

**Best of EDEN 2015**

**Special Issue of the  
European Journal of Open, Distance and E-Learning**



The best research papers presented  
at the 2015 EDEN Annual Conference and Open Classroom Conferences

Annual Conference, 2015 June, Barcelona  
Open Classroom Conference, 2015 September, Athens  
Open Classroom Conference, 2015 November, Aalborg

Edited by  
András Szűcs, Ulrich Bernath

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in collaboration with the  
Ulrich Bernath Foundation for Research in Open and Distance Learning

# Best of EDEN 2015

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## Introduction

An important mission of EDEN has been to support the exchange of academic and professional experience, to promote navigation and information reach on the rapidly evolving scene. The EDEN conferences have become major events in Europe, with increasing attendance from other continents.

Research in open, distance and e-learning is indispensable to provide information for development, decision-making and quality of products and services. Even more this is the case as many changes occur and the pace, as well as the extent of innovation, often seem to be dramatically fast and wide.

There has been growing public interest and high demand worldwide for knowledge and education. Intensive social media movements are experienced both on the provider and user communities' side, but together with skills deficit. The society would expect to improve efficiency by scaling up innovative solutions to better meet the current requirements.

The EDEN Best Research Paper Award was launched in 2008 and it is granted at EDEN's Annual Conferences as well as at EDEN's bi-annual Research Workshops and lately at Open Classroom Conferences. The selection process takes place in collaboration with the Ulrich Bernath Foundation for Research in Open and Distance Learning.

The extended scholarly works of the finalists of the BRPA competition at the EDEN 2015 Annual Conference in June in Barcelona (*Expanded Learning Scenarios*), the Open Classroom conferences in September in Athens (*Transforming Schools into Innovative Learning Organisations*) and in November in Aalborg (*Innovations with Digital Learning for Inclusion*) have been included in this volume.

As the EDEN conferences in 2015 highlighted: we face complex changes, accelerated transformations. The ever-improving performance of digital devices and networking infrastructure continue to increase the appeal of new powerful instruments. The rapid spread of technologies, reflected in their untameable demand and use, the momentous development of research as well as practices inevitably transform the information society mostly outside of institutional settings and often along unexpected pathways.

Catchphrases of the EDEN events in that memorably successful year included accordingly:

Quest for enhanced digital pedagogy – Opening the classroom, to expand education  
Learning analytics – Empowering learners by- new generation of methodologies – Digital technology for learning and inclusion – Social contexts, Social media and learning environments for supporting inclusion – Pervasive/ubiquitous and mobile technologies for inclusion – Cloud-based learning/teaching/assessment – New digital educational practices; and environments; innovative educational strategies.

We thank the authors of this volume, representing seven countries in and outside Europe, for their committed and high quality contributions, enhancing further the EDEN tradition to acknowledge scholarly excellence

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Budapest – Oldenburg, December 2016

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# Technology as a Vehicle for Inclusion of Learners with Attention Deficits in Mainstream Schools

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*Hanne Voldborg Andersen, Elsebeth K. Sorensen,  
Aalborg University, Denmark*

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## *Best Research Paper Award Winner*

### **Abstract**

The potential of technology for supporting educational processes of participation, collaboration and creation is widely accepted. Likewise have digital tools proved to enhance learning processes for disabled learners (e.g. supporting dyslexia students with digital tools such as text-to-speak-programs or writing-support programs). A currently topical group, politically and educationally, in the discourse of inclusion is learners with extensive developmental and attention deficit disorders (e.g. Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorder (ADD), Autism Spectrum Disorder (ASD), Autism etc.). This paper investigates the potential of technology for supporting the inclusion of this group in the general school system, i.e. into mainstream classes, using technology as a tool to join, participate and contribute – and as a vehicle for general human growth in their learning community. The paper presents the primer results and describes and discusses the challenges of both teachers' and learners', involved in the inclusion process. Finally, on the basis of findings, a typology of tools is suggested, which may support inclusive teaching and learning for the target group in question.

**Keywords:** technology, inclusion, special educational needs learners, attention deficit, empowerment

### **Introduction**

In 2012 the Danish Government passed a law on inclusion, which requested public schools in Denmark to include 97% of all learners in the mainstream education system. As a consequence, many learners, who earlier visited special schools and had Special Educational Needs (SEN) teachers, now had to be included in mainstream classes with mainstream teachers. This is a challenge for the schools, for the SEN

learners, for the mainstream learners and for the teachers involved. While pointing to the lack of specific tools as well as competences in teachers for handling inclusion of children with extensive developmental and attention deficit disorders, school leaders and teachers are looking for new ways to handle this challenge. It's a very broad group of SEN learners, who appears to have learning problems and struggling with problems such as: Lack of attention, selective and continuing attention and response inhibition as well as lacking ability for planning, promoting, strategic thinking, change in attention, flexibility in working memory, self-regulation and self-monitoring (Hansen & Sneum, 2008). The investigation, on which this present piece of research is based, is part of a work package in a wider research project, Ididact, which employs ICT as a vehicle in the challenge of inclusion of learners with extensive developmental and attention deficit disorders (focus learners) in mainstream schools. Ididact is a research project, running three years (2013-2015), funded by the Ministry of Education (MBU). The project seeks to test and develop new methods and digital tools that may promote inclusion and differentiation in the teaching and learning. Ididact facilitates action learning at 11 schools and collect data with 46 teachers' in 15 classes. The interventions in the classroom are tried out with more than 500 learners age 6 to 16 years – including 58 learners with extensive developmental and attention deficit disorders (focus learners).

The Salamanca Declaration (UNESCO, 1994) and United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2006) prescribes, that all states should provide an inclusive education system, where disabled children are able to access inclusive education where they live and receive individualised support required within the general education system. Ainschow (Ainschow & Booth, 2002) defines inclusion as “the continuous process of increasing the presence, participation and achievements of all children and young people in local community schools”. Qvortrup (2012) introduces three levels of inclusion, which he argues may form different kinds of inclusion: (a) Physical inclusion is when the learners is (passively) present at school; (b) Social inclusion is when the learners is (actively) present and seems part of the social community that exists among peer at the same age (the student have friends); (c) Academic inclusion is when the learners participates (actively) in the educational programme, contributes to the assignments and achieves learning results from that. To some extent we are able to directly measure these levels of inclusion: Is the student present in the classroom, does he/she collaborate or play with peers, and does he/she receive good grades? However, Alenkær (2010) presents yet another attractive definition of inclusion, which places the individual in the centre stating that an

individual is only, in a qualitative sense, fully included, when he/she experiences him/herself as physically, socially and academically included. The authors of this paper hold the position that a process of inclusion may also be viewed as a learning process – a kind of socialisation process, in which learners are developing to become capable human beings, who achieve knowledge and competences through experiences – academically, socially & culturally (Lave & Wenger, 2005). To design a learning context, in which this is possible, it is useful to distinguish between what's important for an individual and what is important in a community. Finally, it is important to assess which learning competences all stakeholders need in order to become an empowered human being in the complex and constantly changing world of today. The envisioned learning goals of a person's inclusion and development process may be characterised by a set of vital features and values, all of which find support in various learning theoretical positions (Voldborg & Grum, 2011).

It is important to be heard (Dysthe, 2003), recognized (Honneth, 2007), get experiences (Dewey, 2005) and opportunity to explicate these experiences (Vygotsky & Lindquist, 2004) to get courage and ability to join learning and life with an identity as a learning human being. It is important that these actions take place in a process of negotiation with other learners (Lave & Wenger, 2005), in which the individual learn to take the perspective of others (Mead, cited in Dysthe, 2003). The learning process must be scaffolded (Bruner, 1999) and must be conducted in the zone of proximal development (Vygotsky, cited in Lindquist, 2004), resulting in the learner's experience of being immersed in a feeling of flow (Csikszentmihalyi, 2005). Viewed in this perspective, the learner develops competences and awareness of competences. In other words, the goal of inclusion is, that the learner obtains L2L-competences (Sorensen, 2006) and becomes an active, empowered, independent, participating citizen in a democratic society – a citizen with an ingrained motivation to take part and make a difference in democratic life (Sorensen, 2007a; 2007b). In addition, it appears important to pick up knowledge, skills and competences for investigation, problem solving, critical thinking and creativity (OECD, 2008).

The general potential of ICT for supporting educational processes of participation, collaboration and creation is widely accepted (Sorensen, 2009; Dalsgaard & Sorensen, 2008). In a more focused perspective, ICT is internationally recognised as a valuable tool for inclusion (Waller, 2013), particularly for people with disabilities, where technology can improve their quality of life, reduce social exclusion and increase participation (WSIS, 2010). There seems to be extensive evidence of the impact of ICT on: (a) motivating learners; (b) engaging low achievers; (c) supporting differentiation

between learners; (d) improving behaviour; (e) increasing confidence and management (Balanskat et al, 2006; Blamire, 2009); (f) cognitive processing; (g) independent learning; (h) critical thinking; (i) teamwork and (j) enhancing a student-centred learning approach (WSIS, 2010).

From as long list of research, benefits are reported from using a variety of ICT hardware and software tools for inclusion in education: (a) laptops (Corn et al, 2012); (b) tablets (Clark & Lucking, 2013; Flewitt et al., 2014); (c) learning platforms and mobile technologies (Naismith et al, 2006; Passey, 2010); (d) virtual learning environments (VLEs), large multi touch surfaces, multi media rich resources (Waller, 2013), electronic visual scheduling systems (McKnight & Davies, 2012); (e) collaborative learning technologies (Balanskat et al, 2006); (f) assistant technologies (Winther & O’Raw, 2010; Shaw & Levis, 2006; Mavrou, 2012).

We may assume that the recognized benefits themselves of using these technologies also automatically would give rise to new pedagogical approaches. But this does not seem to be the case, one major reason being a lack of ICT competence development amongst teachers. The majority of teachers have not been introduced to these technologies and are not skilled in utilizing their potential in the special pedagogic optic, which is required for the target group in question. According to the European Commission (2013) the potential and benefit for inclusive learning of ICT is not realized, as in many cases appropriate pedagogic methodology and models that truly integrate and operationalize the potential of ICT in a strategy of inclusion, still remains to be generated (Waller, 2013).

## **Research Design**

Very few research projects and research designs provide a holistic view of the complex challenge of using ICT in inclusive education (ibid.). It is difficult to capture the complexity of the research field with its many influencing factors. Therefore, in an attempt to meet this challenge, the methodological approach of “Educational Design Research” (EDR) as introduced by McKenney and Reeves (2012) is applied. EDR may be defined as a “genre of research, in which the iterative development of solutions to practical and complex educational problems also provides the context for empirical investigations, which yields theoretical understanding that can inform the work of others” (ibid. p.7). Iddidact is an iterative and explorative qualitative research project, where data is collected in a real school context. It is a case study in the frame of Action Research (AR) (Jungk & Müllert, 1998; Tofteng et al., 2012) and EDR using a hermeneutical, phenomenological interpretation of data. It is crucial for our data

collection, that the unfolding research process goes hand in hand with the involved teachers' work and interventions into the field of study, so the process becomes a learning endeavour in terms of learning how to work with SEN learners and integrating ICT in the classroom. Therefore, we designed this piece of research using an AR/EDR approach, where the researchers are included as participants – and professional dialog partners and facilitators of the transformation processes – at the schools involved. In the present case we are studying the problem in its real life context: The mainstream Classroom, where the borders between phenomenon and context are unclear. We attempt to collect data from multiple sources, and bring them together in a data triangulation.

## **Analysis and Findings**

The data production and collection was done using various methods and instruments, all of which evolved within the following four themes of interventions as presented below:

### ***1. The challenges of the teachers, when including the focus learners***

The teachers were challenged with:

1. A feeling of deficiency in terms of their own professional knowledge about methods, tools, experience and competences in their educational practice in terms of working inclusive with ICT and focus learners;
2. Understanding focus learners needs, behaviour, interruptions, relations, abilities and offered conditions;
3. Responsibility for a high academic level, appropriate attention and a pleasant learning environment;
4. Lack of participation/responsibility for developing inclusive schools from colleagues, leaders and parents.

### ***2. The challenges (as viewed by teachers) of the focus learners in terms of learning and schooling***

The pre test indicated that the challenges of the focus learners varied widely: Generally they were challenged in proportion to memory, attention, persistence, concentration, hyperactivity, impulsivity, behaviour or social competences. The majority had problems with attention, 50% struggled with hyperactivity, and 25% of the group showed behavioural disorders. They were all challenged in proportion to memory, concentration and persistence. 75% had relatively weak – and not age corresponding –

pro-social competences. Knowledge from the pre test was used to guide the teachers in selecting inclusive ICT based interventions. In the post test a significant reduction was documented in the level of attention problems, hyperactivity, impulsivity and behaviour problems, while no or minor change in pro-social behaviour, emotions and problems with peers was observed.

### **3. The experiences of the teachers, using inclusive ICT based interventions**

Through triangulation of data following types of interventions and technologies was found:

Table 1: The experiences of teachers, using inclusive ICT based interventions

| Intervention                    | Used technology/ICT   | Impact of ICT on focus learners   |
|---------------------------------|---|---|
| Structure & Overview            | Timer<br>Digital planning and management:<br>Timetable for lessons or projects<br>Learning Management Systems (LMS)<br>Digital templates for assignments  | Plans with strictly time schedule for lessons and activities have a positive impact on participation, self-monitoring and task solving. Especially a timer showing remaining time for a task is a valuable tool. Digital templates enable to work independently and structured with assignments and LMSs help to organise and find learning content.  |
| Shielding & Focus               | Earmuff (with/without music)<br>Teacher-microphone and learner-receiver<br>Periodic, individual work on iPad or computer  | Teacher-microphone/learner-receiver has a positive effect on focus learners' attention. Restless learners became calm, felt concentrated and able to work with the tasks. Sensible learners felt the raised teacher voice annoying. Using iPad or computer generally increased concentration and focus.   |
| Comprehension & Differentiation | Multi-media rich materials to the learners (screen casts, video instructions, sound instructions)<br>Text-to-Speech<br>Digital learning resources<br>Digital books/texts<br>Flipped Learning<br>Game based Learning | Flipped learning, scalable templates and multi-media rich assignment for the learners had a positive impact on the learner's participation and contribution.<br>Concepts are trained successful using Google picture searching and repetition in online game based learning tools.<br>A few learners tested a game based learning environment for mathematics with positive impact with respect to focus, concentration, persistence and problem solving. |
| Production & Dissemination      | Multi-media rich assignments from the learners: Text, Pictures, Photos, Voice clip answers, Video clip answers, Graphics, Animations<br>Assistive tools: Text-to-Speech, Speech-to-Text,                            | According to both learners and teachers, the production of multi-media rich assignments increases motivation and engagement for almost all students. Learners challenged in their short time- and working memory, do not benefit from this opportunity without other additional interventions. High impact is observed with the assistive tools.  |

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|                                    |  |  |
|------------------------------------|--|--|
| Collaboration & Knowledge Building | Pre-dictation<br>Cloud based file management and file sharing<br>Digital portfolio<br>Virtual presence | In the LMS learners communicate and collaborate with their peers more concentrated and focused (if the task is well designed, structured and tailored to their needs). They store assignments online, return to them for repetition/remembering concepts, and get help from peers or teachers through lurking in the shared content or communication in chat or mail system. |
|------------------------------------|--|--|

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Teachers use a variety of hardware (e.g. PCs, laptops, iPads, Nexus-tablets) and create interventions for the entire class, but observe specific benefits and challenges for the focus learners in terms of ability to participate and contribute in the learning community. In some cases one-tool-to-one-learner is planned, in other cases one-tool-to-two-learners, or one-tool-to-three-learners. Both teachers and learners express, that ICT in education is a highly motivating factor. Applications, digital learning resources and templates help all focus learners and function as drivers through the various tasks. Computers are useful for writing and working in larger projects, while tablets are valuable as a multi-media production tool, a training tool, a pause tool or a private planning tool. While learners working one-to-one or one-to-two are more likely to participate, focus learners disappear from the task when working one-to-three. In the final survey the teachers express that they during the interventions experienced less noise and disruption (50%), less exclusion of the focus learners (40%), higher professional competence with respect to including the focus learners (50%) and improved conditions for the focus learners' time spend in school (80%).

#### ***4. The experiences of the focus learners, using inclusive ICT in their learning processes***

Through interviews with both focus and mainstream learners it became clear, that they all felt a higher degree of pride in their schoolwork when using ICT. One focus learner expresses happiness and joy, when she – using ICT – succeeds in solving a task. There is also indication that the focus learners' need for help decreases, as they seem to be able to work more independently. The learners recommend wider use of compensatory applications and tools for structuring and managing time. They express more joy and engagement when using computers and iPads, and appreciate their cloud based LMS, as they are able to access resources and assignments – and to collaborate with peers. The teacher-microphone/learner-receiver tool is popular, as “the teacher became more clear, and the headset was good, when one had to be concentrated” (focus boy, age 14). The learners also convey challenges and implications when using ICT in the school. This is primarily in relation to the teacher's

lack of ICT skills, the teacher's unfocused use of ICT, and finally, unstable ICT infrastructures in the schools.

## Discussion

From the perspective of Ainschow's definition of inclusion (2002), the schools in this inquiry may be viewed, to a certain extent, to succeed with increasing the presence, the participation and the achievements of learners with attention deficits in local community schools and mainstream classes. But in what sense were the learners included, and in what ways were the ICT interventions significant? Following Qvortrup's distinction between physical, academic and social inclusion (2012), it is fair to say that most of the interventions primarily had an impact on the physical and academic inclusion, and less so on the social inclusion dimension. Using ICT for, not only *shielding & focusing*, but also for *structure & overview*, seems to help focus learners to join and participate in classes in more smooth and quiet ways, spawning more attention and causing less conflict. These two intervention types may be viewed as basic conditions for SEN learners to participate and physically join, in fruitful ways, educational activities in the classroom, together with their peers. They know what to do, how to do it, when to do it, why they do it, with whom they do it – and for how long, using what. The teachers have gained increased insights into the special needs area. Thus, their abilities had grown in terms of being able to create a learning environment, more accessible to the focus learners. As recommended by Dysthe (2003) and Honneth (2007), the SEN learners appeared to be heard and recognized as who they were, thus, accepted as a legitimate participant of the community (Lave & Wenger, 2005). Distracting impressions were minimized, and focus increased. It may be said that they had been moved to a position, from which they were ready for academic inclusion.

In other words, it may be concluded that when the focus learner is well supported, he is able to participate and contribute in academic activities in the classroom. The focus learner's use of ICT as a tool for wider *comprehension & differentiation, production & dissemination* is useful, when he/she as a consumer is facing new learning challenges, or when he/she as a producer explicate his knowledge. Both processes benefit from compensatory digital tools, such as e.g. Text-to-Speech, Speech-to-Text or Pre-Dictation. The general difficulties of the focus learners in terms of lacking attention, concentration, memory, persistence and arousal (Hansen & Sneum, 2008) seem to impose a challenge, when they are participating in learning activities. But we might say that a mix of multimodalities and compensatory tools seem to have a positive effect



and stimulate them, not only to stay focused, but also to produce outputs more easily – i.e. working in flow (Csikszentmihalyi, 2005). A future research challenge will be to investigate the reason for this. For now there is sufficient ground to conclude that use of ICT interventions for *comprehension & differentiation, production & dissemination* does in fact increase the chance of academic inclusion of the focus learners.

Learners and teachers agree that it is easier to collaborate and share content, when using ICT. Low achievement learners lurk to the assignments of peers and learn from them strategies for solving their own tasks. However, to be socially included is not equal to taking part of collaborative tasks in school (Alenkær, 2010). One also has to be selected as a friend, to contribute in discussions and take part in the social activities in pauses and after school. No indications that the ICT interventions had an impact concerning social inclusion, and our pre/post test showed no significant progress in the learners social and pro-social behaviour. However, we did register indications that the knowledge/insight of the teacher with respect to the special needs and strategic use of five types of interventions of the focus learners, did inspire the focus learners to participate more equally and be less excluded in the classroom: “Structure & Overview, Shielding & Focus, Comprehension & Differentiation, Production & Dissemination, Collaboration & Knowledge Building”. We propose use of and further investigations into using this five-types-model of including, ICT based interventions. We are discussing, if the model has an incorporated progression like a hierarchy of needs (Figure 1 left), or it should be presented more dynamically (Figure 1 right). This issue still remains to be decided through future research.

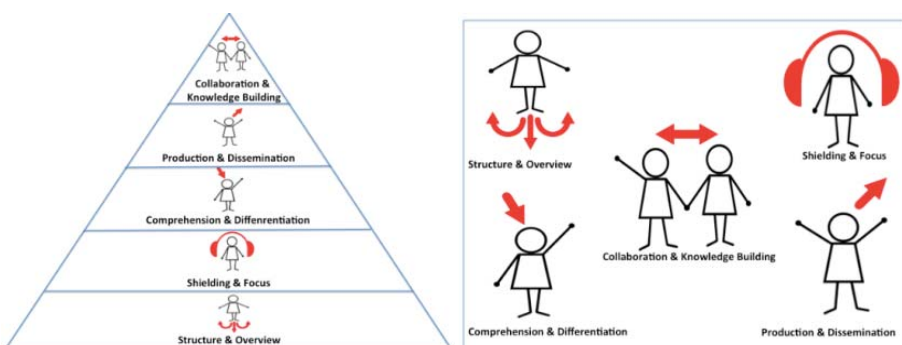


Figure 1. Iterations of a five-type-model of including ICT based interventions – hierarchy left and dynamic right

Similarly, following Alenkær's definition of *full inclusion* (2010), it is also part of our future research challenge to examine, to what extent using use of the ICT based interventions enhances the focus learner's self awareness in terms of experiencing himself/herself physically, socially and academically included. The EDR approach has worked well for this study. The teachers gained new knowledge about the focus learners' special needs, and about ICT as a vehicle for inclusion. Together with the researchers they also developed new methods in their practise. The researchers recognized the teachers' challenges and scaffolded them in their further development of practice. The teachers discussed the new methods and experiences with their colleagues and the researchers, and – exactly like the focus learners – they became empowered to act and enhance their daily practise, using ICT based interventions and developing sustainable L2L competences (Sorensen, 2006).

## Conclusion

This paper reported on an investigation of using ICT for inclusion of learners with extensive developmental and attention disorders in mainstream schools; In other words, the ICT potential for increasing these learners' presence, participation, contribution and achievements in the school context. The general results of this investigation points to ICT interventions as effective tools to empower, hand in hand, teachers and learners in the meeting with this challenge.

In sum, our research on ICT as a vehicle for inclusions indicates:

1. interventions with ICT have high impact on physical and academic inclusion, while less so on social inclusion;
2. using ICT for shielding, focusing, structuring and over viewing helps focus learners to join, participate, and maintain attention, while to some extent avoiding conflicts;
3. specific planning and strict time schedules for lessons and activities, supported by digital assignments in LMS/VLE systems enhance participation, attention and self-monitoring in task solving;
4. use of ICT enhance comprehension, differentiation, production, dissemination and compensation and promote the learners' abilities to participate and contribute;

5. the teacher's knowledge of the learners' special needs, and the teachers' use of the five types of interventions did have a positive effect in terms of supporting focus learners' to participate more equally in the classroom.

While our pre/post test showed no significant progress in the learner's social and pro-social behaviour, no indication was found of ICT interventions having an impact on social inclusion.

This paper finalizes by suggesting an ICT-pedagogical strategy containing a typology of tools and interventions: Structure & Overview, Shielding & Focus, Comprehension & Differentiation, Production & Dissemination, Collaboration & Knowledge Building. Utilizing this typology in the pedagogical strategy is likely to enhance the process of inclusion in classrooms of learners with extensive developmental and attention disorders.

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## Student Vulnerability and Agency in Networked, Digital Learning

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### Abstract

The collection, analysis, and increased use of students' (digital) data promises to increase the effectiveness of student learning, but also potentially to increase student vulnerability. Given the asymmetrical power relationship between higher education institutions and students, they may have little insight or choice into data collected, how it is stored and used, and opportunities to verify or provide context for collected data.

In the context of increasing uses of online teaching and learning we face the dilemma that regulatory data privacy frameworks often lag technological developments and data uses. We should move beyond thinking in binary terms of permitting simple opt in or opt out, and begin to explore the possibilities of reciprocal care by institutions and students in the collection, analysis and use of their data.

This paper explores the promise and perils of learning analytics through the interpretive lens of *student vulnerability and agency*. An applied framework provides a basis for a student-centred approach to learning analytics which values student agency and recognises the fiduciary duty of higher education towards learning analytics as moral practice.

### Abstract in German

Die Erfassung, Analyse und der zunehmende Gebrauch studentischer Daten versprechen zum einen eine höhere Effektivität im Bereich des studentischen Lernens, zum anderen könnten diese jedoch eine größere Vulnerabilität für Studenten zur Folge haben.

Angesichts der Tatsache, dass zwischen Hochschulinrichtungen und Studenten ein unausgeglichenes Machtverhältnis besteht, scheint es, dass Studenten eine geringe Einsicht in erfasste Daten haben und nur wenig Einfluss darauf wie diese gespeichert und genutzt werden. Des Weiteren scheint es, dass sie keine Möglichkeit haben die gespeicherten Daten zu überprüfen oder diese in einen Kontext zu stellen.

Aufgrund des zunehmenden Gebrauchs von “Online Teaching and Learning”, werden wir mit der Problematik konfrontiert, dass behördliche Datenschutzrichtlinien häufig der technischen Entwicklung, sowie der Datennutzung im Wege stehen. Wir sollten das Denken in binären Strukturen bezüglich der Zulassung von “Opt-ins oder Opt-outs” überwinden, und stattdessen beginnen die Möglichkeit gegenseitiger Nachsicht (von Hochschulinstituion und Studenten) bezüglich Datenerfassung, -auswertung und -nutzung wahrzunehmen.

Dieser Beitrag untersucht die Verheißung und Risiken von Bildungsanalytik wobei sich der Fokus auf die Vulnerabilität und Handlungsmacht von Studenten richtet.

Ein angewandtes Rahmenkonzept bietet die Grundlage für ein studentenzentriertes Konzept der Bildungsanalytik, welches die Handlungsmacht von Studenten wertschaetzt. Zudem nimmt es die Verantwortung von Hochschulinstitutionen bezueglich der Bildungsanalytik als moralisches Handeln wahr.

**Keywords:** learning analytics, student data, agency, vulnerability

## Introduction

*“Just as stories yield data, data yield stories. And just as it is difficult to quantify our lives without data, we cannot qualify them without context or narrative. When we bring the two sides together, we achieve deeper self-knowledge” (Boam & Webb, 2014; par. 21).*

It is hard (if not almost impossible) to underestimate the extent to which our lives have become entangled in the technologies we use, generating an ever-increasing amount of data collected, analysed and used by a variety of users acting in unison and competition in an “elaborate lattice of information networking” (Solove, 2004; p.3). And so we are beginning to transform into “informational organisms (*inforgs*) mutually connected and embedded in an informational environment (the infosphere), which we share with other informational agents, both natural and artificial, that also process information logically and autonomously” (Floridi, 2014; p.94). As we connect and are connected in many often unintentional ways with increasingly uncertain outcomes, individual privacy is perhaps becoming ‘the dearest of our possessions’ (Floridi, 2014; p.101). In this hyperconnected world, there is no allowance for hermits, and our digital footprints have become the windows into our souls (Marx, 2016).

It is crucial that we remember, as Boam and Webb (2014) suggest above, that as we engage with individuals' data, we should remember that behind and embedded in the data are contexts and narratives, vulnerabilities and agency. Remembering this is increasingly important amidst the vast changes sweeping the higher education landscape, with the increasing need to use data to define and ensure the effectiveness of teaching and learning. Data and evidence-based management have become the mantra in higher education to ensure accountability and efficiency in an increasingly resource-constrained and competitive higher education landscape (Altbach et al., 2009; Prinsloo, 2016a). Learning analytics, as a research focus and educational practice, focuses on "students and their learning behaviours, gathering data from course management and student information systems in order to improve student success" (Oblinger, 2012; p.11). (Also see Prinsloo & Slade, 2014; Griffiths, Drachslar, Kickmeier-Rust, Hoel, & Greller, 2016; Sclater, Peasgood & Mullan, 2016).

As teaching and learning move progressively online and digital, the volume of student data increases exponentially, opening opportunities for data-informed strategies and pedagogies. Sclater et al. (2016) suggest that "Implementing learning analytics is often one strand of a wider institutional strategy, although even a small scale pilot can generate increased awareness and discussion around issues such as retention. ... Thus analytics can have beneficial effects beyond the immediate aims of the project, and can be part of a cultural change towards more evidence based-decision making" (p.22). Though there is no doubt that the collection, analysis and use of student digital data can offer huge potential, they bring associated risks and ethical challenges. Sclater et al. (2016) propose that the threats in the conceptualisation and implementation of learning analytics include "ethical and data privacy issues, 'over-analysis' and the lack of generalisability of the results, possibilities for misclassification of patterns, and contradictory findings" (p.16). There are additional concerns such as the belief that data is neutral; the role of algorithms and the algorithmic turn in higher education; the assumptions and epistemologies informing the collection and analysis and use of data; and the increasing possibilities for discriminating against already vulnerable and at-risk students (Drachslar & Greller, 2016; Griffiths et al., 2016; Slade & Prinsloo, 2013; Prinsloo & Slade, 2014).

Student vulnerability and agency should be reviewed in the broader context of the increasing pervasiveness of surveillance in institutions of learning (Knox, 2010; Prinsloo, 2016b; Tucker & Vance, 2016). Tucker and Vance (2016) for example point to tensions between surveillance resulting both in students feeling more secure and as a potential deterrent for bad behaviours, and the sense that "surveilled students may



feel they are in a less nurturing, comfortable learning environment” (p.8). These authors also warn that surveillance and the tracking of students may perpetuate historical and present injustices and biases.

This paper follows Prinsloo (2014) who proposes that “Learning analytics are a structuring device, not neutral, informed by current beliefs about what counts as knowledge and learning, coloured by assumptions about gender/ race/ class/ capital/ literacy and in service of and perpetuating existing or new power relations”. Though the collection, analysis and use of student digital data aims to decrease students’ vulnerability and risks of failing or dropping out, there is also the possibility that student vulnerability may actually be exacerbated in the light of the asymmetrical power relationship between student and institutions of higher learning. As higher education institutions (HEIs) move to optimise the potential of learning analytics, this paper proposes that institutions should adopt a student-centric approach to learning analytics, empowering students to make informed decisions about the type of data they share, the uses of that data and access to the data collected by higher education.

### **Privacy in Beta**

Nissenbaum (2010) highlights definitions, assumptions and practices regarding personal privacy as challenged by advances in information technology that enable “pervasive surveillance, massive databases, and lightning-speed distribution of information across the globe” (p.1). National and institutional regulatory frameworks often struggle to keep up with technological developments and changing societal norms (Westin, 2003). Griffiths et al., (2016) point to the fact that the “technological environment in education is increasingly complex” with cloud-based and wearable technologies eroding the traditional “institutional silos of student information” (p.1). Learning analytics as a discourse, practice and emergent research focus is found in the nexus between various discourses and practices such as surveillance and privacy studies, information science, ethics and philosophy, as well as educational and learning theories, to mention but a few. For the purpose of this article, we explore student vulnerability and agency in the context of the broader discourses on privacy and surveillance studies (Drachler & Greller, 2016; Griffiths et al., 2016; Slade & Prinsloo, 2013). Griffiths et al., (2016) state that learning analytics “inevitably partakes in the ethical ambiguity of the educational system as a whole”, and “unplanned consequences of educational activities and interventions” (p.3). Learning analytics applications are furthermore “opportunistic, making use of the opportunities presented by bringing together data in ways which were not anticipated by those who decided to collect that

data in the first place” (p.3). As such learning analytics should account for how it protects and safeguards students’ privacy.

Whilst privacy has traditionally been understood to encompass the “right to be left alone” as well as having sufficient control to restrict unauthorised access to personal information (Xu, 2011), Solove (2006) cites BeVier who suggests that “privacy is a chameleon-like word, used denotatively to designate a wide range of wildly disparate interests – from confidentiality of personal information to reproductive autonomy” (p.479). In a recent study, Marx (2016) suggests that “Privacy, like the weather, is much discussed, little understood, and not easy to control” (p.27). Not only is the concept multidimensional and fluid, its contours are “often ill-defined, contested, and negotiated [and] dependent on context and culture” (Marx, 2016; p.27). Xu (2011) states that in the context of online social networks, conceptualisations of privacy “have been somewhat patchy” (p.1100). Contrary to the belief that the notion of privacy entails a “unitary concepts with a uniform value, which is unvarying across different situations” (Solove, 2006; p.480), we should see privacy as a “multifaceted concept” (Xu, 2011; p.1079) and pluralistic. Xu (2011) helpfully proposes that neither “privacy as control” nor “privacy as restricted access” (p.1080) are sufficient to encompass the complexities and layers inherent in privacy (Pasquale, 2012; 2015).

Blackall (2013) makes the interesting proposition that data is not about privacy in the first place, but rather about power, about determining who sees (collects, analyses and uses data); whether those who are the objects of data collection have access or input to the collection, analysis or uses. While there are ample examples of positive applications of “Data as power” (Blackall, 2013), there are equally, and possibly increasing concerns about the detrimental and potentially abusive effects of the use of data (e.g. O’Neil, 2016). Exactly because data *is* irrevocably linked to power, there is an increasing amount of pushback and activism surrounding uses of data, for example, from indigenous people’s perspectives (Kukutai & Taylor, 2016) and discourses surrounding decolonisation (Prinsloo, 2016b).

While it is tempting to embrace a binary approach which views the collection, analysis and use of student data as either good or bad, it is clear that such an approach is overly simplistic. A further complicating factor is the impact of the asymmetrical power relationships on which most Terms and Conditions are based and which are typically “drafted by one party and offered to the other on a take-it-or-leave-it basis” (NYU, 2015; par.1). Solove (2004) therefore proposes that most “discussions of privacy merely scratch the surface” and that we need “a better understanding of the problems;

we must learn how they developed, how they are connected, what precisely they threaten, and how they can be solved” (p.6).

Marx (2016), for example, explores the tensions, value and conflicts in individual privacy and notes a number of contradictions such as the desire to seek privacy and a form of anonymity, whilst also to acknowledging that secrecy can “hide dastardly deeds and that visibility can bring accountability” (p.299). Indeed, too much transparency may inhibit creativity, experimentation and the taking of risks and disallow individuals from redeeming themselves from past errors of judgement (also see Mayer-Schönberger, 2009). There is also the sense that “many of us want to both see and be seen, even as we also want to look the other way and be left alone. We want to know, and we also want to be shielded from knowing” (Marx, 2016; p.299). We emphasise and value the right to have access to information, but yet, we also want to be assured that some information should not be available for public consumption. Individuals also want their individuality respected and enjoy personalised services – but in order to have our individuality respected and receive personalised services, we need to disclose ever increasing amounts of personal information resulting in an ever-increasing “risk of manipulation, misuse, and privacy violation” (Marx, 2016; p.300). These contradictions and tensions in our expectations and definitions of privacy reflect a misguided “either/or fallacy” (Marx, 2016; p.302) that prevents a proper understanding of the complexities and nuances pertaining to privacy in a networked and digitally pervasive world.

It falls outside the scope of this article to (dis)entangle the different views and theories on privacy (see for example Floridi, 2005, 2006, 2013, 2014; Floridi & Taddeo, 2016; Marx, 2016; Nissenbaum, 2010). It is sufficient to recognise that consensus around the definition, scope, contours and borders of the notion of privacy is fragile and fluid, and frustrates efforts to develop regulatory frameworks that safeguard individuals’ right to privacy, protect individuals and enable them to make informed choices. Despite/amidst acknowledging the fragility and fluidity inherent in making sense of privacy, we embrace the suggestion by Floridi (2014) that privacy is “the dearest of our possessions” (p.101). Should we accept, as Floridi (2014) proposes, that human nature is informational so that the information and data that we generate are not distinct from who and what we are, but an integral part of us. As such our right to privacy is “a right to personal immunity from unknown, undesired, or unintentional changes in one’s own identity as an informational entity, both *actively* and *passively*” (p.120). Our personal information and data and our identity as individuals “are co-referential, or two sides of the same coin. There is no difference because ‘you are your information’,

so anything done to your information, is done to you” (Floridi, 2014; p.120). Seeing personal information and privacy as constituting who you are, is vastly different from seeing personal information as a possession. Floridi (2014) proposes then that violations of informational personal are “now more fruitfully compared to kidnapping rather than trespassing” (p.120). Seeing informational privacy in ontological terms resolves the issue between public and private, personal spaces – “Trespassing makes no sense in a public space, but kidnapping is a crime independently of where it where it is committed” (Floridi, 2014; p.121).

### **Student Vulnerability and Agency as Lens**

If then we proceed from the above stance of regarding student information privacy in ontological terms, rather than in terms of *ownership* and the binary between public and private, it provides us with a richer basis for exploring student vulnerability and agency.

As is clear from the many studies on privacy, data protection and surveillance, there are many possible lenses to choose from when mapping the complexities and nuances of the collection, analysis and use of personal data. Selecting student vulnerability and agency as lens offers one of many possible interpretations of the promises and dilemmas in the use of students’ (digital) data. Combining both the notions of vulnerability and agency offers an interesting heuristic, acknowledging on the one hand that individuals not only willingly share data and personal information in what describes as “digital promiscuity” (Murphy, 2014), but also “do not understand the extent to which their activities generate data that is being collected, analysed, and put to use for varied governmental and business purposes” (Allen, 2016).

To be vulnerable is “to be fragile, to be susceptible to wounding and to suffering; this susceptibility is an ontological condition of our humanity” (Mackenzie et al., 2014; p.4). Despite and amid the asymmetrical power relationship between students and institutions of higher learning, Prinsloo and Slade (2015) state that it is important to note that vulnerability refers not only to the exposure to risk of individuals but also broader society – see, for example, Bauman (2007) as well as the increasing vulnerability of institutions of higher learning due to, inter alia, changing funding regimes and increasing competition (Altbach, Reisberg, & Rumbley, 2009). The increasing resource constraints, competitiveness, and the need to optimise the return-on-investment in the allocation of resources necessitate the need for higher education institutions to collect and use data, including student data, in order to plan more effectively (Prinsloo & Slade, 2014).

Baker and Siemens (2014) point to the potential of learning analytics made possible due to increasing quantities of data, standardised formats of educational data, increased computational power and the availability of a range of analytical tools. As a result students are increasingly exposed and vulnerable as they study online and are confronted by the all-pervasive gaze of the institution. Prinsloo and Slade (2015) state that, though the intention of collecting and using student data arguably falls within the scope of the fiduciary duty of higher education, it is increasingly possible that student data also be used inappropriately and unethically, further increasing the vulnerability of students. Like the notion of privacy, the notion of vulnerability is “undertheorised” (Mackenzie et al., 2014; p.2). Current theoretical thinking suggests that vulnerability is not only a key characteristic of human life, but a defining characteristic. This does not preclude the fact that certain individuals and groups are “more than ordinarily vulnerable” (Sellman quoted by Mackenzie et al., 2014; p.2) (Also see Fineman, 2008; Maringe & Singh, 2014; Trowler, 2014). In this paper we use the notion of vulnerability as *ontological* lens that “stresses the ways that inequalities of power, dependency, capacity, or need render some agents vulnerable to harm or exploitation by others” (Mackenzie et al., 2014; p.6). (Also see Floridi, 2014). This is of particular concern in the context of learning analytics.

Whilst highlighting student vulnerability, we should add the counter-balance of individuals’ responsibility for self-care (e.g. Allen, 2016; Tene & Polonetsky, 2012a, 2012b). In acknowledging the asymmetries in the primary power relationships and the often limited and lagging protection offered by legislation and lengthy Terms and Conditions, individuals also have choices and responsibilities and an ethical duty to self-care and self-respect that “entail reservation and circumspection when it comes to sharing potentially sensitive information and the intimacies of identity and personality” (Allen, 2016).

### **A brief Overview of Some Current Approaches to Addressing Online Vulnerability and Agency**

There are a number of approaches that combine to increase the protection of individuals’ information and decrease vulnerability, as well as facilitating a more effective management of privacy. Xu (2011), for example, warns that most current approaches focus on individual agency but, given that individuals’ information may be accessed due to ignorance of privacy and security of others, we should take a different approach when discussing individual agency. “Optimistic bias” impacts both on the steps which individuals take to control the disclosure and access to their personal

information and “the degree of ease with which [users’] online profiles and their personal information are visible and exposed to others” (p.1083). Though we would assume that individuals make rational decisions regarding the sharing and protection of their information, it is safer and possibly more realistic to speak about a “bounded rationality”. That is, “individuals may genuinely want to protect their information privacy, but ... may opt for immediate benefits of information disclosure, rather than carefully calculating long-term risks of information disclosure” (p.1088). Clearly there is a difference between acknowledging risks to personal privacy and embracing personal responsibility, self-care and self-respect (see Allen, 2016).

Traditionally the main strategy to protect privacy and provide individuals with choice is to provide a facility to opt in or out. A number of authors (e.g., Acharya & Gorman, 2013; Antón & Earp, 2004; Bellman et al., 2001; Earp et al., 2005; Pasquale, 2012; Prinsloo & Slade, 2015) however point to the failures of providing opting in or out as sufficient to protect against online vulnerability. For example, research done by Bellman et al (2001) points to a variety of aspects that might impact on individuals’ decision to opt in or out, such as the default settings of the choice, the typeface and font size used, the length and technical complexity of the Terms and Conditions (TACs), and the framing of the options.

A more nuanced approach is proposed by Miyazaki and Fernandez (2000) who map a range of options regarding the collection, analysis, use and sharing of personal information in the context of e-commerce. Possibilities of disclosure range from (a) never collecting data or identifying customers when they access a site; (b) customers opting in by explicitly agreeing to having their data collected, used and shared; (c) customers explicitly opting out; (d) the constant collection of data without consumers having a choice (but with their knowledge); and (e) the collection, use and sharing of personal data without the user’s knowledge. Prinsloo and Slade (2015) refer to the Organisation for Economic Cooperation and Development’s (OECD) position that “prior affirmative consent in all cases would be impractical” and it can be assumed that should users be required to set up an account to use the services, they implicitly agree to the terms and conditions. Ohm (2015) notes that once data has been legitimately acquired, current legal frameworks do not dictate of the scope and constraints regarding the use of such data. There is therefore a need for a “new deal on data” (Greenwood et al., 2015; p.192). Though Greenwood et al. (2015) specifically refer to changes needed in the regulatory frameworks governing the collection, use and sharing of data, these frameworks are but one part of the bigger strategy to address individual digital vulnerability.

Another approach is offered by Xu (2011) who provides a very helpful framework with regard to privacy management distinguishing between *personal* control, *collective* control and *proxy* control.

- *Personal* or individual privacy management involves both behavioural self-protection and technological self-protection. (Also see Acharya & Gorman, 2013).
- *Collective* privacy management refers to a group accepting the responsibility for co-responsibility of privacy and addressing risk. Though individuals may make informed decisions regarding what they share on which platforms, it may not be the case that others sharing that information will take the same amount of care – e.g., the practice of *tagging* and *untagging*. Sharing practices on Facebook, for example, highlight the “complexities of collective privacy management, the tensions of content ownership, and the effects that one user uploading and tagging a picture of another can have on the latter’s relationships with friends, family, employers, etc.” (Xu, 2011; p.1093). (See Xu (2011) for a discussion on privacy-enhancing technologies for collective privacy control).
- *Proxy* privacy control refers to the practice of individuals and groups who align themselves to “a powerful force in order to gain control through powerful others” in recognition that individuals and groups often lack skills or knowledge in protecting information privacy (Xu & Teo in Xu, 2011; p.1095). Proxy privacy management includes, but is not limited to, industry self-regulation and government regulation. An interesting development in proxy privacy management is the development of accreditation authorities such as TRUSTe, BBBonline and Webtrust who will verify an organisation’s privacy management TOC and their adherence to it (Antón & Earp, 2004).

A more recent example of a framework that maps the complexities and nuances is proposed by Marx (2016; pp.303-304) and is framed by four questions:

- What is the ratio of what a technology is capable of to how extensively it is applied? (*surveillance slack ratio*)
- What is the ratio of what is known about a person to the absolute amount of personal information potentially available? (*personal information penetration ratio*)

- What is the ratio of what individuals wish to keep to themselves to how able they are to do this, given the technology, laws, and policies? (*achieved privacy ratio*)
- What is the ratio of what superordinates know about subordinates to what subordinates know about superordinates? (*reciprocity-equity-ratio*)

As is clear then, there are several ways to approach the dilemmas and tensions in providing optimum and appropriate protection of individuals that also include empowerment to ask more informed questions. (Also see Allen (2016) and Tene & Polonetsky (2012a, 2012b)).

### **Towards a Framework for the Protection of Student Vulnerability and Enabling Student Agency**

In the process of maturing as an established (and accepted) educational practice and research focus, concerns about the ethical and privacy considerations in learning analytics have moved from the margins toward becoming a central focus in learning analytics studies (Prinsloo & Slade, 2016). Despite huge advances in charting different approaches to map and safeguard student privacy (see e.g. Drachsler & Greller, 2016; Griffiths et al., 2016; Prinsloo & Slade, 2016) – there are still concerns and a lag in implementing more ethical approaches. Perhaps as a result of the fluidness and fragility of privacy (as pointed out above) and contesting agendas pertaining to the collection, analysis and use of student data, Griffiths et al., (2016) (still) ask “Is privacy a show-stopper for learning analytics?” (p.1).

While we acknowledge the vast advances in theorising and mapping more ethical approaches to the collection, analysis and use of student data, we would like to see the main value contribution of this article as highlighting student vulnerability and agency. For example, in an earlier work (Prinsloo & Slade, 2015) we suggest a framework to mitigate student vulnerability and optimise student agency. The framework includes (a) the duty of reciprocal care; (b) the contextual integrity of privacy and data; (c) the centrality of student agency and privacy self-management; (d) the need to rethink consent and employing nudges; (e) developing partial privacy self-management; (f) adjusting privacy’s timing and focus; and (g) moving toward substance over neutrality and moving from quantified selves to qualified selves.

Though HEIs have the right to collect, analyse, use and share data within the scope of their mandate, learning analytics should also be located within the ambit of the fiduciary duty of the providers. Though the balance of power lies with the providing



institution, students are not mere data objects but can (and should) participate in the collection, analysis and the verification of data. Prinsloo and Slade (2015) therefore suggest that educational providers make their TACs “as accessible and understandable as possible” making clear “what data is collected, for what purposes, and with whom the data may be shared (and under what conditions)”. It is also suggested that, where feasible, institutions make data sets available to students “to verify or correct conclusions drawn, where necessary, as well as provide context, if appropriate”. From a procedural perspective, this might necessitate the appointment of a neutral ombudsperson to address concerns and issues flowing from the contract between institution and students. The fact that the collection of student data takes place within an asymmetrical power relationship does not exempt students from a responsibility to ensure that their data is correct and current. As already acknowledged, since data and algorithms are not neutral but are embedded in ontological and epistemological positions and assumptions, it is crucial that the contextual integrity of data and especially historical data is recorded, open for scrutiny and preserved. As historical data are increasingly aggregated and re-used in contexts and for purposes different from the original context and purpose in which the data was collected, it is necessary to prevent contextual integrity collapse.

There are many perspectives of education but if it is seen as “moral practice” (Slade & Prinsloo, 2013) and given the imbalanced inherent power relationships, we should aim to critically explore the range of student control over what data will be analysed, for what purposes, and how students will have access to verify, correct or supply additional information. If students are rightly seen as agents and active collaborators in the harvesting, analysis and use of their data, HEIs must find ways to engage students not only in policy formulation but also in assuming responsibility for verifying information and analyses and in contributing information that can result in a better, mutual understanding of students’ learning journeys (Kruse & Ponsajapan, 2012). As Prinsloo and Slade (2015) state, “it is no longer acceptable to assume as default a position where students must accept that registration equates to forfeit of control over their data”.

The framework proposed by Antón and Earp (2004) and Earp et al. (2005) offers another useful approach to safeguarding student privacy and enabling student agency. The framework maps 12 categories against which organisations can check that stated and actual policies are internally consistent and reflect customer preferences. The two central elements of the framework are “privacy protection goal classification” (desired protection of user privacy rights) and “privacy vulnerability goal classification”

(potential for invasions of privacy). Table 1 provides a useful application of the framework to a higher education and learning analytics context. For each element of the framework, we emphasise the importance of fully considering the reciprocal aspects of care and responsibility in order to address various nuances of vulnerability, but also to mitigate against any potential impact on student vulnerability which might result from the asymmetrical power relationship.

Table 1: Privacy policy taxonomy: Privacy protection and vulnerability goals, adapted from Earp et al. (2005)

| Privacy protection goal classification  | Privacy vulnerability goal classification   |
|---|---|
| <p>Notice/Awareness – informing students regarding the type of data collected, timing of collection, protection and storage, sharing of data.</p>   | <p>Information monitoring – students should be informed regarding not only the scope and use of data collected, but also methods of collection, e.g. cookies, whether the data will be re-shared and with whom, etc.<br/>                     However, we suggest that students should be more than informed data objects – they should also be permitted to actively participate in a range of activities that may impact on their studies in biased or detrimental ways. For example, determining the purposes and scope of data collection, as well as safeguards and strategies to ensure the verification of information and provide context for any findings/analyses.</p>  |
| <p>Choice/Consent – the range of available options goes beyond the simple binary of opting in or out. Institutions must explore various possibilities to enlarge students’ participation and awareness.</p> | <p>Information aggregation – historical data is increasingly combined with recent or current data to provide more complete user digital profiles. Students should be better informed regarding the extent and impact of aggregation as well as steps taken to prevent the re-identification or re-personalisation of aggregated data.<br/>                     There is ample evidence regarding ways in which historical data potentially skews institutional perceptions of student potential and risk. Data such pre-higher education experience and performance, home addresses, income classifications, etc., may adversely affect students’ choice and their risk profiles. Students ought then to be involved in making sense of the validity and impact of these variables and be clearer regarding how the institution’s assumptions and beliefs about these variables impact on students’ choices and access to</p> |

Access/Participation – though the collection of most student data takes place behind institutional firewalls, HEIs should investigate the various layers of access and/or participation with various levels of exposure and collection of data. Though Earp et al (2005) only flag the possibility of opting in or out, we suggest that students should also be provided access to data to ensure its accuracy and, where necessary, provide additional information to ensure contextual integrity.

Integrity/Security – students should be provided with the assurance that the data collected will be kept secure and not shared without prior consent.

Enforcement/Redress – not only should students be held responsible for ensuring the accuracy of information, but they should be held accountable where fellow-student information is shared outside the institution's regulatory/policy environment.

resources.

If "data is power" (Blackall, 2013), it is especially important that HEIs acknowledge those inherent vulnerabilities which flow from student data.

Information storage – refers to what data is stored, the governance of data and access control. As Blackall (2013) suggests, consideration should be given to who collects, analyses and makes use of student data, as well as allowing data objects to engage with their data and subsequent analyses, and participate in the sense making of data. Considering student data as an integral part of the ontology of students (Floridi, 2014) raises the responsibility of need for effective and appropriate safeguards.

Information transfer – students have a right to know what type of data will be shared with whom, and under which circumstances. (See Floridi, 2014; Knox, 2010).

Information collection – students need to be informed regarding the scope, type, use, methods and timing of data collection – whether by targeted collection through, e.g., surveys, or by collecting browser information, IP addresses, etc. (See Knox, 2010).

Information personalisation – the mere personalisation of a user's experience when accessing a web site (e.g., 'Welcome back Paul') points to the nature of data collected and used. Students should be informed and provide consent to the personalisation of services where possible. We need to take account of context and make space for student narrative as an integral part of the collection, analysis and use of student data (Boam & Webb, 2014)/

Contact – For what purposes may students be contacted, how and by whom? We need to consider student data in terms of not only preventing "trespassing" but in terms of "kidnapping" (Floridi, 2014)

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## **(In)conclusions**

In line with a student centred approach to learning analytics (Kruse & Pongsajapan, 2012), the renewed emphasis that learning analytics is about “learning” (Gašević & Siemens, 2015) and embracing the agency of students will allow students and HEIs to move from seeing students as data objects or students seeing themselves as quantified selves but rather as qualified selves (Davies, 2013; Lupton, 2014a, 2014b). Through the quantification practices in higher education, students’ vulnerability is increased when they see themselves, their potential and their futures, as presented in the number of clicks, logins, time-on-task. We are more than our data (Carney, 2013). “Where the quantified self gives us the raw numbers, the qualified self completes our understanding of those numbers” (Carney, 2013; par.8). Our students are therefore much more than just conglomerates of quantifiable data and it is important that we take into account “the contexts in which numbers are created” (Lupton, 2014b; p.6).

In this article we accept student informational privacy as “ontological” (Floridi, 2014) which strengthens the need to explore student vulnerability and agency. Protecting student information and privacy in ontological terms means that our frameworks and strategies must go beyond protecting their information and data from being stolen and misused, and rather protect student data as an integral part of who they are. We should remember that student data are much more than what can be quantified. In our collection, analysis and use of student data we should recognise student identity, context and narratives as embedded in the data we collect, analyse and use. Only when we combine student identity, context and narrative (as proposed by Boam & Webb, 2014; Floridi, 2014), can we deepen our understanding of student vulnerability and agency.

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## The “Boomerang Effect”: How Outsourcing Impacts on the Workload of Academics

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### Introduction

This paper is part of a bigger research project undertaken at UNISA (University of South Africa) to understand the changing roles and workload faced by UNISA academic staff in the present period of transition where UNISA changes from a correspondence institution to an institution which makes full use of the affordances of digital technologies. Two major reasons are cited as motivating the change: Firstly, the labour market expects university students to be digitally literate; secondly, UNISA hopes to improve the support for its students to increase retention and throughput rates (as requested by the Department of Higher Education & Training, DHET).

### Research Question & Method

The research question guiding this paper was triggered by an internal time capturing report (du Plessis & Bester, 2014) at UNISA which observed a major perceived shift away from core academic tasks to tasks related to academic administration. How to explain this?

The *boomerang hypothesis* suggests one possible explanation. It is guided by the conceptual framework of the economics of distance education which suggests that traditionally distance education institutions can accommodate large numbers of students due to its cost-structure based on scale economies. This means that such institutions typically try to keep all those costs low which contribute to *variable costs per student*. Traditionally that meant shifting the onus of teaching away from interaction between teacher and student to a specially designed student-content interaction.

However, in a context where distance-teaching institutions want at the same time to make better use of the interactive affordances of digital technologies, including student-teacher interaction, the costs per student tend to rise. In such situations, efficiency considerations suggest limiting the “damage” by resorting to outsourcing,

especially those tasks related to increased student-teacher interaction, and to employ more staff on external, part-time contracts. This is the first leg of the boomerang hypothesis.

The second is that, while outsourcing indeed allows accommodating large number of students without increasing the fixed cost component of the instructional/research professional staff, the increased number of external part-time staff needs to be managed, which includes recruitment, contracts, initiation and training in tasks, supervision and quality assurance, all adding to the academic administration workload of the core academic staff.

The research questions of this paper, derived from the boomerang hypothesis are:

1. Does UNISA react to mounting enrolment pressures by resorting to increased outsourcing?
2. Can the increases in outsourcing plausibly be connected to increases in academic administration thus explaining the perceived shift in academic workload documented in the UNISA time capturing results?

The research method, used to answer these questions, consists of an analysis of UNISA data from the HEDA (Higher Education Data Analyzer) database. We looked for data which would connect increased enrolment with increased levels of outsourcing. The extent to which the increased levels of outsourcing lead to increased academic administration is illustrated by modelling the effects of increases of enrolment in the case of marking student assignments.

### **The Context: UNISA in Transition**

UNISA is an open distance learning university committed to “advancing social justice with an emphasis on redress, equity and empowerment of the previously disadvantaged groups in South Africa such as blacks, women, people with disabilities, the rural and urban poor and adults who have missed out on opportunities to access higher education” (UNISA, 2008). This commitment to open access leads to large increases in enrolments.

At the same time UNISA is increasingly expected to turn *access into success*. Success includes two things: First students are able to complete their degree successfully in a reasonable time. Second, students need to get a university education which responds to some basis requirements of the labour market, such as digital literacy. Both success

conditions are intertwined: Moving online supposedly both enables UNISA to support students and, by studying online, students will acquire the digital literacy required for success in the labour market.

But what could moving online mean for a mega-university with close to 400,000 enrolments and where many of its big courses exceed 10,000? Making better use of the interactive affordances of digital technologies comes at a cost. Student-teacher interaction means chunking up the courses of 5000 and 10,000 students into classes of 50, i.e. hundred classes or 200 classes. This is the approach taken by UNISA's signature courses (cf. Huelsmann & Shabalala, forthcoming). Even if a teaching assistant or e-tutor is supposed to cater for four classes you need to recruit 25 or 50 TAs respectively. These people need to be integrated in a deepening division of labour. They need to be inducted not only to competently navigate the LMS, myUNISA, but also how to moderate online discussions and mark assignments online; all this impacts on academics, on their roles and tasks, their work load, on costing, and on resource allocation.

### **The Cost Structure of Distance Education**

Distance education always used two strategies to achieve efficiencies: *capital for labour substitution and labour for labour substitution* (meaning the substitution of expensive labour by less expensive labour).

Shifting the main locus of teaching away from interaction to course development is a case of capital for labour substitution. The fixed costs of course development can be spread over many students. Labour for labour substitution applies when the function of the teacher can be unbundled in different roles, some of which can be given to less qualified and less expensive personnel. Both strategies aim at reducing the variable cost per student ( $V$ ) in the total cost formula. The total cost formula reads: Total costs = Fixed costs + Variable costs or:  $TC(N) = F + V * N$ , ( $F$  = Fixed costs,  $V$  = Variable costs per student and  $N$  = Number of students. (Note that Variable costs =  $V * N$ .) Average costs are  $AC = TC/N = F/N + V$ . Increasing  $N$  means that  $AC$  falls asymptotically towards  $V$ . Capital for labour substitution shifts costs to  $F$  basically by reducing the need for student-teacher interaction; labour for labour substitution decreases the impact of student-teacher interaction by decreasing  $V$ , e.g. through casualization of labour.

To simplify matters let us say that in a traditional distance education you largely substitute the teacher by the teaching material, in economic terms, a fixed cost. This is a capital for labour substitution. The teaching material needs to be replicated and shipped to the student but all of this contributes only marginally to the variable cost per student. The student-teacher interaction is kept minimal: there are a few assignments to be marked and some occasional evening classes. Grading is done according to rubrics and does not require subject matter experts with senior postgraduate degrees. This illustrates the role of labour for labour substitution. The combined arrangement allows keeping variable costs per students low; where fixed costs of course development are high (as it may be occasionally the case when TV production is involved), they can be spread over many students. The low variable costs per student means that even an increase in student numbers leads to decreasing average cost per student. Daniel et al. (2009) claims that distance education allows bringing down costs while at the same time increasing access and keeping up quality (Daniel's Iron Triangle). Daniel refers, however, to average cost per student. One of the consequences of this may, however, be in terms of quality assurance.

The advantageous cost structure of distance education was historically necessitated by the lack of a technology sustaining responsive student-teacher interaction at a distance. While this leads to a form of distance education susceptible to scale economies it also was considered as a central weakness of distance education and the major reason why distance education was widely seen as second rate.

The new affordances of digital technologies (with learning management systems and videoconferences or social media) have changed all this: responsive student-teacher interaction is possible but it comes at the cost of eroding scale economies.

Scale-economies dependent institutions like UNISA which want to make better use of the interactive affordances of the digital technologies need to find a way how to wriggle out of the incompatibility between scale economies and responsive interaction. To limit the "damage", which increasing student-teacher interaction does to the cost structure of distance education, distance teaching institutions tend to focus on labour for labour substitution rather than capital for labour substitution. Outsourcing is a point in case.

However, before addressing the question to which extent UNISA, as a response to increased enrolment figures, resorts to increased outsourcing, the time capturing results, which gave rise to the boomerang hypothesis at the first place, should be summarized.

### **The Time Capturing Results**

The data made available by du Plessis and Bester (2014) suggest that, for the academic staff at UNISA, in the time period between 2009 and 2013 there had been a shift away from core academic tasks to academic administration. The data are based on an ABC (Activity Based Costing) exercise. Academic staff members are requested to complete a survey in which they distribute their work time as percentages. These time sheets are completed for each semester (of approximately 900 hours), but it is important to note that it is based on the *perception* of the academics' sense of percentage time spent. The time of the respective staff is then turned into hours and converted into costs (ZAR). These figures are represented in the Table 1. That the figures go up though they are based on percentages is due to the fact that, together with the increased enrolments, staff numbers and salaries increase.

Much has been said about the credibility of these results. They are criticized for two reasons: Firstly, staff members report doing it rather carelessly and because they have to, not because they are convinced of the importance of the exercise. The time allocation breakdown is not based on diligent daily recording of activities but by rough estimates done in retrospect. However, the authors of the report argue that because of the sheer amount of academics having responded (about 83%) the perceived shift in workload should be taken seriously. Secondly, that the time capturing done in percentages, rather than in substantive hours, systematically excludes overtime. The allocation of workload is in percentage and, as soon as one allocates more than 100% the system stalls.

Table 1: Academic time capturing results from 2009-2013

|                                       | 2009    | 2010    | 2011    | 2012    | 2013      |
|---------------------------------------|---------|---------|---------|---------|-----------|
| Core academic                         | 431,255 | 461,320 | 459,638 | 533,039 | 665,593   |
| 1. Course and curriculum development  | 22,836  | 24,963  | 26,749  | 30,436  | 39,299    |
| 2. Community engagement               | 34,536  | 37,759  | 36,399  | 40,401  | 58,844    |
| 3. Research                           | 137,764 | 147,196 | 134,897 | 168,979 | 213,293   |
| 4. Tuition                            | 236,119 | 251,402 | 261,593 | 293,223 | 354,157   |
| Academic support                      | 207,937 | 257,683 | 229,492 | 267,372 | 460,377   |
| 5. Academic administration            | 169,275 | 209,668 | 179,078 | 208,613 | 380,342   |
| 6. Academic personnel development     | 20,310  | 24,124  | 25,106  | 28,210  | 35,363    |
| 7. Community outreach                 | 8,264   | 13,097  | 14,952  | 14,215  | 22,265    |
| 8. Executive management participation | 10,088  | 10,794  | 10,356  | 16,334  | 22,407    |
| Grand total                           | 639,192 | 719,003 | 689,130 | 800,411 | 1,125,970 |

Source: Du Plessis & Bester (2014)

If the core academic activities are disaggregated, it is not surprising that Research and Tuition are the biggest fields of activities. Course Development is the smallest field even as compared to community engagement. Note that tuition is not necessarily associated with variable costs. For example, setting the annual tutorial letters is listed under tuition. It is done by UNISA core academic staff and hence classified as part of the fixed costs. Figure 1 illustrates the relative contributions of these core academic activities.

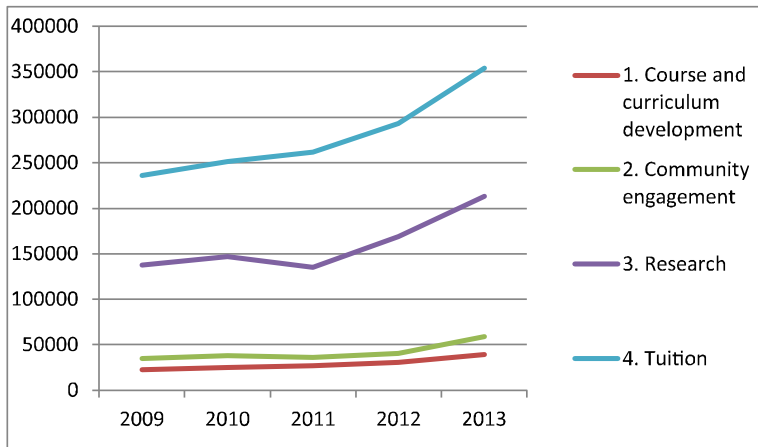


Figure 1. Core academic tasks

Figure 2 indicates the most dramatic aspect of the time capturing results, namely that there has been a dramatic increase in the Academic Administration from 2009 to 2013.



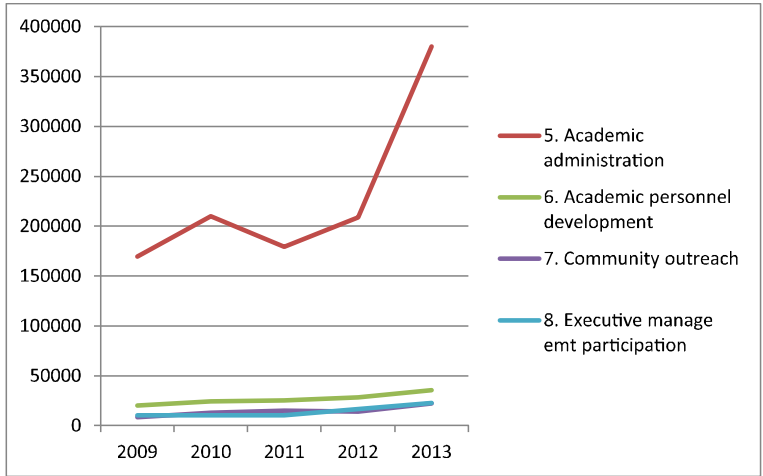


Figure 2. Academic time capturing results from 2009-2013 (Academic support)

What is of most concern, and so noted in the du Plessis and Bester Report (2014), is that once you merge Research & Tuition in percentage terms, rather than in Rand value, and compare it to Academic Administration, Research & Tuition shows a relative decrease of 8%, whilst Academic Administration increases by about 8%.

Table 2: Tuition and Research versus Academic Administration

|                            | 2009  | 2010  | 2011  | 2012  | 2013  |
|----------------------------|-------|-------|-------|-------|-------|
| Research and Tuition       | 58.5% | 55.4% | 57.5% | 57.7% | 50.4% |
| 5. Academic administration | 26.5% | 29.2% | 26.0% | 26.1% | 33.8% |

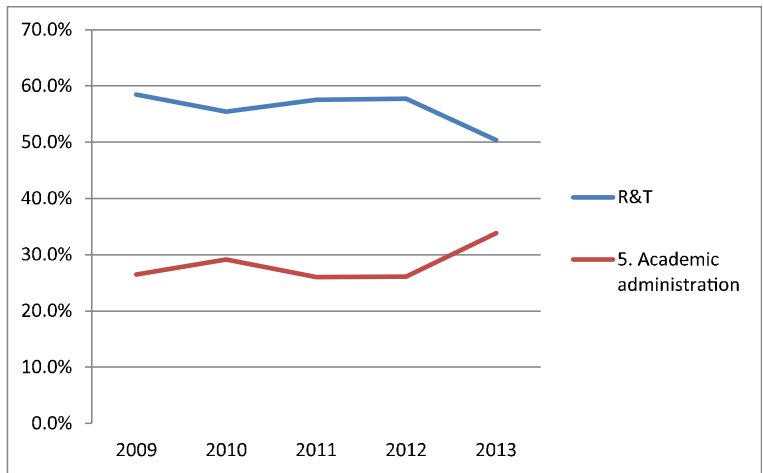


Figure 3. Tuition & Research versus Academic Administration

The findings should be a concern both from a management as well as from an academic perspective. From a management and costing perspective it should be a concern when academics find themselves allocating an ever greater part of their time to tasks not related to their core academic functions. This is likely to impinge on the quality of their core duties. Moreover, it should be a concern for any institution if peripheral administrative support activities start to outstrip the core functions (in this case tuition and research) of the institution.

What is underlying this perceived shift in the academic workload allocation reflected in the time capturing exercise? One possible explanation is based on the boomerang hypothesis. It states that UNISA under the pressure of increased enrolments resorts to outsourcing. While outsourcing indeed takes out some of the pressure, it boomerangs back as administrative tasks. The analysis of the HEDA data impressively confirms the first part of the boomerang hypothesis.

### Analysis of HEDA Data

The HEDA data show that the number of full time equivalents for instructional/research professional staff did increase with the full time equivalent enrolments. The FTE staff numbers went up; on average by 16%. Enrolments only increased by 6%.

This, at first sight seems to contradict our assumption that increase enrolment increases workload pressures. In fact, the student-teacher ratio has improved. While in 2009 there was one FTE staff serving 85.1 FTE students, in 2014 one FTE staff could focus on 54.2 students. Essentially, staff and student numbers expand in parallel.

Table 3: FTE staff & FTE students

|                  | 2009    | 2010    | 2011   | 2012    | 2013    | 2014    |     |
|------------------|---------|---------|--------|---------|---------|---------|-----|
| FTE staff a      | 1,598   | 1,792   | 1,937  | 2,097   | 2,541   | 3,346   | 16% |
| FTE enrolments b | 136,108 | 148,275 | 68,679 | 172,304 | 197,102 | 181,425 | 6%  |
| Ratio c          | 85.1    | 82.7    | 87.1   | 82.2    | 77.6    | 54.2    |     |

Source: HEDA,

a: FTE = Full time equivalents for Instructional/research professional staff;

b: Full time equivalents enrolments;

c: Ratios= Full time equivalents enrolments/Full time equivalents for Instructional/research professional staff.

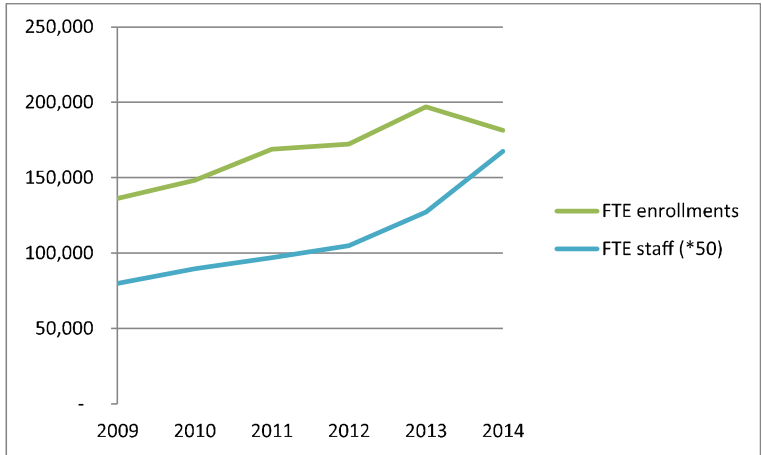


Figure 4. FTE staff vs. FTE students

Note that the FTE staff is multiplied by 50. The intention here is to visualize that FTE enrolment and FTE staff develops in parallel.

The overall student-staff ratio does not seem to signal increase workload pressure; but by decomposing the full time equivalents for Instructional/research and Professional staff into those employed on full-time and those on part-time basis, we come closer to the boomerang hypothesis.

Table 4: Ratios of full time and part time to total

|                          | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  |
|--------------------------|-------|-------|-------|-------|-------|-------|
| FTE a                    | 1,598 | 1,792 | 1,937 | 2,097 | 2,541 | 3,346 |
| Full time b              | 1,498 | 1,501 | 1,638 | 1,749 | 1,797 | 1,891 |
| Part time c              | 101   | 291   | 299   | 347   | 744   | 1,455 |
| Ratio full time to total | 94%   | 84%   | 85%   | 83%   | 71%   | 57%   |
| Ratio part time to total | 6%    | 16%   | 15%   | 17%   | 29%   | 43%   |

Source: HEDA b: Most recent employed on full-time basis; c: Most recent employed on part-time basis

The category of staff employed on a part-time basis consists of markers, e-tutors and teaching assistants, all involved in activities contributing to the variable costs per students. The HEDA data confirm the first part of the boomerang hypothesis: there is a marked shift in the employment strategy. While in 2009 most staff members were recruited on a full time basis and only 6% on a part time basis, the composition has drastically changed. In 2014 the percentage is close to fifty-fifty.

The graph shows that the number of part-time contracts has increased much faster than the number of full-time contracts, leading to a marked shift in the composition of the workforce.

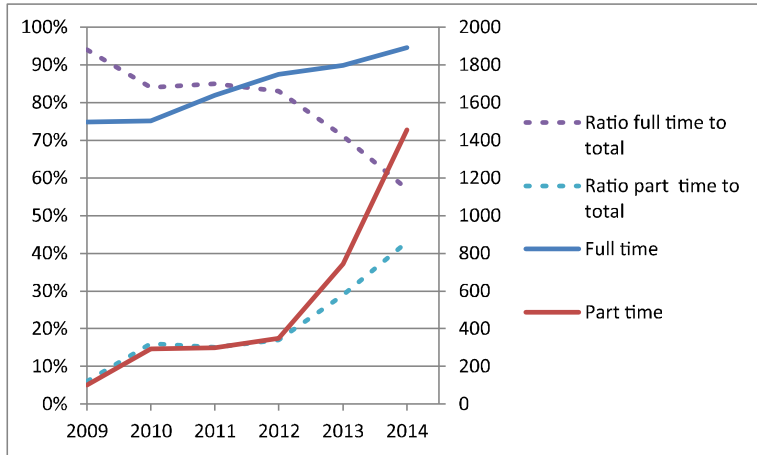


Figure 5. Ratios of full time and part time to total

The shift suggests that the increased costs related to making more use of responsive interaction at a distance, especially interaction between teacher and students, is compensated by a shift in employment practices to limit the ‘damage’ increased interaction does to the traditional cost structure of distance education. This is what the following table shows: due to the shift in employment conditions you can employ more staff with a C1 unit (a C1 value is the equivalent to a senior lecturer’s salary). While in 2009 you could only employ 0.76 full time equivalents for one C1 unit you can now employ 1.22. Hence, the shift in the composition of staff, which is at the same time a shift from fixed to variable costs, allows with the same budget to employ more staff.

Table 5: Budget implications of shift in staff composition

|              | 2009      | 2010        | 2011        | 2012        | 2013        | 2014        | AI(%) f |
|--------------|-----------|-------------|-------------|-------------|-------------|-------------|---------|
| TB a         | R 856,851 | R 1,023,753 | R 1,105,973 | R 1,315,059 | R 1,405,971 | R 1,696,696 | 15%     |
| C1 b         | R 408,725 | R 442,819   | R 478,880   | R 517,740   | R 553,532   | R 618,510   | 9%      |
| Cost units c | 2,096     | 2,312       | 2,310       | 2,540       | 2,540       | 2,743       | 6%      |
| FTE staff d  | 1,598     | 1,792       | 1,937       | 2,097       | 2,541       | 3,346       | 16%     |
| Ratio e      | 0.76      | 0.78        | 0.84        | 0.83        | 1.00        | 1.22        |         |

Source: HEDA; a: TB = total budget (in thousand Rand); b: Academic cost unit (Rand); c: number of cost units; d: FTE = Full time equivalents for Instructional/research professional staff; e: FTE/cost units; f: average increase (%)

Does the shift in employment conditions affect the quality of the learning experience? We looked in a number of proxy quality measures (Table 6) which suggests that quality is not greatly affected. There are year by year more graduates; the success rate was improving until 2012. The considerable drop in 2013 is internally discussed (cf. Makhanya, 2014) and by some attributed to a calculation error (e.g. by including

students enrolled in short term programs). Activity level of students on myUNISA is seen as a good indicator for student engagement. Funding depends on completing a course or module which requires completing the assignments which are uploaded to my UNISA. Research output per capita has increased which could suggest that outsourcing indeed frees time for academic staff to keep up or increase their output.

Table 6: Proxy quality measures

|                              | 2009   | 2010   | 2011   | 2012   | 2013   |
|------------------------------|--------|--------|--------|--------|--------|
| Number of graduates          | 22,675 | 26,073 | 26,808 | 26,210 | 34,934 |
| Success rate a               | 60%    | 63%    | 66%    | 67%    | 58%    |
| Student active on myUnisa    | 75%    | 78%    | 83%    | 93%    | 96%    |
| Research output per capita b | 0.57   | 0.63   | 0.71   | 0.86   |        |

Source: HEDA and Makhanya (2014); a: Makhanya (2014, p.16 Table 11); b: date for 2013 missing

The analysis of the HEDA figures tallies with what is expected from an analysis of the cost structure of distance education: variable cost per student serves as a safety valve when enrolment pressures tend to increase academic workload. Activities contributing to variable costs are associated with markers, e-tutors and teaching assistants; staff employed in these roles are typically employed on a part-time basis. The HEDA figures impressively demonstrate the shifting composition of the instructional/research professional staff to staff employed on a part-time basis, i.e. markers, e-tutors or teaching assistants.

## **A Model-Based Reflection on Marking**

What about the second part of the boomerang hypothesis? Is it possible to show that the demonstrated shift to outsourcing leads to increased academic administration? This section is not based on empirical evidence but on modelling the effects on enrolment numbers on marking using figures and requirements from the UNISA context.

The initial conundrum is the following: Increased number of students means more marking to be done. Marking is classified as tuition hence a core academic task. The time capturing results confirm that, while tuition goes up in absolute terms, the percentage of core academic tasks decreases relative to academic administration; how could that be explained?

Applying the boomerang hypothesis to marking (as a proxy for tuition) suggests the following explanation: Increased enrolment means that marking has to be outsourced. This means that the academics' time is re-allocated to the following tasks:

- Recruiting and appointing suitable external markers. Some parts of this would be done by the HR department and administrative support, but the core academic staff retains responsibility for the external markers appointed to their course.
- Training the external markers (in the discipline content, in the outcomes required of the specific module, in the marking rubric, as well as in UNISA ICT systems such as the J-Router and myUNISA).
- Physically or electronically moving assignments and scripts to external markers, and receiving them back, is normally done by an administrative person, but the academic would have to supervise and take responsibility for this task.
- Moderating the scripts that have been marked by the external markers. The UNISA Assessment Policy requires that all 10% of all marking should be moderated by a second person. In this case, the initial marking is done by an external marker, and the moderation is done by the full-time academic.

At UNISA the term moderation is used for checking if markers do mark appropriately. Markers have neither a personal relationship with students nor do they necessarily identify with the institution. They mark for the money they receive. Hence UNISA needs to supervise if the marking has been done properly. The following table models what happens when a program increases its enrolment from 1000 to 5000 students and the departments strictly applies the UNISA moderation requirements.

Table 7: Marking and moderation model

| Stud no                          | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 |
|----------------------------------|------|------|------|------|------|------|------|------|------|
| Mark cap (# papers)              | 200  | 200  | 200  | 200  | 200  | 200  | 200  | 200  | 200  |
| marking time (hrs. per semester) | 50   | 50   | 50   | 50   | 50   | 50   | 50   | 50   | 50   |
| papers outsourced                | 800  | 1300 | 1800 | 2300 | 2800 | 3300 | 3800 | 4300 | 4800 |
| moderation (10%)                 | 80   | 130  | 180  | 230  | 280  | 330  | 380  | 430  | 480  |
| Total to mark (# papers)         | 1080 | 1630 | 2180 | 2730 | 3280 | 3830 | 4380 | 4930 | 5480 |
| Marking (non moderation)         | 120  | 70   | 20   | -30  | -80  | -130 | -180 | -230 | -280 |
| # of markers                     | 4    | 7    | 9    | 12   | 14   | 17   | 19   | 22   | 24   |

The table demonstrates, based on simplified model assumptions, the effect of increased enrolments on the grading capacity of an academic. The calculation demonstrates:

- that, obviously, the initial marking capacity of the academic (assumed to be 200 papers) is quickly exhausted when you increase enrolments; this makes outsourcing marking necessary; however, the model shows further:
- maintaining marking quality of outsourcing requires moderation; while buffering the impact of enrolment on marking, moderation quite quickly absorbs all the assessment capacity of the academic;
- the model also suggests that you can stretch the buffering effect of moderation by decreasing the percentage of papers to be double checked (if you would substitute the 10% in the table by merely 2%);
- further increases in enrolment have to be countered by providing the lead academic with full-time academic assistants; this again comes with additional administrative workload since the academic now leads a team.

That academics interpret all this as a relative increase in academic administration and do not experience it as an increase of the core academic activity of tuition is because outsourcing protects them against having to do proportionally more marking. But at the same time markers need to be found, they need to get contracts, they must be trained. That having been done, the moderation process sets in. Without further assistance being provided moderation quickly spirals out of hand. The lead lecturer needs a team. Pushing down marking and moderation tasks to the markers and teaching assistants, the core staff remains with activities (correctly) perceived as academic administration.

The model shows allows tracing a morphing process: Marking morphs into moderation, and moderation morphs into academic administration. This can be graphically illustrated as in Figure 6 where Tuition (T) and Research (R) go down and Academic Administration (AA) goes up as Outsourcing (O) goes up (and Community Engagement (CE) remains stable.

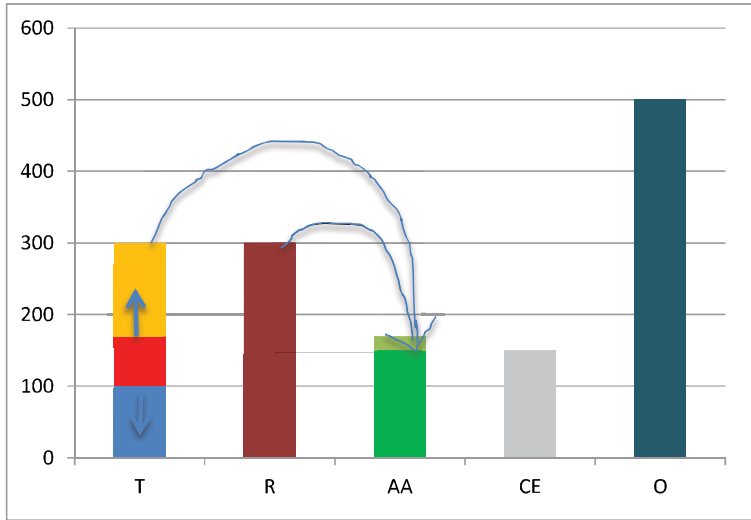


Figure 6. Ratios of full time and part time to total

### Limitations and Conclusions

The research question of the paper was triggered by an internal time capturing report of UNISA which reported that UNISA academics see a reallocation of their workload away from their academic core task towards academic administration. This finding gave rise to the boomerang hypothesis which includes two predictions: (a) UNISA responds to increased enrolment pressures by resorting to increased levels of outsourcing; (b) outsourcing, in turn, “boomerangs back” in the form of increased academic administration.

The data extracted from HEDA impressively demonstrate the first point. The increased level of outsourcing is reflected in a massive change to employing part time staff. This form of contract typically includes markers, e-tutors and teaching assistants.

The second part of the boomerang hypothesis would require a time capturing exercise with a specific focus on administrating markers, e-tutors and teaching assistants. By modelling the effect of increases of enrolments on stretching the departmental marking capacities, a morphing process away from the academic core task of marking (as part of tuition) towards academic administration was made plausible.

While there is a high level of plausibility of the assumption that outsourcing indeed impacts on increased academic workload the effect size to which it contributes to the perceived shift reported in the time capturing results, remains unclear. There are indeed other factors also contributing to the perceived shift. For example, UNISA’s



commitment to improve quality in a transparent way means that UNISA has set a number of indicators against which performance is to be measured. This leads to a considerable increase in measurement activities within UNISA (measurement of quality may, hence, compound the problem of quality). All this is perceived by academics as part of academic administration. Further qualitative research in the form of focus-group interviews with academic staff is being undertaken.

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## Acknowledgement

We thank Willem du Plessis and Philipp Bester to make the time capturing results available and discuss them with us in the light of the boomerang hypothesis; without Liana Griesel pointing us to the relevant HEDA data not even the first part of the boomerang hypothesis could have been demonstrated.

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## Video-Based Learning in Higher Education: The Flipped or the Hands-on Classroom?

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### Abstract

Higher Education is adopting new ways of teaching, such as Video-Based Learning (VBL) approaches, with the aim of moving away from traditional classroom methodologies towards enhanced learning. The most broadly known method that uses video as a tool for learning is Flipped Classroom. In many cases, the result of introducing videos in a learning design eventually converges in this type of methodology. This research presents a case study that uses a combination of VBL and Project-Based Learning methodologies. The course is face-to-face but there are no lectures; students develop small projects in labs. A set of teaching explanations is recorded in videos provided together with the descriptions of the projects. The objective of this research is to study the behaviour and satisfaction of the students using the videos, their utility as well as the position of the professors. The study was conducted following a mixed methodology, using five different instruments to gather qualitative and quantitative data. Results indicate that the use of video-based learning may not necessarily converge in the use of the flipped classroom methodology. Videos can be used during a hands-on classroom as a support tool that encourages a more autonomous, flexible and significant learning.

### **Abstract in Spanish**

La Educación Superior está adoptando nuevas formas de enseñanza, tales como los enfoques de Aprendizaje Basado en el uso de Videos (VBL), con el objetivo de mejorar las metodologías tradicionalmente utilizadas en el aula. El método más conocido que utiliza el vídeo como una herramienta para el aprendizaje es la clase invertida (Flipped Classroom). En muchos casos, el resultado de la introducción de vídeos en un diseño de aprendizaje converge eventualmente en este tipo de metodología. Esta investigación presenta un estudio de caso que utiliza una combinación de VBL y la metodología de aprendizaje basado en proyectos. El curso es presencial pero no hay clases teóricas. Los alumnos desarrollan pequeños proyectos en el aula. Juntamente con las descripciones de los proyectos a

realizar, el alumnado tiene a su disponibilidad un conjunto de vídeos didácticos que pueden consultar durante el curso. El objetivo de esta investigación es estudiar el comportamiento, la utilidad y la satisfacción de los estudiantes en relación al uso de vídeos, así como la posición de los profesores. El estudio se realizó siguiendo una metodología mixta, utilizando cinco instrumentos de recogida de datos cualitativos y cuantitativos. Los resultados indican que el uso del aprendizaje basado en vídeos puede no necesariamente implicar una metodología del aula invertida. También es posible que los alumnos decidan utilizar los vídeos durante las clases prácticas como una herramienta de soporte, fomentándose un aprendizaje más autónomo, flexible y significativo.

**Keywords:** video-based learning, VBL, flipped classroom, FC, higher education

## Introduction

Nowadays Higher Education is adopting new ways of teaching such as ways of Video-Based Learning (VBL) with the aim of moving away from the traditional classrooms. Video lectures have been growing in popularity and their use is increasing both inside and outside classrooms (Giannakos, 2013). “Many higher education institutions and educational technology companies are using them as a main of self-study medium or as tool to enhance the learning process” (Vieira, Lopes, & Soares, 2014).

Despite VBL has a long history as a learning method in educational classes in the past decade, the interest in VBL has increased as a result of new forms of online education, most prominently in the case of Massive Open Online Courses (MOOCs) (Yousef, Chatti, & Schroeder, 2014). VBL has unique features that make it an effective Technology-Enhanced Learning (TEL) approach. Furthermore it seems to support a rich and powerful model to improve learning outcomes as well as learner satisfaction (2014).

Despite this, it is important to note that the mere use of videos in class is not by itself an improvement, since it is necessary to choose an appropriate instructional approach when designing VBL environments (Seidel, Blomberg, & Renkl, 2013). One of the latest methods that use video as a tool for learning is Flipped Classrooms – or inverted classrooms – and, in many cases, it is showed that the result of introducing videos in a learning design eventually converges in this type of methodology.

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### ***Flipped Classrooms***

The flipped classroom is an instance of VBL model that enables to save time in the classroom by discussing only difficulties, problems, and practical aspects of the learning course (Tucker, 2012). In the flipped classroom model, learners watch video lectures as homework. The class is then an active learning session where the teacher use case studies, labs, games, simulations, or experiments to discuss the concepts presented in the video lecture (Herreid & Schiller, 2013).

Regarding learning theories, Lowell et al. (2013) suggest that flipped classrooms represent a unique combination of these theories once thought to be incompatible. Firstly, active, problem-based learning activities founded upon a constructivist ideology and then instructional lectures derived from direct instruction methods founded upon behaviourist principles. Despite of this, Mason et al. (2013) add that an inverted classroom can play a key role in a modern engineering education by freeing time for learner-centred activities and encouraging students to become independent self-learners. The question that our study lays out here is whether a student-based learning system without using inverted classroom would do emerge unexplored students behaviours.

### ***Effectiveness of VBL and Teaching Methods***

The analysis of the VBL research of Yousef, Chatti and Schroeder (2014) showed mixed results in terms of learning outcomes in VBL environments. Despite possible advantages as the high user's rate interaction and learner satisfaction in VBL environments comparing to traditional classroom environments, authors pointed out that several aspects concerning effectiveness in VBL need further investigation:

1. What are the positive and negative attitudes towards using video lectures?
2. How can VBL motivate learners?
3. How can a MOOC as VBL environment personalize the learning experience for learners?

Seems that, a way to improve the effectiveness of the learning experience – with videos or not – is to provide students with a greater degree of freedom to select the educational resources and the learning style that meets their characteristics best. But instead, the previous study showed that most of the reviewed VBL studies followed a teacher-centred approach and only 15% of studies focused on student-centred learning.

According to this, authors denoted that additional research is needed to investigate the benefits of new ways of VBL based on new concepts such as personal learning environments (Greenberg & Zanetis, 2012) and networked learning.

### **Purpose of Current Study**

To explore this context, this research presents a case study that use a combination of the VBL and Project-Based Learning (PBL) methodologies. The classes are face-to-face but there are no lessons: the students develop small projects in labs. A set of teaching explanations are recorded in videos provided together with the descriptions of the projects. The objective of this research is to study the behaviour and satisfaction of the students using the videos, their utility as well as the position of the professors.

### **Methodology**

This research was conducted using a mixed methodology, an option that was considered appropriate because we were faced with complex processes such as behaviour (Creswell, 2005). In the next paragraphs it will be introduced the context of the study as well as the instrumentation, data collection and analysis.

### **Participants and Sample**

Participants were the students of the course “Wireless sensor networks”. This was designed as an optional subject in the 3<sup>rd</sup> and 4<sup>th</sup> year of the Bachelor Degrees in Computer Engineering, Electronic Engineering and Audio-visual Systems Engineering within the Engineering School of the Universitat Pompeu Fabra (UPF).

The course is quarterly and with a load of about 100 hours of study per student. It took place in April to June of 2014 and the number of students enrolled for that academic year was 17, of which there were only 3 girls. In class the students worked in groups of 2-3 people, specifically there were four groups of two and three groups of three. Two professors were in charge of the course, one of them acting as a coordinator and other as a teaching assistant.

The sampling technique used was not probabilistic due to the participation in the course was not random. The participants were the units available to the investigator: the students enrolled in the course, so the samples of the study are accidental and therefore biased. Hence, there is no guarantee that they represent the entire population to which they belong. Moreover, the size of the sample, as mentioned before, is 17 people and it will not be enough to draw general conclusions. These two issues

must be taken into account in the possible generalization of the results (Yin, 2009). However, the main purpose of the study is to have the maximum guarantees to be able to set affirmations from the field work. The aim of this research is not to maximize external validity – generalization to the population reference –, the intention is to maximize internal validity since it is a case study (Yin, 2009).

### Procedure

This subject had been conducted in prior academic years without the aid of videos, but during the year of the study the professors developed a MOOC of the course and they decided to use the videos of the online program as part of the traditional classroom. It was a practical course, divided in 7 projects, where students had to develop seven Arduino circuits. Each project had a video composed by three possible parts (Figure 1): (a) Short explanation of the theory by the professor, (b) Demonstration of how the circuit is built, (c) Instructions of how to program the circuit.

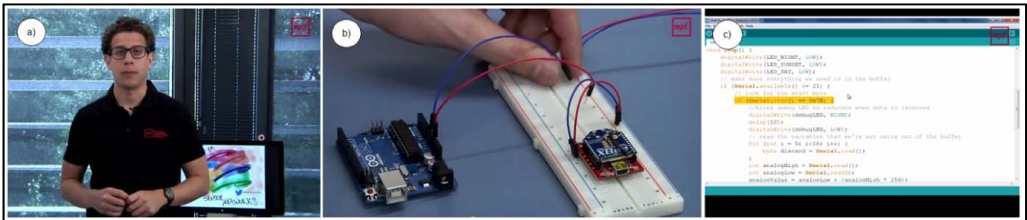


Figure 1. Screenshots from a project's video, where it is showed the three possible types of content explanation: (a) professor's explanation (b) circuit demonstration and (c) programming instructions.

In addition to videos, students could consult a text guide of the course. That document explained all the information of the videos; in fact, it was the basis for audio-visual material. Both course materials were available in a learning environment: Moodle. Students had free access to the environment and they could connect to it by logging in and outside class times. The students were also allowed to consult external material to the subject.

The instructors did not lecture during the classes and they tried to assume the role of facilitators (Smyth, 2011). During classes, the students worked at their pace developing the circuits done in the video. When they needed help, they could request help from the teacher or consult other classmates. When they had completed the circuit example, they had to develop an improved circuit and propose some innovative applications of it.

Every two weeks the video of a new project was published in the Moodle. Despite this, students could work at their own pace, without strict delivery deadlines. The course did not include a written exam. The participants submitted their work as a post entry in their blog and were awarded a badge for completing the project.

### ***Instrumentation, Data Collection and Analysis***

The current study used five instruments to gather data from the field work: two surveys, an interview, an observation protocol and two automatic registers. The first online survey instrument utilized for this research was designed to collect information from students regarding the utility and their interaction with the content in the online learning environment: text material and videos. Students answered this questionnaire once for each completed project.

The second online survey was developed to collect general information from students at the end of the course. The objective was to know their satisfaction with the course, especially with videos, as well as their perspectives about the utility of the face to face classrooms. Last survey question referred to whether the use of videos helped them to become more autonomous. All these survey items used a 5-point Likert-type multiple choice response format.

To gather the professor perspective about the course dynamics, the educator was interviewed in the middle of the course. Moreover, the researcher recorded all classrooms in order to observe the participants' interactions off-line. Basically, two kinds of interactions were observed: students with students and students with professor.

Finally, two automatic registers were used to collect quantitative data. On the one hand, the data from the Moodle Log Files have allowed to obtain all times that students have accessed the course materials through the learning environment – date and time were recorded, in addition to indicate what material was accessed. These results could be downloaded in Excel format to facilitate further analysis. On the other hand, the YouTube Analytics tool has led to the number of visits for each video and information related to the corresponding withholding public.

Note the importance of being able to have more than one view of the object of study, from the integration of the two methods in terms of equality – quantitative and qualitative. This study uses triangulation (Neuman, 2006; p.149) to analyse the data.

This is a process that combines strategies, methods or techniques in order to obtain a more accurate – more exhaustive- representation of the phenomenon.

## Results

### ***Most of the Interaction with Content (Videos) Occurs within Class***

Figure 2 presents the number of student’s Moodle actions per hour depending on the project. Two time zones are distinguished, within or outside campus classes. The graph shows that the interaction with the course content – access to videos and text material – mainly occurs during classes’ hours.

The graph shows that the actions/h decrease as the course evolves. However, there is an exception to this trend in Project5. The reason for this increase may be due to the content level of this project. Until Project4 students had programmed Arduino IDE and the Project5 first introduced the Python programming language. This new development was associated with an increase in the difficulty of assessing the project and can be one of the main reasons for the rise in the number of interactions with the course content for this particular case.

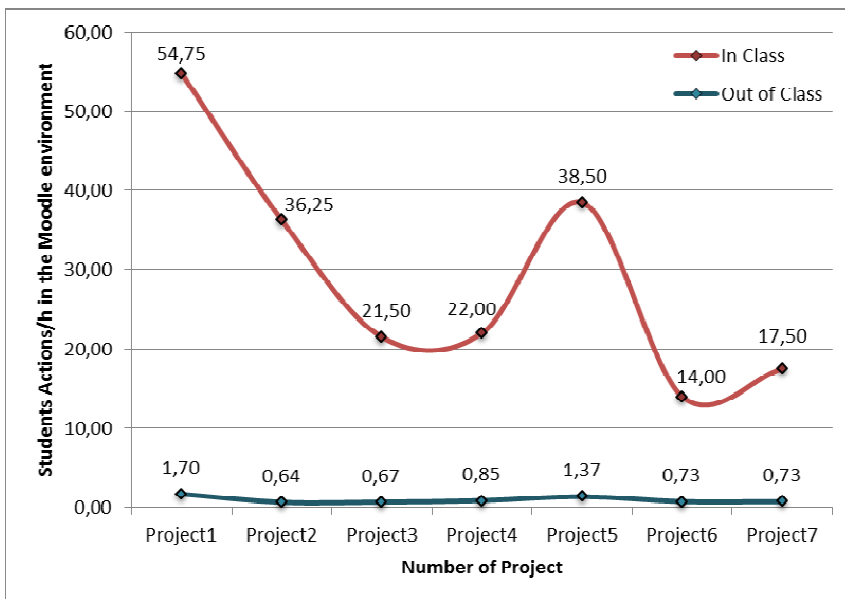


Figure 2. Students actions per hour in the online Moodle learning environment depending on project.



**Flexibility in Viewing Videos**

Figure 3 reflects the time when the students watched the videos of each project. Every row is a student and the group number to which belongs is also indicated, there are seventeen students divided among seven groups of work and in addition, legend shows which colour represents each video project. The data of this plot was collected from YouTube Analytics tool and from the Moodle Log Files.

Nearly all the students affirm in the surveys that when they watched the videos within class they did it together with another classmate. This would explain that some student have not seen all the videos, because, when they viewed a video with a classmate, a unique student registration of view is shown in the graph.

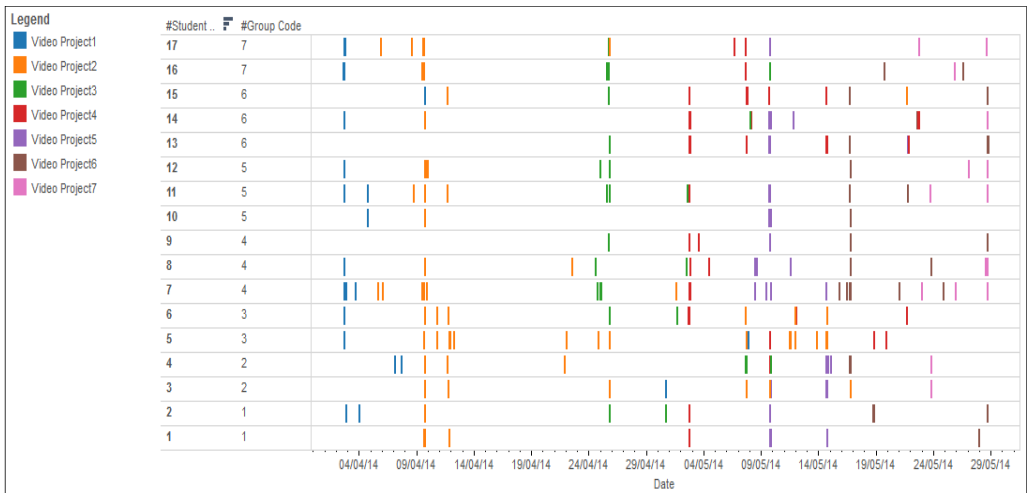


Figure 3. Video views of the students in time depending on project

The main result observed from the figure is the difference in the times at which the participants watch the videos. Each student has seen the video at different moments – even on different days – and most times she or he has displayed the same video more than once. Students show to take advantage of the flexibility in viewing videos, according to their pace when completing the projects (being able to self-organize their schedule depending on their duties in the others subjects, etc.).

**Videos have Increased Student’s Autonomy**

Most of the students stated that the videos have helped them to become more autonomous (Table 1). The main professor also reaffirmed the result during the interview. He observed that the students of this course were more autonomous due to

the videos: dependence of the students towards the teacher was lower than in previous editions of the course.

Table 1: Relationship between videos and autonomy of students

| Videos have helped you to become more autonomous? |     |
|---|-----|
| Strongly agree                                    | 73% |
| Agree   | 20% |
| Indifference                                      | 7%  |

The results of the observation protocol, in addition to the surveys indicate that the interaction between the different working groups was low. Interaction mainly occurred among students of the same group or with the teacher. The most frequent questions to the professor were related to the practical course content or programming questions. Finally, student satisfaction results with the course indicated that 93% of students have fulfilled all or practically all their initial expectations as well as they assessed the utility of the videos in 3.64 out of 5.

## Discussion

Students interacted with the course content mainly during class hours, despite the fact that they had the opportunity to watch the videos before the sessions. Hence the flipped classroom was not present though it was the expected situation. Students used videos as support material within class while they were working on the projects at their pace.

On the one hand, the incorporation of videos in class allowed students to enjoy a great flexibility to access the professors' explanation. The advantage of this flexibility questions the use of oral teacher presentations in class because of the latter are governed by schedule that means that the students cannot access to this explanation beyond the class in the moments when their application is more significant. These conclusions are somehow in line with claims by other researchers saying that the role of presence-based learning may be re-thought, standard lectures do not take advantage of having the students personally present in the class (Marwedel & Engel, 2014). However, the use of video allows access to content *on demand*. Moreover, the use of videos has helped students to become more autonomous.

In a learning design based on the student as in our case, the flexibility and autonomy that provide videos – used as support material during classes – help students to have more control over their own learning process and, therefore, the role of the teacher as facilitator is reaffirmed.

### **Limitations**

Above mentioned findings must be interpreted in light of limitations of the study. The first limitation of this research is that this is a case study and therefore it is difficult to extrapolate the findings and generalize. In order to counteract this limitation, it has been placed emphasis on achieving a good internal validation of the results. The second limitation is the type of course of our case: a subject in electronics and programming - essentially practical. Classroom attendance facilitates the resolution of practical problems related to circuit assembly and programming more effectively than virtually, since they are very specific problems, difficult to predict. This conclusion is reinforced by the data obtained from the interviews and online surveys.

Other limitations are due to instruments used in research, basically derived from the surveys. This research study required from the volunteer participation and involvement of the students. Every effort was made to reduce the burden on the students. The questionnaires were integrated in the online learning environment to make them easily accessed. In addition, the instructors periodically reminded the importance of collaborating with this research.

### **Conclusion**

Contrary to common belief, the use of video-based learning may not only converge in the use of flipped classroom methodology. It is also possible to use the videos in a hands-on class as a support tool that encourages a more autonomous, flexible and significant learning. The application of a flipped or a hands-on classroom approach depends on diverse aspects, including the nature of the course (with practical or theoretical orientations), the behaviour emerging from the students (depending on their needs and preferences, time constraints, etc.) and the design of the activities proposed by the teachers (strongly requiring students to watch videos in a certain timeframe, e.g. previously to the class, or offering flexibility). Future research considering variations of these parameters will help to understand the benefits and limitations of both approaches and to what extent they may coexists in VBL.

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## **Social Networking and Informal Second Language Learning in Livemocha and Busuu Online Communities**

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### **Abstract**

This paper reports on a PhD study about learners' construction of opportunities for second language (L2) use in online communities designed for L2 learning.

The main objectives of this paper are to explain the dynamics generated within these online communities, to describe what types of experience learners make of these communities and, accordingly, to describe what kinds of behaviour they enact.

This paper adopts a socio-cultural framework and an online ethnographic approach. The methods of the investigation ranged from online fieldwork, to online survey and online interviews, which allowed the cross-checking of the data obtained.

The results showed the presence of different profiles of learners, different forms of peer assistance and provide information of learners' engagement to online communities over time.

### ***Abstract in Spanish***

Este estudio está basado en una tesis doctoral sobre estudiantes de lengua que crean oportunidades para comunicarse en la lengua meta en unas comunidades en línea diseñadas para el aprendizaje de una segunda lengua.

Los objetivos principales de este estudio son explicar las dinámicas que se generan en estas comunidades en línea, describir las experiencias de los estudiantes en estos entornos y, consecuentemente, describir cómo se comportan y qué acciones toman.

El estudio se inscribe en el marco teórico de la perspectiva sociocultural y está enfocado en el método etnográfico. Los métodos de investigación incluyen trabajo de campo en línea, un cuestionario en línea y entrevistas en línea. Esta triangulación metodológica ha permitido comprobar la exactitud de los datos obtenidos.

A través del análisis de los resultados se han observado diferentes perfiles de estudiantes, se han evidenciado diferentes formas de retroalimentación entre pares y se ha obtenido información sobre el nivel de dedicación a las comunidades en línea por parte de los estudiantes a lo largo del tiempo.

**Keywords:** online communities, second language learning, social network sites (SNSs)

## Introduction

Current Second Language (L2) learners come into contact with a wide range of voice applications, social networks, video-sharing websites, podcasts, wikis and blogs, and are more and more integrating the traditional bookish way of learning a language with the Web. Among the different online applications that arose with the social web, there are the so called “language learning communities” such as *Busuu* ([www.busuu.com](http://www.busuu.com)). These communities are designed as common social network sites like *Facebook* ([www.facebook.com](http://www.facebook.com)) with the difference that they rely on learning content and material in the target language (TL) selected. In addition, they are designed in such a way so as to put into contact learners with native speakers from all over the world in order to exchange one’s native language with the TL. The pedagogical foundation of these communities is tandem language learning, which consists in a language partnership in which each learner is an expert of his/her interlocutor’s TL. These communities are untied to formal learning institutions, they are characterized by the absence of teachers (except for the presence of tutors in the case learners pay a fee) and the activities on the communities are structured with progressive didactic units and grammar exercises carried out consciously by learners. For all these reasons, they are a clear example of how formal, non-formal and informal spheres are intermingled. These environments designed for a potential language improvement and based on social networks raise some questions about the use that online users make of its tools and the behaviours enacted when inhabiting the communities. In particular, this study investigates learners’ behaviours in the online communities and their spontaneous creation of opportunities to practice the language in their informal interactions with other learners.

## Literature Review

The literature at the basis of this study covers the 3 following levels: (a) L2 learning practices in association with SNSs, (b) L2 learning practices occurring in online communities, (c) and L2 telecollaborative practices in online chats and communities.

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### **Social Network Sites**

This study is an extension and a contribution to the analysis of L2 practices using SNSs through the lens of the socio-cultural theory made by a considerable number of researchers (McCarty, 2009; Blattner & Fiori, 2009; Halvorsen, 2009) and that characterises the current research in the field. It adds more insights to the field because it takes into account the perception of online learners who have been selected randomly in the SNSs rather than in a classroom context. Their way of inhabiting the communities is free and voluntary and it is not dependent on the syllabus.

### **Online Communities for L2 learners**

In the realm of online communities designed specifically for L2 learning, the literature shed light on their affordances and constraints under technical and pedagogical points of view. The literature has also stressed that these online communities could play a valuable role if integrated in formal learning contexts and in telecollaboration projects, for instance (Harrison & Thomas, 2009; Chotel & Mangenot, 2011; Brick, 2011; Lloyd, 2012; Chotel, 2012). Moreover, as the literature shows, in these online communities, rather than strengthening learners' previous offline social bonds with their language partners, the main tendency is to build new ones (Harrison & Thomas, 2009; Liaw, 2011; Chotel, 2012), weaker and fragmentary. My study provides a further contribution because it investigates learners over a longer period of time and to analyse if, how and why some learners are able to shape their own network of language partners after facing the challenging “zapping” interactional situations.

### **Telecollaboration in Online Chats and in Online Communities**

Online environments have been considered potentially beneficial for L2 learning through telecollaboration practices in particular. Research in L2 learning communities has mainly focused on the telecollaboration between geographically distant learners exchanging their native languages in the online chats (Lam, 2009; Black, 2009; Pasfield-Neoufitou, 2009; Tudini, 2010; Kurata, 2011; Gonzales, 2012). Not only did they find that the chat cemented these relations but also that the visual nature of the text-based chat facilitated repair when learners had as primary goal language learning rather than social interaction. Tudini (2010) explored the role of online chat in supporting the teaching and learning of foreign languages in open-ended tasks and in out-of-class settings. She identified important aspects occurring in the real-time textual conversations such as repair, negotiation of meaning, peer assistance, visual saliency and noticing. Gonzales' (2012) study on telecollaboration is very insightful since it relies on naturalistic data on *Livemocha*. This study revolved around the L2



pragmatic development (strategies in conversation closings) in CMC carrying out the analysis of user perception interviews and online interactions of seven learners participating on *Livemocha* over the course of one academic year. The author analysed their conversation closings over time and found several patterns in conversation closings such as thanking, apologizing and making future plans.

The present study makes a contribution to telecollaboration research both at a micro and a macro level. At a micro level, it provides longitudinal, naturalistic data of spontaneous interactions among learners in a CMC context, within communities designed for L2 learning and in absence of institutional organization and pedagogical intervention. At a macro level, it researches on if and how peer assistance is established among learners and on learners' use and perceptions of their learning tools to facilitate the L2 process.

## **Objectives and Research Questions**

This study is to my knowledge one of the first longitudinal studies about informal interactions in online communities relying on a naturalistic corpus data and occurring in an out-of-class setting.

The objectives are:

- To learn about the dynamics generated within these online communities and how such experiences might foster or impede opportunities for the use of the language.
- To know more about learners' autonomy without the guidance of a teacher in informal L2 learning in online communities.
- To assess the effectiveness of online communities for meeting long-term learning outcomes.

The research questions in broad are:

- What kind of opportunities for L2 use occur in the learners' interactions in online communities and what social and contextual factors affect and contribute to the construction of such opportunities and to learners' perceptions of L2 learning?
- What are the affordances and constraints of online communities in relation to their effectiveness for long-term learning outcomes? That is, is learners' engagement maintained constant, increased or decreased over time?

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## **The Socio-Cultural Framework**

The big theoretical underpinning of this study is socio-cultural theory, according to which human mind is mediated (Lantolf, 2000; Lantolf & Thorne, 2006) and L2 learning is socially constructed through interaction. Vygotsky (1978; Wertsch, 1985) provides the basis for socio-cultural approaches to learning with an emphasis on the social construction of learning. According to the socio-cultural theory, social contexts are crucial to understand L2 learning and personal, interpersonal and social factors have a strong influence on access to linguistic resources, interactional opportunities and L2 learning outcomes. Research in L2 learning has usually employed the sociocultural theory to explain the online interactions (Belz & Kinginger, 2002; Thorne, 2003) or to analyse collaborative online interactions and open-ended tasks in L2 classrooms (Kurata, 2011; Tudini, 2010; Darhower, 2007; Tanaka, 2005).

### ***The Zone of Proximal Development (ZPD)***

An important socio-cultural notion employed for this investigation is The Zone of Proximal Development (ZPD). In the field of language learning this is “the distance between the L2 learner’s developmental level as determined by independent language use, and the higher level of potential development as determined by how language is used in collaboration with a more capable interlocutor” (Ohta, 1995; p.96). The ZPD is basically the gap between what L2 learners can do by themselves and what they can do with assistance through collaborative interaction. Another notion related to the assistance in ZPD is “scaffolding” (Wood, Bruner, & Ross, 1976; Rogoff & Gardner, 1984). It refers to the assistance provided to learners so that they are able to reach a higher level of performance. It is meaningful in the context of social networks because learners working together create a collaborative scaffold.

### ***Activity Theory (AT)***

The empirical work carried out is also guided by the conceptual framework of Activity Theory (Engeström, 1987). AT provided a theoretical framework and a valuable tool applicable to this study in order to gain a better understanding of the complex L2 learning practices enacted in the online communities, and in particular to understand learners’ construction of opportunities taking into account each single learner in relationship and his interdependence with the social environment of the community. AT also proved to work as a good conceptual model to conceive the use of L1 and/or L2 as resources as mediational artifacts to organise the on-going discourse (Kurata, 2011; pp.120-121) or to seek assistance (p.133) in their online conversations. The adoption of AT as an underpinning framework permitted to explain the division of

labour and the social roles and norms among learners while they are interacting in their informal social networks. It also allowed a deeper investigation on learners' goal-driven strategies in their learning experience and the possible incompatibility of two goals (i.e. grammar accuracy vs. self-confidence in speaking the L2) or two motives (socialization vs. language learning) (Kurata, 2011).

## **The Methodology**

The methodology of this investigation relies on the interpretative paradigm, which, in line with AT and socio-cultural theory, holistically reconstructs isolated pieces of facts into a meaningful whole and which sees the world as complex, dynamic and socially constructed, interpreted and experienced by people in their interactions with each other and with the social systems (Schwandt, 1994). In fact, the analysis of the online community has taken into account the whole phenomenon as a complex system and the research focused on the complex interdependencies and dynamics developing within this system.

### ***A Multiple Case Study Ethnographic Approach***

The study relies on online ethnography, which is considered as the most common approach to investigating online communities (Thomsen, Straubhaar, & Bolyard, 1998). Through online ethnography I have studied the culture of the communities selected, the norms and rules determining learners' behaviour, their shared values and beliefs, their practices and their understanding of surrounding environment also when relating to others. This research is longitudinal because aimed to acquire new insights on the process of strengthening social-bonding between online learners, which is something that requires time to mature. In addition, this study adopts a case-study approach. This approach allowed an in-depth understanding of the participants' learning experiences and perspectives, as well as more focus on the process of construction of L2 use and learning opportunities in the online interactions.

### ***The Methodology and its Phases***

A wide range of qualitative methods has been adopted, from the online survey and the semi-structured interviews to the collection of samples of interactive discourse occurring in online social networks. In this way, the methodological triangulation, that is, the use of different methods to corroborate each other, allowed the cross-checking of the data collected, improving further internal validity. The methodology adopted is funnel-shaped and it consists of 6 phases, as the Figure 1 shows:

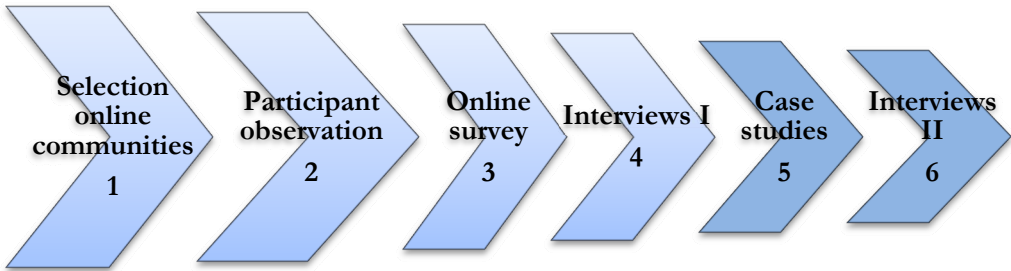


Figure 1. The 6 methodological phases of the investigation

Each phase opens up the way to the following phase and redirects to a deeper and deeper understanding of the behaviours enacted by informal learners in these communities, of the modalities in which peer assistance among them occurs, and of the different types of assistance they provide to each other.

- 1<sup>st</sup> phase: *Contextualization*. Review of the existing landscape of online communities for language learning and selection of *Busuu* and *Livemocha* communities as settings for the investigation.
- 2<sup>nd</sup> phase: *Fieldwork*. Immersion in the activities of the communities object of the study, inhabiting the communities and observing learners' behaviour.
- 3<sup>rd</sup> phase: *Survey submission*. The objective of this phase is to identify trends, patterns of behaviours and main practices among language learners in the online communities.
- 4<sup>th</sup> phase: *Interviews 1<sup>st</sup> cycle*. This phase elicited learners' more detailed accounts of their experience and of their language use and learning in the communities through semi-structured interviews.
- 5<sup>th</sup> phase: *Identification case studies*. Collection of samples of interactive discourse occurring in natural social settings and longitudinal micro-analysis of the learner discourse with the community interactants.
- 6<sup>th</sup> phase: *Recall interviews*. This phase consisted in interviewing the case studies at time distance with a two-fold purpose: verifying whether their level of engagement to the platform was maintained constant, decreased or increased; and also recording learners' reflections on the online interactional data they sent me some months before, to see whether their language exchange partnerships produced long-term learning outcomes.

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## Results

In relation to Question 1 about the opportunities to use the L2 that learners are able to construct in their interactions, the results of the survey and the interviews indicated that there are different profiles of learners and different learning behaviours to which correspond different uses of the platform, a different level of engagement and attitude and different types of opportunities for L2 use. Three broad categories of learners' profiles were distinguished (Malerba & Appel, 2016). To the (a) first category belong those learners who make a wide use of the didactic tools, to the (b) second those who decided to opt for the social networking features of the community. These learners in part prefer the interactions in the online chat because these suit their personal learning style and in part because of the behaviourist and repetitive didactic tools of these platforms; to the (c) third those of combine the use of didactic tools with the social networking features of the community. Learners belonging to profiles 2 and 3 proved to be those who have more opportunities of exposure to the TL if they interacted in the chat.

The results of the analysis of the online interactions in the chat provide concrete evidence of some specific forms of peer-assistance (mistake correction, metalinguistic talk, word provision, word explanation) learners exchanged once they had found a language partner or created their language partner network. In the case study phase learners' utterances proved how learners in their exchange partnership collaboratively co-construct opportunities to interact with their partners in the L2 in an authentic context. The corpus data analysed also provides examples of failure of peer-assistance provision and examples of successful peer-assistance provision. Results show that if learners have previously agreed on the roles as experts and novices of the language they are learning, their language partnership and peer assistance are more likely to result in a positive outcome. In this study, the analysis of learners' exchanges revealed more evidence of peer assistance and a potential for L2 learning in the case of more autonomous learners. In other words, those learners who showed a more autonomous attitude and were already lifelong learners when they joined the communities tended to have a more effective learning experience, to find interesting topics for discussion and to be able to combine social and pedagogical trajectories (even if not adequately supported by a teacher).

In relation to the Question 2 about learners' level of engagement to the platforms over time, it emerged that there is a wide amount of inactive users and that among the most active users there are many novice users. This means that there is a general decrease of

engagement over time, which was confirmed by the previous literature (Jee & Park, 2009; Harrison & Thomas, 2009; Stevenson & Liu, 2010; Brick, 2011; Liaw, 2011). In particular, learner profile 1 is the more likely to abandon the communities given the repetitive and automatic learning activities, object of many critics and complaints. The survey also showed that there is a key-factor stimulating learners' activities and determining learners' engagement to the platforms, that is, prompt and adequate peer-assistance provision and offering. It emerged that learners are aware of the importance of the reciprocity between peers but seem not to be adequately trained and competent to provide correct assistance. Another problem that emerged regards the fact that it is difficult for learners to create bonds and to intertwine contacts with their language partners because many of them are not immediately available in the chat. This is due to the fact that they are inactive users, that they use the platforms in a different way or that they distrust the interactional aspect of the communities because of cyberflirting and hoaxing episodes. Results also show a prevalence of "networking", which emphasizes relationship initiation, often between strangers. Once a tandem partnership is established, it usually develops outside of the community and through other Web 2.0 tools. In other words, the communities after a while start being considered as a source where to draw online language partners. The results of the analysis in general confirm the presence of the "zapping" interactional situation among learners identified by Chotel (2012).

## **Conclusion**

This study contributed to add more insight to lifelong learning processes and it enabled some continuity between formal and informal learning contexts, by providing some insights for teachers, tutors and practitioners but also for lifelong online L2 learners interested in integrating these learning practices with more traditional forms of learning. Given that collaboration between tandem partners is reflected in mutual support, equal contribution, same extent of benefit and equal roles (as learners or experts), this study makes a little contribution to the achievement of a better understanding of the dynamics occurring in online communities, on how to offer and respond to online assistance, to define social roles, to suggest an effective corrective feedback. The study also provided further contributions to the social aspect of L2 learning and to the field of telecollaboration drawing on learners' spontaneous interactions in a non-formal out-of-class context.

A limitation of this study concerns its longitudinal approach. On the one hand, the study was longitudinal because it looked at how learners developed their network of language partners and at their level of engagement to the platform over time, on the other hand the corpus data of the online interactions is not longitudinal. It is very difficult to track learners' online discourse over a long period of time, especially if the learners selected are volunteers spread all over the communities, do not depend on an institution where formal learning telecollaborative practices occur and are not rewarded by evaluation. Another limitation was that the presence of the researcher might have inevitably influenced the interviewees and the case studies during the data collection process.

Future research should insist with the idea of “bridging activities” (Thorne & Reinhardt, 2008) between the communication occurring in out-of-class informal settings and the learning activities taking place in the formal context of the language classroom. To this regard, it would be useful, for instance, to apply AT to telecollaboration initiatives on *Livemocha* and *Busuu* occurring in formal contexts. To conclude, another possible direction for further research would be about technical and usability issues in relation to these sites in order to determine which design features are most suitable and helpful to language learners.

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## **Added Values and Challenges Social Media Represent in the Hybridisation of Teacher Training**

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### **Abstract**

How do student teachers of our time acquire information? How do they find their way to knowledge? Students and newly qualified teachers establish, maintain and develop digital networks as an important source of development in the school subject and subject didactics. In a teacher education context, it is important to know this new interaction patterns that occur between children, adolescents and adults. This article discusses what teacher educators should be aware of when they orchestrate and facilitate learning with new technologies.

The methodological approach is based on a theoretical review, previous empirical data and our own experiences as teachers in teacher training courses.

Our findings related to the tree Ps (participation, personalization and productivity) indicate potential and challenges for teachers and institutions to cope with. The triangle of Ps is framing the complexity in a constructive way. Findings and discussions related to the characteristics of each of the angles indicate we have to change practice and task descriptions. This mean we have to implement our web 2.0-pedagogy and design learning (environment and activities) which supports purposeful activities, possibilities for reflection – spaces and tools which facilitate communication and sharing of ideas and understandings.

### **Introduction**

Today digital technology plays a central role within important areas of society such as business, entertainment, transportation, art, education, and of course the media industry. The interesting question now becomes: How do students of our time acquire information? How do they find their way to knowledge? – Students use social media to communicate and to obtain information. Teacher students' activities in social media are high, both to nurture friendship and for professional development (Helleve,

Almås, & Bjørkelo, 2013). Higher education institutions are still primarily relying on traditional learning management systems (LMS). Research on what student says about being and learning in a formal online classroom (Nilsen, Almås, & Krumsvik, 2013) indicates that students learning are social and that they create supporting arenas (Facebook and Twitter) in addition to the pedagogical platform the institution offers. But also newly qualified teachers establish, maintain and develop digital networks as an important source of development in the school subject and subject didactics (Engvik, 2014).

In a teacher education context, it is important to know and gain knowledge about this new interaction patterns that occur between children, adolescents and adults. Teachers in all types of schools must also consider how the information gathering and learning that occurs in the informal learning context can be used in a school context. Web 2.0-technology allows geographically separated learners to participate in a 21<sup>st</sup> century classroom. Unifying factors associated with the recent web 2.0-technology are related to sharing, collaboration, networking and community. The characteristics of the content have changed to a more dynamic state, with a higher degree of participation and influence. Key pedagogical questions related to these changes in content and pattern of use is what learning competencies, knowledge and practices that develops.

This means that the educational foundation is challenged and a revitalization of pedagogy is in progress (Krumsvik & Almås, 2009). McLoughlin and Lee (2008) suggest a pedagogy 2.0 for network community containing three key P's "Personalization, Participation and Productivity".

With this background this article discusses what teacher educators should be aware of when they orchestrate and facilitate learning with new technologies.

### **Our context**

The authors are both working in higher education in Norway, and are conducting courses for students in teacher training programmes. Our experience is that the generation of students entering higher education expect flexible studies. This is also acknowledged by other studies (Dahlstrom & Bichsel, 2014). Technology is embedded into students' lives and they possess digital skills. They are used to social media, working often in groups via the web and use, share and retrieve information online.

Several documents express high expectations about the potential of technology in teaching, learning and assessing online in higher education (Allen & Seaman, 2011; Johnson, Adams Becker, & Hall, 2015). But what kind of ICT skills teachers should develop during teacher education have not been discussed to any substantial degree (Kirschner, Wubbels, & Brekelmans, 2008). Current approaches to initial teacher training and in-service training in digital tools and pedagogies are insufficient for the need (Johnson, Adams Becker, Cummins, & Estrada, 2013; p.3). There is a need for new practices that respond better to the dynamics of the 21<sup>st</sup> century learning (Lieberman & Pointer Mace, 2010) and we will need teachers who can design new practices with ecological validity for a changing world (Lund & Eriksen, 2016).

We know that: (a) they learn from others than the teacher; (b) they learn from peers; (c) they don't necessarily learn all at an educational institution

These three points are by no means new. It has always been instructive to work in good study groups with clever fellow students whether you are in high school or in higher education. We also know that students' school performance is related to parents' education and access to homework help at home. However, the technology enables collaboration and competent others are more available. Capitalizing on peer-based learning is now easier (Ito et al., 2008). Students in upper-secondary school report that collaboration in social networks is a preferred strategy for homework and learning activities (Helleve, Almås, & Bjørkelo, 2013). The policies in higher education in Norway allow students to use their own devices in the classroom, and cloud-based resources are increasingly being used by students as collaborative tools. And Norway is ranking third highest among European nations for posting to social media platforms (Johnson, Adams Becker, Cummins, & Estrada, 2013). This means that they

*“arrive equipped not only with individual technologies that they maintain and improve, but also with their own personal learning environments and social networks. (...) Computer-based activities that are set in the classroom can be continued elsewhere and then shared at school. Students' personal collections and networks, gathered inside and outside school, can become resources for learning” (Sharples, et al., 2014; p.4).*

Norwegian authorities have taken several initiatives towards teacher education for us to be ready to meet future student teachers in a good way. Despite such initiatives, a recent survey on ICT in teacher education says that “Teacher training at all levels in

Norway may not be fully meeting its responsibility of producing teachers who are sufficiently digitally literate to help learners make the most of the tools at their disposal” (Tømte, Kårstein, & Olsen, 2013; p.9). Other research justifies this by saying that “teachers may have difficulty understanding the complex relationships between technology, pedagogy and content, because these are often taught in isolation in most teacher education programs” (Koehler, Mishra, & Yahya, 2007; So & Kim, 2009).

The digital social media tools we’re focusing here are increasingly used by both new teachers and students and are often called web 2.0. A short characteristic of these tools is important for later discussing for how web 2.0-functionalities can be implemented in a pedagogical setting.

### **Technology characteristics**

Wireless connectivity, hardware miniaturisation and central data storage are main “drivers” of web 2.0. Web 2.0-tools make it easier to produce content together. File storage moving from local hard drive to the cloud simplifies sharing. This means that we see a proliferation of services that are based on relationships between people and we say that the media has become social. Social media is tailored for many-to-many communication and media content is primarily created by participants. Posting in such platforms generate an immediate dynamic from the audience. The audience access your work anywhere and anytime. And they can respond. They share, rate, like, tag or post comments to images, articles and other content. Digital technology (smart phones and the Internet) change the size, scale and dynamics of children, young people and adults’ social worlds (Ito et al., 2008). Thus this technology may be a game changer in higher education (Oblinger, 2012). For the teacher it is therefore relevant to relate this to what new skills, knowledge, practices and competencies that develops. Everything from applying information to produce new expressions – and reflection of ideas are evolving.

Writing with pencil on paper is not very shareable and not searchable. Here, technology has provided affordances which cause a rethinking of the tasks and learning goals we set for our students. But it is not about finding one tool that increases learning outcomes in one learning objective. This involves a constructive process consisting of communication, learning and reflection.

## Theoretical perspectives

No matter how we describe the generation of young people today (Selwyn, 2009), we meet pupils and students who have been exposed to lots of technology during their childhood. Their use of digital technologies can be seen as “a media ecology where more traditional media, such as books, television, and radio, are ‘converging’ with digital media, specifically interactive media and media for social communication” (Ito et al., 2008; p.8). Usage is woven into the social contexts in which technology is integrated. Activities are created between technology and its users’ subjective intentions. This means that the technology will be a part of, and should be understood in the social context. In this perspective the technology will act as an artifact, created and transformed – and carrying a particular culture (Kuutti, 1996). This is helping to make knowledge visible, accessible and thus subject to sharing and imparting to others, but reveals also a potential to transform teaching and learning (Furberg & Lund, 2016). In this article we concentrate on how digital technologies can allow for a much larger repertoire of creative and innovative and collectively oriented learning activities.

Consequently this fits into our teacher’s practices and the students’ self-regulated learning. A broader interpretation of knowledge and teaching requires a perspective where teaching and learning takes place in very complex educational ecosystem (Shear, Gallagher, & Patel, 2011; p.12). Educational and technological changes require a framework that emphasizes a number of factors related to teaching practice and student learning. A sociocultural learning perspective emphasizes that knowledge is constructed through interaction. In this perspective, interaction and cooperation are fundamental for learning. It further highlights the context, environment and culture around the pupil. Although learning here occurs through targeted actions in a social and cultural setting, is not necessarily the consequence that students always have to work together – but that they have insight into related activities in their environment.

McLoughlin and Lee (2008) presents three Ps to describe pedagogy 2.0 adapted to our time and our network society. It is about *Personalization*, *Participation* and *Productivity*. The learners today have easy access to ideas, resources and environments that supports their learning interests and their progress occurs through personal needs and choices. This goes under the name *Personalization* which also relates to customising. The pedagogy must engage the learner in the social process of knowledge development (*Productivity*) instead of just letting them use the information and learning material as the teacher presents. The teacher must support connections,

dialogues and links within and across communities and larger networks (*Participation*) for the purpose of sharing ideas, questions and to solve problems. The core of pedagogy 2.0 is to take advantage of web 2.0's strengths in relation to self-regulation an increased degree of socialization and interactivity, access to open environments and opportunities for easier use of peers. In a triangular model McLoughlin and Lee (2008) try to visualize a new pedagogy with the principles (a) Personalization, (b) Productivity and (c) Participation.

As Selwyn (2011) states, it is not sufficient to see schools just as physical structures (buildings, corridors, classrooms). The totality of the learning session is important, "the curriculum, the activities that students engage in, students' perceptions of the learning goals in the classroom, their social interactions, the teacher's behaviour, and more" (Salomon, 1992; p.63).

## **Methodological Framework**

The methodological approach is based on a theoretical review, previous empirical data and our own experiences as teachers in teacher training courses. The previous empirical data includes respondents from teacher education enrolled in net based courses at (anonymous institution). 56 students (66.1% female, M age = 42.5 years) completed a survey which investigated experiences and behaviours with the use of desktop videoconferencing (in-service student teachers (n=32) and master's degree students (n=24)). 11 of the students were selected for focus group interviews and we conducted observations based on the recordings from the teaching lessons. The survey was conducted in November and interviews were conducted later (February 2012). A group of students (n=11) was selected (purposeful selection, (Maxwell, 2005)) and split into two separate focus group interviews (Kvale & Brinkmann, 2009), which were based on the survey data and conducted when the courses were completed. In addition to time and settings, age, sex and demographic variables were controlled to ensure that the selection was purposeful.

## **Discussion of Findings**

This article aims to discuss how teachers can design their teaching and learning activities in higher education in the ecology of web 2.0 and social media. According to the introduction and theoretical aspects presented, we are using the three key points; participation, personalization and productivity to focus our discussion to contribute to developing new practices.



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## **Participation**

Our research indicates that students are learning without teachers. But this does not mean that teachers are unnecessary. The students appreciate teacher-involvement but it seems like the role and context have changed. Despite every student using their own device, our findings identify that students learning are social. McLoughlin and Lee (2008) state that more engaging, socially-based models for teaching and learning are needed. In our ICT-supported learning environments more than two thirds of our students report they prefer participate via chat (instead of oral talk). They participate in formal LMS-discussion-threads, open Twitter-streams and closed Facebook-groups. Some respondents indicate that using email is ousted by i.e. Facebook-communication. The degree of participation is richer in these kinds of web 2.0-tools. The sender can see: who (how many) have read the message, if there are any reply-comments, or *likes* and he can keep control of how many *followers* he got. By allowing comments and annotations by others, such personal publications allow for social constructivist forms of participation. With a greater emphasis on teacher-student partnerships in learning, we must accept the learners' productions, content, activities and contributions as part of the curriculum.

Our students find web 2.0-tools like Facebook easy to use for learners to engage deeply with their peers. Findings from different student groups show that students who engage in such net based activities, they learnt not only about the profession they are entering, but also about themselves as practitioners.

## **Personalization**

Terms describing personalization like *learner-centred*, *self-regulated* and *responsibility of your own learning* are not new to teachers. But we find that the use of ICT add some reflections and need some extra decisions. Central to the development of personalization in this context is moving on from LMS's, towards an approach that are more learner-centric (McLoughlin & Lee, 2008). Schools that make use of hybrid learning models find that using both the physical and the virtual learning environments to their highest potentials allows teachers to personalize the learning experience and engage students in a broader variety of ways (Johnson, Adams Becker, & Hall, 2015), but our respondents state difficulties choosing a suitable platform for learning and communication. Quotes from colleagues like: "Should we use Google Apps for Education, Facebook or Fronter?" and "Do I have to teach netbased? Or, how much can be done on campus?" express insecurity but also an understanding of teaching in the 21<sup>st</sup> century.

Our findings are related to studies where some or most activities are recorded. Our surveys show that the students want to choose between live and recorded activities and lectures. This corresponds with the desire of learning anywhere and anytime. Interview also revealed that this self-regulation and flexibility also provides dilemmas, i.e. related to collaboration and the need for social communities. A detailed schedule with mandatory checkpoints is valued, for students to be deeply committed to the study.

Constructing personal learning environments (PLE) can help integrate formal and informal learning in higher education, to maximise the potential of the new tools to support learning by capitalising on the competencies and skills students bring into the classroom (McLoughlin & Lee, 2010). We find a broader understanding of the learning situation among our respondents. Teachers admit that “my teaching is a lot more than me”. Teachers and students are expanding their learning space, and incorporate YouTube, blogs, wikis, experts, peer-groups, etc. Establishing and developing such a community “adds a further dimension to participative learning by increasing the level of socialization and collaboration (...) by fostering connections that are often global in reach” (McLoughlin & Lee, 2008; p.17).

### ***Productivity***

Changing from students as consumers to producers has long been taking place in the focus of pedagogical practice in higher education. The shift to students as creators, is by NMC (Johnson, Adams Becker, & Hall, 2015) described as a fast trend in Scandinavian schools for the next one to two years. Our research among teacher students since 2011 indicates that they are able to cope with the practical and technological issues. The technology is not an obstacle. This paves the way for increased productivity. They produce resources and share various contributions. We identify multimodal texts, hyperlinks, presentations, movies, blogs, comments, recordings from practice, etc. Our research reveals that students also establish their own channels “outside” the institution (i.e. Facebook-groups). A larger specter of possible formats, are nevertheless also among our students perceived as difficult for those from a conservative tradition.

A challenge identified for the teacher is that students still are doing lots of other things while being taught. But several of these activities are closely related to teaching. We find students checking URLs and resources on Internet during lectures, and sometimes they share and contribute to the lecture with their findings. 25 % of the students said they asked more questions in online meetings than in campus sessions

and interviews did reveal, that the chat opportunity can be used to “ask questions we don’t dare to ask in an auditorium”.

Our research shows that students are capable of creating, producing and sharing ideas, concepts and knowledge. And they contribute with their inputs both spontaneous and when asked. This is in accordance with the findings in the Norwegian ICT Monitor (Norgesuniversitetet, 2015), which also emphasize the levers of change spotted in developing learning objectives, assessment and learning activities, so that these can represent a whole in such a way that they contribute to better learning outcomes and constructive alignment (Biggs & Tang, 2011). This means we, as teachers, have to prepare for and organize our learning environments in line with this perspectives and our students’ practice. Our reading lists, activities, tasks should be open and flexible to the students contributions, and the social constructed knowledge. Their creative productions can in this way, validate their own learning and knowledge.

## **Summing up**

Collaboration and relationships is one of the pillars of web 2.0 and social media. The main aim of this article is to make contributions to how teacher educators can design their teaching and learning activities in line with these perspectives. When the interaction between communication, technology and daily activities change, it provides opportunities to build good learning environment within the class but also outside their four walls. This is what we define as a basis for the debate of hybridisation. What should be done where (online, on- or off-campus), by whom and at what time? It also provides opportunities for pupils and students to create coherence in their learning efforts across various venues (formal/informal) and across studies and semester (McLoughlin, 2013; p.189). Hopefully, these perspectives and this practice in teacher education also will prepare the new teachers for their practice in a 21<sup>st</sup> century school.

Today’s students have high expectations of how they should learn, they select technologies and learning environment that is tailored to their needs and they have a sophisticated understanding of how they can manipulate both technologies and learning environments to their advantage (Conole, De Laat, Dillon, & Darby, 2008). Shared responsibility accelerates better quality learning, but teachers have to lead the change. We have to enable the teachers to be the drivers of pedagogic innovation for their students (Laurillard, 2012). Offering relevant teacher education it is essential that the institutions reflect these issues. Our findings related to the three Ps indicate potential and challenges for teachers and institutions to cope with. The triangle

(McLoughlin & Lee, 2008) is framing the complexity in a constructive way describing three keywords as tools for constructing, analysing, testing and sharing innovative learning designs. Findings and discussions related to the characteristics of each of the angles indicate we have to change practice and task descriptions. This mean we have to implement our web 2.0-pedagogy and design learning (environment and activities) which supports purposeful activities, possibilities for reflection – spaces and tools which facilitate communication and sharing of ideas and understandings.

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**Best of EDEN 2015**

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## **Implementing Innovative Learning Methods: A Two Schools Example**

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### ***Best Practice Award Winner***

#### **Abstract**

Applying new innovative learning methods in schools can strongly influence and reform them. We questioned ourselves how these innovative educational approaches can reform an urban and a rural school respectively. We selected an urban school, a Model Experimental School and a typical rural High School in Greek countryside. We applied almost the same innovative approaches to both schools inquiring gradually the changes. In the case of the urban school new education methods were applied in order to raise students' interest, while in the case of the Experimental School has to do with its fundamentals and basic principles. Students attending a Model Experimental School are in general willing to take part into educational programs and innovative projects. We detected that the rural school reformed rapidly, achieving gradually some of its pronounced educational goals. Teachers and students developed working groups and organized Astronomical, Environmental events and Drama performances joining thus the rural school with the local society. On the other hand at the Model Experimental School, all these activities regarded as obligatory activities. We concluded that the urban school reformed itself, but not as fast and mainly as crucial as the rural school did.

#### **Introduction**

We are witnessing a new social capital where knowledge and learning are the result of cooperation and interaction of people, with master trust among participants, social networks, linkages and partnerships based on the social values of society (Kalantzis & Cope, 2013). "The new learning is reflected in the concepts of transformational, integrative and cooperative education mainly of the Social Gnosticism, of the state

pluralism but also of the principles of reconsideration, cognitive repertoires and synergistic feedback” (Arvanitis, 2013; p.19). It is therefore clear from the above that the issue of us as educators, it is now shifting from the teaching of the subject, in teaching the active subject, where the meta-modernism, i.e. the affirmation and acceptance of pluralism and integration of the personal style, has the total power in learning practice (Kossyvaki, 2003). Furthermore, some dogmatic concepts of objective and indisputable knowledge and the acceptance that knowledge is considered as a social construction adequate under continuous trading, alongside to the circular organization of living systems that self-regulated entities in interaction with the environment, are required to be abandonment (Kossyvaki, 2003; p.44). Schools which purport to stand at the forefront of the education system should at least work pluralist in its choices of educational methods used. As teachers we are called to respond and to rebuild the context of the educational process. The student turns from passive to active receiver underlying learning and teachers must abandon the role of authorities (Kossyvaki, 2003), by developing the necessary skills that will give it the ability to cope with a world that is constantly changing. Additionally, compelling is the need for using alternative forms of education that will offer good education for students who for whatever reason cannot participate in the conventional system of education. Teachers must prepare their students, integrating the life skills that will enable them to recognize and manage a world that is constantly changing.

Practically, how can we organize and reform a rural school? Designing a long period action plan can help a school? How can we implement theoretical predictions into real school environment and evaluate our findings? It is well known that teachers have to participate into educational conferences and courses (Baird et al., 1991). Meetings and courses are crucial for the overall progress and development of teachers (Shannon et al., 1998). New trends in education had to be spread into a rapidly changing world (Tillema, 1994). Modern educators and teachers are expressing a growing demand for lifelong learning programs (Hobson, 2002). Additionally, all new trends must be implemented into classrooms and embodied in the traditional curriculum (Helsby, 1995). In parallel students must accept and incubate modern pedagogical methods (Finn, 1998). Working in groups, consisting working teams, preparing projects and presenting results are some of the new aspects of education. On the other hand, excellence groups (Howley, 1989) and students’ contests (Verhoeff, 1997), seems to gain an important part of nowadays educational system. Furthermore, extroversion of knowledge gradually becomes a goal for many schools (Holland & Andre, 1987). Astronomical and environmental events (generally science courses), cultural

performances (theatre) are of high educational content. But the question is how we can implement all these aspects into daily educational practice.

## Implementation

The two schools, on whose actions we rely on to develop our thoughts and with whom we have engaged either as Headmasters/mistress or as teachers, tried to implement a knowledge management program aimed at achieving specific learning outcomes such as the diffusion of knowledge, the improved performance, competitive advantage in a public school and high levels of learning innovation. So through the exploration and implementation of pre-existing knowledge trying to create new knowledge for our students and ourselves, always having in mind that in any educational application, learning as a product of the learning and not just teaching (Lionarakis, 2006). At the same time we took seriously into consideration that learning is not only cognitive development but depends heavily on the feeling, the will, the drive and the *physicality* (Kossyvaki, 2003). The Knowledge management model we rely on in order to design our educational plan for both schools was that proposed by Collison and Parcell (2001), considering three basic knowledge management elements: people, technology and procedures. At the same time we received seriously in consideration the promotion theoreticians' opinions about the crucial role of the schools' culture in every single case i.e. the differences between the culture of the rural and the urban school.

Thus we tried to set the bases for creating schools with teachers and students as an integral part of the *knowledge society*, exploiting creatively knowledge which occurs outside the classroom and implementing the so called *School on cloud*. Schools that are familiarizing students with inquiring, managing and extracting the information, pull down the watertight boundaries of disciplines and interdisciplinary approach knowledge, involving diversity in learning and finally teachers that try to get out of the suffocating confines of Marxist *alienation* of alienation that is the product of his labour. The four axes of the action plans that were formed were:

- the logistical equipment and improvement of building infrastructure,
- teachers training and engaging with new pedagogical data, innovation and research,
- improving teaching instrumentation aimed at developing students skills that will ensure a smooth, balanced and productive path in their integration into society and the labour market in particular and finally,
- evaluation.

In both schools we have mainly problems on rising students' interest, provoke curiosity, but especially in the rural school we have also some disciplinary matters. Both schools wished to develop extroversion and come closer to local communities. According to these major needs in both schools we based on lifelong learning, implementation, group working, production of educational material, extroversion, seminars, educational and cultural events, participation in contests, evaluation and feedback.

### **Urban School Activities**

The goal for improving the education provided includes actions related to the Organization of the school community as community learning, developing educational material relating to the curricula of the new school and the pilot curriculum and designing teaching methods as set out in the institutional framework (Kalantzis & Cope, 2013). Initially the improvement of education in a public school requires in-service training for teachers. The drafting of a questionnaire on the training needs of teachers and the exploitation of the data helped in the planning of training activities under the supervision of School Counsellors and properly design seminars and projects. Furthermore we designed training activities in cooperation with Universities, other educational institutions but also through applying and succeeding an Erasmus+ proposal for Certified In-Service Training Mobility Program for the school staff: The proposal indeed provides a summer school for teachers as an implementation activity.

Additionally, we signed protocols of cooperation and development of partnerships and actions with Universities or other educational institutions while our connection with the local community formed the next long-term goal. In particular the cooperation protocols were signed with the Laboratory of Educational Material and Educational Policy of the Hellenic Open University (HOU), The Laboratory of Research and Mathematics Teaching of the Department of Primary Education (University of Patras), department of Telematics Applications and Regional Development of Computers Technology Institute CTI and Technological Institute (ATEI) of Patras. With all the above institutions have developed actions involving both students and teachers or students and has been planning for the full development of cooperation in the coming years. At the same time is in process the signing of protocols with School of Pedagogical and Technical Education (SPETE), the Laboratory of Sociology, Educational Research and Professional Development of the Department of Educational Sciences and Education in Preschool Age (TEEAPI) and Science Centre of

Patras. At the same time we also formed partnerships with other local and international bodies. The opening of the school in the academic arena but also in society in general resulted in the change of the mentality of educators and further enriching and updating the curriculum.

Regarding the digital school equipment, we pursued potential sponsorships, while significant turned out to be the volunteer work by teachers. As a result of these actions we can refer that our school was equipped with the latest technology machinery and two computer laboratories where each pupil has his computer, the development of excellence clusters of Robotics with four available robots. Furthermore we equipped all classrooms with computers and video projector in well accordance with installation of optical fibre connection and the possibility of developing high speed Internet in every classroom or lab. These were important steps towards upgrading the quality of the learning process and practice while at the same time gave us the ability to design and implement innovative actions. In addition to the adopting of teachers Learning Content Management Systems, which will allow them to create a Web module, was one of the components of the future design of the learning process.

The curriculum of the Pilot Schools (Including Model Experimental Schools) allows educators and teachers to produce educational material utilizing interdisciplinary approach. Indeed until now we configured important educational material that is posted on the website or in our *school in cloud*. Shaping interactive online class from all teachers is the next challenge. It is worth noting that where applied online class or online educational platform the number of visitors was overwhelming. Alongside the order constituted an important part of the curriculum which was implemented this year, another major innovation was the seven clusters (groups) of excellence, innovation and creativity that functioned with the participation of about 150 students (out of 180). In addition, all students and teachers of the school were involved in experiential synthetic work. Pupils and teachers had to remain at school after completion of the course in order to implement these activities. The consistent presence of the students and the almost non-existent, leakage is a positive feedback for our effort but simultaneously creates higher expectations to which we must respond with the unique reward of taking care for our students and their parents. It is important to stress that all these actions and other innovative measures undertaken by individual teachers followed a prescribed procedure dictated by the principles of modern pedagogical-educational movements, as well as specific instructions and instrumental approval of the Scientific Supervisory Committee (EPES).

Finally we must mention the importance of the evaluation process of the action plan and educational work of the school in general. It should be noted here that both the excellence groups and the actions initially involved in the original design their valuation and deliverable material – after their completion-all deliverables, educational tools and results of assessment were filled out. In the final meeting of the Plenary Session of Teachers but also in the Scientific Supervisory Committee (EPES) meeting where the theme of the evaluation of curriculum and the actions of the school year were discussed, we concluded that the process of feedback is very important in order to further proceed into decision-making for the remodelling of the stages of the learning process that did not worked effectively.

### **Rural School Activities**

First of all in order to face the problems we realized that teachers had to be educated and trained on new pedagogical and didactic trends (Day, 1999). Teachers were encouraged to participate to several training and learning activities. During the first stages of our action plan teachers were educated mainly on new education trends, educational scenarios, ICT implementation in classrooms, modern pedagogical trends and new approaches in daily school life. It was clearly understood that traditional pedagogical methods were inefficient. On contrary whenever a new pedagogical method was applied a rising interest was observed. Teachers also appear more willing to test new approaches. As a result of all these activities we realized how important is for educators to attend training activities and programs. New prospective occurred and new methods applied in classrooms. This was the first step of a school that learns, evolves and develops.

Secondly, teachers were encouraged to produce educational content. Educational scenarios were developed, learning materials were produced and working groups organized. We introduced and encouraged a new innovative idea of organizing student groups with special skills and responsibilities (Johnson & Johnson, 1990). For example, the Event Organizing Group, the Promotion Group, the Media (e.g. video) Producing Group, the Drama and Astronomical Team were some of the most active groups. We uploaded most of the produced educational material and scenarios on electronic means (e.g. our website), while the working groups started producing projects and events. A group of teachers was responsible for each working group. They were setting final goals, organizing their working plan, scheduling meetings and evaluating their progress. We tried all steps of the working groups to be based on educational scenarios. This parameter was also an important aspect of a constant



learning school (Schank, 1994). We detected and evaluated all steps, extracting important conclusions of how a school can become a working community. Additionally, the educational material and scenarios seem to encourage students to further search for knowledge. As all this educational materials were available on the web, educators and teachers found additional teaching tools.

## **Excellence and Contests**

A second step to our action plan was excellence, focusing mainly on contests (Bishop, 1991). We realized that participating on National or International Contests was really a unique opportunity to raise the interest and competitiveness of our students. We can refer to the most successful attempt, the *Odysseus Contest*. This contest was about Astronomy and co-evolution of life in space. Winning the contest was not our initial goal; instead we were mainly interested on developing a progressive educational pathway (Jacobson & Wilensky, 2006). First of all we organized a team consisting of almost ten students interested in Astronomy. We scheduled some standard meeting dates, but we met each other mainly out of schedule. Because of the strict school curriculum we had to communicate a lot through electronic means (e.g. Skype). All these state problems and aspects are interesting parameters of how a school learns to work in groups, communicate and develop a project (Garmston & Wellman, 2013). We learned that ICT are absolutely necessary tools for education.

## **Astronomical Event**

Developing our Astronomy project, we realized that we needed some hands on experience, observation knowledge and support by experts. These realizations were important on organizing the first Astronomical event in our school's region open to local community. The event was a result of an excellent collaboration between several working groups, teachers and authorities. The event-organizing group supported the whole action, the promotion group, the media group and astronomical team also took great responsibilities. Teachers from our school participated in several parts of the event, while we had the support of the Municipality of A. Olympia and the 7<sup>th</sup> Ephorate of Prehistoric and Classical Ancients (EPCA) of A. Olympia. We operated remote telescopes from distance, a professor from University of Patras gave Lecture about the Universe and finally we observed astronomical objects by telescopes. All these activities raised the interest of students and revealed a new orientation in learning procedure for our school. Local communities and authorities came closer to our school and we learned how to expand our audience (Hanifan, 1916). We had now a strong team willing to work harder for our contest project.

From this point and on the final title of our project was clear. We decided to work on plants attitude and colour on another planet. The contest's demand was a clearly defined scientific question, fully developed and answered through experimental and bibliographic justification. Although the difficulties, we managed to win the National part of the contest on March 2013 and the European part of the contest on April 2013. Of course this was the first step of a working methodology. Although it seems that our main goal was the win of the Contest this is not absolutely accurate. We initially tried to intrigue and provoke students to take part to all the related activities. It was the same with the participation of an environmental Contest and also with the drama performances of our school. Furthermore, we realized that extroversion events are extremely important for the educational practice (Elmore, 2007).

### **Environmental Event**

We followed up with an environmental event, which was actually an ecological meeting. This event combined lectures by professors of the University of Patras (another important parameter is growing a standard collaboration with higher education foundations), hands on activities (experimentation related to chemical effects on environment), speeches by market representatives and groups of volunteers. This was also an open event to local community. Apart from this aspect students learned many about connection between education and market especially on the agricultural field (Clark, 1983). Additionally, volunteerism presented to students as a part of environmental protection part (Goldberg, 1998). All these aspects were highly educative for students and local community, while a rural school approaches the day life of local society (mainly agricultural) from many aspects (scientific, economic, activism). On the other hand this was our second extroversion event. Our working groups continued developing and performing even more professional. Doubtless an important parameter of the constant learning school is assigning important responsibilities to students (Ames, 1992).

### **Innovative Approaches**

In parallel we introduced some innovative approaches in every day teaching practice. Real time (synchronous) video conferences were implemented on several lessons (Murphy & Coffin, 2003). An interview from the researcher Michael Tsambas at Lyon France and a couple of virtual visits to CERN were some of our distant learning attempts. Additionally, we increased the use of ICT on daily teaching practice. Whole lesson were presented digitally, while experiments were combined with electronic means e.g. we used augmented reality applications (Kaufmann, 2003) and Kinect

camera for detecting movement and air presenting (Hsu, 2011). In all these actions students' working groups organized almost the whole activities. We realized that students were feeling important in participating actively, while they count the success of the event as their personal success. This is also a remarkable point as we often focused on students with low learning expectations but exceptional technical skills giving them responsible roles on all events Furthermore, we also gained important profits on the disciplinary section. Students felt that a well-organized and extrovert school is not only a matter of strict rules and punishments, but mainly a school that develops healthy relationships between all members (students, teachers, parents, local community).

## Conclusions

As far as concerns the Urban School, which is actually a Model Experimental School we can assume that the institutional changes that have occurred in the operation and administration of the school, created the certainty of a positive climate of cooperation and participation in educational matters. A climate that is indeed inherent in public schools, but its development impinges on bureaucratic mechanisms and regulatory frameworks. At the same time the present State Control Mechanisms in Education that transforms educators and teachers into forwarder civil servants, are strongly forced to change form. The latter is not painless or easy, requires a change in the way of facing the concept of *participation*, something that may eventually be dangerous for the system. The possibility of a learning unit to utilize its experience and develop culture of innovation is what matters in a society that is constantly changing, changing us also in parallel. At the same time the implementation of an action plan based on respect of the educational and vocational development targets and the simultaneous creation of mechanisms of communication and collaboration with students and the wider social and educational context, could lead in the near future to transform us into thinking school. We strongly believe in a school that learns from its imperfections, his mistakes and the new comings, but his vision remains a collective creation and constant pursuit.

On the other hand the rural school concluded, according to its action plan, that first of all it is of high importance, schools to organize and plan their actions in long term (Sniehotta et al., 2005). We realized that planning a three or four years plan will be absolutely beneficial for achieving goals and upgrading educational practices. This also reveals that an essential evaluation can only be performed after a long period (3-5 years) of actions and activities. Secondly we confirmed the importance of lifelong

training for teachers and educators. Doubtless, participating in educational seminars, conferences and training meetings allow teachers to be always informed about new educational trends (Day, 1999). Implementing all these compulsory methods in classrooms turns out to be extremely positive for students. Furthermore, organizing extroversion events by entrusting critical responsibilities to students was also one of our positive remarks (Elmore, 2007). We observed that all these events joined teachers, students and local community together. Science and culture came closer to students and local society, while the interest of students rose remarkable. All these events include the element of collaboration and cooperation between several partners and promote our basic goal of knowledge diffusion. Additionally, participation in contests is another crucial parameter (Bishop, 1991). Healthy competitiveness between students and schools can only offer benefits to all participants. Winning a contest is not the key. We are mainly interested in the whole progress and steps of contest. We wish students to take part, work, and search, compose papers and support publicly their projects. Of course a won contest satisfies students and encourage them for new tries. Another remarkable conclusion is the importance of educational scenarios, material and content (Jacobson & Wilensky, 2006). All these produced objects are really useful for planning and orienting bigger action plans. Furthermore if all these educational objects are uploaded in websites, everyone can easily access and use them. Finally, we can claim that each step was an evaluated progress of a previous one, helping us to achieve goals and milestones. This is how a school learns by itself and by others.

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## **Closing the “Learning Design Life-Cycle” with the Pedagogical Planner**

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### ***Best Research Paper Award Winner***

#### **Abstract**

In the last few years, a number of approaches and tools have been proposed in the Learning Design (LD) research area, with the aim to support teachers in the complex process of conceiving and planning innovative educational activities. Most of the available tools support one or two stages of the whole learning design cycle and this has caused a certain variety of the available tools. Even if some researchers suggest such variety is positive, as teachers are free to pick up from the shell tools depending on the specific needs, others claim that this is too much disorienting, especially for those teachers who are not familiar with the LD field. To contribute to this still open discussion, we have developed a tool, able to cover the whole learning design cycle and have started studying its impact on teachers' LD practices. The paper illustrates such a tool, called Pedagogical Planner (PP), which is able to support the three main phases of the learning design cycle, namely Conceptualization, Authoring and Implementation. The PP so far has been used by teachers to support innovative educational interventions in the field of intangible cultural heritage education and has proved to present a number of advantages and innovative aspects in respect to other existing tools, which are discussed in the paper.

#### ***Abstract in Italian***

Negli ultimi anni nel settore di ricerca del Learning Design (LD), sono stati proposti diversi metodi e strumenti, con l'obiettivo di supportare i docenti nel complesso compito di ideare e pianificare attività educative innovative. La maggior parte degli strumenti oggi a disposizione supportano una o due fasi del ciclo di vita del learning design e questo causa una certa varietà negli strumenti a disposizione. Mentre alcuni ricercatori vedono tale varietà come positiva, poiché consente ai docenti di scegliere liberamente quali strumenti utilizzare a seconda delle

specifiche esigenze, altri lamentano che questo possa risultare disorientante, specialmente per quei docenti che non sono esperti del learning design. Per contribuire a questa discussione ancora aperta, è stato sviluppato uno strumento, capace di coprire l'intero ciclo di vita del LD, per studiare l'impatto che questo ha sulle pratiche di progettazione dei docenti. L'articolo descrive lo strumento, chiamato Pedagogical Planner (PP), che supporta appunto le tre fasi principali del ciclo di vita del LD, cioè: la Concettualizzazione, la Pianificazione e l'Implementazione. Il PP al momento è stato usato da dei docenti nell'ambito di interventi educativi nel campo del patrimonio culturale intangibile ed ha mostrato una serie di vantaggi rispetto agli strumenti esistenti, che vengono discussi nell'articolo.

**Keywords:** learning design, intangible cultural heritage, pedagogical planning, conceptualization, authoring, implementation.

## **Introduction and Background**

One of the main aims of the learning design research field (LD) is to provide teachers and educators with methods and tools able to support them in the delicate phases of (re-)designing and planning innovative educational activities. This should address the evident and urgent need of innovating the educational systems. The field has been quite active in the past few decades, with researchers striving to find effective ways to support teachers for the complex task of conceiving teaching and learning activities that can be enacted, shared and repurposed (Conole, 2012; Mor & Craft, 2012; Persico & Pozzi, 2015).

Through the years, researchers have proposed and tested a range of different methods and technological tools, with different aims and with varying degrees of success (Prieto et al., 2013a; Persico et al., 2013): for example, some tools are more oriented to support pedagogical reflection, others are aimed to foster teachers' creativity in conceiving new educational solutions, others are used to make teachers' design knowledge explicit (and thus potentially sharable and reusable), along the whole process of going from design ideas to delivery (Muñoz-Cristóbal et al., 2012; Earp et al., 2013; Pozzi et al., 2015a; Persico & Pozzi, 2015).

Clearly, there is not a unique way for going from teachers' abstract learning design ideas to their delivery with actual students; on the contrary, the learning design process is quite complex in nature, at some stage it is systematic, at others it is creative and in any case it is hardly reducible to a number of predefined steps (Winograd, 1996;



Masterman et al., 2013). This has basically caused the variety of tools that are presently available.

Just to provide some examples, among the tools aimed to support the conceptualization of new activities, we can mention the Course Map (Conole, 2012), the 4SPPIces approach (Pérez-Sanagustín et al., 2012), the 4Ts model (Pozzi & Persico, 2013), Persona Cards (Chacón-Perez et al., 2015), etc. Among the tools aimed to author the design, we can mention WebCollage (Villasclaras-Fernández et al., 2013), CADMOS (Katsamani & Retalis, 2012), OpenGLM, (De Liddo et al., 2011), LAMS (Dalziel, 2003), CeLS (Ronen et al., 2006), etc. A more exhaustive overview of the existing tools, along with a discussion about their main characteristics, can be found in Prieto et al. (2013a). In this same work, the same authors claim the field is too much fragmented.

In front of such variety, some researchers suggest to take advantage of this richness, by using various tools, instead of striving to find one single tool that fits for all purposes (Mor, Craft, & Maina, 2015; Masterman & Manton, 2011). In our recent experience, instead, especially developed within the METIS project ([www.metis-project.org](http://www.metis-project.org)) (funded under the LLP Programme), this runs the risk to disorient teachers, especially if they are novice to the LD field.

As opposed to this position, other researchers (Pozzi et al., 2015b) suggest to provide ‘unique, tools’, each one being able to support the whole design life-cycle, starting from the first steps of conceptualizing the design idea (defining the learning objectives, identifying the contents to be addressed and choosing the most adequate pedagogical strategies), down to planning the flow of activities, associating the educational resources and tools to be used by students, and finally delivering the resulting design (being it a single activity or a whole course) to students through a Learning Management System (LMS).

In order to contribute to the LD field, the present paper illustrates a tool, which is called “Pedagogical Planner (PP)” (Bottino et al., 2008). One of the main assets of the PP (and its distinctive feature in respect to all the other tools) is its ability to support – alone – the whole design cycle, in such a way that it allows a smoother and more organic design approach. This makes the PP unique in the LD research field, as it bridges and integrates all the main phases of the design process.

In this paper, one particular instance of the PP is described, as it has been proposed within the i-Treasures project (Ott et al., 2015). The tool has been used by designers of innovative educational interventions in the field of intangible cultural heritage education; after illustrating the tool, the paper provides preliminary data coming from experience of use within the project, thus showing strong points and weaknesses of the PP and paving the way for further work in the field.

## **Context of the Study**

As already mentioned, the instance of the Pedagogical Planner (PP) described in this paper has been proposed and tested within the i-Treasures project (funded under the FP7). The project is about fostering innovation in the field of intangible cultural heritage education, i.e. creating conditions for supporting the “passing down” of rare and traditional artistic expressions (such as traditional dancing, singing, etc.) to new generations through the use of technologies. Thus, i-Treasures represents a genuine novelty in a field where educational practices are usually not yet well consolidated (Ott & Pozzi, 2011) and where technologies definitely represent a disruptive innovation (Ott et al., 2015). An exhaustive description of the project is out of the scope of this paper; here it is enough to underline that in such context, there is obviously a serious need of pedagogical reflections and the learning design phase is essential to make the most of the available cutting-edge technologies, especially because most of them have never been used in these domains (Ott et al., 2015).

Teachers in i-Treasures need to be supported at the different stages of the design process and to reflect on the various elements at play and on the interactions between them, so as to ensure that these form a coherent, manageable whole that responds effectively to learners’ needs – insofar as this can be determined a priori (Jonassen et al., 1997). For this reason, within the project, the Pedagogical Planner has been proposed, with the aim to support the teachers/ designers of pilot teaching/learning experiences in the various intangible cultural heritage domains addressed.

The Pedagogical Planner refers to the Learning Design Life-cycle model, described in Asensio-Pérez et al. (2014) that is based on three main phases: Conceptualization, Authoring and Implementation.

During the Conceptualization phase, educators make a rough design, define the learning objectives to be reached, the contents to be addressed, and consider the target population and the context. As to the Authoring phase, detailed activities are planned and their flow fixed; besides, teachers need to associate to each activity the related

educational resources, etc. As a final stage, during Implementation, courses in a Learning Management System (LMS) are created, according to the design done in the previous phases.

In the following, the paper illustrates how the PP is able to support the three phases of the cycle.

## **Conceptualizing, Authoring and Delivering with the Pedagogical Planner**

In this section, the Pedagogical Planner (PP) is described, as it has been proposed and used within the i-Treasures project.

The PP is a scalable cross-browser web-based application developed in PHP, MySQL and JavaScript. As already mentioned, it is intended to cover the three learning design phases. Consequently, the tool can be conceptually seen as subdivided into three areas:

1. the Conceptualization area;
2. the Authoring area;
3. the Implementation area (which takes the form of the LMS).

In the Conceptualization area (Figure 1), the designer is guided through the definition of a number of aspects, namely:

- the target *Population*: here the designer can reflect and then make it explicit the main characteristic of the population, their age, their pre-requisites (if any), etc.;
- the learning *Context*: here the designer can define the learning situation/environment where the educational intervention will be carried out. In particular, type of context, constraints (if any), timing and setting;
- the *Content domain*: the designer defines the main aim of the intervention and can build a map of the content to be addressed (see Figure 1);
- the *Objectives and Metrics*: here the designer is supported in defining the main learning goals the intervention is meant to reach, plus the criteria to monitor and evaluate the teaching/learning process (during and after the enactment);
- the *Tools*: here the designer can tentatively define the innovative tools and the features s/he is planning to use during the enactment phase with learners.

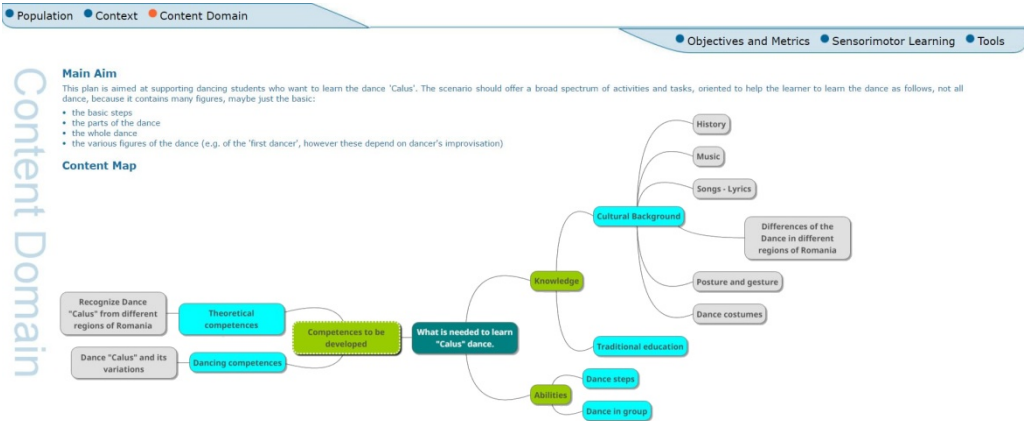


Figure 1. The Conceptualization area – Content map

In the Conceptualization area, textual fields are available, but also content maps can be used (see Figure 1), as this is the most creative stage of the LD process, where these kinds of diagrams might help. In this area of the tool, as in any other area, no field is mandatory and everything can be compiled partially and with no pre-defined order: this is to guarantee a total flexibility to the learning design process, as teachers should be free to use the parts of the tool they mostly need; at the same time, in case the teacher is a novice designer, s/he can follow the suggested structure of the PP, thus being guided in the process.

In the Authoring area of the PP (see Figure 2), the designer is supported in the definition of the activity flow, i.e. the sequence of activities to be proposed to learners (left side of Figure 2), which should then lead them to reach the learning objectives.

Each activity is specified in terms of: Objectives (where specific learning objectives of the single activities are defined); Orchestration (where the required setting is described and the instructions for students are provided); Tools and Resources (educational resources and tools to be used by learners during the enactment phase are provided); Evaluation Criteria (criteria to be adopted in order to evaluate the effectiveness of the activity are defined) (see right side of Figure 2).

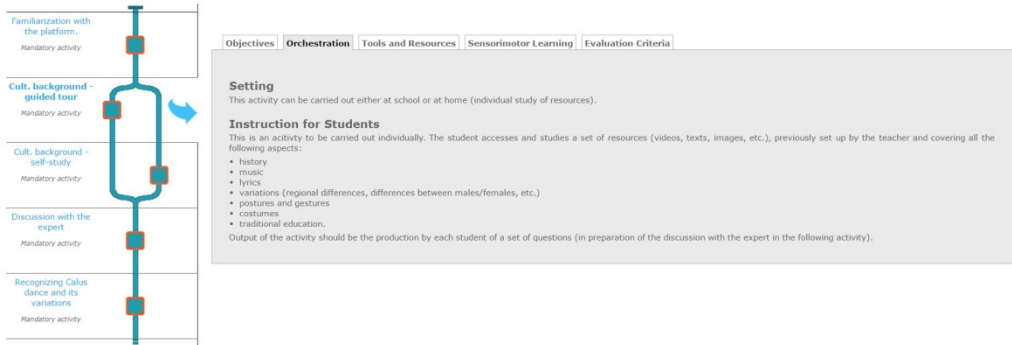







Figure 2. The Authoring area

In the PP, in addition to fashioning a simple step-by-step sequence for (all) learners to follow, the designer can also introduce different kinds of variation and these are represented graphically in the flow chart: authors can designate individual activities as mandatory or optional, and can indicate whether the order in which certain activities are to be tackled will be up to learners. They can also design flows with branching (multiple pathways) in cases where the plan is to include a certain degree of personalization, e.g. by proposing different activities to different learners (or groups of learners) who are ultimately pursuing the same overall learning objectives (see Table 1 containing the main activity options in the PP).

Once the Conceptualization and the Authoring phases are completed, the PP is ready to support the Implementation phase (button “Send to the LMS” in Figure 1), i.e. the automatic configuration of the LMS. In i-Treasures the LMS adopted is Chamilo (<https://chamilo.org>): once the first two design phases are done, all the design knowledge contained in the PP is automatically migrated into Chamilo, where a new course is created, which contains all the basic information about the educational intervention (objectives, contents, etc.), as well as the activity flow, already filled in with the educational resources and tools provided by the designer in the previous phases (see Figure 3).

Table 1: Main activity sequencing options in the PP

| Activity sequence options   | Representations  |
|---|--|
| <p><b>Single activity</b><br/>The simplest option. This is to be designated either as mandatory (square symbol) or optional (diamond).</p>  |    |
| <p><b>Ordered sequence of activities</b><br/>Two or more activities that are placed in a sequence, which learners are to carry out in the specified order. There is no limit to the number of activities the designer can add.</p>  |    |
| <p><b>Non-ordered sequence of activities (cloud)</b><br/>The same as above, but in this case no sequencing is imposed. Consequently, learners will be free to choose in what order they wish to tackle these activities. Graphically these are clustered together in a cloud.<br/>There is no limit to the number of activities the designer can add.</p> |    |
| <p><b>Path branching</b><br/>This option allows the designer to split the activity flow into two (or more) separate threads that propose different activities but nevertheless lead towards the same overarching learning objective. Learners will be free to choose which path they wish to take.</p>  |    |
| <p><b>Group branching</b><br/>The same as above, except that the purpose for the branching is to assign specific sub-groups of learners to the respective threads, thus allowing the designer to run differentiated, group-based learning.</p>  |  |

The screenshot displays the Chamilo LMS interface. On the left, a user profile shows a 6% progress bar for the 'Cultural Background' course. The course menu includes sections like 'Before you Start', 'Tsamiko', and 'Cultural background - self study'. The 'Tsamiko' section is expanded to show a lesson titled 'GREEKS FIRST RELATING TO DANCE'. The lesson content includes a text paragraph about Greek dance, three images (a painting of a dance lesson, a vase, and a dancer), and a list of references.

Figure 3. Implementation in Chamilo (LMS)

From a technical point of view, in order to allow the migration from the PP to the LMS, once the design is ready, an XML is produced. The XML document, conveniently encrypted, is then sent through a POST form to the LMS, which elaborates the request and use the received information to create and properly populate a new course in Chamilo.

## Discussion and Conclusions

So far, the PP has been used by the teachers involved in the i-Treasures project, to conceptualize, author and implement pilot innovative interventions in various intangible cultural heritage contexts, and addressing a variety of different populations having different backgrounds, interests and potentialities.

During the experience, we have collected qualitative feedback from the teachers/users, thanks to a continuous dialogue with them during actual use, as well as through final individual interviews. The teachers have been positive regarding both ease of use and usefulness of the PP.

The tool has proven to adequately support the three main phases of the learning design process, thus providing full coverage of the whole learning design cycle. This is an innovative feature in the Technology Enhanced Learning field; even if other tools exist, usually these are able to bridge Authoring and Implementation (i.e. Prieto et al.,

2013a) rather than Conceptualization, and managing the whole cycle within one single tool, remains – to our knowledge – a novelty.

Furthermore, the PP offers other advantages, in respect to the other existing tools: for example, it allows multiple forms of representations of the design knowledge (textual representations, as well as graphical representations, such as the content map and the activity flow); representations in the LD field are one of the most debated topic and allowing multiple representations, is certainly an asset of the PP (Pozzi et al., 2015a), which enhances its flexibility.

Flexibility, which is one of the most advocated requirements for LD tools (Masterman et al., 2013), is also achieved by allowing partial usage of the tool (nothing is mandatory) and allowing to jump from one section to the other. At the same time, if teachers need guidance, they can follow the embedded structure of the tool. From this point of view, the PP can be a good candidate in teacher training contexts, where teachers often need to be supported in re-designing and/or re-planning their traditional teaching/learning activities.

Regarding the Conceptualization function, the PP embeds a ‘neutral’ pedagogical approach, i.e. it can be used to design any activity, independently on the intended pedagogical models behind it; it thus well fits the need for differentiating educational interventions, by offering not only a variety of different contents, but also by envisaging the adoption of different educational approaches, strategies and methods. This “neutral” approach is different from the one adopted by other tools, such as for example the 4Ts (Pozzi & Persico, 2013) or the 4SPPIces (Pérez-Sanagustín et al., 2012), which are exclusively intended to support the design of collaborative or problem-based learning activities respectively.

Furthermore, the PP has proved to be particularly easy to use, which is one of the most critical aspects often raised by teachers in similar experiences. For example, it has been recognized that the tool does not require any particular technological skills from the teacher to manage both the Authoring, as well as the Implementation phase, which in other tools are far more complex and require high digital skills.

The ability of the tool to support the design of learning paths together with their “multiple variations” to accommodate differences in the target population needs, has clearly emerged from the initial testing in the field of cultural heritage and suggests



that the PP can be seen as a suitable tool for fostering personalization of learning interventions (Meyer et al., 2006).

Regarding the present drawback of the tool, we must acknowledge that the LMS used in i-Treasures for Implementation (i.e. Chamilo) is very user-friendly, but for sure this is not the most popular LMS and this makes the PP not very much transferrable to other contexts, at least as far as Implementation is concerned. Nonetheless, this experience has proven the feasibility of the approach and it is already in the developers' plans to develop the Implementation functions using other LMS (such as for example Moodle). As a matter of fact, experimentations in this direction have already started and other data will be soon made available to the scientific community.

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## When Innovative Learning Designs are too Innovative: Creating Relations in Chaosmos

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*Best Research Paper Award Winner*

### Abstract

This article presents a study of what happens when the innovative ideas behind a new learning design may be too innovative. The article analysis an implementation process of a new learning design in Nurse Education. The intention with the new learning design was to move away from a *functionalist* approach to teaching and it was developed to motivate and encourage the students to engage in more *situated* and self-regulated learning processes. The investigated course was infamous for low attendance and for unmotivated students. The new leaning design utilised teacher-produced video-clips, role-play and open supervision to qualify the students learning process while they were preparing for the lessons but also during the lessons. The new pedagogical activities were designed to make the learning process more situated and less rigours, thus demanding of the students to develop skills as self-regulated learners who, in turn, would be able to create relations between video content and lesson activities, while forming a *chaosmos*. The video-clips should also scaffold the academic reading during preparation with video-clips. However, the outcome was not as planned. The students did not recognise the video-clips as a significant part of the preparation for the lessons and therefore they were not prepared for the activities that the teacher had planned for the lessons. The article analyses and interprets the students' missing relations between content, activities and their roles as learners. The article suggests an iterative, spiralic process to develop *schemata* and relations to learn in a situated learning environment while forming as *chaosmos* and developing as self-regulated learners.

**Keywords:** preparation for lessons, chaosmos, schema, self-regulated learning, scaffolding

## Introduction

The context of this article is demotivated students at Nurse Education in a course regarded as less relevant by the students. The aim of this article is to provide a philosophical framework for understanding why the students experienced a learning design to be confusing, when the learning design was actually designed to better the situation. Our philosophical framework, our lens, for looking at and understanding the learning design is divided into three perspectives:

- Creating awareness of the students' own level of self-regulatedness;
- Creating awareness of possible relations between what appears to be chaotic elements, while forming a chaosmos;
- Creating a shared understanding of needed schemas for understanding the learning design and for learning in the new learning design.

The three perspectives should help us understand a learning design where teachers and students navigate a chaosmos leading the students to learn in less rigorous context while creating their own strategies for learning in the specific context.

Before we go into details with the framework we will introduce the context in which the new learning design was applied.

### ***About the Context***

The context is the implementation process of a new learning design in Nurse Education. The intention with the new learning design was to utilise the students' preparation time between lessons for the students to familiarise themselves with the academic content and consequently to use the time during lessons for more dialogical activities to provide circumstances for deeper learning.

The development and implementation of the learning design is based on the work of Lukassen, Pedersen, Nielsen, Wahl, Sorensen and Kjærgaard presented in these papers (Lukassen, Pedersen, Nielsen, Wahl, & Sorensen, 2014; Wahl, Pedersen, Nielsen, Lukassen, & Kjærgaard, 2015).

The empiric data notes from the initial study (Lukassen et al., 2014) show that the students are generally motivated by content and activities that seem (directly) applicable in their future profession and, conversely, less motivated to engage in academic activities that they regard as being on the periphery of nursing practice. In that sense they share traits with the students in Huffman and Huffman's study of *study*

*skills* (Huffman & Huffman, 2012). Huffman and Huffman find that the students tend to use the technology that is deemed *useful* either for passing class or for their future practice. Technology that does not directly contribute to passing exams or future practice is thus regarded as irrelevant, which indicates that it is not just a local phenomenon at Nurse Education at UCN. The course, to which the learning design was implemented was a course on “Organization, administration and management” (6<sup>th</sup> semester, programme for Nursing at UCN) that suffered from low attendance and mediocre evaluations. The students generally regard the course as digressing into areas of low immediate interest to them. Furthermore, it seems as if the students did not regard the course as a part of their professional identity formation process, which may also be the reason for the low attendance and low motivation.

The course is an appendicle part of a module that focuses on acute and critical illness. The students think of the two parts of the module as incoherent and contrasting in the sense that acute and critical illness is regarded to be at the core of their budding nursing identity and organization, administration and management is more in the periphery of nursing. The teachers at Nurse Education claim that the course on organization, administration and management could profit from a placement later in the programme, however it is not within the power of this study to reorganise the whole programme. The reason why the nurse teachers suggest placing the course later in the programme is that by that time the students have experienced the need for knowledge on organization, administration and management during their internship. Therefore, there are two organisational issues, beyond our control, that affect the results in this study; the academic context of the course and the placement in the progression of the programme. Organization, administration and management is a growing part of the obligations of a nurse, however the teachers at Nurse Education explain that it is not regarded as a part of the nurse’s core identity amongst most students. In order to overcome these challenges the teacher and her action research group have developed a learning design that is less functionalist and more situated. The aim is to steer away from a teleological *means-ends* logic and move in the direction of a more deontological causal logic. The learning design was an attempt to bridge between functionalism (Welch, 1985) and situated learning (Lave & Wenger, 1991).

## Research Design

In this article we analyse and evaluate the implementation of the learning design and its implications through a critical realist lens. This means that we ask the ontological

question: “if this knowledge is obtainable of the world, what world is it then?”. That is a reciprocal relation to the epistemological question; how is knowledge of the world possible (Bhaskar, 2008; Collier, 1994; Corson, 1991; Elder-Vass, 2007).

This means that we investigate our data retroductively, in the sense that we look back to recreate the circumstance that made the event possible. Thus, we study the causal mechanisms that cause the events that we see in reality (Peirce, 1998). Our analysis of the learning design becomes similar to the work of a detective in the sense that we seek to recreate the traces and evidences for the emerging of the event in order to suggest which actors and mechanisms may have caused the event (McEvoy & Richards, 2003). The purpose of using a critical realist approach is that we want to look beyond the immediately visible facts and concentrate on what might have caused the visible facts in the *event* and thus lay bare possible false representations.

The learning design that generated the *event* for the critical realist investigation in this study was developed in an action research cycle. The cycle was a quest for emancipation through inquiry and reflection (Adelman, 1993; Lewin, 1946). We started the cycle by identifying and pinpointing the problems (lack of motivation, exclusion and idle ICT) that were common, tacit knowledge amongst the nursing teachers but not articulated. Then we developed a learning design that might improve motivation and enhance the use of ICT. This resulted in a redefinition of the relay between preparation and lesson. It was inspired by *flipped classroom* studies in other nursing colleges (Schwartz, 2014) and the more general notion of utilizing video instead of face-to-face lecturing. The reason behind this was that the students said (in a preliminary survey) that they experienced more acknowledgment of learning from supervision than from lecturing. The aim was to create a situated learning environment where the students would be motivated by collaborating on the activities and not only by the risk of failing exam (Lave & Wenger, 1991). The activities included; role-playing, teacher-produced video-clips, real life cases etc. The learning design eliminated all face-to-face lectures instead, the presentation of academic content was done through teacher-produced videos. These videos were supposed to support the students' preparation for lessons in conjunction with reading and other activities.

The learning design was created on the basis, interviews, focus groups and observations. The data collection should investigate how the new learning design worked in practice. We analysed the data and realised that there were major issues with the new learning design (Lukassen et al., 2014). For the second run of the course,



the teacher made a few adjustments to the learning design and the data showed that some of the issues were dealt with. Finally, the results of the study could be concluded and they were:

1. An island of *situatedness* (the course) in a sea of functionalism (the programme in general) requires a lot of explanation and attention;
2. The students need time to figure out how to learn in a situated, learner centred context;
3. The students need guidance to learn how to centre themselves in their own learning process.

Based on these concluding comments on the learning design, the critical realist investigation begins. We re-visited the field notes, focus groups interviews and surveys in order to generate a deeper understanding of why the learning design was not an immediate success.

## **The Philosophical Framework – Three Perspectives**

Before we go into details with the framework, we will introduce each component separate. First, we introduce self-regulated learning as an important skillset for students to navigate the learning design, then we introduce chaosmos for understanding the nature of the learning design and lastly we will introduce schemas as a way understand the learning activities in the chaosmos.

### ***Self-Regulated Learning***

Parts of the learning design required the students to preparing for lessons or work with exercises on their own or in groups. Being on their own both before and after lessons require students to take control over their own learning process. Pintrich (2000; p.453) defines self-regulated learning as “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment.” Zimmerman (2000; 2002) divides the process of self-regulated learning into three phases: the (a) Forethought Phase where the learner set expectations, set goals and planes the process, the (b) Performance Phase there the learner will self-instruct and monitor the process, and the (c) Self-reflection Phase where the learner will self-evaluate the process. The cyclical characteristics of the model means that learning always builds on top of prior learning. The learners

expectations constructed in the Forethought Phase build on prior experiences formed in the Self-reflection Phase.

A recent study in student's self-regulated learning and metacognitive skills shows that online and on-campus students relies on and find different learning strategies and metacognitive strategies important. In the study, online students indicate that skills like planning, controlling and evaluation are important for distance learning; while on-campus students stated that lack of self-discipline and limited communication skills are barriers to distance learning (Barak, Hussein-Farraj, & Dori, 2016). This indicates the importance that the students can apply different learning strategies to different learning designs. One (the teacher) cannot expect the students to switch from one self-regulated mode into another when a new learning design is applied.

### **Chaosmos**

The Chaosmos is a notion developed by Deleuze and Guattari (1994; p.201), it is based on James Joyce's idea from "Finnegans Wake" that chaos and cosmos are not opposites by rather two points on a continuum.

*[...] as Joyce says, a chaosmos, a composed chaos--neither foreseen nor preconceived. (Deleuze & Guattari, 1994; p.204)*

Deleuze and Guattari, through Joyce, describe art as composed chaos. The outer perimeter of chaos is guided by what Deleuze and Guattari call "the plane of immanence". The *plane of immanence* is a way of describing a reality, which a group or an individual realises as his/her shared repertoire of experience, actions, narratives, possibilities that help them form meaningful relations between, otherwise, chaotic elements (Deleuze & Guattari, 1994; p.36).

In this context, the notion of chaosmos is used to put into words what the students may have lacked in the implemented process of the new learning design. The chaosmos is the force of chaos creates difference (Beaulieu, 2016). That is, when the student's process of creating relations between chaotic emergencies (the activities in the new learning design) leads the student in new constructive and creative directions. The chaosmos also relates to the dialectics of *being* and *becoming*. The chaosmos refers to a state of *becoming* rather than a state of *being*. The state of being would refer to *cosmos*, while the state of neither becoming nor being would refer to chaos in a Deleuzian/Guattarian understanding of the terms (Beaulieu, 2016). The situation of neither *being* nor *becoming* is referring to a situation of a *self* that appears vaguely

defined and the prospect of the *self* developing a more explicit definition is not evident.

### **Lack of Schemata**

We use the Kantian notion of *Schema* to understand what is needed to learn in new circumstances (Radford, 2005; p.219). In this paper, we use Kant's three types of *schema*: empirical, pure sense and transcendental schema. Generally, the notion of *schema* is a cognitive framework for understanding and interpreting information. It is related to language through metaphors and stereotypes in what Lakoff and Johnson would call "image schemas" (Lakoff, 1990; Lakoff & Johnson, 2008). Furthermore, it is related to "shared repertoire" in Wenger and Lave's theory on "Communities of Practice" (Wenger, 1998).

The schema describes the cognitive competence to interpret information: In language; through metaphors, in behaviour; through stereotypes and in collaboration; through "shared repertoires". The Kantian tripartition of the schema divides the schema into; empirical, sensuous and transcendent schemata (Johnson, 2005).

An empirical schema is an empirical concept that many perceive in similar way.

A pure sensuous schema describes the ability to think systematic abstract thoughts of concrete matter. It describes the abstract system of understanding the invisible complexity of things that appear simple (geometry: triangle, circle).

Pure concepts of understanding are referring to schemas coming from within and affecting understanding of what is experienced. Intuition for example.

The schema is a diagram for understanding the organisation of the event. In this case the teacher's schema is somewhat expressed in the syllabus and the actual experience of learning is the sense experience. The schema expressed in the syllabus is at best an empirical concept.

*"Formal deduction removed from all empirical content, however, Kant argued, cannot yield knowledge. The question then was to explain how abstract concepts relate to their concrete content. In an important sense, the Critique of Pure Reason is an attempt to achieve this goal and the schema, in fact, was Kant's answer."* (Radford, 2005).

The syllabus is an abstract concept created through the teacher's deduction of prior experiences in relation to the outcome of new circles of reflection. In the sense that the teacher reasoned:

*Priming* an academic subject to the students is important, letting students watch a video before lectures will *prime* the students memory and make room for more motivating activities what seems more meaningful to the students.

This deductive approach to reasoning was, unintendedly, used by the teachers while designing the learning design. The design process was *passive* so to speak, it did not involve empiric experience it was solely build on the theoretical deduction of an alleged relation between video, role-playing and motivation. Even though the syllabus gave instructions of how to use the videos, it does not say anything about why. So, the students didn't have a clear idea of what purpose the videos served? The students were used to reading syllabuses and they had a fixed impression of what teaching meant, so when bearing elements are changed, the students prior schema does not seem to fit the new design.

### ***Scaffolding Schema through Chaosmos***

We suggest a scaffolding structure for gaining both self-regulatedness and schema. The need for scaffolding the students learning process became evident we analysed the empiric data produced in the implementations process (see section below). The notion of combining scaffolding and schema is derived from the work of Aída Walqui (Walqui, 2006).

### ***Framework***

In the bottom of the framework the individual elements (the coins) represent individual learning activities in the learning design. They are of course part of the learning design or the curriculum but at the same time, they are independent in the chaosmos, here represented by the middle layer. Students navigate the chaosmos engaging in activities. The top layer represent the common schema of the learning design helping students (and teachers) navigate the learning design though the chaosmos. What holds it all together is Self-regulated Learning here represented by the outermost cylinder (Figure 1).

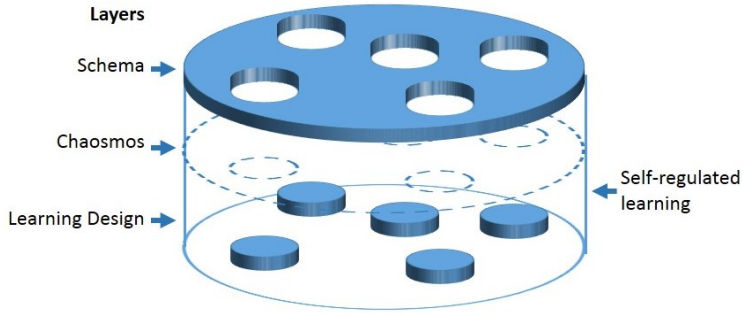


Figure 1. Philosophical framework

Three perspectives on Learning Design; Schema, Chaosmos and Self-regulated Learning. (The model (Figure 1) was developed for this article).

## Analysis

The Critical Realist approach to analysing the context relies on an assumption that what we see might be a sort of a false representation.

This *passive* approach to developing learning designs might be the causal mechanism that triggered the displacement between the teachers expectations of how the students would engage in learning within the new learning design and how the students actually reacted in the real *event*, the lesson. In Louis Radford's article "The Semiotics of Schema" (Radford, 2005) the schema is described as a vehicle for understanding that requires active interaction between information and the learner:

*"The schema entails of an individual who, to acquire knowledge, has to become active" (Radford, 2005; p.147).*

The schema is like a catalyst in chemistry. A substance that makes the process happen in a certain way without actually including itself in the process.

*"...in Kant's theory of knowledge, the schema exhibits or unveils its concepts – it does not produce it." (Radford, 2005; p.147)*

If the schema is not present, the concept remains undisclosed or even uncommunicated.

The teacher explains that the intentions with the action research cycle were to create a learning design that:

- Bridged between functionalist and situated approaches to learning;
- Create an environment of *concrete labour* that focuses on the intersection between theory and practice;
- Reformat the teacher role to become closer to the learning processes work-groups;
- Make her (the teacher) part of the students learning process more involving;
- Make her (the teacher) part of the lectures non-interchangeable with technology.

These intentions were mostly communicated through text in the syllabus and not at all during the lessons.

The syllabus was presented on the campus LMS as a resource webpage containing all relevant information about the course (Figure 2).

The screenshot shows a web browser window displaying a page from a Learning Management System (LMS). The page title is "Administration, organisation og ledelse". The author is listed as "Forfatter: sygeplejerske". The page content is divided into two main sections. The left section is titled "INTRODUKTION TIL ADM.ORG.LEDELSE" and contains a welcome message for Tema 3, mentioning flipped classroom and video-based learning. The right section is titled "INDHOLD TIL LEKTIONERNE - KVALITET OG IMPLEMENTERING" and details the course structure and flipped classroom approach. A footer note asks students to bring their computers, tablets, or smartphones.

Figure 2. Excerpt from LMS

The introductory text is referring to *flipped classroom* and other teaching principals/methodologies that the teachers seeks to utilise in the course, it also refers to the official curriculum for the course. These references are properly not that useful to the students. It would presumably have been more fruitful to align expectations and demands of how to actually take the course.

The students in the focus group explain:

*“I just logon, get the PowerPoints and logout again” – Student 1*

The student is trying to assimilate to the new learning design by maintaining or recreating the learning design that she is used to in the new learning design, and at the same time limiting the usefulness of the technology (Huffman & Huffman, 2012).

*“If there are any notifications somebody copy it and post it on Facebook” – Student 2*

The student utters a common tendency, which is that LMS is marginalized in favour of social media. The teacher’s efforts to utilise LMS functionality to improve her learning design proved to be in vain.

*“We lack a connecting thread - we put something on the LMS, we get feedback or comments - that never happens” – Student 3*

The students wish for more online interaction and feedback. Uploading to LMS without getting feedback seems redundant, almost provocative to them.

*“When posting a question on the Facebook group you just know that 60 people will see it and somebody will give an answer” – Student 4*

The students use the rhizomatic, a hierarchical nature of networks in social media, which is in direct opposition to the arborescent, hierarchical organisation of the LMS. This notion is interesting in the sense that the intention with the learning design was to produce a map of possible routes to learning and not a trace to follow. The intentions with the learning design wasn’t communicated clearly or understood by the students, in either case it seems like both students and teacher want the same thing; a plateau of intensity in a rhizomatic network of learning, but they don’t quite level with each other in terms of how to construct the plateau (Deleuze & Guattari, 1987).

The syllabus is very well organised and it presents the resources and content of the course very clearly, however it is done in a functionalist way in the sense that one element has a specific function and it is a means to achieve a specific goal from curriculum. The different elements are not situated in the intended context. The syllabus centres its focus first and foremost on content and second on form it doesn’t

describe what the students are expected to do or how it fits into the situatedness of the learning design.

In the terms of the John Biggs the teacher is in the process of “obtaining an armoury of teaching skills” (Biggs & Tang, 2011). That is, moving from level 1 to level 2 in Biggs and Tang’s levels of recognising ones role and obligation as a teacher towards the students learning needs. The levels could be described as follows (Biggs & Tang, 2011; pp.17-20):

1. Is concerned with what the students are; lazy, unprepared, good, creative etc. Teaching revolves around content and possibilities are limited because the teacher is fixating on what the students are. Teaching style; lecturing. Technology; PowerPoint.
2. Is concerned with what the students do in relation to teaching; make videos, cooperate, appear active, participate etc. Teaching revolves around form and activities the possibilities are unlimited anything could be a learning resource. Teaching style; facilitator. Technology; any.
3. Is concerned with how and what the student is learning; heutagogic study skills, feedback and content channels align etc. Teaching revolves around a synthesis of content, form and learning skills. Teaching style is problem based, reflective and relational.

In the interviews and in the first action research cycle the teacher expressed an urge to move away from blaming the students for poor attendance and low motivation and instead take on the challenge of changing her teaching to develop a new more inclusive way of teaching the curriculum for the course. Now she will be moving to level 2 and now she will be the one to blame for any unsuccessful evaluation of the course according to Biggs. The intentions with the new learning design was to centre the student in his/her own learning process and decrease the teachers’ experience of the students being at the periphery of their own learning process. In the teacher’s opinion the students only immersed themselves in the learning process if the content was relevant for exams or for immediate use in a basic understanding of nursing practice. The teacher’s shift in teaching principal could be visualised in a model used to describe learning in an “Open Source Learning stream” (Kjærgaard & Sorensen, 2014; Kjærgaard, 2015) (Figure 2).



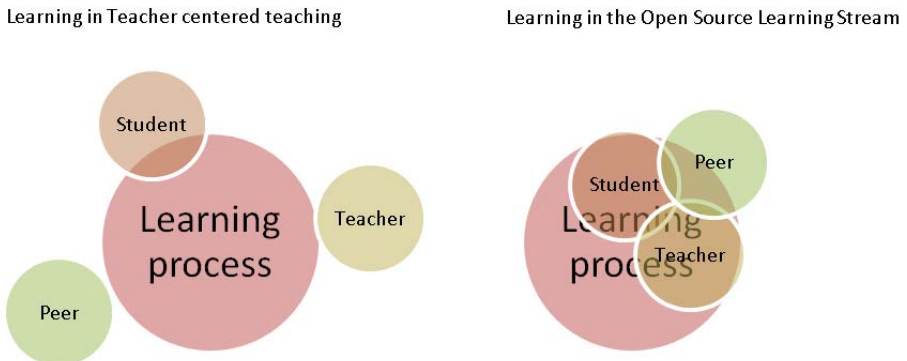


Figure 3. Reconfiguring roles in the learning process

The model shows how students relate to learning in a teacher centred lesson and how they relate to learning in an Open Source Learning Stream (shared learning process in a synchronous stream of learning). In the teacher centred lesson they mostly off-load (Salomon, 1997) throughout the lesson they don't really engage in cognition. Off-loading is the process of documenting the lesson in a system that is not proved to work without the purpose of later cognition:

*“What would we say of individuals who off-load some of their cognitive processing onto a computerized expert system without having learned to provide it with appropriate inputs or to read its outputs properly, without having learned to doubt the system’s accuracy or without mastering the skill needed to weight the alternatives it provides?” (Salomon, 1997 p: 127)*

The computerised system could be LMS or note-taking in PowerPoint, which is very common for these students. They off-load the overload of information that the lecture provides into systems that they might not be capable of operating properly. In the Open Source Learning Stream it is quite different because off-loading and cognition becomes one and the same in the learners route from legitimate peripheral participant to member of community of practice (Lave & Wenger, 1991).

The teacher wanted to establish a situation where the students would be forced to take centre stage in their own learning process. The video-clips should solve the problem with unreflected off-loading because the video-clips opened for the opportunity to take some of the stress of the synchronous learning situation, that lecturing bring, in the

sense that the students now had the opportunity to revisit the teacher’s presentation of processed academic content in a cognitive progression:

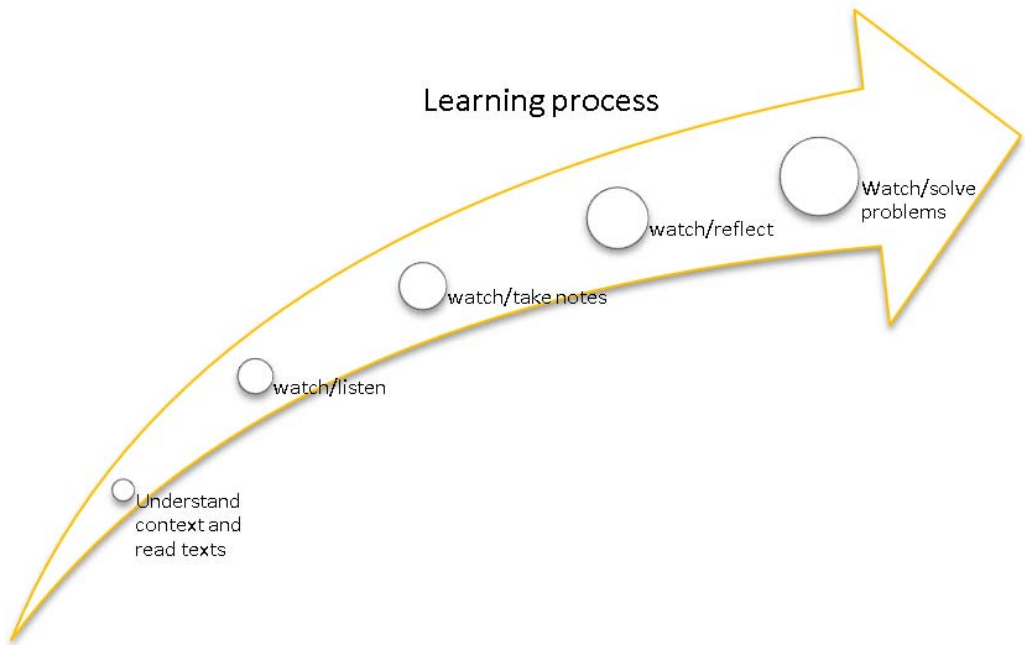


Figure 4. The progression of the students’ use of video clips for preparation

The new lessons had no forward momentum in themselves, there were no lectures tracing the route of the lesson which meant that the student/group had to bring forward momentum to the learn process themselves.

### Findings

The students were expected to lack schemata, but the interesting part is that the teacher actually also lacked schemata. She also had to figure out how to operate the new learning design. During the action learning cycles leading up to the design process the other members of the research group influenced her. She was new to many of the suggestions that came forth in the action research conferences, which mean that she was to an extent assimilating her own practice to the new design without fully adapting the principles of the new design. This lead to a discrepancy between her expectations of what the new design could bring to her teaching and what actually happened.

In the interviews, the students explain:

*“I just gave up reading those 70 pages - I was thrilled watching the videos”*

Videos as substitution for reading – an unwanted side-effect that calls for reconsidering of how the videos should support the students’ preparation for lessons.

*“We don’t need more literature. We just need a connection between what the teacher says in the video and the texts”*

*“They [the teachers] just mention all those theories and models. What we need to learn them is explanations, examples and generally elaborations of what is already in the text”*

The videos did not bring the putative quality to the preparation that the teacher intended.

*“in the video you just saw the PowerPoint, I need to see who it speaking”*

The students rely on a phatic connection between video-clips and teacher.

The second run was better than the first and the third run was a success. This means that the teacher’s own schema building was just as important as the students’.

The teacher explains:

*“The changes that I have made from the 2<sup>nd</sup> to the 3<sup>rd</sup> time, is that I have tried to make the relations between all the elements in the course more obvious. I referred systematically to the work that the students did the day before and asked them to consider what they learned in the next day’s lessons. Last, I wind up the theme trying to get the students to draw on the knowledge they have acquired through the process, by asking them to substantiate their responses / reflections with theory.”*

The teacher elaborates:

*“Moreover, I can mention that after the third time I have become more familiar with this way of working - and have an overview of all the details / elements, which I didn’t have the first time.”*

The findings suggest that there are quite a few considerations to implementing learning designs created through action research. The findings also suggest that a radical change in teaching principal requires a substantial intersection of understanding between teacher and students. Both teacher and students need shared schemata for understanding their role in the learning design.

## **Conclusion**

Action research as a developmental model in teaching has shown a few downsides. The students felt excluded and bewildered. It would have been expedient to include the students in the action research process. The aim of the new learning design was to include more students and to motivate to participation. It would have been fruitful to involve the students the process of designing the course.

The learning design lacks elements of schemata building. The lack of schema as conceptual catalyst results in misconceptions of how to engage in the learning design. The syllabus presented was an agenda for the lessons and a functionalist resource collection. The situated activities that should motivate and include the students were presented as functionalist, teleological *school assignments* and not as situated problem-based cases – even though they were in fact both situated and problem-based.

The students had already established an Open Source Learning Stream in Facebook. The students say that the campus LMS is rubbish and that it lacks feedback from teachers and that Facebook always delivers feedback from peers. This limbo between LMS and social media is not new and a solution properly does not lie in a new *perfect* system but rather in the individual. If the learner/group takes centre stage in the learning process then a *perfect* system is not that important. A mesh of systems including social media and LMS has proved to be fruitful in other studies. An added benefit is that when the students are involved in the selection of digital tools for the mesh then they will have to analyse and discuss the affordances of the digital tools in the actual context. While analysing digital tools the students would engage in a shared meta-learning process that would sharpen their perception of how digital tools can enhance learning processes.

The analysis of the implementation process also showed a few pitfalls, one being that the students use the videos as short-cuts for easier preparation for the lessons. This is positive if the alternative is no preparation but in an ideal context, it is negative because the videos only deal with the digest of the texts. It also shows the importance of making relations between videos, texts, context and activities. The study shows that the videos should:

- Contain instructions on how to use other resources in relation to the videos;
- Contain footage of the teacher presenting the video;
- Elaborate on the content of the texts;
- Not paraphrase texts and other resources;
- Not make texts redundant;
- Be approximately 10-15 minutes of length;
- Contain articulation of the intersection between video, text and activities;
- Be personal to the teacher;
- Be accompanied by activities that necessitates all resources for preparation (test).

The study also shows the importance of developing the students understanding of how they learn and which digital tools are helpful and in what ways. The implementation of a new learning design should address meta-learning as a part of the new design focusing on the self-regulated learning skills applicable to the learning design.

The teacher is the theoretical expert and the specialist in nursing practice and the students are in the process of becoming nurses. Within the intersection between the two positions students and teacher share the wish for acquiring new skills, competences and a higher reflective level. The study concludes that if the teacher does not address this in her reflections on how to design her teaching the shift between a functionalist approach and a situated approach seems difficult.

The three layers that we interpret to be of importance (presented in Figure 1) is the notion that the schema sets the outer perimeter for chaos and, thus, establishes a chaosmos in which the students can develop strategies for self-regulated learning. This interpretation also implies that without the schema the students (and teacher) are prone to experience the learning design as chaotic.

According to the model, the teacher may need to address the outer perimeters of chaos explicitly when implementing a new learning design. As the students explain the learning design becomes *brittle* and prone to create chaotic circumstances instead of delineating the perimeters within which chaos may turn into a chaosmos in which learning is possible.

To put this into perspective, Dave Cormier, who we regard as one of the forerunners of a community and learner centred learning design, also addresses the outer perimeters of chaos. His notions of *rhizomatic learning* (Cormier, 2008; Cormier, 2014) and *community as curriculum* (Cormier, 2008) starts with establishing a structure for learning in a rhizomatic community. Dave Cormier explains it as follows in the course blog (Rhizo14):

*“So we need some structure, at least in the beginning, to make sure that everyone gets to play. Some of this structure can take the form of remediation... where you prepare answers to simple questions that allow newcomers to help themselves. We also need to have an effective way for people to be able to ask the community simple questions and ways to effectively mentor people to a place where they can be fully contributing members of the community.” (Cormier, 2013)*

This implies that we may need other ways of creating and communicating new learning designs. The analysis of the implementation process indicates that a traditional syllabus may not be sufficient for making sure that the learning design creates conditions for learning.

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