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

European Distance and E-Learning Network, 2016
in collaboration with the
Ulrich Bernath Foundation for Research in Open and Distance Learning

Best of EDEN 2015

Published by the European Distance and E-Learning Network

Editors:

András Szűcs, Ulrich Bernath

Editorial co-ordination:

Anna Wagner, Zoltán Fekete

EDEN Secretariat, c/o Budapest University of Technology and Economics
H-1111 Budapest, Egry J. u. 1, Hungary
Tel: (36) 1 463 1628
E-mail: secretariat@eden-online.org
http://www.eden-online.org

Supported by the Erasmus+ Programme of the European Union

The publication reflects the author's view, the EACEA and the European Commission are not responsible for any use that may be made of the information it contains.

ISSN 1027 5207

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

Dr András Szűcs
Secretary General, EDEN

Dr Ulrich Bernath
Chair, Board of Trustees
Ulrich Bernath Foundation
for Research in Open and Distance Learning

Budapest – Oldenburg, December 2016

Editorial Board of the European Journal of Open, Distance and E-Learning

Table of Contents

Annual Conference, Barcelona

Open Classroom Conferences, Athens, Aalborg

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 2015 June, Barcelona

Edited by
András Szűcs, Ulrich Bernath

European Distance and E-Learning Network, 2016
in collaboration with the
Ulrich Bernath Foundation for Research in Open and Distance Learning

Members of the Jury for the EDEN Best Research Paper Award at the 2015 Annual Conference in Barcelona

Christine Appel, Chair of the Jury, Director, eLearn Center, Open University of Catalonia (UOC), Spain
Maarten F. de Laat, Professor of Professional Development in Social Networks, Welten Institute, Faculty of Psychology & Education, The Open University of the Netherlands, the Netherlands
Wim van Petegem, Expert Multicampus & Engineering Education, KU Leuven, Belgium
Ulrich Bernath, Trustees and Directors of the U. B. Foundation, Germany

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

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

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 educations 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). Idiact 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 Digital planning and management: Timetable for lessons or projects Learning Management Systems (LMS) 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) Teacher-microphone and learner-receiver 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) Text-to-Speech Digital learning resources Digital books/texts Flipped Learning 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. Concepts are trained successful using Google picture searching and repetition in online game based learning tools. 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 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.

Collaboration & Knowledge Building	Pre-dictation Cloud based file management and file sharing Digital portfolio 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.

Teachers uses 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 planed, 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.

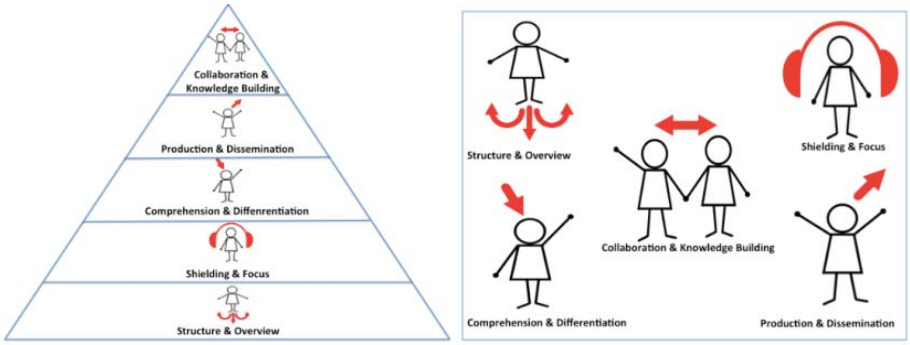

Figure 1. Iterations of a five-type-model of including ICT based interventions – hierarchy left and dynamic right

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.

References

1. Ainschow, M., & Booth, T. (2002). Index for inclusion, developing learning and participation in schools. (p.4)
2. Alenkær, R. (2010). Den inkluderende skole.
3. Balanskat, A., Blamire, R., & Kefala, S. (2006). The ICT Impact Report: A review of studies of ICT impact on schools in Europe.
4. Blamire, R. (2009). ICT Impact Data at Primary School Level: the STEPS approach.
5. Bruner, J. (1999). *Mening i handling.*
6. Clark, W., & Luckin, R. (2013). *iPads in the Classroom.*
7. Corn, J. et al. (2012). Students with special needs and 1:1 computing: a teacher's perspective.
8. Csikszentmihalyi, M. (1998). Finding Flow: The Psychology of Engagement with Everyday Life.
9. Dalsgaard, C., & Sorensen, E.K. (2008). A Typology for Web 2.0. Proceedings of ECEL 2008: The 7th European Conference on e-Learning. 2008, 272-279.
10. Dewey, J. (2005). Demokrati og uddannelse.
11. Dysthe, O. (2003). Dialog, sampil og læring.

12. European Commission (2013). Survey of Schools: ICT in Education – Benchmarking Access, Use and Attitudes to Technology in Europe's Schools.
13. Flewitt, R. et al. (2014). New directions for early literacy in a digital age: The iPad.
14. Hansen, G. M., & Sneum, M.M. (2008). *ADHD – fra barndom til voksenalder.*
15. Honneth, A. (2007). Recognition and Power.
16. Jungk, R., & Müllert; N.R. (1998). *Håndbog i fremtidsværksteder.*
17. Lave, J., & Wenger, E. (2005): Situated Learning. Legitimate peripheral participation.
18. Mavrou, K. (2012). Examining peer acceptance in verbal and non-verbal interaction during computer supported collaborative learning: Implications for Inclusion.
19. McKenney, S., & Reeves, T. (2012). Conducting Education Design Research.
20. McKnight, L., & Davies, C. (2012). Current Perspectives on Assistive Learning Technologies – 2012 review on research and challenges within the field.
21. Naismith, L. et al. (2006). Literature Review in Mobile Technology and Learning.
22. OECD (2008). 21st Century Learning Skills: How can you prepare students for the new Global Economy?
23. Passey, D. (2010). Mobile Learning in School Contexts: Can Teachers Alone Make it Happen?
24. Qvortrup. L. (2012). Inclusion – en definition In Er du med? – om inklusion i dagtilbud og skole.
25. Shaw, R., & Lewis, V. (2005). The Impact of computer-mediated and traditional academic task presentation on the performance and behaviour of children with ADHD.
26. Sorensen, E. (2006). Learning-to-Learn: A Meta-Learning Perspective on Pedagogical Design of e-Learning.
27. Sorensen, E. (2007a). Dialogic eLearning – A Vehicle for Fostering Active Democratic Citizenship in Higher and Continuing Education. *Proceedings from The 2nd International Conference on e-Learning (ICEL 2007).*
28. Sorensen, E. (2007b). Dialogic e-learning2learn: creating global digital networks and educational knowledge building architectures across diversity.

29. Sorensen, E., Andersen, H. V., & Grum, H. (2013). Intercultural Dialogic eLearning: A Tool for Fostered Shared Understanding and Sustainable Competence Development in Practices of Inclusion.

30. Thisted, J. (2013). Forskningsmetode i praksis.

31. Tofteng, D. et al. (2012). Aktionsforskning – en grundbog.

32. UNESCO (1994). The Salamanca Statement and Framework for Action on Special Needs Education.

33. UNESCO (2008). Inclusive Education: The Way of the Future. (p. 3)

34. United Nations (2006). Convention on the Rights of Persons with Disabilities.

35. Voldborg, H., & Grum, H. (2011). Ikt faciliteret didaktisk koncept for inklusion af børn med ADHD I skolen.

36. Vygotsky, L., & Lindqvist G. (2004). Vygotskij om læring som udviklingsvilkår.

37. Waller. T. (Ed.) (2013). Information and Communication Technology for Inclusion.

38. Winther, E., & O'Raw, P. (2010). Literature Review of the Principles and Practices relating to Inclusive Education for Children with Special Educational Needs.

39. WSIS – World Summit on the Information Society (2010). *Outcomes document.*

Acknowledgement

The authors would like to thank the teachers for opening their classrooms and granting us access to their development processes, and for participating in the generation and collection of data enabling the Ididact project.

Student Vulnerability and Agency in Networked, Digital Learning

Paul Prinsloo, University of South Africa, South Africa,
Sharon Slade, The Open University, United Kingdom

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 Hochschuleinrichtungen 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 zunhemenden 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 studenten-zentriertes 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, Drachsler, 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 (Drachsler & 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 (Drachsler & 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
Notice/Awareness – informing students regarding the type of data collected, timing of collection, protection and storage, sharing of data.	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. 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.
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.	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. 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

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

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.

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)

(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.

References

1. Acharya, S., & Gorman, S. (2013). Reclaiming information privacy online. *Colonial Academic Alliance Undergraduate Research Journal, 4*(1), 1-15. Retrieved from http://scholarworks.gsu.edu/caaurj/vol4/iss1/4

2. Allen, A. L. (2016, December 9). Protecting one's own privacy in a Big Data economy. [Blog post] Harvard Law Review Forum. Retrieved from http://harvardlawreview.org/2016/12/protecting-ones-own-privacy-in-a-big-data-economy/

3. Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2009). *Trends in global higher education: tracking an academic revolution.* A report prepared for the UNESCO World Conference on Higher Education. Paris. UNESCO. Retrieved from http://atepie.cep.edu.rs/public/Altbach,_Reisberg,_Rumbley_Tracking_an_Academic_Revolution,_UNESCO_2009.pdf

4. Antón, A. I., & Earp, J. B. (2004). A requirements taxonomy for reducing Web site privacy vulnerabilities. *Requirements Engineering, 9*(3), 169-185. Retrieved from http://link.springer.com/article/10.1007/s00766-003-0183-z

5. Baker, S.J. D., & Siemens, G. (2014). *Educational data mining and learning analytics. Cambridge Handbook of the Learning Sciences.* Retrieved from http://www.columbia.edu/~rsb2162/BakerSiemensHandbook2013.pdf

6. Bauman, Z. (2007). *Liquid times. Living in an age of uncertainty.* Cambridge, UK: Polity Press.

7. Bellman, S., Johnson, E. J., & Lohse, G. L. (2001). To opt-in or opt-out? It depends on the question. *Communications of the ACM, 44*(2), 25-27. Retrieved from http://dl.acm.org/citation.cfm?id=359241

8. Blackall, L. (2013, October 1). Data and power. Presentation given to the University Analytics Forum in Melbourne. Retrieved from https://www.youtube.com/watch?v=TgPsrPRa1t8

9. Boam, E., & Webb, J. (2014, May 2). The qualified self: going beyond quantification. [Blog post] Design Mind – Collection No. 5., Insights Sensing. Retrieved from http://designmind.frogdesign.com/2014/05/qualified-self-going-beyond-quantification/

10. Carney, M. (2013). You are your data: the scary future of the quantified self movement. [Blog post] Pando. Retrieved from http://pando.com/2013/05/20/you-are-your-data-the-scary-future-of-the-quantified-self-movement/

11. Davies, J. (2013, March 13). The qualified self. [Blog post] The Society Pages – Cyborgology. Retrieved from http://thesocietypages.org/cyborgology/2013/03/13/the-qualified-self/

12. Drachsler, H., & Greller, W. (2016). *Privacy and learning analytics – it's a DELICATE issue.* Retrieved from http://dspace.ou.nl/bitstream/1820/6381/1/Privacy%20a%20DELICATE%20issue%20%28Drachsler%20%26%20Greller%29%20-%20submitted.pdf

13. Earp, J. B., Antón, A. I., Aiman-Smith, L., Stufflebeam, W. H. (2005). Examining Internet privacy policies within the context of user privacy values. *IEEE Transactions on Engineering Management, 52*(2), 227-237. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.138.8232&rep=rep1&type=pdf

14. Fineman, M. A. (2008). The vulnerable subject: anchoring equality in the human condition. *The Yale Journal of Law & Feminism, 1*, 1-23. Retrieved from http://heinonline.org/HOL/LandingPage?handle=hein.journals/yjfem20&div=4&id=&page=

15. Floridi, L. (2005). The ontological interpretation of informational privacy. Ethics and Information *Technology, 7*(4), 185-200.

16. Floridi, L. (2006). Four challenges for a theory of informational privacy. *Ethics and Information technology, 8*(3), 109-119.

17. Floridi, L. (2013). *The ethics of information.* Oxford, UK: Oxford University Press.

18. Floridi, l. (2014). *The fourth revolution.* Oxford, UK: Oxford University Press.

19. Floridi, L., & Taddeo, M. (2016). What is data ethics? *Philosophical Transactions A, 374*(2083), 1-5. doi : 10.1098/rsta.2016.0360. Retrieved from http://rsta.royalsocietypublishing.org/content/roypta/374/2083/20160360.full.pdf

20. Gašević, D., & Siemens, G. (2015). Let's not forget: learning analytics are about learning. *TechTrends, 95*(1), 64-71. Retrieved from http://link.springer.com/article/10.1007/s11528-014-0822-x

21. Griffiths, D., Drachsler, H., Kickmeier-Rust, M., Hoel, T., & Greller, W. (2016). *Is privacy a show-stopper for learning analytics? A review of current issues and solutions. Learning Analytics Review 6. LACE.* Retrieved from http://www.laceproject.eu/learning-analytics-review/is-privacy-a-show-stopper/

22. Greenwood, D., Stopczynski, A., Sweat, B., Hardjono, T., & Pentland, A. (2015). The new deal on data: a framework for institutional controls. In J. Lane, V. Stodden, S. Bender, & H. Nissenbaum (Eds.), *Privacy, big data, and the public good* (pp. 192-210). New York, NY: Cambridge University Press.

23. Knox, D. (2010). *Spies in the house of learning. A typology of surveillance in online learning environments.* Paper presented at Edge, Memorial University of Newfoundland, Canada, 12-15 October.

24. Kruse, A., & Pongsajapan, R. (2012). *Student-centered learning analytics.* CNDLS Thought Papers. Retrieved from https://cndls.georgetown.edu/m/documents/thoughtpaper-krusepongsajapan.pdf

25. Kukutai, T., & Taylor, J. (Eds.) (2016). *Indigenous data sovereignty. Toward an agenda.* Research Monograph no. 38. Australian National University Press. Retrieved from https://press.anu.edu.au/publications/series/centre-aboriginal-economic-policy-research-caepr/indigenous-data-sovereignty

26. Lupton, D. (2014a, July 28). Beyond the quantified self: the reflexive monitoring self. [Blog post] This Sociological Life. Retrieved from https://simplysociology.wordpress.com/2014/07/28/beyond-the-quantified-self-the-reflexive-monitoring-self/

27. Lupton, D. (2014b). *You are your data: self-tracking practices and concepts of data.* Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2534211

28. Mackenzie, C., Rogers, W., & Dodds, S. (EDS.). 2014. *Vulnerability. New essays in ethics and feminist philosophy.* Oxford University Press: Oxford.

29. Maringe, F., & Sing, N. (2014). Theorising research with vulnerable people in higher education: ethical and methodological challenges. *South African Journal of Higher Education, 28*(2), 533-549.

30. Marx, G.T. (2016). *Windows into the soul. Surveillance and society in an age of high technology.* Chicago: University of Chicago Press.

31. Mayer-Schönberger, V. (2009). *Delete. The virtue of forgetting in the digital age.* Princeton, NJ: Princeton University Press.

32. Miyazaki, D., & Ferenandez, A. (2000). Internet privacy and security: an examination of online retailer disclosures. *Journal of Public Policy & Marketing, 19*(1), 54-61.

33. Murphy, K. (2014, October 4). We want privacy, but can't stop sharing. [Blog post] The New York Times. Retrieved from http://www.nytimes.com/2014/10/05/sunday-review/we-want-privacy-but-cant-stop-sharing.html?partner=rss&emc=rss&smid=tw-nytopinion

34. Nissenbaum, H. (2010). *Privacy in context: Technology, policy, and the integrity of social life.* Stanford, CA: Stanford University Press.

35. NYU – New York University (2015, January 30). Focusing on the fine print: Florencia Marotta-Wurgler's ground breaking research on consumer contracts. [Blog post] NYU LAW. Retrieved from http://www.law.nyu.edu/news/ideas/Marotta-Wurgler-standard-form-contracts-fine-print

36. Oblinger, D. G. (2012). Let's talk analytics. *EDUCAUSE Review, July/August*, 10-13.

37. Ohm, P. (2015). Changing the rules: general principles for data use and analysis. In J. Lane, V. Stodden, S. Bender, & H. Nissenbaum (Eds.), *Privacy, big data, and the public good* (pp. 96-111). New York, NY: Cambridge University Press.

38. O'Neil, C. (2016). *Weapons of math destruction. How big data increases inequality and threatens democracy.* Great Britain: Allen Lane.

39. Pasquale, F. (2012). Privacy, antitrust, and power. *George Mason Law Review, 20*(4), 1009-1024.

40. Pasquale, F. (2015). *The black box society: the secret algorithms that control money and information.* London, UK: Harvard University Press

41. Prinsloo, P. (2014). *A brave new world: Student surveillance in higher education.* Paper presented at SAAIR, Pretoria, South Africa, 16-18 September. Retrieved from http://www.slideshare.net/prinsp/a-brave-new-world-student-surveillance-in-higher-education

42. Prinsloo, P. (2016a). Evidence-based decision making as séance: implications for learning and student support. In J. Botha & N. Muller (Eds.), *Institutional Research in support of evidence-based decision-making in Higher Education in Southern Africa* (pp. 331-353). Stellenbosch, South Africa: SUN Media.

43. Prinsloo, P. (2016b, November 14). Decolonising the collection, analyses and use of student data: A tentative exploration/proposal. [Blog post] opendistanceteachingandlearning. Retrieved from https://opendistanceteachingandlearning.wordpress.com/2016/11/14/decolonising-the-collection-analyses-and-use-of-student-data-a-tentative-explorationproposal/

44. Prinsloo, P., & Slade, S. (2013). An evaluation of policy frameworks for addressing ethical considerations in learning analytics. *Proceedings of the Third International Conference on Learning Analytics and Knowledge – Leuven, Belgium, 8-12 April*, 240-244. Retrieved from http://dl.acm.org/citation.cfm?id=2460344

45. Prinsloo, P., & Slade, S. (2014). Educational triage in higher online education: walking a moral tightrope. *International Review of Research in Open Distance Learning (IRRODL), 14*(4), pp. 306-331. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1881

46. Prinsloo, P., & Slade, S. (2015). Student privacy self-management: implications for learning analytics. *Proceedings of the Fifth International Conference on Learning Analytics and Knowledge, LAK15*, 83-92. Retrieved from http://dl.acm.org/citation.cfm?doid=2723576.2723585

47. Prinsloo, P., & Slade, S. (2016). Here be dragons: Mapping student responsibility in learning analytics. In M. Anderson & C. Gavan (Eds.), *Developing Effective Educational Experiences through Learning Analytics* (pp. 174-192). Hershey, Pennsylvania: ICI-Global.

48. Sclater, N., Peasgood, A., & Mullan, J. (2016). *Learning analytics in higher education.* JISC. Retrieved from https://www.jisc.ac.uk/sites/default/files/learning-analytics-in-he-v3.pdf

49. Slade, S., & Prinsloo, P. (2013). Learning analytics: ethical issues and dilemmas. *American Behavioural Scientist, 57*(1), 1509–1528. Retrieved from http://abs.sagepub.com/content/early/2013/03/03/0002764213479366.abstract

50. Solove, D. J. (2004). *The digital person. Technology and privacy in the information age.* New York, NY: New York University Press.

51. Solove, D.J. (2006). A taxonomy of privacy. *University of Pennsylvania Law Review, 154*(3), 477-564.

52. Tene, O., & Polonetsky, J. (2012a). Privacy in the age of big data: a time for big decisions. *Stanford Law Review Online, 64.* Retrieved from https://www.stanfordlawreview.org/online/privacy-paradox-privacy-and-big-data/

53. Tene, O., & Polonetsky, J. (2012b). Big data for all: Privacy and user control in the age of analytics. *Northwestern Journal of Technology and Intellectual Property, 11*(5), 239-273. Retrieved from http://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1191&context=njtip

54. Trowler, V. (2014). May the subaltern speak? Researching the invisible 'other' in higher education. *European Journal of Higher Education, 4*(1), 42-54. doi: 10.1080/21568235.2013.851614

55. Tucker, J. W. & Vance, A. (2016). *School Surveillance: The consequences for equity and privacy.* National Association of State Boards of Education. Retrieved from http://www.nasbe.org/wp-content/uploads/Tucker_Vance-Surveillance-Final.pdf

56. Westin, A. F. (2003). Social and political dimensions of privacy. *Journal of Social Issues, 59*(2), 431-453.

57. Xu, H. (2011). Reframing Privacy 2.0 in Online Social Network. *Journal of Constitutional Law, 14*(4), 1077-1102. Retrieved from http://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1058&context=jcl

The "Boomerang Effect": How Outsourcing Impacts on the Workload of Academics

Thomas Hülsmann, Britta Zawada,
University of South Africa, South Africa

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), the 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.

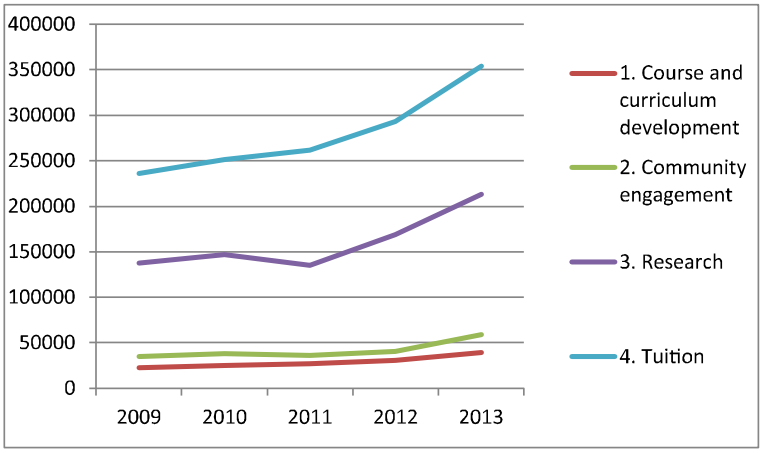

Figure 1. Core academic tasks

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.

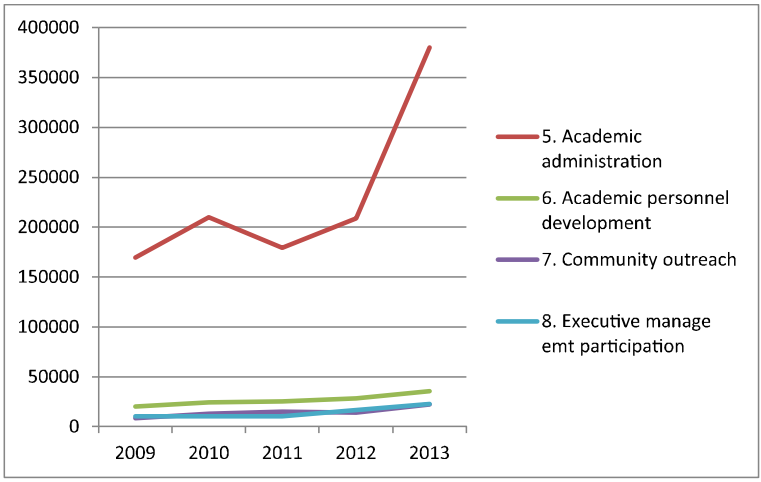

Figure 2. Academic time capturing results from 2009-2013 (Academic support)

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%

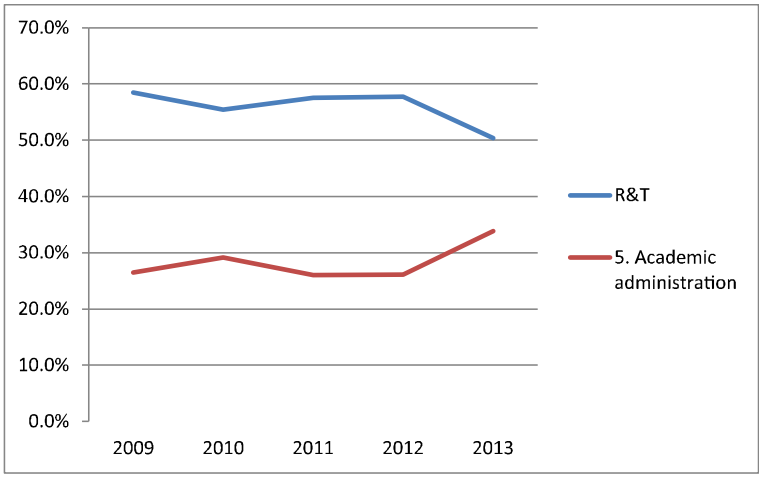

Figure 3. Tuition & Research versus Academic Administration

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.

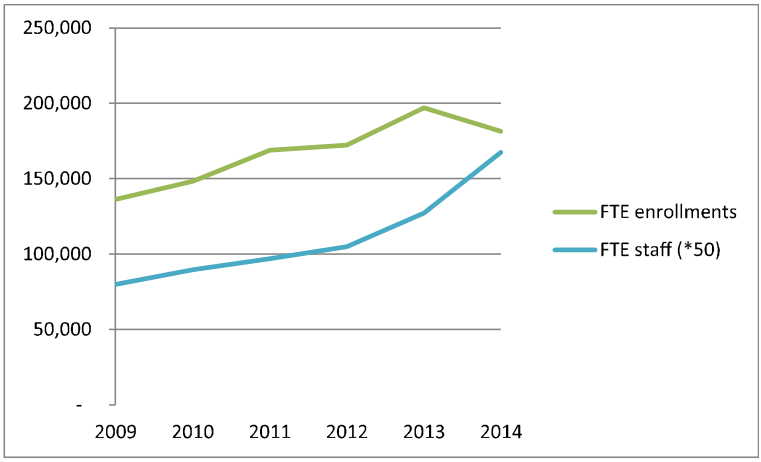

Figure 4. FTE staff vs. FTE students
Note that the FTE staff is multiplied by 50. The intention here is to visualize that FTE enrolment and FTE staff develops in parallel.

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.

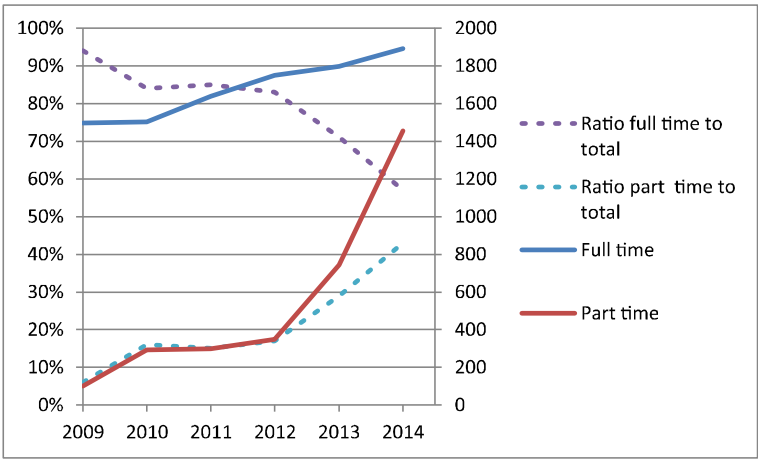

Figure 5. Ratios of full time and part time to total

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 Instructional/research professional staff 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 form 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.

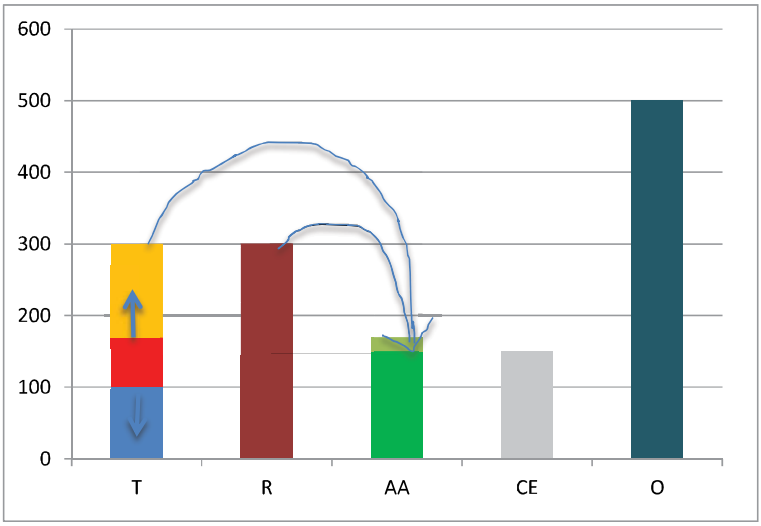

Figure 6. Ratios of full time and part time to total

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.

References

1. Daniel, J., Kanwar, A., & Uvalic-Trumbic, S. (2009). Breaking Higher Education's Iron Triangle: Access, Cost, and Quality. *Change, The Magazine of Higher Learning.*
2. du Plessis, W., & Bester, P. (2014). *Academic time capturing results from 2009-2013.* Management Committee, Office of the Vice-Principal Finance and University Estates, UNISA.
3. Hülsmann, T., & Shabalala, L. (forthcoming). UNISA's signature courses: A way of wriggling out of the Incompatibility theorem?
4. Makhanya, M. (2014). Report to Council on performance of the university 2009 to 2013. UNISA.
5. UNISA (2008). *ODL Policy.* Retrieved from http://www.unisa.ac.za/static/corporate_web/Content/Colleges/CGS/schools,%20institutes%20&%20research%20chairs/institutes/documents/odl-policy_version5_16Sept08.pdf

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.

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

Laia Albó, Davinia Hernández-Leo, Jaume Barcelo,
Luis Sanabria-Russo, Universitat Pompeu Fabra, Spain

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.

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 3rd and 4th 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.

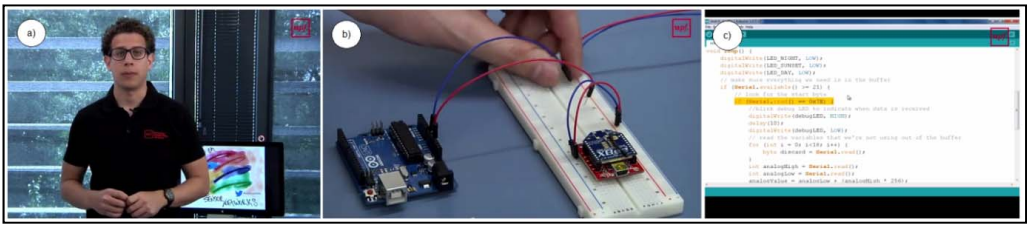

Figure 1. Screenshots from a project's video, where it is showed the three possible types of content explanation: (a) professor's explanation (b) circuit demonstration and (c) programming instructions.

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.

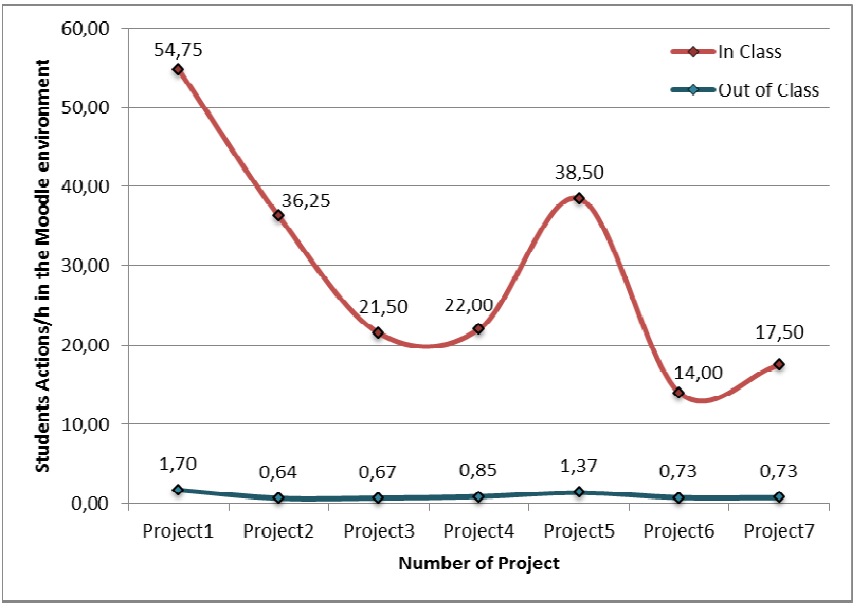

Figure 2. Students actions per hour in the online Moodle learning environment depending on project.

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.

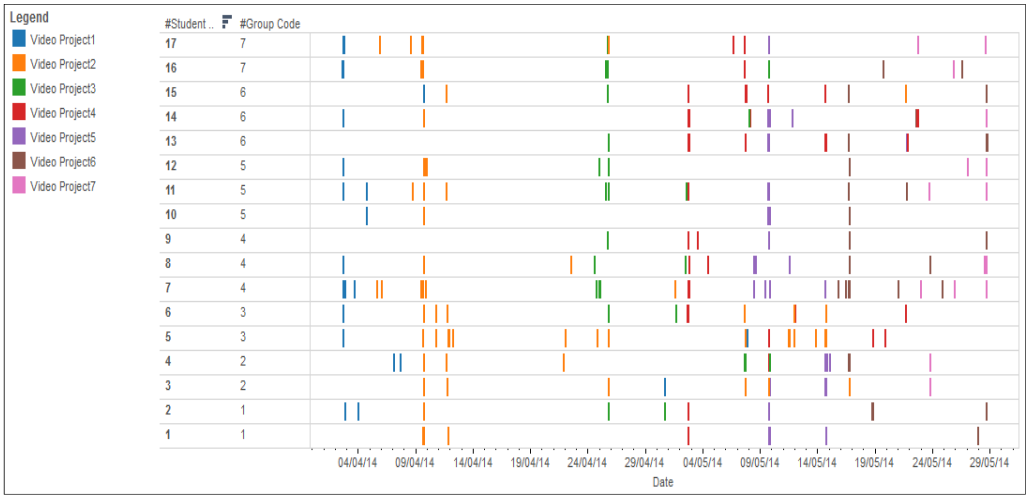

Figure 3. Video views of the students in time depending on project

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.

References

1. Creswell, J.W. (2005). Mixed methods designs. In J. W. Creswell (Ed.), *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (2nd ed.). New Jersey: Pearson Prentice Hall.
2. Giannakos, M. (2013). Exploring the video-based learning research: A review of the literature. *British Journal of Educational Technology, 44*(6), 191–195.
3. Greenberg, A., & Zanetis, J. (2012). *The impact of broadcast and streaming video in education.* Ainhouse Research, CISCO.
4. Herreid, C., & Schiller, N. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching, 42*(5), 62-66.
5. Lowell, J., Utah, B., Verleger, M., & Beach, D. (2013). The Flipped Classroom: A Survey of the Research. *Proceedings of the Annual Conference of the American Society for Engineering Education.*
6. Marwedel, P., & Engel, M. (2014). Flipped Classroom Teaching For A Cyber-Physical System Course – An Adequate Presence-Based Learning Approach. *Proceedings of 10th European Workshop on Microelectronics Education (EWME),* 11–15.
7. Mason, G., Shuman, T., & Cook, K. (2013). Comparing the Effectiveness of an Inverted Classroom to a Traditional Classroom in an Upper-Division Engineering Course. *IEEE Transactions on Education, 56*(4), 430-435.
8. Neuman, W. L. (2006). Qualitative and quantitative research designs. In W.L. Neuman (Ed.), *Social research methods: Qualitative and quantitative approaches* (6th ed., pp. 149-178). Boston: Pearson Prentice-Hall.
9. Seidel, T., Blomberg, G., & Renkl, A. (2013). Instructional strategies for using video in teacher education. *Teaching and Teacher Education, 34,* 56–65.
10. Smyth, R. (2011). Enhancing learner-learner interaction using video communications in higher education: Implications from theorising about a new model. *British Journal of Educational Technology, 42*(1), 113–127.
11. Tucker, B. (2012).The flipped classroom. *Education Next, 12*(1), 82-83.
12. Vieira, I., Lopes, A., & Soares, F. (2014). The potential benefits of using videos in higher education. *IATED Publications,* 750–756.

13. Yin, R. (2009). Designing case studies: Identifying your case(s) and establishing the logic of your case study. Case study research; design and methods, (4th ed., pp. 25-65). London: SAGE.

14. Yousef, A., Chatti, M., & Schroeder, U. (2014). Video-Based Learning: A critical analysis of the research published in 2003-2013 and future visions. *eLmL 2014, The Sixth International Conference on Mobile, Hybrid, and On-line Learning*, 112–119.

Acknowledgements

This work has been partially funded by the Catalonia Government, 14MOOCs14 program, and by the Spanish Ministry of Economy and Competitiveness, RESET TIN2014-53199-C3-3-R. This paper was presented in the EDEN 2015 conference and was selected as one of the best papers for publication in this journal.

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

Maria Luisa Malerba, Open University of Catalonia, Spain

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). These communities are designed as common social network sites like *Facebook* (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.

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?

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:

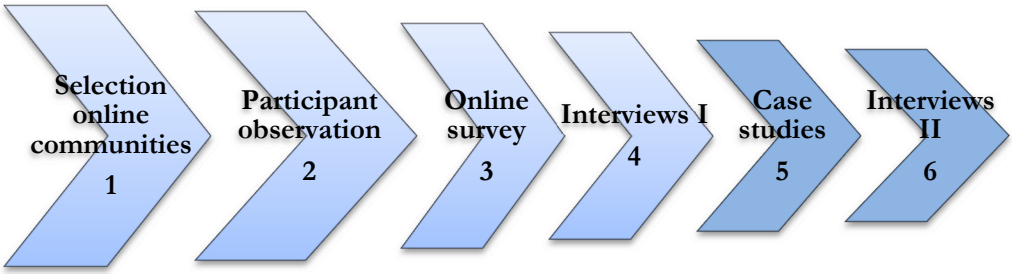

Figure 1. The 6 methodological phases of the investigation

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.

- 1st 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.
- 2nd phase: *Fieldwork*. Immersion in the activities of the communities object of the study, inhabiting the communities and observing learners' behaviour.
- 3rd 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.
- 4th phase: *Interviews 1st 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.
- 5th 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.
- 6th 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.

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.

References

1. Belz, J. A., & Kinginger, C. (2002). The Cross-linguistic Development of Address Form Use in Telecollaborative Language Learning: Two Case Studies. *The Canadian Modern Language Review, 59*(2), 189–214.
2. Black, R. W. (2009). Online Fan Fiction , Global Identities, and Imagination. *Research in the Teaching of English, 43*(4), 397–425.
3. Blattner, G., & Fiori, M. (2009). Facebook in the Language Classroom: Promises and Possibilities. *International Journal of Instructional Technology and Distance Learning, 6*(1), 17–28.
4. Brick, B. (2011). Social Networking Sites and Language Learning. *International Journal of Virtual and Personal Learning Environments, 2*(3), 18–31.
5. Chotel, L., Mangenot, F. (2011). Autoformation et sites d'apprentissage et de réseautage en langues. *Proceedings of the EPAL 2011 conference*, University Stendhal Grenoble II, France.

6. Chotel, L. (2012). *Interactivité et interactions sur un site d'apprentissage et de réseautage en langues: analyse systémique de l'activité de trois apprenants.* Unpublished Master's thesis, Université Stendhal - Grenoble III.

7. Darhower, M. (2007). A Tale of Two Communities: Group Dynamics and Community Building. *CALICO Journal, 24*(3), 561–589.

8. Engeström, Y. (1987). *Learning by expanding. An activity theoretical approach to developmental research.* Helsinki: Orienta-Konsultit.

9. Gonzales, A. (2012). *Interlanguage Pragmatic Development in Native Speaker/Nonnative Speaker Participatory Online Environments.* Unpublished Ph.D. thesis, University of New Mexico.

10. Halvorsen, A. (2009). Social Networking Sites and Critical Language Learning. In M. Thomas (Ed.), *Handbook of Research on Web 2.0 and Second Language Learning* (Vol. 2, pp. 237–258). Hershey, New York: Information Science Reference.

11. Harrison, R., & Thomas, M. (2009). Identity in Online Communities: Social Networking Sites and Language Learning. *International Journal of Emerging Technologies and Society, 7*(2), 109–124.

12. Jee, M. J., & Park, M. J. (2009). Livemocha as an online language-learning community. *CALICO Journal, 26*(2), 448–456.

13. Kurata, N. (2011). *Foreign Language Learning and Use: Interaction in Informal Social Networks.* London: Continuum International Publishing Group.

14. Lam, W. S. E. (2009). Multiliteracies on Instant Messaging in Negotiating Local, Translocal, and Transnational Affiliations: A Case of an Adolescent Immigrant. *Reading Research Quarterly, 44*(4), 377–397.

15. Lantolf, J. P. (2000). Introducing socio-cultural theory. In J. P. Lantolf (Ed.), *Sociocultural Theory and Second Language Learning* (pp. 1–26). Oxford: Oxford University Press.

16. Lantolf, J. P., & Thorne, S. L. (2006). Sociocultural theory and second language learning. In B. Van Patten & J. Williams (Eds.), *Theories in second language acquisition* (pp. 201–224). Mahwah, NJ: Erlbaum.

17. Liaw, M.-L. (2011). Review of Livemocha. *Language Learning & Technology, 15*(1), 36–40.

18. Lloyd, E. (2012). Language Learners' "Willingness to Communicate" through Livemocha.com. *Alsic, 15*(1). Retrieved from http://alsic.revues.org/2437

19. Malerba, M. L., & Appel, C. (2016). Telecollaboration in online communities for L2 learning. In S. Jager, M. Kurek, & B. O' Rourke (Eds.), *New directions in telecollaborative research and practice: selected papers from the second conference on telecollaboration in higher education* (pp. 305–312). Dublin, Ireland: Research-publishing.net.

20. McCarty, S. (2009). Social networking behind student lines in Japan. In M. Thomas (Ed.), *Handbook of research on Web 2.0 and second language learning* (pp. 181–201). Hershey, New York: Information Science Reference.

21. Mynard, J. (2011). Learning environments that facilitate reflection on language learning. *Jalt Call Journal, 7*(3), 293–306.

22. Ohta, A. (1995). Applying Sociocultural Theory to an Analysis of Learner Discourse: Learner – Learner Collaborative Interaction in the Zone of Proximal Development. *Issues in Applied Linguistics, 6*(2), 93–121.

23. Pasfield-Neofitou, S. E. (2009). Learners' Participation in Informal Japanese-English Internet Chat. *New Voices, 3*, 43–62.

24. Rogoff, B., & Gardner, W. (1984). Adult guidance of cognitive development. In B. Rogoff & J. Lave (eds.), *Everyday cognition: Its development in a social context.* Cambridge, MA: Harvard University Press.

25. Rogoff, B., Paradise, R., Arauz, R. M., Correa-Chavez, M., & Angelillo, C. (2003). Firsthand learning through intent participation. *Annual Review of Psychology, 54*(1), 175–203.

26. Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Thousand Oaks, CA: Sage.

27. Stevenson, M. P., & Liu, M. (2010). Learning a Language with Web 2.0: Exploring the Use of Social Networking Features of Foreign Language Learning Websites. *CALICO Journal, 27*(2), 233–259.

28. Tanaka, N. (2005). Collaborative Interaction as the Process of Task Completion in Task-Based CALL classrooms. *The JALT CALL Journal, 1*(2), 21–40.

29. Thomsen, S. R., Straubhaar, J. D., & Bolyard, D. M. (1998). Ethnomethodology and the study of online communities: exploring the cyber streets. *Information Research, 4*(1), 1–4.

30. Thorne, S. L. (2003). Artifacts and Cultures-of-Use in Intercultural Communication. *Language, Learning & Technology, 7*(2), 39–67.

31. Thorne, S. L., & Reinhardt, J. (2008). "Bridging Activities," New Media Literacies, and Advanced Foreign Language Proficiency. *CALICO Journal, 25*(3), 558–572.

32. Tudini, V. (2010). *Online Second Language Acquisition. Conversation Analysis of Online Chat.* London: Continuum International Publishing Group.

33. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* MA: Harvard University Press.

34. Wertsch, J. V. (1985). *Vygotsky and the social formation of mind.* Cambridge, MA: Harvard University Press.

35. Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*(2), 89–100.

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

Anders Grov Nilsen, Aslaug Grov Almås,
Stord/Haugesund University College, Norway

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 21st 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 21st 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.

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. McLouglin 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 21st 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 21st 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.

References

1. Allen, I. E., & Seaman, J. (2011). *Going the Distance: Online Education in the United States, 2011.* Wellesley: Babson Survey Research Group.
2. Biggs, J., & Tang, C. (2011). *Teaching for Quality Learning at University* (4th ed.). Maidenhead: McGraw-Hill/Society for Research into Higher Education and Open University Press.
3. Conole, G., De Laat, M., Dillon, T., & Darby, J. (2008). 'Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology. *Computers & Education, 50*(2), 511-524.
4. Dahlstrom, E., & Bichsel, J. (2014). *ECAR Study of Undergraduate Students and Information Technology, 2014.* Louisville: EDUCAUSE.
5. Engvik, G. (2014). The importance of networks for newly qualified teachers in upper secondary education. *Educational Research, 56*(4), 453-472.
6. Furberg, A. L., & Lund, A. (2016). En profesjonsfaglig digitalt kompetent lærer? Muligheter og utfordringer i teknologirike læringsomgivelser. In R. J. Krumsvik (Ed.), *Digital læring i skole og lærerutdanning* (pp. 26-48). Oslo: Universitetsforlaget.
7. Helleve, I., Almås, A. G., & Bjørkelo, B. (2013). Use of Social Networking sites in Education - Governmental recommendations and actual use. *Nordic Journal of Digital Literacy, 7*(4), 191-207.

8. Ito, M., Horst, H., Bittanti, M., Boyd, D., Herr-Stephenson, B., Lange, P. G., Pascoe, C. J., Robinson, L., Baumer, S., Cody, R., Mahendran, D., Martínez, K., Perkel, D., Sims, C., & Tripp, L. (2008). *Living and Learning with New Media: Summary of Findings from the Digital Youth Project.* Cambridge: MIT Press. Retrieved from http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-WhitePaper.pdf

9. Johnson, L., Adams Becker, S., & Hall, C. (2015). *2015 NMC Technology Outlook for Scandinavian Schools: A Horizon Project Regional Report.* Austin, Texas: The New Media Consortium.

10. Johnson, L., Adams Becker, S., Cummins, M., & Estrada, V. (2013). *Technology Outlook for Norwegian Schools 2013-2018: An NMC Horizon Project Regional Analysis.* Austin, Texas: The New Media Consortium.

11. Kirschner, P., Wubbels, T., & Brekelmans, M. (2008). Benchmarks for Teacher Education Programs in the Pedagogical Use of ICT. In J. Voogt, & G. Knezek (Eds.), *International Handbook of Information Technology in Primary and Secondary Education* (20th ed., pp. 435-447). New York: Springer Science + Business Media.

12. Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. *Computers & Education, 49*(3), 740-762.

13. Krumsvik, R., & Almås, A. G. (2009). The digital didactic. In R. Krumsvik (Ed.), *Learning in the network society and the digitized school* (pp. 107-139). New York: Nova Science Publishers, Inc.

14. Kuutti, K. (1996). Activity Theory as a Potential Framework for Human-Computer Interaction Research. In B. A. Nardi (Ed.), *Context and Consciousness. Activity Theory and Human-Computer Interaction* (pp. 17-44). Cambridge: Massachusetts Institute of Technology.

15. Kvale, S., & Brinkmann, S. (2009). *Interviews: learning the craft of qualitative research interviewing.* Los Angeles: SAGE.

16. Laurillard, D. (2012). *Teaching as a Design Science.* New York: Routledge.

17. Lieberman, A., & Pointer Mace, D. (2010). Making Practice Public: Teacher Learning in the 21st Century. *Journal of Teacher Education, 61*(1-2), 77-88.

18. Lund, A., & Eriksen, T. M. (2016). Teacher Education as Transformation: Some Lessons Learned from a Center for Excellence in Education. *Acta Didactica Norge, 10*(2), 53-72.

19. Maxwell, J. A. (2005). *Qualitative research design. An interactive approach.* London: Sage Publications.

20. McLoughlin, C. (2013). Teacher Professional Learning in Digital Age Environments. In M. A. Flores, A. A. Carvalho, F. I. Ferreira, & M. T. Vilaça (Eds.), *Back to the Future. Legacies, Continuities and Changes in Educational Policy, Practice and Research* (pp. 189-206). Rotterdam: SensePublishers.

21. McLoughlin, C., & Lee, M. J. (2008). The Three P's of Pedagogy for the Networked Society: Personalization, Participation, and Productivity. *International Journal of Teaching and Learning in Higher Education, 20*(1), 10-27.

22. McLoughlin, C., & Lee, M. J. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology, 26*(1), 28-43.

23. Nilsen, A. G., Almås, A. G., & Krumsvik, R. J. (2013). Teaching Online or On-Campus? – What Students Say About Desktop Videoconferencing. *Nordic Journal of Digital Literacy, 8*(01-02), 90-106.

24. Norgesuniversitetet (2015). *Digital tilstand 2014.* Tromsø: Norgesuniversitetet. Retrieved from https://norgesuniversitetet.no/file/3658/download?token=pU0rwnQK

25. Oblinger, D. G. (2012). IT as a Game Changer. In D. G. Oblinger (Ed.), *Game Changers: Education and Information Technologies* (pp. 37-51). Washington D.C.: EDUCAUSE. Retrieved from http://net.educause.edu/ir/library/pdf/pub7203.pdf

26. Salomon, G. (1992). What does the design of effective CSCL require and how do we study its effects? *SIGCUE Outlook, 21*(3), 62-68.

27. Selwyn, N. (2009). The digital native – myth and reality. *Aslib Proceedings, 61*(4), 364-379.

28. Selwyn, N. (2011). Will Technology Displace the School. In N. Selwyn (Ed.), *Education and Technology. Key Issues and Debates* (pp. 139-161). London: Continuum International Publishing Group.

29. Sharples, M., Adams, A., Ferguson, R., Gaved, M., McAndrew, P., Rienties, B., Weller, M., & Whitelock, D. (2014). *Innovating Pedagogy 2014: Open University Innovation Report 3.* Milton Keynes: The Open University. Retrieved from http://www.open.ac.uk/iet/main/sites/www.open.ac.uk.iet.main/files/files/ecms/web-content/Innovating_Pedagogy_2014.pdf

30. Shear, L., Gallagher, L., & Patel, D. (2011). ITL Research 2011 Findings: Evolving Educational Ecosystems. *ITLresearch, Innovative Teaching and Learning Research. 2011 Findings and Implications* (pp. 9-29). Menlo Park: ITLresearch/SRI International.

31. So, H.-J., & Kim, B. (2009). Learning about problem based learning: Student teachers integrating technology, pedagogy and content knowledge. *Australasian Journal of Educational Technology, 25*(1), 101-116.

32. Tømte, C., Kårstein, A., & Olsen, D. S. (2013). *IKT i lærerutdanningen. På vei mot profesjonsfaglig digital kompetanse?* Oslo: Nordisk institutt for studier av innovasjon, forskning og utdanning.