given that central governments' financial support for OER initiatives has decreased over the past two years and shows no sign of returning to pre-2012 levels it is important to explore the business models summarised in section 2.2 of this document, both in the context of reduced government funding and copyright and licensing reform.

The third strand, which is made more explicit in the recommendations for universities, is concerned with innovation, and links back to funding issues.

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[29] Thille, C. (2010). "Building open learning as a community-based research activity In T. Ilyoshi & M. S. Vijay Kumar (Eds.), Opening up education (pp. 165 -180). Cambridge, MA: MIT Press. Retrieved from http://mitpress.mit.edu/sites/default/files/titles/content/9780262515016_Open_Access_Edition.pdf.

[30] Lovett, M., Meyer, O., & Thille, C. (2008). The Open Learning Initiative: Measuring the effectiveness of the OLI Statistics Course in accelerating student learning. *JIME: Journal of Interactive Media in Education*. Retrieved from http://jime.open.ac.uk/jime/article/viewArticle/2008-14/351

[31] http://www.wikimedia.de/wiki/OERde13

4.1. Communication and Awareness Raising

4.1.1. Recommendations to the Commission

- The Commission should clarify its position with regards to the abundance or scarcity of appropriate resources currently available and should communicate clearly this message.
- The Commission should continue to promote to educational users (leaders, practitioners, students and guardians) the availability and accessibility of open resources created through its cultural sector programmes. The Commission should encourage and support Member States to promote these resources within the context of their sovereign educational aims and objectives.
- The Commission should encourage Member States to do likewise for their domestic cultural sector programmes, to make these available across the European Union and ensure that future programmes do not have unintended legal impairments to cross-border sharing.
- The Commission should encourage Member States to promote to publicly funded schools and federations of schools the benefits of making resources available under an appropriate open license.

4.1.2. Recommendations to Member States

- Member States should promote (within the context of their sovereign educational aims and objectives) to educational users (leaders, practitioners, students and guardians) the availability and accessibility of open resources created through their respective cultural sector programmes.
- Member States should promote to schools (especially publicly funded schools and federations of schools) the benefits of making resources available under an appropriate open license.

4.2. Funding

4.2.1 Recommendations to the Commission

None directly – but see also Further Research.

4.2.2 Recommendation to Member States

- Member States should ensure that budgets for digital educational resources are flexible enough to support the development (and maintenance) of openly licensed materials.

4.3 Copyright and licensing

4.3.1 Recommendation to the Commission

- The Commission should ensure that any public outputs from its programmes are made available as open resources under an appropriate license[32]. (see http://creativecommons.org/licenses)

4.3.2 Recommendation to Member States

- Member States should ensure that any public outputs from their national research and teaching development programmes are made available The Commission should ensure that any public outputs from its programmes are made available as open resources under an appropriate license[33]. (see http://creativecommons.org/licenses)

4.4 Quality and accessibility

4.4.1 Recommendations to the Commission

- The Commission should ensure that access and accessibility are central tenets of all its OER programmes and initiatives.
- The Commission should seek to exploit its considerable investment in Repositories to help inform greater understanding of the success/fail factors behind OER Repositories and OER – particularly the influence of the various approaches to quality assurance.

4.4.2. Recommendations to Member States

- Member States must require (within reasonable expectation) OER to meet (disability) accessibility standards and ensure that accessibility is a central tenet of all OER programmes and initiatives.
- Where Member States have Quality Assurance or materials approval processes they should ensure that OER are allowed to be included on approved instructional materials lists.
- Member States should consider establishing and funding an OER evaluation and adoption panel. This panel should include lead teachers, content experts and accessibility experts.
- Member States should consider establishing a specialist OER function/post to undertake an in-country cost-benefit analysis to assess the potential savings (or otherwise) which might be achieved through implementing an OER strategy.

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[32] This has already been implemented through the Erasmus+_programme.

[33] This has already been implemented through the Erasmus+_programme.

4.5 Continuing Professional Development

4.5.1 Recommendations to the Commission

No specific recommendations, but financial support for innovative programmes by Member States would not only be useful, but send a strong positive signal.

4.5.2. Recommendation to Member States

- Member States should establish (and adequately fund) a professional development programme to help teachers and administrators understand the benefits and uses of OER and open licensing.

4.6   Infrastructure

4.6.1 Recommendation to the Commission

- The Commission should continue its focus on improving the ICT in education infrastructure in Member States (and levelling out disparities of access) so that they are able to exploit potential pedagogical and financial advantages of OER.

4.6.2. Recommendations to Member States

- Continue their focus on improving the ICT in education infrastructure (and levelling out disparities of access) so that they are able to exploit potential pedagogical and financial advantages of OER.
- Where nations (or institutions) are providing digital devices they should ensure that all considerations have been taken to maximise the effectiveness (economically and pedagogically) of devices, support and strategy with regards to OER.

4.7   Further research

4.7.1   Recommendations to the Commission

- The Commission should develop its understanding of how new modes of learning (including online, distance, OER and MOOCs) impact on quality assurance and recognition.
- The Commission should fund research into the verifiable benefits and disadvantages of OER, with greater efforts to integrate such analyses with its ongoing research on distance learning, on-campus online learning, and pedagogy; and recommend the same to Member States.
- Future K-12 OER research should explicitly embrace Repositories, Federations, Portals and Tools and should consider off-campus learning (both institutional – virtual schools - and self-directed or home-tutor led).

- Specifically, the Commission should support extant or future research which seeks to inform greater understanding of the success/fail factors behind OER Repositories and OER – particularly the influence of the various approaches to quality assurance.
- The Commission should foster research into potentially sustainable business models for OER, integrating this with its ongoing research on distance learning, on-campus online learning, and pedagogy; and recommend the same to Member States.
- The Commission should explore the means by which closer, *enduring* collaboration can be fostered between Higher Education researchers and the schools sector with the objective of increasing the research evidence-base concerning K-12 OER and developing a culture of two-way discourse and sharing across the sectors.

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