
Preparing the Ne(x)t Generation: Lessons learnt from Free/Libre Open Source Software and their Communities

This article deals with lessons that can be learnt, in this regard, from the Free / Libre Open and Source Software (FLOSS) **communities**. FLOSS communities, as best practice examples of Open Participatory Learning Ecosystems (OPLE), illustrating possible pathways for Higher Education (HE) to go beyond the limits of the current Open Educational Resource (OER) move.

1. FLOSS Principles Constituting the ‘Net Generation’

The web as we know it today features a myriad of virtual communities whose members voluntarily interact in a collaborative manner in order to share and create knowledge. FLOSS communities (and Wikipedia) are probably the best-known examples of this trend.

The FLOSS case is likely the most mature and developed learning ecosystems to be found at the web. FLOSS communities succeed in providing and distributing in a sustainable manner the knowledge necessary for the production of good quality software. They apply a different development approach than proprietary software producers, as software is built by a community of volunteers and companies, the latter generating revenues from the provision of services rather than from selling software. Knowledge is created collaboratively by experts and users, support is provided by user to user support systems, and sustainability and quality are also assured through community involvement.

Therefore, FLOSS communities gained attention for their community production and support models and their way of knowledge creation, sharing, and learning opportunities. FLOSS turned out to be an ecosystem that goes way beyond the pure production of software. From the learner’s point of view, participating in this ecosystem is not per se and not only dependent on good programming skills. Besides coding skills, FLOSS also requires and provides expertise in patents law, license issues, management skills, capacities to mobilise community members, or language skillsⁱ.

With the advent and spread of such communities, today’s young generation is not only growing up as a net generation but additionally with open source software and open content. This generation is therefore used to two fundamentals, which are also fundamentals of the so-called web 2.0: Openness and Freeness.

1. Web 2.0 services are *open*, which means that in general there should be no access restrictions to participate at a given environment; e.g. due to prior education, age, culture, or professional position.

2. Web 2.0 services are predominantly *free*; both in terms of the freeness of accessing content and communities (free in monetary terms), but also freeness in terms of freedom to express oneself and to be creativeⁱⁱ.

The experience of these two fundamentals constitutes what we would like to call the ‘net generation’. This generation, which is about to enter higher education, not only grew up with ICT, but is also used to taking on an active role, to create and design resources, and to engage at the web with peers from all over the globe.

The crucial questions with regard to HE are: What would be the demands of this generation once entering HE and how will HE respond to those demands? Would this generation accept traditional HE structures and principles; being well aware about the alternative ways the web provides?

Our hypothesis is that students with the experience of freedom and openness will not easily accept traditional HE, but tend to take the right as granted to change or modify software, content, structures and hierarchies. In the following sections we examine in more detail how the net generation challenges HE and how HE may respond to the needs and aspirations of the net generation.

2. Challenges to Higher Education in a virtual world

There are several challenges for HE if acting in a virtual world; and some of them have their origin in the fact that traditional laws are not any longer valid in an online world.

The first of those challenges relates to knowledge sharing and creation. The knowledge is power rule, for example, only applies if knowledge is being shared with others, but not by ‘hoarding knowledge’ as this means to remain invisible; with the knowledge being provided by someone elseⁱⁱⁱ. As a consequence ‘selling knowledge’ is equally difficult in the virtual world, as someone else might be willing to provide the same knowledge for free.

The second challenge concerns “knowledge impairment”. In times when knowledge is becoming obsolete faster and faster, a 4 years’ university student enrolled for a technical degree might face that half of what has been learned during the first year will be out of date by the third year of study.^{iv} Traditional educational settings frequently struggle to update their courses within these shorter and shorter cycles or to develop new ones to meet current demands, with lessons still being largely given like 100 years ago^v. The web, however, can provide students with up to date content and up to date community-based support.

The third challenge of the net generation to HE concerns the attribution of roles of teachers and learners. In Internet-based teaching and learning environments, symbiotic interactions between learners and between learners and content may produce sustainable learning processes. Sustainability, in this context, means that even novice participants will, over time, graduate to experts.

One certainly could argue that HE can not be benchmarked with informal learning environments the web provides. After all, HE is a full service provider and offers recognized degrees that can not be compared to self-studying at the web. However, the case of computer science education research has shown^{vi} that 39% of surveyed IT companies expressed that there is no difference between formal qualification and

practical experience in FLOSS, with a further 17% claiming that formal qualification is even worse.

This indicates that HE is well advised to keep an eye on the learning opportunities the web provides, especially in contexts where practical experience is considered equally or even more important than “theoretical” education at school or university.

Understanding web success cases like e.g. FLOSS is therefore crucial for HE to adapt itself to the new realities. The FLOSS case, but also the web at large, provide an insight on how HE might benefit from going a step beyond the current Open Educational Resource (OER) move towards Open Participatory Learning Ecosystems (OPLE)^{vii} and an educational commons^{viii}.

3. Going Beyond OER: Towards Open Participatory Learning Ecosystems

The OER movement has emerged as what might be seen as an alternative to traditional educational environments, aiming at opening the door to the next generation of HE provision. However, the examination of FLOSS as an example of a well functioning open participatory learning ecosystem (OPLE) reveals that by now the OER movement did not tap the full benefits provided by Web 2.0, which are already widely used by the ‘net generation’.

The current OER move still largely follows the traditional expert production model^{ix} (analogue to the proprietary software development model) resulting in the fact that content and learning activities / processes (discourse) are still disconnected. The OER side today is largely characterized by creating static content repositories that lack vivid and active learning communities, meanwhile on the other hand one can find a myriad of non HE and non OER labelled vivid and active informal learning ecosystems (e.g. Jishka, Yahoo answers or Physicsforum^x) with a diverse range of dynamic and / or user generated content and considerable degree of collaboration.

So what can we learn from the FLOSS case?

The FLOSS case provides us with insights in how to make use of ICT to provide students and free learners outside formal education with learning opportunities that are embedded in global virtual OPLE. Free, open, transparent, inclusive and sustainable are just five of the keywords that relate to those approaches and that might be taken forward to educational settings. There are many advantages for learners in FLOSS communities, such as access to a variety of resources, learning by doing, community support and engagement, though there are admittedly limitations and critical aspects to be considered as for example earlier outlined by Philipp Schmidt^{xi}.

Probably the most relevant characteristics of FLOSS communities that could help to improve (higher) education and to meet the net generation’s expectations are the community production model, the community support model, and the underlying business models to assure sustainability.

The FLOSS-type of learning is not radically new and unrelated to the solid pedagogic framework that has been established for new types of learning, as a response to the shortcomings of traditional educational systems. FLOSS appears NOT as a contradic-

tion to these pedagogies but in many respects as a best practice case of the implementation of their principles and goals.

Traditional educational settings would equally benefit from access to a large pool of up to date learning materials / content, the community support system and a bridge between the former and the latter; allowing future learners to follow learning processes of others and to re-use, build upon and improve prior works.

However, there is still the need for further research and piloting to better understand the applicability of such approaches to formal educational settings, or to establish open participatory learning ecosystems that go beyond the current open educational resource movement and that are self-sustainable.

Fortunately, there are many pioneering educators *on the web* that help us paving the way towards the future of education, like e.g. the authors' current [NetGeners.Net](#) pilot or the [Connectivism and Connective Knowledge Course](#) by Stephen Downes and George Siemens – to just name two of the various attempts.

About the authors



Andreas Meiszner is the project manager of the EU funded FLOSSCom project (www.flosscom.net) on behalf of the coordinator Sociedade Portuguesa de Inovação and a research fellow at the British Open University. Besides the world of academic research Andreas also worked in various business sectors and functions during the past 14 years, having obtained three higher education degrees in management from universities in France, Germany and The Netherlands.



Rüdiger Glott is a social scientist and member of the Collaborative Creativity Group (<http://ccg.merit.unu.edu/>) at UNU-MERIT, a research institute of the University of Maastricht (NL) and the United Nations University, where he holds a position as researcher. He carried out a number of studies on the FLOSS community, such as the European FLOSS Developer Survey in 2001 or the FLOSSPOLS Developer Survey in 2005. He also works on issues of skills attainment, eLearning, and eGovernment.



Sulayaman K. Sowe (PhD) is a research fellow at the department of informatics, Aristotle University, Greece. He works in a number of EU funded projects including FLOSSCom. His research interests include Free/ Open Source Software Development, Knowledge Management, Information Systems Evaluation, Social & Collaborative Networks. He has published at various scientific journals, conferences, international workshops, and is a co-editor of the book "Emerging Free and Open Source Software Practices". He is a member of a number of international committees and editorial review boards, including the IGI Global Editorial Advisory Review Board, the International Journal of Open Source Software & Processes (IJOSSP).

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ⁱ Glott, R.; Meiszner, A. & Sowe, S. K. (2007) "Analysis of the Informal Learning Environment of FLOSS Communities", FLOSSCom Project. 2007. Available at http://opensource.mit.edu/papers/FLOSSCom_WP2_Phase_1_Report_v070709_1.pdf

ⁱⁱ Slot, M. F., Valerie (2007). "Users In The 'Golden' Age Of The Information Society", OBS-Observatorio, Special Issue 'Users as Innovators' Vol. 1(No. 3): 201-224. <http://obs.obercom.pt/index.php/obs/article/viewPDFInterstitial/153/110>

ⁱⁱⁱ Wayner, P. (2000) Free for All - how Linux and the free software movement undercut the hightech titans, 1st ed., New York, NY: HarperBusiness.

^{iv} Following Richard P. Adler, Minds on Fire: Enhancing India's Knowledge Workforce (Gurgaon, India: Aspen Institute India, 2007), <http://www.aspeninstitute.org/atf/cf/%7BDEB6F227-659B-4EC8-8F84-8DF23CA704F5%7D/ICT07IndiaMindsonFirefinal.pdf>

^v Sowe, S. K. and Stamelos, I. (2008a) "Involving Software Engineering Students in Open Source Software Projects: Experiences from a Pilot Study", Journal of Information Systems Education (JISE), Vol. 18 (4), pp:425-435. http://findarticles.com/p/articles/mi_qa4041/is_200712/ai_n25419258

^{vi} Ghosh, R. & R. Glott (2005) "FLOSSPOLS Skill Survey Report", www.flosspols.org

^{vii} The term open participatory learning ecosystem was coined by Brown & Adler. See also: Brown J. S. & Adler R. P. (2008). "Minds on Fire: Open Education, the Long Tail, and Learning 2.0." EDUCAUSE Review Vol. 43(no. 1): 16–32. <http://net.educause.edu/ir/library/pdf/ERM0811.pdf>

^{viii} Hepburn, G. (2004) "Seeking an educational commons: The promise of open source development models", First Monday, Volume 9 (Number 8). http://www.firstmonday.org/issues/issue9_8/hepburn

^{ix} Meiszner, A, Glott, R. & Sowe, S. K. (2008b) "Free / Libre Open Source Software (FLOSS) Communities as an Example of successful Open Participatory Learning Ecosystems", UPGRADE, The European Journal for the Informatics Professional, Vol. IX, issue no. 3 (June 2008): "Next Generation Technology-Enhanced Learning" (to be published) http://flosscom.net/index.php?option=com_docman&task=doc_details&gid=188&Itemid=116

^x Jishka is a forum that assists thousands of children and teenagers with schoolwork everyday by publishing educational content and providing instant-help services for students who need urgent help (<http://www.jiskha.com>) / Yahoo answers allows finding and sharing information where individuals can ask questions on any topic and get answers from real people (<http://answers.yahoo.com>). / PhysicsForums is an informal collaboration space where people can chat about maths, physics and science. The forum went online in 2003 and had 77.203 members that started 154.509 threads and received 1.341.084 answers by November 2007. <http://www.physicsforums.com>. Those are only three randomly picked up examples out of myriads to be found at the web.

^{xi} Schmidt, J. Philipp (2007) "Open Educational Resources as a higher education strategy for openness and social development" GUNI – Global University Network for Innovation, Newsletter issue September 13, 2007. <http://www.guni-rmies.net/news/detail.php?id=1103>