



Evaluation of PBL and e-learning Courses and Community of Practice

Elaborated by:

Pär-Ola Zander, Aalborg University

Bed Prasad Dhakal, Tribhuvan University

Geoffrey Tabo, Gulu University

Ann Bygholm, Aalborg University

Betty Ogange, Maseno University

Heilyn Camacho, Aalborg University

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Executive Summary

This report concerns the key pilot activities of MAGAART. They consist of 5 activities, conducted in PBL and e-learning mode:

- Orientation Workshop
- Proposal Development
- Conflict Management
- Data Analysis
- The establishment of a community of practice between the different partner universities.

MAGAART participants benefitted considerably from these activities, thus the courses worked as a way of strengthening active learning in the South institutions and research capacity development. The courses show-cased various forms of active learning, which strengthened the outcome in terms of education. The future faculty tend to teach and supervise as they have been taught. All courses were relevant in their content and are candidates to run again at the respective institutions.

The participants in the courses built individual capacity regarding the core group (PhD students within the BSU) but also among more peripheral beneficiaries, e.g. staff at MU that currently studied at another Kenyan university, or the staff at MU that undertook their doctoral studies supported by a non-BSU scholarship in Denmark.

The model with recurring combined web conferencing and face-to-face meetings (e.g. the Data Analysis course) is a promising model, both as it promotes collaborative learning across institutions, gives internationally based feedback to the individual PhD student from peers, and can be combined with learning-by-doing.

The pilot courses generally give support to the decision by all three institutions to rely on Moodle as the main component of their Online Learning Environment, although Moodle benefits from complements e.g. in the form of BigBlueButton or open web-based services like Dropbox.

It is recommended to monitor that it is possible to export the courses of MAGAART and make sure that content for all courses are available - by example.

All three universities are held back by low bandwidth. The piloted courses worked despite low bandwidth. For wide-spread adoption, further institutional investments in bandwidth is recommended. While MAGAART has not investigated the alternatives to investing in non-e-learning infrastructure, it seems clear that bandwidth improvement would create significant opportunity –

including budgets for temporary “top-ups” through portable routers. The e-learning activities would not have been possible with no-cost existing infrastructure.

The problem-based learning approaches, especially the component of active learning, worked well and it is recommended that courses that are planned at the postgraduate level employ student-centered and active learning approaches, rather than being dominated by series of lectures.

The main PBL aspects of the MAGAART workshops were collaborative learning, critical thinking and activating previous knowledge. The aspects of solving or identifying a given problem was a subordinated theme in the workshop approaches. In that sense, PBL became a catch-word for a more general approach. This approach, *active learning*, seem to be a suitable default approach to employ when complementing supervision and self-directed learning in doctoral education at MU, TU and GU with courses/workshops. The MAGAART project recommended that courses that are planned at the postgraduate level employ mainly student-centered and active learning approaches, rather than being dominated by series of lectures. It would also be interesting, and more innovative, to experiment with the problem aspect combined with collaboration in doctoral education.

There is a secondary order digital divide gap (skills, habits, possibly even motivation) as a source of inequalities, which may be less easy to spot, and it may render South faculty be reactive in e-learning course development. Widespread adoption of e-learning at the institutions require stronger ICT skills among faculty and this can be achieved by instruction or more coaching approaches. The project cannot conclude on the recommendation of which of these approached that should be dominant. There is support for both approaches, but it is an important question to handle deliberately and strategically. Many participants avoided the use of Open Educational Resources in practical activity planning, which is interesting (since the global trend is the opposite) and deserves closer attention.

The online community of practice activity was not sustained, neither on Moodle nor on email. There are many successful establishments of online communities, and also many failures. Whereas the potential is high, so is the risk. It seems that the need for such community is not so great that it overcomes any tactical mistake or competition. While it is not possible to make any confident recommendations, it seems safer to build on existing relationships thereby growing participation more organically, and make them more open (in order to attain critical mass), and hope that the attract more participation.

Abbreviations used

MAGAART = Maseno, Aalborg, Gulu, Aarhus, Roskilde, Tribhuvan
GU = Gulu University (Uganda)
MU = Maseno University (Kenya)
TU = Tribhuvan University (Nepal)
AU = Aarhus University
AAU = Aalborg University
RUC = Roskilde University center
BSU = Building Stronger Universities
PSDR = Platform for Stability, Democracy and Rights (a depreciated Danida structure for research capacity development)
SDR = Stability, Democracy and Rights, the thematic and academic frame for the platform of SDR within BSU 1 (i.e. PSDR)
TPCK = Technological-pedagogical Content Knowledge
CoP = Community of Practice
R = Respondent (from the conducted interviews)

Course Development Methodology

A key part of MAGAART was to develop and conduct a number of courses and through that, strengthen a network of scholars at the North and South institutions. The project had a bottom-up approach, rather than trying to implement one model of e-learning and PBL uniformly across the South partners. The MAGAART project had its genesis as an add-on to the BSU program. Therefore, a number of activities were conceived that complemented the mother program's objectives. Furthermore, the activities were the result of negotiations between three different universities, that while agreeing on the strengthening of research capacity within PSDR, had varying institutional priorities regarding e-learning and Problem-based learning. There was no systematic variance in how the courses were implemented, but rather a bottom-up approach and networked negotiation on what was needed in terms of content. Hence, the courses were carried out according to their own inner logics. This is important to mention, since the outcomes of the courses and community are contingent on the development process. It makes sense to reflect on development processes that can be scaled and foster good e-learning practices, instead of merely conclude on the forms of current courses. This is further discussed in the 'results'.

The values underlying the activities were investigated in the kick-off workshop in Kathmandu in 2013, and resulted in a concretized project plan. The faculty running courses (referred to as instructors) were all experienced faculty from AU and RUC. Their teaching approach was not harmonized, instead their different takes on PBL were tried out, in collaboration with AAU e-pedagogical consultancy.

Overview of Activities

Orientation Workshop (OW)+Community of Practice (CoP)

Lead: AAU (OW). Community of Practice (AU)

Description: Awareness, introduction to e-learning tools and PBL in a doctoral supervision context. This course feeded into the launch of a community of practice between the partners, where the practice is research in PSDR in a South context.

Site: MU (GU collocated) and TU.

Proposal Development

Lead: AU.

Description: Course in academic proposal development for prospective or early-stage PhD students.

Site: TU

Conflict Management

Lead: AU

Course: Course aimed at conflict negotiation.

Site: GU, MU and TU.

Data Analysis

Lead: RUC

Course: Course focused on qualitative data analysis.

Site: TU (MU & GU online), MU (GU & TU online), and GU (MU & TU online).

Evaluation Methodology

The objective of this evaluation is formative in its objective; it sets out to describe what is perceived to succeed in a PBL-based, e-learning supported doctoral education, activities that are promising but where there is room for improvement, and unfruitful or high-risk strategies.

As a means to reach this goal, we need to map the initiatives in terms of focus in doctoral education and their focus on technology, pedagogy and content.

The objective was in particular *not* to evaluate the performance of certain stakeholders, benchmark given activities or objectively assess the learning achieved amongst participants.

We generated semi-structured interviews based on an interview guideline. This guideline took departure in central concepts in the TPACK model (Mishra & Koehler, 2006) and (Bengtsen, 2014). Interviews were conducted face-to-face in most cases, and when in local language when deemed necessary in order to capture nuances. The interviews ranged from circa 15 minutes to well above 1 hour. In all, 28 interviews plus one focus group interview were conducted (16 TU, 3 DK, 5 GU, 4 MU).

These interviews were transcribed, and coded according to the aforementioned concepts. Furthermore, inspired by Grounded Theory (Charmaz, 2006; Strauss &

Corbin, 1998), we allowed for further inductively derived codes and memoing. The coded interviews were further interpreted and reported in the results section of this report.

It can be noted that the instructors of each course decided for themselves whether it was important to them to do any learning assessment.

Results

What Participants Learnt

Here, we describe what the participant learnt; possibly but not necessarily based on the explicit curriculum. The workshops had many learning accomplishments that participants were able to remember. Participants got some exposure to Problem-Based Learning during the workshops, and that introduction inspired them to demand for further training on the pedagogy. The most intriguing part of the PBL principle that was amazing to them was the role of lecturers and supervisors, students' centeredness and linkages between institution and community created by students through their projects. A participant narrated how students begin to solve practical problems applying theories they learnt from the lectures which also engages their supervisors in the same as a beautiful model of training. The facilitators introduced the PBL methodology and its principles and implementation procedure especially for PhD supervision, but some of the participants although the pedagogy is not enshrined in the curriculum had already tried with the subjects they teach by the time of this interview.

Technology and tools to support learning and communication were reported to have been very interesting and engaging by participants, and learnt to some degree (See hands-on section later in the report). Many of these participants had some knowledge of Microsoft Office for processing their documents but did not have exposure to many other tools for supporting learning. They therefore commended the workshop for enabling them to learn how to use Moodle, Google docs, Google Drive, Zotero, Mendeley, Dropbox, Skype, web conferencing, Diigo and social media to mention a few.

The full list of identified knowledge is summarized below. It is showing the variety of things learnt rather than trying to document any increase in research capacity (see the following page):

Domain:	Participants' responses:
Pedagogical Knowledge	Introduction to PBL (supervision, problem identification, roles of students, communication). The PBL model with example.
Content Knowledge	Student centered learning, aware about publications and communication networks, data analysis etc., share thoughts, research, views and query on the web, PBL principles (asking questions and listening). Note that interviewees seldom highlighted particular content of courses (e.g. what is validity in data analysis), but there is no reason to believe that they did not learn such content.
Technological Knowledge	Mostly on 'tool awareness' and 'why' level rather than 'hands-on': Moodle. Software use for learning and communication tools, Skype, Dropbox, Zotero, Moodle, Google Docs, Dropbox for sharing large files, policies, was using ICT tools for educating people eg. audio recorder, mobile apps, Diigo for bookmarking, Dropbox for cloud storage and e-library, video conferencing, social media like Facebook, camera, video recording, connecting to video conferencing for the workshop, use of cell phones, use of ICT tools in the classroom for extended learning, searching the web, available infrastructure (equipment and Internet connection).
Pedagogical-content knowledge	Students work to solve a problem using PBL, seminars, courses and workshops, using technology and pedagogy. The importance of listening and process of doing PhD courses and supervision, it was more of building learning process of a PhD student, the activity of using Lego Serious Play methodology for building a common model, peer learning, enacting the principles of PBL, theoretical parts of PBL, groups worked very well because of the right questions, Principles for supervision related to principles of PBL and learning principles of the students, how to implement different tools of ICT and PBL in their supervision, the principle of structuring reflection and not the document. Making plan to improve supervision.
Technological-pedagogical knowledge	Institutional support to use of ICT in teaching may be a possibility, research and learning, Moodle is 'technical' but can be very useful, institution needs to install own Moodle platform, use of mobile apps for teaching learnt through "building interactive way in teaching", e-learning and tools to support PBL, Moodle environment can enhance teaching, many sessions can become "alive" in class while using technology.
Technological-content	Use of Dropbox for content, online supervision,

<p>knowledge</p>	<p>referencing using Zotero, Mendeley, Diigo, Google Docs for sharing files, ability to manage accounts in Moodle, create online directory, invite knowledgeable participants, create files, tried interactive writing, create own profile, CV, post, how to share large information, use ICT for data collection, institutional ICT policy, share materials in Moodle through forums, use of video, audio recording, camera, for fieldwork research, ICT tools being used for PhD supervision, Moodle for biography.</p>
<p>Technological-pedagogical content knowledge (which is central in a mature teaching/learning practice in e-learning mode)</p>	<p>Participants learnt to share problems with our academic community through Moodle, Legos and building the learning process of the PhD student.</p> <p>Participants tried out some of the tools in Moodle by themselves, took their pictures and uploaded them, analyze material in Moodle in data analysis.</p>
<p>Enculturation in institution</p>	<p>Supervisors of PhDs shared their experiences, learnt that communication among supervisors and students is vital in the process of supervision – i.e. enculturation should be thought into doctoral education <i>as such</i>. Organisation, routine meeting, follow-up on the training, peer learning of tools benefit benefits more south PhDs and support enculturation. Sharing resources and materials for students through MU’s Moodle System during the workshop made contribution to researchers’ and scholars, research policy and culture.</p>
<p>Research Craftmanship</p>	<p>Examples of linkage between university and community, understanding and tolerance, application of tools learnt, peer learning, tried to use Moodle with undergraduate students, evaluation of learning outcomes, learnt more from the workshop that expected, University moving towards introducing ICT in classrooms, application of ICT in research, lack of skills to use ICT tools and trust of the technology.</p> <p>Supervisory competences: interactive learning, creating good understanding between you and student.</p>

The Practice of e-learning in MAGAART Project

Here we analyze the practice, including the overall design of activities that integrate e-learning into the content and pedagogical concerns (or what in TPACK terms is called TPACK knowledge). We conclude that all activities focused on distance learning, although e-learning by some definitions also include classroom aids electronic support (Sangrà, Vlachopoulos, & Cabrera, 2012), and hence we have not analyzed more closely the in-class pedagogical use of ICT. However, we consider the relationship between the online and face-to-face activities.

Overall Description of the e-learning Practice of MAGAART

The main aim of the e-learning aspect in the MAGAART practice was to supplement the face-to-face activities and develop ICT skills, in particular within e-learning, in the south participants.

Regarding the design of the learning environment, it is possible to note that MU has a stronger instructional design emphasis than AAU. This means that MU has a very structured practice about how an online learning activity should be designed and developed. Furthermore, it is possible to define different levels of “virtuality” in the different courses, as well as different levels of interactivity and interactions.

The Data Analysis course could be classified as the most virtual and interactive course. This course used Moodle and BigBlueButton. There were 3 workshops taking place in three different locations (TU, MU and GU). However, only the participants from the local institution were collocated, the other participants were on videoconference using BigBlueButton. Moodle was used to share material, discussions and as repository. The web conference tool was used to support interaction between the different places.

In second place of virtuality and online interactivity, is the Orientation Workshop. On third place is the Proposal Development Course and finally, the last one is the Conflict Management course. This course had only one activity in Moodle and the communication was almost only one-way communication, from facilitators to participants.

Innovation in the e-learning practice was relatively low, if measured against commonly applied e-pedagogies. The pedagogy could be classified as a kind of constructivism, collaborative learning and problem based learning, however there was no major change of mode nor medium – it seems to continue using textual resources and extending the face to face practice. There was neither use

of social networks, nor any use of Web 2.0. The limited infrastructure and skills of participants puts some constraints for innovations.

The level of online learning reliance and level of innovation show that no shared approach emerged for e-learning (as expected, given the bottom-up design of the project). The e-learning practice was related to the experience (working with the partners) and willing of the facilitator to use ICT in the teaching process. In the case of the Conflict Management course, the e-learning aspect was used because it had to be used, otherwise the facilitator would prefer to use email with a Word document, they were not willing to “explore” the use of other e-learning components that could support pre-online activity. A similar situation was expressed by one of the facilitators of the Data Analysis course. She stated that she was skeptical about the e-learning aspect, however, she got a positive surprise regarding the results. The facilitators of the Proposal Development course were more aware of the context and the lack of ICT skills, so they included few online activities. The facilitators of Orientation Workshop used more activities and technologies during the online activities but were less aware of the context. These drivers create diversity in the approaches.

There are 3 aspects relevant to discuss, which are very easy to identify in the data:

1. Readiness for e-learning
2. Lack of continuity
3. The experience of share knowledge and interact with others

Readiness for e-learning

There is a very interesting element in the data regarding participation. Each MAGAART course had a set of pre-workshop activities in the online modality, however the participation was very low. The data shows a possible reason for this low participation. In all the four courses you can see a big difference between the participation and engagement of the participants in the online activities in relation to the face-to-face activities. During the online activities the participation was very poor. This gave the facilitators a sense of discouragement and demotivation. It also demanded a lot of effort to get people aboard in the online activities. However, during the face-to-face activities the participants were quite engaged in the discussions and in the different activities.

This difference in the level of participation may be related to the lack of ICT infrastructure and the ICT skills.

To analyze these aspects we base our analysis in some of the elements portrayed by Akaslan and Law (2011) regarding measuring readiness for e-learning. We look at the ICT skills and the components of perceived ease to use and perceived usefulness regarding technology.

ICT Skills

E-learning participants need experience and some level of ICT skills to use ICT in their learning process. The experience, confidence and competence of using ICT will differ a lot within the participants of the online activities. It is clear from the data that many participants had a low ICT competence and almost no experience of using Virtual Learning Environments. Below are some of the interview respondent's comments:

- “Due to lack of skills of technology, it makes us panic while exploring” (R1, DAC)
- “It's alternative was email and phone” and “My competence was in email habit and easy and not competent in Moodle and doodle” “Email is easier. Email is instant it can be sent after type” (R2, PDC)

In the data it is possible to see that people who have worked previously with Virtual Learning Environments and other technologies also were more active during the online activities (R3, R4, R5).

The participants in the Proposal Development course did not upload their proposals, but they were able to use Dropbox and email. As a reaction, the facilitators changed the approach into use Dropbox instead. This was done despite offering Moodle training. We can conclude that competences regarding Moodle are less general, that the participants do not draw on their other ICT skills and that some participants will avoid learning Moodle if they can.

In the Conflict Management course faculty participation online was higher than in the other courses. From the data it is not possible to identify the reason for this participation as the course has two variants: first, it was a requirement to participate in the online activities to get the certificate and second, there was only one activity in Moodle, and a step by step guide was created to help the participants complete the activity.

The lack of ICT infrastructure and ICT skills brings frustration to the facilitators as they need to use much more time to get the participants aboard, and also due to the lack of participation which could be a sign of lack of interest or motivation in the course. However, this was not the reason for the low participation during the online activities. Time wastage and frustration using computers are barriers to e-learning implementation (Ouma, Awuor, & Kvambo, 2013).

Attitude and Perception Toward Technology

This aspect is related to the understanding of participant's acceptance of particular ICT, in this case Moodle, for a practice of e-learning. Following Akaslan and Law, we look at the perceived usefulness and perceived ease to use.

Regarding the aspect of perceived usefulness it relates to, to what extent the MAGAART participants believe that using Moodle can support their professional development. The participants expressed that Moodle is very useful for them to perform their academic practices:

“Very satisfied with Moodle. The Moodle can be used through flashback at any convenient time. This Moodle was really great and exciting and motivating.” (R1, DAC)

“...is very useful, because we can read the learning materials there, even we can download the materials, we can share our own opinion in the forum.” The Moodle environment can enhance teaching, learning and research too.” (R6, OW)

“The model, talking about its features, and services, are well. I do not know other e-learning portal so much that work better than Moodle. In my knowledge up to now, the Moodle is perfect,” (R7, OW)

“Moodle is used as a discussion forum. It is very useful for collaborative learning, exposing our ideas and receiving feedback, also that it is more confidential.” (R8, PDC)

Regarding the aspect of perceived ease of use, it relates to the extent that MAGAART participants find difficulties in using Moodle. However the participants found Moodle very easy to use. They did not know Moodle beforehand and they needed some help to start using the platform, but once they got to know Moodle, they found it easy to use:

“It is hard but after reading instruction you can use Moodle and I did improvements.” (R9, CMC)

“Moodle is easy to use because it did not take us much time to learn, we were able to create our own profile, CV, and we are able to post some information on our profile and on the general profile so it was not difficult. (R4, OW)

“I feel easy to use Moodle and it is user friendly so I can say Moodle is easy for beginners.” (R5, PDC)

This shows that Moodle can be used in other environments in a similar, future project.

Lack of Continuity

One of the common comments from the participants was the lack of continuity. It seems that the common practice during the project was, that previous to any of

the courses, most of the participants did not have any knowledge regarding Moodle. It was their first experience in an e-learning activity and many of them had low ICT skills. Therefore, in each course a kind of training took place – skill development – but most of the participants did not have the opportunity to continue the development of their skills and knowledge. Few of them participated in all the courses. So those who did not participate in another course did not know if they could access Moodle after the course, they were not involved in more e-learning activities and so on. The implication of this is that as long as there is no official institutional public commitment to Moodle, the project cannot investigate the propensity among faculties to incorporate Moodle.

In the future it is recommendable that the activities are shown to the end-user as activities that are smaller parts of a larger stream (e.g. showing a course in GU as a cross-cutting course at GU's center for graduate studies, in TU at their Doctoral school), rather than in an area of MAGAART at Maseno eCampus. This has some technical challenges, it is not trivial to achieve through Moodle. Furthermore, it is in tension with the ambition to create a cross-cutting community between TU, MU, GU and the Northern institutions.

The Experience of Sharing Knowledge and Interacting

It seems that a gate to share and create knowledge together with others was open in the online activities. Participants highly valued the opportunity to get access to a broader academic audience:

“The first one I would really acknowledge is the Web conferencing because I was able to interact with my peers, other PhD scholars from different regions. There were participants from Denmark, from Gulu, from Nepal, and we were brought on the same table in our 10th [floor] e-learning center at Kisumu City Campus and it was quite an experience because this is where you are having input from different scholars, different perspectives as all of us are pursuing our PhDs.” (R10, DAC)

“There was the fusion and coalition of six universities to exchange the knowledge and skills and up-to-date the efficiency of ICT of faculties.” (R11, OW)

“Moodle is used as a discussion forum. It is very useful for collaborative learning, exposing our ideas and receiving feedback, also that it is more confidential.” (R8, PDC)

“I love the discrimination of ideas shared and I am excited about technology used.” (R5, PDC)

Some participants perceived that their communication skills improved greatly after the training within the Orientation Workshop (and also the GU training at

MU, not further analyzed here). They learnt how to communicate with colleagues in the digital media, appropriate language, tone and how to expose their work to get critique from others.

Some general recommendation for the e-learning practice:

1. The evaluation of the online activities demonstrates evidence of the relevance of e-learning for teaching, learning and research capacity development. If the South partners wants an embedded use of e-learning, it is apt to design long-term initiatives to support the practice of e-learning, short term initiatives, as the ones developed in MAGAART are key for starting the process, but the local partners should go beyond the short term initiatives (which is now being done).
2. The model of longer teaching activities in an iterative cycles of face to face online activities – combined with Moodle and videoconference – seems to be a good way to develop ICT competences and knowledge about e-learning as this approach is more based on learning by doing and collaborative learning.
3. The South partners universities are interested in fostering knowledge sharing, research dissemination and strengthen communication. Moodle has a great potential to achieve these aims, at the institutional, national and international level. Moodle shows to be relatively easy to use after a short introduction to the tool. Furthermore, Moodle has the features to facilitate those activities.
4. Given that the North partners want to work collaborative with the South partners regarding developing e-learning practice, it is necessary to be aware that there is still a secondary order digital divide gap (skills, habits, maybe even motivation) as a source of inequalities.
5. If the South partners want to continue the development of e-learning in their universities, Open Educational Resources could be very valuable as a resource to design e-learning activities for self-directed learning.

Experiences of Connectivity

Overall, the connectivity experience in MAGAART is sufficient for affording learning, but still a bit problematic. One participant from TU [R1] said that “*there were disturbancesnot adequate internet facility*”. Another participant from TU [R12] said “*technology can give us disturbance because of low internet speed, .*”. He further said that “*there is some technical disturbance at GU workshop: I have lost 1 hour class because of weak internet speed*”. R13 mentioned that “*the first day was not successful*” in the workshop because of internet connectivity. R7 from TU said in this concern that “*....., the program didn’t started in time. It was delayed and delayed. Even it started later, the video conference not worked well, there was no*”

sound, and even not listening properly. Later, we are told that the internet is not working via text messages. The whole 1st day was frustrating”.

GU is also facing a lot of problems with the internet, one example can be seen in the eyes of R14, GU *“student are working in most remote areas, no opportunity to interact using internet”*. R4, GU elaborated that *“internet was good at the training, but when I tried later with my students, the connectivity is low, sometimes there is a lag and we have to wait”*, and this can lead to frustration on internet usage. In a focus group interview with key stakeholders they said that *“people are struggling to get internet...”*. One respondent expressed some frustration with other colleagues: *“Even now more than 60% do not know to handle computers” (R2)*

Web conferencing (Data Analysis) in MAGAART was acceptable with some challenges, especially for the first day. The actual series of the program were severely delayed, including parts with no sound. The whole first day was quite frustrating, but the other days went fine.

It should be noted that all South universities takes special technical measures for these occasions. MU, TU and GU temporarily increased their workshop bandwidth by either:

- a) Downgrading other parts of the university network.
- b) Run the workshop from venue with better bandwidth.
- c) Temporarily increase the bandwidth from the vendor.
- d) Set up temporary networks (e.g. with a 4G router).

Downgrading (a) seems to not be a generalizable strategy. That means that future activities still will need to rely on budgets with provision of equipment/services and technical assistance – but that is an extra cost comparable with food. However, it is not possible to use the MAGAART piloted modes for spontaneously organized activities between a few scholars.

The literacy required, which can be considered a second-order connectivity in digital work, is largely acceptable in the MAGAART community after training, but still it should be noted that individuals may feel that *“Due to lack of skills of technology, it can make them panic while exploring” [R1]*. It is seen that participants forget how to use Moodle after the initial use, even ones who said that Moodle seems very good.

It is also claimed by the South universities that several of the Northern supervisors did not even look at the site, some of them have never even joined it. So there is a lack of motivation, there are serious obstacles that block out supervisor participation. Furthermore, it has also been said that North co-supervisors are not been giving the time for supervision and finds it difficult to work in online supervision or using online forums.

One option for the senior professors, and faculties, was to have a provision for immediate help and support to take them along with the pace of technological use in their work habit.

Community Building

The MAGAART project aimed at establishing a community of practice (Wenger, 1998) in continuation of two Orientation Workshops on e-learning and PBL for PhD supervisors held in Kenya and Nepal, August 2014. The community of practice would support an enculturation process for members of the evolving research community comprising PhD students from the south institutions and supervisors from the north and south institutions.

It would appear that the community of practice variously aimed at supporting the acquisition of technological, pedagogical and content knowledge. The following strategies were used to evolve and grow the community:

- Establishment of an explicit COP area in Moodle (lead: MU)
- Management of such COP (lead: AU)
- Kick-off through orientation workshop (lead: AAU)
- Co-Supervisor stewardship (lead: RUC)
- Use of discussion forums in all courses offered (all activities)
- Pre-workshop activities involving sharing of readings and peer critique (all activities)
- Peer engagement and collaboration through web conferencing (Data analysis)

Participants were enrolled in the COP area of Moodle but little participation was noted in the space. The COP had aimed at identification of the audience, goals and vision of the group as a research community, right from the formative stages. However, despite non-participation in the designated COP area, participants observed that at the end of the MAGAART courses, they felt a sense of connection and belonging to an international research community and were no longer 'cocooned' in class with their supervisors only:

"A hundred per cent, yes. For a very long time we have been cocooned into just being in class with your supervisor. In future, if it can be frequent, because academics, particularly social sciences are not static, they evolve." (R15)

Added to this was the novelty of the ideas acquired in this process:

"The dynamics, therefore, ... expose participants to new ideas [in the research domain]". [R15]

Pre-workshop activities involved sharing of readings and peer critique. Many of the participants expressed that the community enabled them to make prior contact with their peers as well as their supervisors, to obtain useful feedback on their evolving papers.

The evaluation reveals that a number of participants took part in the discussion forums, which enabled dialogue between them and other people in disparate locations. In the forums, they shared common challenges and possible solutions:

“We talk on phone and if I singled out the MAGAART Conference in Kisumu, my discussant was from Gulu University. That kind of interaction had a lot of input though it was not linguistic but it was quite general and it really helped me to think generally and broadly about my project. So this interaction was very important because without feedback you might just be groping in darkness. You need people to input in your work. You need to interact with your supervisors and I believe this kind of arrangement is quite beneficial to any PhD project.” (R10)

“The technological aspect that I liked was the e-learning Portal of Maseno University because we were prescribed to a facility under the pre-workshop training and then the workshop itself and we were able to interact at various forums that were established in the platform. There was the social platform, there was the news platform, and then there was the discussion platform. All those platforms gave you an opportunity to engage in interaction with the participants within the group. So I believe that ... the Web site technology that we were exposed to was quite beneficial in getting resources for our research.” (R10)

Peer engagement and collaboration were achieved through web conferencing as participants were exposed to collaborative processes and free exchange of information through the web conferencing platform. Participants observed that there was a lot of satisfaction in seeing and obtaining feedback from a colleague whose face you could see on the web conference. The web conference was extensively used in the Data Analysis workshops series:

“Besides the comments I got, I was able to hear him, see him, give now his take. That to me was very important because the body language speaks volumes than what someone takes down.” (R15)

“Feedback was now subjected to the platform where everybody could now comment. So other than getting that peer feedback there was direction from the facilitators and the supervisors who were present.” (R10)

The effects of community of practice, offline trust and reciprocity as well as personal relationships was witnessed by some participants. Some participants were willing to share ideas freely, ask questions through both synchronous and asynchronous means:

“Me, Tom, and Victoria are more less like a family from Maseno. And then Olang... and Owiso. So it is like five family members under BSU, under MAGAART appearing in a workshop. It is encouraging in a way that you’re all focused on achieving a PhD at the end of the period and as we graduate we shall be five closely interrelated scholars who have the same like background that need a backing. I think that the peer element is very vital in this workshop and I credit it.” (R10)

A number of participants felt that the exposure to the MAGAART community through the various courses and tools had helped them in transforming their practice, especially in articulating their needs and the technologies that they needed to attain these needs in an e-learning and PBL context.

They were anticipative of further evolution of a stronger community:

I think we have a community and I believe if these workshops were coming monthly towards the end of the program we are going to be a very strong community. (R10)

The good thing about such forums is that they introduce you to new friends. And also open you up to know who is good in what. Yeah. So that you can identify and we are already identifying people within this interaction on how we can form a team of researchers and be able may be to come up with a project (R3)

Other optimistic voices lay emphasis on the social friendships that would lead to future learning teams and research groups:

So this one really is a good move from being a lone researcher. You are doing it all alone. That can't you now open it up and team up with the rest and may be if, for example, whatever we have started if it continues, we may look for other team members so that we have like a multidisciplinary approach to research. Not multidisciplinary in the thematic area alone, but institutional levels. Yes, so that we have so many other institutions. But we are still just trying to come up with something. (R3)

However, these statements concern MU staff, and may have occurred in many local institutional face-to-face activities beyond doctoral supervision rather than the activities related to Moodle. When separating the comments that talks about the benefit of the cross-institutional interaction in terms of community (not e.g. the excitement of interacting with another specialist, or getting another idea), evidence of the advantage of a distributed community of practice wears thin¹.

The project objectives of the online CoP were not explicit in terms of online activity. The PSDR framework was changed underway, and it is likely that this

¹ There is one interviewee who sense a larger community, but his sentiment is not as manifest among other members, nor is the activity in the fora corresponding to that.

muddled the decision process. If the CoP was to support a multi-year SDR platform, it makes sense to expect a steady flow of sharing and discussions. If it only is to support a project with slightly over less than two-year duration of activities, the goal is not necessarily to have temporally sustained activity. It is likely that the expectations were different among different stakeholders. The online part of the CoP turned out to be of marginal importance for the doctoral student activity. In some cases, distributed communities of practice are pivotal and very sustainable (Renninger & Shumar, 2002). Either the MAGAART project did not to *realise* such potential, or *it was never there*, although some actors considered it promising in the beginning.

Summing up, a community of practice is beneficial, and we know that it generally is potentially powerful for learning (Wenger, 1998). We can also see the effects here on the local level inside the institutions. Breaking out of the “cocoon” supervisor-supervisee relationship seems very feasible. MAGAART did, however, not really find the way to strengthen a *distributed* community of practice. From this we can infer that it is not an easy task. What could have been done differently? Candidate strategies may have been:

- Forcing all communication to Moodle (less email and email lists).
- Opening the different fora (“Moodle rooms”) more in order to attain critical mass.
- Using more active community management to drive content to the Moodle (push people to post on Moodle).
- Increase incentives to people to post content there (give buy-out hours, award scholarships would be extreme examples).

Although all these strategies are examples from ‘best practices’, they consume resources and might have other trade-offs, which we will leave up to the reader to assess. The data do not offer any conclusive evidence of any key mistakes from any part.

Open or Closed?

In the context of GU and TU, it is interesting to note that there was almost no course use of any Open Educational Resources (OERs) or MOOCs (Massive Open Online Courses), in a project that took place in the midst of the controversy of MOOCs (Khalid & Sorensen, 2015). The Orientation Workshop introduced a number of technologies that afford open collaboration (sharing of links, etc.), but this was not adopted into the courses or informal collaborations. OERs and MOOCs are often held to be major cost savers, access enablers of knowledge that is scarce in the South, and improvers of quality in higher education in the South.

However, there were no requests for having the courses open so that participants beyond the SDR students could learn, get inspired, or ask to get involved. One suggestion from AAU to scan for disaster management courses was

not acted upon, hence demand is likely to have not been there. This skepticism towards OER seems to stem from:

- Cost reduction is not a main reason for pursuing e-learning (Source: card-sorting priorities in Nov. 2013 (Aarhus, only with TU) and March 2014 in MAGAART kick-off).
- It is unclear how to monetize OER use. Since they are produced outside of the organization it is controversial to charge for them. MU is a role model for GU and TU, and its e-learning activities are organized in “profit center” mode, that is, it charges for its courses and programs and are fully sustained by that funding.
- OER as a paradigm is conceived by some informants as naïve. Will it lead to faculty stealing research ideas or instruction materials from each other?
- The more open and fluid the network is, the less each actor can be assured to take part in the next stage of the stream of projects.

Problem-based Learning in Workshops for Doctoral Education

In this section we examine the role of PBL in the learning activities held in the MAGAART project. Apart from writing the thesis and getting supervision, the doctoral education can also be supported by courses/workshops. PBL does not refer to one specific pedagogical method but covers different understandings and approaches (Bygholm & Nyvang, 2013). The PBL research field has identified several common factors on the different applications of PBL: Learning should be a constructive, self-directed, collaborative, interdisciplinary and contextual process (Dolmans, De Grave, Wolhagen, & Van Der Vleuten, 2005). The problem is of course a focal point for all approaches, but the conception of a problem differs as well as the organization of learning processes.

At a general level we distinguish here (a priori) between three different understandings of a problem in problem based learning. Problems related to the experiences of the students as in the approach based on critical theory; problems that are representative for the domain that the learning processes are aimed at qualifying for, a more professional oriented understanding used especially within the field of medicine and engineering; and problems as a way of cooperating with relevant organizations in the surrounding society. In the first type the problems are identified by the students, in the second case the problems are identified by the teachers and in the third case problems are identified by partners in the surrounding society.

Common to the different understandings of problem based learning are that they are often conducted in groups and that they are understood in contrast to more guided instruction strategies (Kirschner, Sweller, & Clark, 2006). In general, guided instruction strategies are aimed at providing the students with a

relatively fixed amount of knowledge (the curriculum) within a domain. Focus is on content, teacher control and instruction. Problem based strategies on the other hand is more aiming at providing the students with the abilities to acquire knowledge appropriate to solve problems within the domain.

In mainstream PBL, students work collaboratively to solve the problem (often also to formulate it). Collaborative learning is understood as a process of interaction and negotiation with other agents of a learning environment (materials, teachers, peers, etc.), which demands that students have to come to a mutual agreement and interpretation about what is to be learned (common goals), and how they will approach that situation (van der Linden, Erkens, Schmidt, & Renshaw, 2000).

Regarding the aspect of critical thinking, often a part of PBL, Barnett (Barnett, 1997) refers to being critical in three domains: the knowledge domain (propositions, ideas and theories – critical reason), the self domain (a form of critical thought that is demonstrated in critical self-reflection) and the world domain (a critical thought that is demonstrated in critical actions).

In self-directed learning, also often an intended outcome of PBL, students are more aware of themselves as learners. Students play an active role in planning, monitoring and evaluating the learning process. They are active promoters of their academic achievement by defining what they know, what the new task demands and they come up with a specific strategy to get the knowledge that they lack to achieve desired goals and objectives (Ertmer & Newby, 1996).

Another common aspect of PBL is activating previous knowledge (Savin-Baden, 2000). The analysis of the problem will activate students' prior knowledge, this will help them to construct a theory around the problem and understand the variety of aspects that are relevant for their professional practice.

The learning activities in the MAGAART workshops were controlled by the workshop facilitator in regards to the overall theme, duration, literature etc. This was decided without consulting the students and the PBL strategy can be characterized as at type two of the above mentioned, meaning that the problems primarily are identified by the teachers. Within this frame the teachers should give the student a possibility to "find" their way of reaching the problems so it becomes relevant to them. Below we examine how the learning processes was organized. We focus here on the role of the participants and participants' experiences and their comments and opinions on this.

Using the term workshop instead of course in itself implies that participant are going to be active, to "work", and not to be passive listener and that was definitely the case in all of the workshops held in the MAGAART project. We go through the workshops, one by one, and briefly describe how the learning processes were organized and how this was perceived by the participants, furthermore we identified the main PBL aspect that was strengthened.

The workshop on *Practical Conflict Management* was a two-day workshop (held twice) with assignments on Moodle before and after the face-to-face workshop. In the assignment before the workshop the participants had to introduce themselves, describe an example of a conflict they had themselves experienced, and their expectations for the workshop. In the assignment after the workshop the participants were to reflect on their own reacting patterns, what they have learned in the workshop, and mention something that had surprised them. The workshop was thus to a great extent based on the participants' own experiences, sharing experiences and mutual reflections. The different tools and theoretical concepts within conflict management was introduced by letting the participant work with concrete examples/cases and in that way realize the patterns and key concepts and tools in conflict management themselves before introducing them explicitly. In the students' reflection on the workshop (assignment 2) and in the interviews, the students comment on this approach to accomplishing learning:

The trainer triggered us to share your experiences to each other so that we would be familiar with different approaches inductively in the workshop".
(R16, interview)

"It surprised me that learning can take place without note taking yet I was able to enthusiastically follow the presentation." (R17, assignment 2)

"Lastly, the approach to learning surprised me too. It was relaxed and participatory hence I still remember what I learnt in the workshop" (R18, assignment 2)

"So it was a new kind of learning experience..., So definitely it was the workshop was able to integrate both the local and global practices of conflict management" (R20, interview)

"The most important thing I learned from the workshop ... about the conduction about classroom activities in the learning activities in the workshop ...next important concern is ... about the group work the way that works in group I realized that it is not only the division of the work but it is the sharing of the works so division of the works and sharing of the work they are two different things I realized this" (R20, interview).

Many of the participants expressed that the workshop also had inspired them to use new methods in their work as teachers and some also felt that the workshop should be extended from two to five days. The workshop was a good example on how the students could use their own experiences to learn the key concepts and forms of reasoning used in conflict management. The main PBL aspects strengthened in this workshop were activating previous knowledge and critical reflection. In general all the workshops has a problem as a trigger to start the learning process.

The workshop on *Data-analysis* was organized as three succeeding workshops, each consisting of three days. The workshops were held in Maseno, Gulu and Tribhuvan and five PhD students participated from each university. Some supervisors also participated in some of the workshops to take part in the discussions, to present own work, and to present the rules and regulations for doing PhD studies at the involved universities. The students were organized in five groups with a PhD student from each of the universities in each group. During the workshops all students made presentations of own work and acted as a discussant on one other project from their own group. The presentations and discussions of the individual PhD project were supported by online web-conferencing and activities were also based on a handbook in qualitative research and a number of research papers on research methodology from different points of view. The workshop thus combined the presentations and discussing of the individual project with readings of more general knowledge on research methodologies.

"...I would really acknowledge the Web conferencing because I was able to interact with my peers, other PhD scholars from different regions. There were participants from Denmark, from Gulu, from Nepal, and we were brought on the same table in our 10th e-learning center at Kisumu City Campus and it was quite an experience because this is where you are having input from different scholars, different perspectives as all of us are pursuing our PhDs. (R10, interview)"

"One thing that I liked from the workshop was the collaborative approach from the Web conference where colleagues from afar could comment constructively on my paper and the comments were very insightful and very helpful besides just someone writing comments of your paper but letting discussing it and also air his comments online through Web conference was very richful because you are speaking to him and getting to know where his concerns in my paper was. This, to me, I found very enriching." (R15, interview)

*"Moreover, I learnt that research is a kind of knowledge sharing among same level of participant.....
Presentation was problem-based. Each of the researcher shared their problems that were faced while collecting and analyzing data" (R1, interview)*

The data analysis workshop took point of departure in the students own work on their PhD project in order to teach them how to work with different methodological problems. As part of this workshop the students also learnt to give and receive feed-back on methodological issues. The main PBL aspects were collaborative learning/peer learning and critical thinking.

The *Proposal Development* workshop consisted of three elements; a five days face-to-face workshop held in the realm of TU and pre- and post workshops on Moodle. The aim of the pre-workshops was to establish a community and prepare for the face-to-face workshop, among other things the participants were asked to share a first draft of their research proposal. The face-to-face workshop was planned as a mix of lectures, presentation by participants, exercises, reflection time and group work. Due to very low participation in the online pre-workshop in Moodle the participants were asked to send their draft proposal by email to the responsible of the workshop, which increased the submission rate. The proposals were shared in Dropbox. Also due to problems in using Moodle the online post workshop was changed to a face-to-face training in Moodle. During the course of the face-to-face workshop more time was allocated to supervision on the individual proposals than what was originally planned.

"My proposal format was changed. My objective was to collect more information but I learnt few information and lot of analysis my proposal was changed. The comment of the participants helped me a lot." (R2, interview)

"This workshop has provided the connectivity among researchers, guides, professionals and supervisors" (R5, interview)

Some of the participants felt that there should have been more interaction and group work, which was quite a surprise for the organizers of the workshops as they felt most of the activities had been based on group work. The participants might have expected to finish the proposal during the workshop, whereas the aim seen from the people responsible for the workshops perspective was to provide the participants with knowledge and tools to do so. However, this workshop used the same learning strategy as the others, that is taking the students own work as a point of departure for teaching the student some general knowledge of the structure and content of a good proposal. The PBL aspects were more focus on self-learning.

The *Orientation* workshop was a three-day workshop for PhD supervisors with the overall aim of introducing PBL and e-learning into the supervision process. The workshop was held both in Kisumu (including participants from Gulu and MU) and in Kathmandu (for participants from TU). There were also a pre- and a post-workshop. The aim of the pre-workshop was to get the participants started in the issues of e-learning and PBL. The participants were supposed to e.g. make a profile in Moodle, get familiar with the Moodle environment and other ICT tools, be introduced to PBL and different supervisions styles and finally to hand in a case describing a supervision situation they themselves have been involved in. The face-to-face workshop was organized around a variety of activities with an intent to provide a space for the exchange of knowledge and experiences and with a requirement of active participation from the participants.

“There was this time when one of the facilitators gave us some objects to try and manipulate them, to try and build, to show the team work you know and we really fumbled to come up with a design, to come up with a structure. So, you’re learning through practice, the practical skills that go beyond the theories.

That wakes you up when you learn from other people about the styles of supervision ...this was really a sharpener as we shared with different people from Gulu, Nepal, and Denmark and they were giving their supervision styles.... That interaction with other people from elsewhere can really inform you style of supervision.” (R3, interview).

This workshop had PBL (and e-learning) as a topic and not necessarily as a learning strategy. Nevertheless, the workshop did offer a possibility for the participants to work with their own problems to some degree.

In general, the workshops used the students’ experiences and problems as a basis for teaching the participant some general, you could say curriculum based, knowledge within the area of concern. Through the workshops, the participants were involved in and exposed to different techniques and strategies, as also the above quest have shown, and the trend is that they very much appreciated that. They want to share experiences, to learn from each other, to collaborate, to take responsibility for own learning process, and are very open to new ways of learning. The main PBL aspects of these workshops were collaborative learning, critical thinking and activating previous knowledge.

Overall, the idea behind PBL is to create learning environments that foster learning as knowledge construction through collaboration, critical reflection and experiential activities, rather than focusing on delivery of information and knowledge. Those key aspects of PBL were, to some extent, the design principles of all the MAGAART workshops.

Hands-on Training versus Skills Development

The ICT needs are quickly changing for the teaching in the human sciences of higher education. New tools are introduced, and existing softwares and web sites continuously get new functionalities and changed graphical interfaces. One size-fits-all training programs (henceforth referred to as training) that aims at development on hands-on skills (e.g. in PowerPoint, Moodle room design, etc.) are unlikely to cover the development in the long run. The most important reason is that there are rarely sufficient funds for continuous professional development in the South, which is necessary to follow the trends through training. The funding for this is typically jumpy and irregular. It is also very expensive to carry out training of this type at such duration that a faculty would be satisfied and their skills would be sustainable.

Even when funding is available, another disadvantage is the lag time involved. From the time that a skill gap is identified by faculty, to the time an expert is found, the training session is approved by management, and the course is organized, the teaching has suffered from the gap of time. Expert-led professional development suffers from the risk to fail to be timely. If a technology is introduced to a faculty generally before they perceive the need, training often fails (Lock, 2006).

Skill training is partly antithetical to PBL, and also to the goal of developing autonomy in a PhD student. A core reason for teaching PBL is that it develops self-regulating learning in a given area, e.g. ICT in the context of supervision. Faculty-wide skill training ignores that aspect. PBL and skill-based training approaches are not entirely mutually exclusive. Skill training may function as a subordinated approach to PBL, e.g. in elements that require a certain chain of steps that are difficult to figure out (for instance, it might be useful to learn how to import libraries into Zotero from Google Scholar). However, it only applies when the participants have a concrete need to do it; such procedures will be forgotten quickly.

There are cases when training works well. For instance, when there is a need for repetition of a pedagogy across courses, teachers and perhaps even programs or if all courses should have been present in a Moodle system *within a few months*. Such implementation will have uniform needs across courses and disciplines, and therefore the advantage of economy of scale will be optimal. Since such roll-out has not been decided at MU, TU or GU it is not the case. Nor did MAGAART explicitly plan for a consistent trainer-of-trainer roll-out approach.

With this in mind, the Orientation Workshop, the Community of Practice, and other e-learning elements that we evaluate in this report has not focused on training in the “faculty-wide skills development” sense. There is emerging evidence that training works well when it is not of the above described kind, but rather taking place in experimentation and coaching (Kinley, 2015; Lloyd, Cochrane, & Beames, 2005; Lock, 2006; Shear, Gallagher, & Patel, 2011).

However, the evaluation shows a number of comments from MAGAART participants describing that they expected hands-on skills rather than awareness and strategies around ICT:

First it should be noted that the Orientation workshop largely got a very positive response, (Camacho, Buus, & Ogange, 2014). For instance one senior interviewee said:

“So I think the tool chosen and used for the training was excellent (Moodle, Zotero, Google Docs...) they were very important tools.” (R4) .

The respondent was also in general very satisfied with his level of competencies. Another participant agree with the general approach:

“I Think skills training is highly overrated.” (Respondent 1 [FGS]).

Nonetheless, some staff argues in favor of training in the form of hands-on skills development:

“...for the ICT skill oriented courses and workshops, the time duration is better to elaborate to make it hands on.” [TU respondent]

“Yes! Of course the web tools are very useful, but truly speaking, the skill we learned from the workshop is not adequate because of the time span in the workshop. We expect such training extensively and hands on again. (R7)

“The tools, content, way of presentation, pace of training/workshop was perfect. But the time duration of the workshop was not sufficient. Since the participants were unknown of these sorts of tools beforehand, it would be better to have had intensive hands on workshop adding some more days. Many-many useful tools were introduced within short span of time and inadequate internet connection. So participants were expected to extend the time duration.” (R7, TU)

“There was little time for the many interesting activities that were introduced. I found myself just flipping over the activities due to the time limitation” (survey comment OW self-evaluation)

It is worth noting that while there are many references with wishes for training, almost no one said they aim to experiment on their own with these technologies.

Some faculty members are biased towards a certain kind of training. The hands-on skill training to which they are biased is not viable, as discussed above. Nevertheless, it will hamper adoption and diffusion. Therefore, we suggest that future e-learning activities explicitly incorporate exercises/discussions that inoculate the faculty members against this view, or perhaps even better, involve them in co-designing of the staff development activities, where they can critically discuss the merits and limitations of their suggestions.

In sum, based on theory, we recommend to prioritize resources towards nurturing self-directed learning. When self-directed learning attitudes are manifested, they can still be catalyzed by various training attempts, e.g. if opportunities for donor interventions comes in.

Another consideration is whether some participants simply experienced “information overload” and could not sort/prioritize/get an overview of the suggestions for teaching activity, however useful.

One “mental model” of a CoP (community of Practice)-based online community of supervisors is that there are some necessary skills that should be there beforehand, then the CoP can be launched. A similar way of thinking also emerged after the PhD Proposal Development workshop at TU. The low competences of ICT and of Moodle were deemed barriers of the workshop. This mental model is not entirely without merit. If it would take several weeks of self-regulated, individual effort before any ICT can be incorporated into the teaching activity, many faculties would no doubt give up. Worse, it is sufficient that they only *perceive* it like this, which could lead to them giving up. In this view, it would be useful to bring the faculty up to the level of capable CoP members. Our project can not conclude empirically on the strength of this argument. It would be highly useful to follow e.g. TU’s training efforts, and make a follow-up a year after to see what percentage of the trained participants that are self-directed learners (or whether they “sit and wait” for follow-up training).

Sustaining the Change

The courses were designed as pilot courses, which means that they should be possible to reinstantiate. It would be a dangerous to design courses that rely on external funding or travelling. The best case scenario may be that the South institutes provide venue, or external participants in the country or by other funding (for instance, one North professor visit MU while travelling over Nairobi anyway). A likely scenario is that the courses are to be reinstated by the Southern faculty.

By the time of evaluation, the courses are still not open to all partners:

“Any MAGAART partner university should be able to use the content, apply the technology, and have information on how to set up the courses, after completion of the project. Apart from copyright of academic publications used, all courses should therefore be free from intellectual property limitations and equivalent constraints, but credit should be given to course authors, including e-learning input. The courses should be exportable from the technical platform and not “locked into” a specific technology.” (MAGAART, 2014)

This can easily be accomplished by increased access rights within the consortium.

The sustainability of the data analysis course is problematic in the context of this particular network since it is so expensive to travel between East Africa, Denmark and Nepal (the budget was 72000 DKK for the Danish partners). However, the format is promising in a more local context, for instance travelling between three neighboring countries, or in a context where long-distance travel

funding for some reason is sustainable in the long term. At the same time it is important to maintain an incentive for North participants.

Conclusions

In this section, we further discuss some cross-cutting issues of MAGAART.

The combination of video-conferencing and Moodle has proven to be the most adequate for the South institutions. There are various challenges both in terms of pedagogy, connectivity, and openness, but overall it seems feasible. For instance, the possibility to temporarily increase bandwidth when needed seems to be a viable approach for doctoral education.

The level of innovation in the course development was in general low, in the sense of being experimental, but rather executed well-proven models of learning. That is a viable strategy for a university such as TU, who does not have a strategy to brand themselves as a cutting edge university. Universities such as MU and GU may adopt development approaches that have higher risk but also higher potential in future projects.

As a whole, the broader use of web tools that the participants have been exposed to, was not sustainable. This goes both for Moodle as well as Dropbox, Zotero, etc. It remains questionable whether courses should be the main instrument for encouraging appropriation of educational and research technology.

The main PBL aspects of the MAGAART workshops were collaborative learning, critical thinking and activating previous knowledge. The aspects of solving or identifying a given problem was a subordinated theme in the workshop approaches. In that sense, PBL became a catch-word for a more general approach. This approach, *active learning*, seem to be a suitable default approach to employ when complementing supervision and self-directed learning in doctoral education at MU, TU and GU with courses/workshops. It would also be interesting, and more innovative, to experiment with the problem aspect combined with collaboration in doctoral education.

An online community of practice did not succeed to establish, neither on Moodle nor on email. There are many successful establishments of online communities, and also many failures. Whereas the potential is high, so is the risk. It seems that the need for such community is not so great that it overcomes any tactical mistake or competition. While it is not possible to make any confident recommendations, it seems safer to build on existing relationships thereby growing participation more organically, and make them more open (in order to attain critical mass), and hope that the attract more participation.

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