ASSESSING THE IMPACT OF OER AVAILABILITY ON THE EMERGENCE OF OPEN EDUCATIONAL PRACTICES IN SUB-SAHARAN AFRICA: THE CASE OF AN ICT-INTEGRATED MULTINATIONAL TEACHER EDUCATION PROGRAM IN MATH AND SCIENCE

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Assessing the impact of OER availability on the emergence of open educational practices in Sub-Saharan Africa: The Case of an ICT-integrated Multinational Teacher Education Program in Math and Science

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ROER4D sub-project 10.2

Background/Context

- Focus of this study is the multinational teacher education project that was funded by the African Development Bank (AfDB) and United Nations Development Program (UNDP), Somalia and implemented by the AVU between 2005 and 2011.

- This was an ICT-integrated teacher education curriculum in Math, Physics, Chemistry and Biology.

- Seventy three courses were developed, peer-reviewed and translated in English, French and Portuguese totaling 219 modules that were released under a Creative Commons License.

- The TEP was aimed at building capacity in the participating institutions with the objective of increasing access to quality education

Background/Context
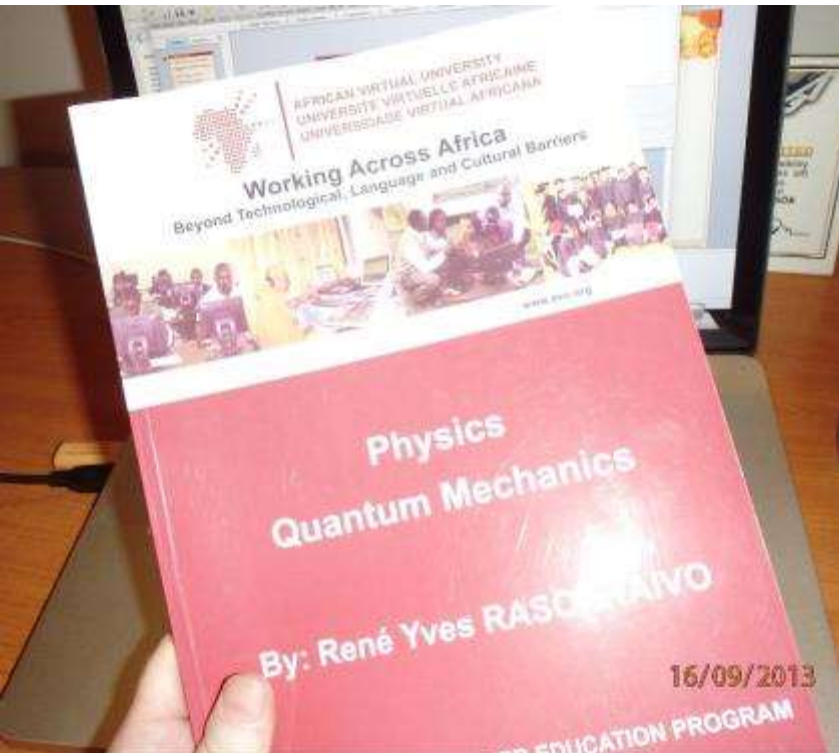
73 modules in English
73 modules in French
73 modules in Portuguese

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219 modules available as OER
⇒Print
⇒DVD (pdf + doc versions)
⇒Online (oer.avu.org)
⇒Youtube (Intro videos)

- 12 African Universities
- 146 Authors
- 10 Peer Reviewers (Anglophone, Francophone, Lusophone)

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News

Press Release: AVU Open Courses Voted the 'Most Progressive' by the Global Community

Nairobi, Kenya, 14 September 2012

The African Virtual University Open Education Resources (OER) initiative has been voted the "Most Progressive" resource in the second Education-Portal.com OpenCourseWare (OCW) People's Choice Awards.

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➜ By Issue Date

Background/Context

AVU Multinational Project Phase 1 Countries

Country	Institution
1. Ethiopia	1. Jimma University
2. Kenya	2. University of Nairobi
3. Madagascar	3. Universite d'Antananarivo
4. Mozambique	4. Universidade Pedagogica
5. Somalia	5. Amoud University
	6. East Africa University
	7. University of Hargeisa
6. Senegal	8. Université Cheikh Anta Diop
7. Tanzania	9. Open University of Tanzania
8. Uganda	10. Kyambogo University
9. Zambia	11. University of Zambia
10. Zimbabwe	12. University of Zimbabwe

Research Question/Hypothesis

- What has been the impact of access to, and availability of, OER on the emergence and extent of OEP at the level of the AVU consortium and across its network of partner universities?

- The underlying assumption (or hypothesis) for this study is that access to and availability of OER has the potential to lead to the emergence of open education practices, at least to some varying extent which may be dependent on the institutional context.

- OPAL (2012) observes that the issue of OER use could be facilitated by creating a culture of openness within institutions through a complementary focus on educational practices in addition to resources.

- OEP defined as practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path.

Conceptual Framework

Dimensions of Open Educational Practices	
Steps	Dimensions of OEP
Step 1: Positioning your organisation in the OEP trajectory: Use of OER and Open Learning Architectures	1. Extent of using and repurposing OER 2. Availability of a process for OER creation 3. Degree of sharing of OER and OEP 4. Extent of working with open learning architectures
Step 2: Creating a vision of openness and a strategy for OEP in an organisation	5. Organizational vision for OEP: 6. Existing OEP strategies and policies:, 7. Business model related to OEP: 8. Partnerships related to OEP: 9. Perceived relevance for OEP:
Step 3: Implementing and promoting OEP to transform learning	10. IPR and Copyright regulations: 11. Motivational framework for OEP 12. Tools to support sharing and exchange of OEP 13. Quality concepts for OEP 14. Level of knowledge and skills 15. Digital literacy 16. Support mechanisms for OEP

Conceptual Framework

		OER Usage		
		Low No OER (re)usage	Medium OER (re)usage or creation	High OER (re)usage or creation
Degree of Pedagogical Openness	**High** Social practices, co-creation, sharing (reflection in action) Knowledge co-creation • open objectives; • open methods	A	B	C
	Medium Dialog, Procedures, Rules, (Know-how) • Closed objectives • Open methods (e.g. problem based learning)	D		F
	Low Knowledge transmission (Know that) • "closed" objectives; • "closed" methods	G	H	I
	Source: Conole (2011), Ehlers (2011)			

Enhancing OEP

Data collection & analysis

- Data collection methods included interviews and document analysis

- Data collection, analysis and reporting has focused on these three levels:

    - the AVU network (consortium) level;
    - the organizational level of the partner institution; and
    - the educational professionals' (individual faculty/lecturer) level.

- Document analysis - published literature on the AVU OER, organizational documents, the module development template and the ICT integration modules and Mathematics module.

- A semi-structured questionnaire was developed and used to guide the interview which was done with respondents from UA. The questionnaire was administered to the respondents during face-to-face interviews, and a total of eleven interviews were conducted.

- The different respondents interviewed for example at the organizational level of the partner institution included the Director of the Center for Open and Distance Learning at UA, Coordinator of Open, Distance and eLearning (ODeL) Science, Head of the Mathematics Division at UA.

Q. 1. Impact of availability of OER on extent of use and repurposing at the network level

- At the network level - What was the extent of use and repurposing of OER in the creation of the AVU teacher education OER courseware?

- The OER modules and the module development template were some of the documents reviewed for extent of use and repurposing of OER.

- Resources and readings suggested for the completion of learning activities be copyright free, either written originally by the module developer, or be from open access content.

- This requirement was quite strict because it is stated in the template that modules that do not comply with the request for copyright free resources will not be accepted.

Q. 1. Impact of availability of OER on extent of use and repurposing at the network level

Suggested Resources

- GEODE (http://www.uw-igs.org/search/)

- MERLOT (http://www.merlot.org/)

- Canada Learning Object Project eduSource (http://www.edusource.ca/)

- Burrokeet (http://www.burrokeet.org/)

- VLORN (http://www.flexiblelearning.net.au/vlorn/)

- LON-CAPA (http://www.loncapa.org/)

- Collections of learning objects
  (http://www.uwm.edu/Dept/CIE/AOP/LO_collections.html).

- Wikipedia and open access journals

Q. 1. Impact of availability of OER on extent of use and repurposing at the network level

- A review of select modules showed extensive use of open access content

- These include complete pdfs, textbooks, wikibooks, links to various online resources on a range of topics and software.

- A number of the resources and readings such as the textbooks were availed on CD. This corresponds with the instructions in the template to consider that ease of access is not guaranteed for all students and therefore authors should ensure that in addition to the web links, the resources are provided on a CD.

- Resources have different licenses—the GNU General Public License version 2 (GPLv2), Creative Commons, some just give permissions for use but no license attached.

Q. 1. Impact of availability of OER on extent of use and repurposing at the network level

Example of repurposing

- In the template, module authors were advised to "find a variety of learning activities will suit a variety of learning styles, within the African context."

- One module author and a faculty at UA, described the AVU OER as being "rich in the pedagogy element...." in particular the aspect of storytelling drawing from familiar African stories and symbols.

- He stated that this was a powerful pedagogical tool, which he admitted was initially a challenge in coming up with stories.......

- *....in fact it was the greatest challenge I have ever faced as somebody who trains Mathematicians. Because they [facilitators] said it would be better before you introduce the topic, you give a story in form of an activity. You can give a story which is fiction or real but is based on our African context. You see what that means is that you are infusing culture in the learning of Mathematics and Science concepts (resp)   cont....*

Q. 1. Impact of availability of OER on extent of use and repurposing at the network level

Example of repurposing cont…

- Permutations? Our grandfathers used to tell us stories that "one day a person was carrying a leopard and a goat and potato vines. And he needed to cross the river. Do you know how those three are related?

- Introducing problems in this way helped demystify the concep, "that way the learner receives the concept in a way that is more natural than mysterious."

- This is especially for the African context, and if the OER being repurposed might have been produced for other contexts.

- However, the Respondent cautions that differences in students' backgrounds such as those living in rural versus urban settings may affect their understanding of such stories.

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- *What was the extent of use and repurposing of OER at the PI, as a result of access to, and availability of, the AVU OER courseware?*

- The study found that the UA did not take up the AVU teacher education curriculum as a degree program to be offered through their institution

- *…if you say is [UA] using OER materials for their courses or do they have some students who are using OER from AVU as the teaching mechanism leading to an examination and an award at the end? On the basis of that one, the answer will be no…..we participated in the development of the instructional materials but we did not participate in using those materials for our own award"* (Respondent 1).

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- Cost sharing arrangement. To deliver the AVU teacher education degree program required that UA sign a cost-sharing agreement, so that a certain percentage of student fee would be shared with the AVU. The following justifications were provided for why UA should not get into the cost-sharing arrangement:

- Even if it used the AVU OER courseware, the contention was that UA would still have to use its own materials. *"because it is going to cost us money yet we have adequate resources we can use for teaching our students by distance mode without having to sign into this other than openness*

- Without any kind of a proposal for joint certification then the AVU teacher education program and the OER became just a resource, *"because if you don't get to certification there was no need for paying. If it is UA certification then it becomes just a general resource area"* (Resp. 1).

- The courses were only in four broad subject areas. *"we don't have to bother developing new ones, [since] to some extent they are good in certain areas, but they were only in four broad subject areas* [Math, Biology, Chemistry and Physics], *therefore, they were going to exclude several other areas"* (Resp. 1).

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- Despite the fact that ICT-integration was the strongest point of the AVU OER, UA was not in a position to offer learners ICT-integrated courses. (Resp. 1)

- The technological environment and the level of supply of equipment was not in place. UA was not able to assure compliance through its learning portal to ensure that all students had the capacity to access the system equally, or even ensure that they had access to computers.

- *because for you to assess students using a mechanism, that mechanism must be available to all of them in the same way without any discrimination. Otherwise the exam would be tested on areas where they are not given opportunity to do the right things (Resp.1).*

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- 1. AVU OER given to junior faculty to use in teaching their courses

- 2. AVU OER distributed to students (in the regular STEM program and in the B.Ed program). They are given photocopies of module for a fee.

- 3. Incorporating the aspect of ICT integration in course development. The ICT-integration aspect of the AVU OER courseware seemed to have had an impact as far as UA using them for the development of their own ICT-integrated instructional materials at UA and in turn having the potential to improve quality of instruction.

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- **4. Use/repurposing of AVU OER as a resource for training and development of courses for distance learning.**

- UA uses a variety of OER when developing distance learning resources. He stated that, "when we are involved in training we [tell faculty] we've got a lot of OER materials…. and we [refer] them to use these as resource areas. He noted that they use resources that "are in familiar areas and from familiar institutions." (Resp 1).

- He gave examples of some of the OER they use and these included, the AVU OER, the COL and TESSA

- Compared to the other two the AVU OER were particularly the closest. *If you go to AVU, these are materials which have been developed very close to [the curriculum of UA], because a lot of our people participated in those. If you look at them, generally they are even more closer to our normal curriculum. Therefore they respond to our syllabus with much less modification at all (Resp. 1).*

Q. 1. Impact of availability of OER on extent of use and repurposing at the organizational level of the PI

- The OER were not being used as is, but were being repurposed. The course writers repurpose the OER when developing their own instructional materials. *"I think what is important is you [the writers] use it as an important resource area for developing your own. They are not bringing these [AVU OER] to use as theirs….they are repurposing them."*

- Use and repurposing of OER at UA was quite high and was embedded into the practice of the institution, in particular, in areas where UA was developing distance and open learning materials, they were using OER,

- *Like now the policy of [UA] is to develop open distance eLearning for all courses in the university. One, to serve the regular students as a different mode of delivery. Two, to enable them where possible to serve students who will not necessarily be internal students…As of now we have developed materials for 20 schools and we are about 80 schools. So you find the [use of OER] across the board at all levels.* (Resp. 1)

Q.2. Impact of availability of OER on the process for the creation of the AVU OER

- Availability of OER or open access content, software, and tools like the Creative Commons License did have an impact on the process for the creation of OER modules at the network (consortium) level.

- OER made it possible for AVU to create modules that could be freely accessed, used, repurposed and redistributed.

- The process for creation was undertaken at the network (consortium) level and involved subject matter (faculty) drawn for the participating universities.

- Done within the context of the teacher education program, there was a well-defined process and steps for the creation of the AVU OER modules that included the following processes: (i) policy and curriculum conceptualization, (ii) curriculum design, (iii) content development and authoring (iv) module production, (v) peer review, (vi) translation and (vii) attachment of an open license.

Q.2. Impact of availability of OER on the process for the creation of the AVU OER

- One of the concerns for the OEP dimension of availability of a process for the creation of OER, is that the licenses adopted allow for the free use and repurposing of OER.

- Certain strategies were undertaken by the AVU to enable the modules to be released as OER. These included:

- First, the stipulation that members of the consortium agree to assign intellectual property rights to one institution or the consortium in order to allow the resources to be released under a Creative Commons license.

- Secondly, individual modules authors and peer reviewers waive their intellectual property rights to AVU by signing the Creative Commons Agreement.

- Thirdly, in the development of the modules, authors were directed to use and repurpose relevant OER readily available online, or create their own original materials.

- This therefore made it possible for AVU to release the modules as OER under the Creative Commons license; hence, allowing users to freely access, use, repurpose and retain the materials.

AVU Creative Commons License

- All materials released on the OER@AVU site are covered under the Creative Commons

- Attribution-ShareAlike 3.0 Unported license (CC BY-SA). This license allows users to freely modify, rework and extend any of the material, and later distribute it under the following two conditions:

- You must provide attribution to the creator of the material, and you must license your derivative version under the same license (CC BY-SA).

- If you contribute material to OER@AVU, you must be the owner of the material, and you must consent to releasing the material under the CC BY-SA license as part of the submission process.

Q.3. Impact of availability of OER on extent of working with open learning architectures?

- What needs to be determined is the degree of pedagogical openness—low, medium or high:

- Low degrees of openness exist if objectives and methods of learning and/or teaching are represented by closed, one-way, transmission and reproductive approaches to teaching and learning. The underlying belief is that teachers know what learners have to learn and mainly focus on knowledge transfer.

- Medium degrees of openness represents a stage in which objectives are still pre-determined and given, but methods of teaching and learning that are represented as open pedagogical models that encourage dialogue-oriented forms of learning or problem-based learning (PBL) that focus on developing 'know how.'

- High degrees of freedom and openness in pedagogical models are represented if objectives of learning and methods (e.g., learning pathways) are highly determined and governed by learners (self-regulated learners). Teachers facilitate learning through open and experience-oriented methods which accommodate different learning pathways.

Using learning types to assess pedagogical openness

|		
Acquisition - Learning through acquisition is what learners are doing when they are listening to a lecture or podcast, reading from books or websites, and watching demos or videos	**Investigation** - Learning through investigation guides the learner to explore, compare and critique texts, documents and resources that reflects the concepts and ideas being taught	**Practice** - Learning through practice enables the learner to adapt their actions to the task goal, and use the feedback to improve their next action. Feedback may come from self-reflection, from peers, from the teacher, or from the activity itself.
Production - Learning through production is the way the teacher motivates the learner to consolidate what they have learned by articulating their current conceptual understanding and how they used it in practice	**Discussion** - Learning through discussion requires the learner t articulate their ideas and questions, and to challenge and respond to the ideas and questions from the teacher and/or from their peers	**Collaboration** - Learning through collaboration embraces mainly discussion, practice and production. Building on investigations and acquisition is about taking part in the process of knowledge building itself

Source: Laurillard (Conversational Framework)

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Mapping Learning Types to the Conversational Framework

Types of learning mapped onto the Conversational Framework
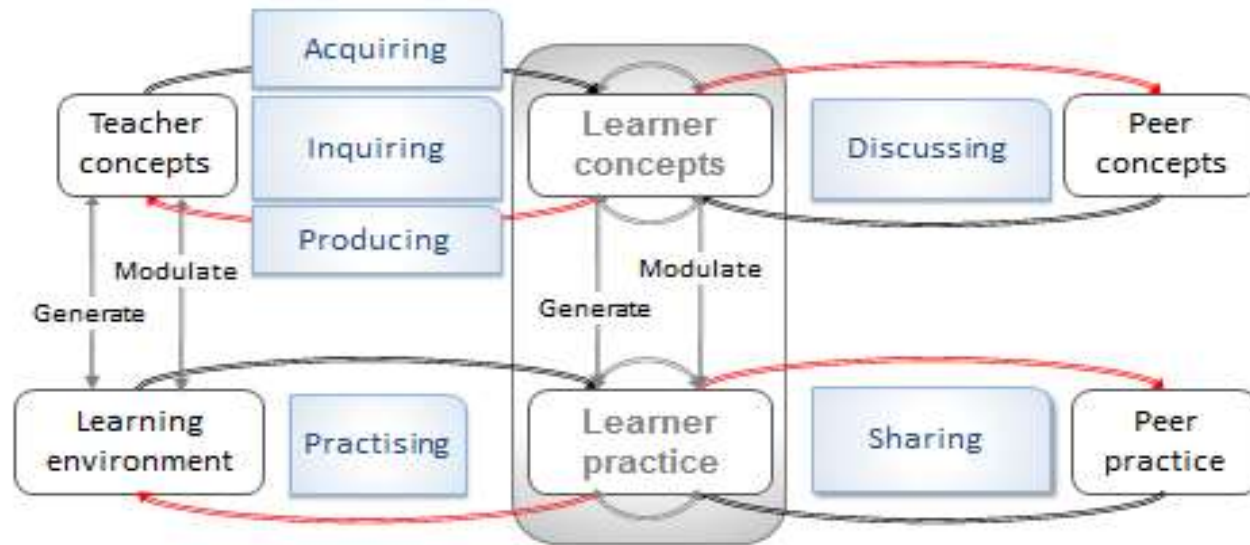
The teacher needs to design for all these types of learning

Source: Laurillard ppt presentation

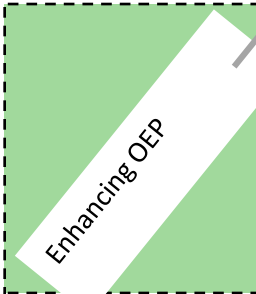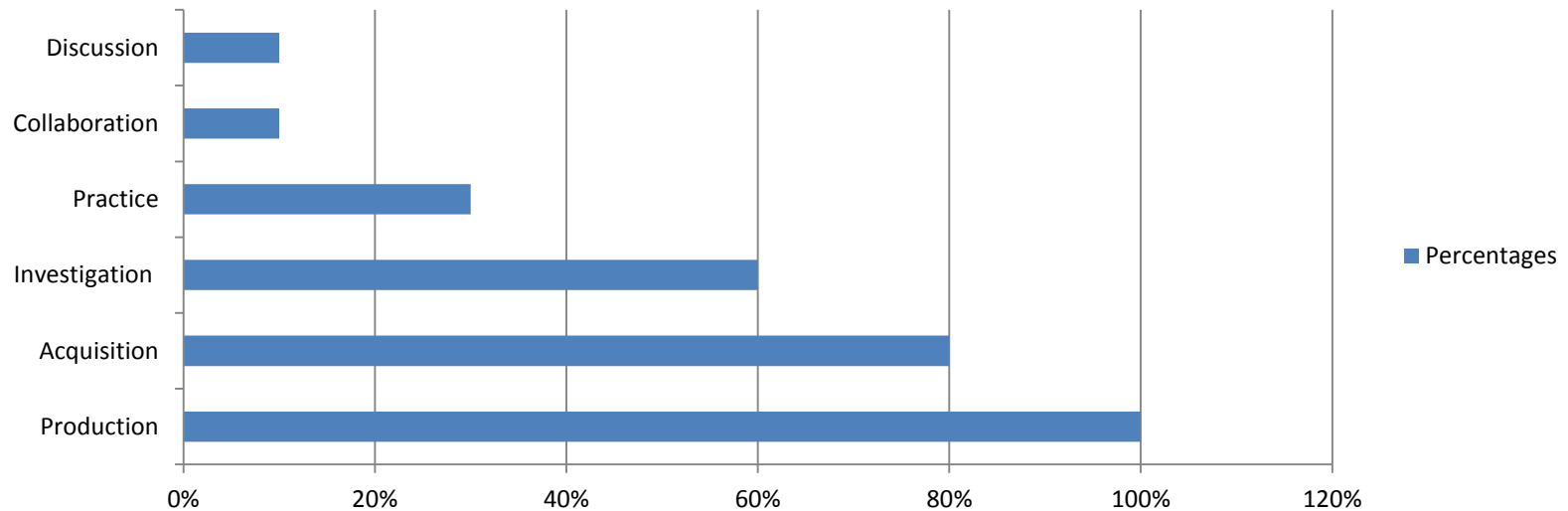|	Task(s)	Learning Types	Technology
1.	Learning activity 1.1: Reading critique		
	Read the UNESCO (2004) texts on continuing education for teachers, and the integration of ICT in scientific disciplines (lessons-learned and best practices for ICT in Mathematics, Biology, Physics and Chemistry teaching programs).	**Acquisition:** the learning activity consists of reading the assigned compulsory readings.	The readings that have been provided in a digital form as pdfs and also availed on DVDs
	Produce: A 3-page summary report that brings out the major points of a professional development plan that would allow teachers to succeed in integrating ICT in their discipline. A synthesis table presenting the basic skills necessary to apply ICT in pedagogical practices. An analysis of the important themes developed in the readings.	**Production:** the learning activity consists of learner producing a summary report, a synthesis table and an analysis of report.	Written report Table

Analysis of ICT Integration in chemistry module

		Acquisition	Investigation	Practice	Production	Discussion	Collaboration
1.	LA 1.1	▓			▓		
2.	LA 1.2	▓			▓		
3.	LA 1.3	▓			▓		
4.	LA 1.4	▓			▓		
5.	LA 2		▓		▓		
6.	LA 3.1	▓	▓	▓	▓		
7.	LA 3.2	▓	▓		▓		
8.	LA 3.3	▓	▓		▓		
9.	LA 4	▓	▓	▓	▓	▓	▓
10.	LA 5		▓		▓		
	Tally	8	6	3	10	1	1

Using learning types to assess pedagogical openness

Learning Types by Percentage

		OER Usage		
		Low No OER (re)usage	Medium OER (re)usage or creation	High OER (re)usage or creation
Degree of Pedagogical Openness	**High** Social practices, co-creation, sharing (reflection in action) Knowledge co-creation • open objectives; • open methods	A	B	C
	Medium Dialog, Procedures, Rules, (Know-how) • Closed objectives • Open methods (e.g. problem based learning)	D	Enhancing OEP	F
	Low Knowledge transmission (Know that) • "closed" objectives; • "closed" methods	G	H	I
	Source: Conole (2011), Ehlers (2011)			

Conclusions: Impact of availability of OER on OEP

- The study found that while OER usage was quite high, when it came to the creation of the modules, the degree of pedagogical openness of the modules was closer to medium.

- While the use of OER was quite high in the creation of the AVU OER modules, this was not necessarily the case when it came to the integration of pedagogical openness in the design of the modules.

- For this reason locate the extent of OEP at the network level of the AVU is located in cell [D] in the OEP trajectory matrix.

- This is also the same for degree of sharing as far as collaborative and social practices.

So what? Implications for teacher training

- Make learning relevant – take advantage of the affordances offered by the internet and access to knowledge and social media to increasingly incorporate social learning practices.

- Opportunities to incorporate OEP in training of student teachers

- Opportunities for professional development in OEP training

- Update AVU OER from the perspective of embedding OEP

- Quality – work on organization and content to improve quality