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Flipping the Class
An Action Research Approach to Improved Classroom Practice

Andrew Knox Cass
Appendix 1  Working Portfolio

Title: Flipping the Class: An Action Research Approach to Improved Classroom Practice

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Synopsis:

This report is compiled in three parts. The first addresses my professional background and established competency in technical aspects of lecturing at department of Energy and Environment at University College of Northern Denmark. The second tracks my own professional development and how I evolved my teaching practice during my first two years of teaching.

The final section reviews my academic research on educational practices. I produced four research papers, three on education, and one in the engineering field I teach in. The report is my own work and tracks my professional development as a teacher.

Notice:

This report uses both first and third person references to the subject of the report myself. In the third person for main content and in the first person to represent reflections on processes and actions. In addition, I refer to ‘we’ in the first person when referring to collaborative work in research activities to ensure the integrity of the type of collaboration, in which I was an equal partner.

References are made in APA 6th edition format with bracketed authors and date embedded in the text immediately adjacent to the referenced text.
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1 Introduction

Employment at University College Nordjylland (UCN) was granted on the basis that I would proceed to achieve the qualification of Lektor. This process involves a series of professional development activities and a report. This is the latter part of the requirements and the reports intent is to establish competency in the subject’s that I am teaching, track the development of teaching skill and professional development during employment.

To achieve this, the report has been organised into three distinct parts. The first part tries to establish linkages between my personal history and how they establish a competency in the subjects I teach. It begins with an introduction to the context of my teaching and a discussion of the pedagogical practices I adopted and how I understand the landscape for teaching at a Danish Professions Højskolen which is a higher institute of learning (HEI). It concludes with selected details from my curriculum vitae and how they are relevant. The second part is an explanation about my activities as a teacher and the pedagogical and theoretical underpinnings of my approach. I gathered quantitative metadata from the Learning Management System (LMS) and applied an action research approach to document growth in my pedagogical practice over a two year period. The third section describes and discusses my ongoing activity in the field of educational research and goes into detail on research I have published with a colleague. The final part of this report is a reflective appraisal of my pathway and a look at the future for research activity and teaching practice.

In summary, I hereby request lecturer qualification according to the curriculum 900 of 28.08.2015 (“Bekendtgørelse Om Lektorkvalificering, Lektorbedømmelse Og Docentbedømmelse Af Undervisere Ved Erhvervsakademier, Professionshøjskoler, Danmarks Medie- Og Journalisthøjskole Og Visse Maritime Uddannelsesinstitutioner - Retsinformation.dk” 2015). I have met the requirements set out therein and summarised and reflected on that in the following.

1.1 UCN Job Curriculum and courses.

The Danish educational system is based on a top down hierarchical standards based curriculum mandated by the education ministry’s laws applying to accreditation. This means that a curriculum must be accredited to be able to form a valid degree certification. The laws enacted as ministerial orders 214 (2013), 467 (2013), 1521 (2013), 1519 (2013) and 262 (2007) are relevant to the course Energy Technologist and Energy Management at the academy profession and professional bachelor programs.
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The resulting curriculum designed by UCN and accredited by the ministry - ‘Curriculum for the Academy Profession Degree Programme in Energy Technology’ (UCN b. 2015) is the basis for forming the study plan and lesson plans.

The curriculum requires the following compulsory educational components:

- a) Building technology
- b) Thermal engineering, indoor climate systems, building automation
- c) Energy technology, traditional and new energy forms
- d) Energy analyses, energy consumption calculation
- e) Energy-efficient project planning
- f) Process facilities, data collection and energy-technology automation
- g) Energy-economic and environmental assessment methods
- h) Study tools, Project management and Innovation
- i) Business understanding and Innovation

In researching the course in preparation for my job interview I drew strong associations with my experience and the curriculum requirements. In the following section I will refer back to these curriculum components by their designation letter (a,b,c..)

1.2 Personal History

As a business professional of over 25 years’, I come to the profession of teaching with no teaching experience, I do however have a strong CV, based on business and project development.

I graduated from Victoria University, Wellington - New Zealand, with a Bachelor of Science degree, with majors in Geology and Geography. Upon leaving university I turned casual work into a management position and within 1 year, was overseeing a chain of 5 businesses, located in the 5 major cities across the country, employing around 100 staff, and headquarters in the largest video games venue in the southern hemisphere, over 1,000m² hall, with a capacity of over 500 gamers. During this period, I realised that I was a natural business leader, could plan and implement business and cope with rapidly changing and complex situations. This experience provides competency for (i).

5 years of travel, funded by casual work across Asia, America and Europe, saw me return to NZ with a wife and child. I founded a city tourism association for Palmerston North and built it to be regional tourism authority - Tourism Manawatu. I created an innovative funding scheme based on a small tourism tax on hotel occupancy rates and while a tourist tax is not new, it was a revolution to have it demanded from the bottom up and implemented by Council and the first operating in New Zealand. This added public service to my commercial perspective (i). I left there to join my father, who recently diagnosed with terminal cancer, needed someone to continue his sole trader business in renewable energy. We formed ‘Geo Energy’ partnership to project develop geothermal power stations of
between 5MW – 100MW capacity. At the beginning, my role was to support my father’s network, however his illness quickly incapacitated him, and I assumed most of the duty in the turnkey sales and construction of the power stations. I completed the sales of three power stations, Mokai (Figure 1), Rotokawa and Ngawha, all in the north Island of New Zealand. I also was part of the negotiation team closing out the project contracts with the owners. Also, I spent three years as project coordinator building the 65MW Mokai station consisting of 4 production wells, 3 injection wells, a backpressure steam turbine with combined cycle bottoming units, and 2 Ormat energy converters for the hot fluid.

These projects were all structured around a community ownership model. This was especially valuable to the partnership because we were by enlarge free from a corporate paradigm. This further exposed how a community focus could be used to unlock value that was not beneficial to the corporate model, therefore was ignored by them. Interestingly, it exposed the weaknesses of corporate projecting and large corporations who are sometimes trapped by politics, power and other “lock-in” agents (Latour, 1999). This realisation is central to my experience to sustainable energy projects and has become one of my guiding principles when looking at sustainability. Community lead, owned or driven projects can focus on intangible results that can be given a value. This value is often under-priced in the market, especially when the market is distorted by large subsidies paid to fossil fuels, annually 1.4 trillion in 2014 (Coady, Parry, Sears, & Shang, 2015). This experience provides competency for (c,d,e,f & g) a major component of the energy technology course. Specifically, the planning sales and construction of a major renewable energy project gives you both a technical understanding and insight to the forces acting on the project (technology) from the outside.

Taking a senior role in a large project required a large time commitment and by 2002, I realised that I needed to reprioritise family and work, so built a boat and moved to Europe with the family, living aboard the boat for 2 years. As a family, we travelled the inland waterways and I did sporadic consulting work culminating in an I.T. start up that was sold off in 2009, with 100 million users in over 40 countries worldwide. Aangel messaging was a speech to text service available for your phone that enabled you to organise contacts, calendar and to-do list via voice instructions. The I.P. we generated was sold to Spinvox ® and on-sold to Nuance PLC. In reflection, the Aangel messaging sales process
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was an introduction to globalisation, large corporations and their lack of moral compass and endless capacity to cheat people out of valuable contributions by endless legal proceedings and complex interrelated deals and co-ownership. During this time, I learned how normal people can be led to do bad things given the cover of institutional and financial power. This insight is useful to understand why mankind is facing such an existential issue such as climate change. This is useful to the teaching role as it helps explaining the roles played by the different actors in energy technology influenced by incentives, economics and policy.

I also owned a main street retail shop, HiFi and CD specialists. I added a new high-end home theatre and automation division and used the retail part as my access to potential customers. This expanded value proposition led to spectacular growth for the small business and I designed built and programmed home automations systems for high and medium value customers and dealt with a rapidly changing technology landscape. This was my introduction to domestic indoor climate issues, HVAC, lighting and energy consumption (a & b), and I programmed systems to integrate uninterruptable power supply and solar in the New Zealand semi-rural context, climate control via indirect radiation and ventilation (f,g & h). I found that the engineering principles that applied to a large-scale sustainability project are equally valid at the small scale, it was just a lack of domestic equipment that made projects unaffordable compared to today.

The Global Financial Crisis hit our small town quite hard and left the retail sector decimated. This left me free to move to Aalborg, for my wife, who landed a prestigious position at AAU. During the first two years in Denmark, I completed a M.Sc. in engineering, in Sustainable Energy Planning and Management. This brought me an excellent understanding of the ‘Danish context’, and I utilised the university network of contacts and industry partners to begin developing new projects. As a business developer, your most important asset is the network of businesses and banks that can bring the expertise and financial backing to a new project. My master’s thesis was to develop a 100 MW nearshore windfarm off the coast of Aerø, Denmark. This was to be combined with the purchase of 7,500 electric vehicles. I prepared a development grant application with the EU (ELENA Program). The activity did lead to my inclusion to a small NGO – Windpeople, where we proceeded to make a bid to the energy ministry for a 300MW nearshore wind farm project. This was my first real development project here in Denmark, and I negotiated with Siemens their first ever turnkey, design-build-operate wind turbine project. We were successful with funding, brought a fully developed project, based on community ownership to the tender procedure. The experience of developing sustainable energy projects in the Danish context, a has given me an insight to the Danish business environment (i).
I was asked to join UCN because of my profile enables me to take the business sections of our curriculum and a strong focus on sustainability, and energy management which is the core. When I reflect on the reasons I took the position at UCN, I thought that teaching might be an option for me because I was competent in the core subjects and because I thought that a teacher would require a similar toolbox of interpersonal skills required for a business leader. I have been elected to many leadership positions and I felt that this was because I was naturally able to construct a positive group environment, with many individuals working towards one goal. I thought that the classroom would be just such an environment, where natural leadership, and the ability to plan and implement a strategy would be an advantage. Upon reflection I recognise my current harmony is largely due this correct intuition. I am really engaged in my teaching, am happy spending time in improving performance.

Before I move onto reflecting on my experience over the preceding two years, let me quickly discuss the paradigm I moved into.

1.3 The UCN Model.

To discuss this paradigm, I will follow closely my journey and introduction to it. Because I have no specific training, I started on the first day being presented with the curriculum document (UCN b. 2015). The curriculum document produced by UCN and used as the basis for accreditation clearly spells out three tranches for learning processes namely, knowledge, skill and competency. Within each tranche are clear goals set out for the course. An example of this is shown in Table 1. In this example, the first letter designation refers to the subject, in this case Energy Management. The second letter designation references the tranche (knowledge, skill and competency respectively) and the last is a numerical separator.

| Table 1: Examples of knowledge, skill and competency goals for Energy Technology 0916, (UCN b. 2015). |
|---|---|
| **M.V.5** | Økonomi. Forstå økonomiske begreber, samt reflektere over principper og metoder til registrering af energistyrende indsatser. |
| **M.F.8** | Anvende relevante metoder og redskaber til inddragelse af brugere i energioptimeringssystemer. |
| **M.K.1** | Anvende og kombinere relevante energiledelsesredskaber til opnåelse af et helhedsorienteret og bæredygtigt energiledelsessystem, for den samlede institution/virksomhed. |

A teacher at UCN can take this information and design a lecture or series of lectures that address the knowledge, skill or competency at the education level appropriate. It is the start reference point for course content and it is imperative that a teacher uses this guide to align the education with the accredited curriculum.
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What is interesting about this approach is the point that the teacher from this start reference has wide determinacy on how these goals are met. It is immediately apparent to a new teacher that it is not appropriate to lecture a competency nor a skill. It is part of the teachers planning process to take the content of the curriculum and choose which skills and competencies can be met by exercises, projects and practical work. This aspect is addressed by the corporate approach to learning adopted by UCN and addressed next.

1.4 Working with Reflective Practice-based Learning

Reflective practice-based learning (RPL) is the ‘learning approach’ used by UCN and is at the heart of the learning methodology. Based largely on Biggs (1999), the RPL structure is based on the three tranches; knowledge, skills and competencies (see figure 1) with an emphasis on moving towards higher order learning processes. These three tranches open the opportunity for practices other than the traditional lecture because just the mere mention of ‘skills and competencies’ opens the mind to activities, practice and doing rather than listening.

From that perspective, it is abundantly clear that the curriculum has tranches that apply directly to the RPL approach and that a lecture may not be the most appropriate method of achieving the learning goal.

As a new teacher and new to UCN RPL approach is revelatory, because when I was educated, there was few assignments and report writing and a major part of attending university was attending lectures. So, it was with this illusion that I joined UCN, but it was immediately apparent that this paradigm was out of date due to the way RPL is promoted within UCN.

UCN literature refers to making the students prepared for real life, (Danish University Colleges, 2014) and this derives from the expectation that UCN students will have competencies for job specific activities. It is therefore incumbent that teachers provide enough opportunity for those competencies to be developed and derived. One confusing factor for me that wasn’t resolved until I commenced research for this publication was how competency is used in an educational context. Competency is defined within this approach to something akin to experience. The definition relies heavily on assessment of realistic scenario based project work (J. B. Biggs, 2011). Along with a written report, we utilise a long oral assessment.
The reason to pursue this RPL approach is based on raising the students a level or two on Bloom’s taxonomic scale (B. Bloom 1956) where ‘using, transferring and reflecting on knowledge’ signifies a more developed learning. UCN has set the standard for the learning environment and as a member of the teaching staff it is clear that it is the intention to provide plentiful opportunities for activity-based work. I approached this realisation with the open mind of the industry outsider and looked for ways to enhance my practice.

After 2 years of teaching in the class I can draw positive correlations from my experiences to Knud Illeris’s ‘three dimensions of learning’ model. I am now fully engaged in exploiting its insights on the interaction dimension which describes the initiation of the learning activities such as “perception, transmission, experience, imitation, activity, participation etc. Maybe it is a similar insight that lead me to evolve from lecture style PowerPoint presentations to creating rich environments for active learning (REAL) by focusing on this part of the 3D model. However, to be honest Illeris is something I read in preparation for writing this report, so a positive correlation is the expected result. It is easy to reflect on two years’ experience of teaching to find the positive correlations based on confirmation bias theory (Greenwald, Pratkanis, Leippe, & Baumgardner, 1986; Jonas, Schulz-Hardt, Frey, & Thelen, 2001; Mynatt, Doherty, & Tweney, 1977). The same is true for Engstrom’s “directionality in concept formation”, in reflection I can see the constructivist influence and build a positive correlation.
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Because these results are expected they will be the same for most people who read a lot of educational theory, but I think the most influential section of Illeris’s book is on page one:

“Learning is also a very complex matter, and there is no generally accepted definition of the concept. On the contrary, a great number of more-or-less special or overlapping theories of learning are constantly being developed, some of them referring back to more traditional understandings, others trying to explore new possibilities and ways of thinking. It is also worth noting that whereas learning traditionally has been understood mainly as the acquisition of knowledge and skills, today the concept covers a much larger field that includes emotional, social and societal dimensions” (Illeris, 2009 p 1.)

My technical understanding of networks and how they relate to the design and operation of the nodes they connect exposed me to some of the fractal mathematics concerning emergent phenomenon. West, Brown and Enquist’s description of allometric scaling algorithms have used mathematics to expose the ‘quarter power scaling’ that underpins all growth consistent across all biology. Attempts to apply this to education have exposed a similar structure supporting learning outcomes at a societal, social, local and individual scale. Braga (2013) and Souza (2013) conclude from a complexity perspective that learning models can foster practical initiatives, that consider the network and connections [in the model], as ‘systems that learn’ (Braga, Junia de Carvalho Fidelis, 2013). This theory is said to be the 4th dimension that underpins educational theories, (West, Brown, & Enquist, 1999) and offers new insights on Illeris’s 3D model. My trust in constructivist models is weak because my history has no exposure to the education system other than being a participant and my constructivist background is quite divergent from the traditional educational researcher. It is clear from the literature however that learning models need to be supported by data because utilising Illiris to inform a practitioner how altering parts of the 3D model for example, does not specifically explain how learning is improved.

To understand learning, teachers need to be able to work with evidence of their students’ learning. This insight is of course not only useful for teachers but also to students. Understanding what has been learned and how to build on this information is crucial for both teachers and students. Assessment of learning should measure students’ learning outcomes and represent what has been taught and this should mirror in turn the intentions that the curriculum had set (Pellegrino, 2009). Pellegrino and others have also highlighted that assessment practices should complement, rather than undermine, the curriculum. Gaining insights into students’ educational experiences assessment has not only a direct impact on individual student’s educational pathways by providing feedback on students’
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performance but is also used to compare educational systems against each other and substantial resources are being invested in producing various large-scale state testing tools.

These tools have been characterized and critiqued based on their proximity (or lack of) to what actually happens in the classroom (Ruiz-Primo, Shavelson, Hamilton, & Klein, 2002). Pellegrino writes that to better support the learning intentions of the curriculum, more focus needs to be on finding an alignment between curriculum, classroom instruction, and how learning is assessed (2009). In order to better understand teaching and learning it is important to become assessment-literate to construct valid interpretations about student learning (R. J. Stiggins, Arter, Chappuis, & Chappuis, 2004; R. Stiggins, 2005; Volante & Fazio, 2007). Being assessment literate allows a teacher also to use evidence to adjust the teaching in order to meet students’ needs and support their learning. Research highlights that teachers need to be able to understand the connection between learning progressions and assessment (Brookhart, 2011; Gong, 2008) for both formative and summative purposes. Assessing the learning experiences of my students has therefore become a significant aspect of my own learning about how to be a better teacher. Chapter 3 looks in detail at techniques I utilised to evaluate my own performance and the students development utilising a variety of assessment techniques.

As a business developer, I have learned that preconceptions are not worth much, and tend to erode your ability to find the correct solution or pathway, so I have learned to trust the advice of my peers, and to critically evaluate traditional practice and take decisions in an evidence-based approach. I have learned that common practice is often not best practice, and that best practice is a relative term. So, I approached the classroom environment with the confidence of subject competence, and the trepidation of a new venture. My natural strength is in planning and strategic thinking so for my first lectures, I approached the course from scratch, taking the learning outcomes from the curriculum and itemising a list of teachable points. I planned a semester of lessons for three courses in the period before the commencement, made lesson plans, made a timetable for constructing lessons, and tried to execute the plan I had made. I did this as a businessman, not a teacher, but exactly as I would have treated a new business, which gave me little time for worrying about outcomes, and no real considerations for the student experience. I settled on ‘30 slide’ PowerPoint presentations as both familiar and functional platform for lecturing. This format was what was demonstrated to me as current best practice by semester start lectures to staff from the rectorate. However, it was immediately apparent that this lecture style was at odds with UCN’s reflective practice-based learning (RPL) approach. This is further addressed in the following chapter.

My business development side means that I am receptive to rapid improvement feedback processes. I conducted some research into how teachers normally went about improving practice and discovered
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the action research methodology (ARM). ARM appeals to my natural tendencies because it closely resembles management improvement techniques and even the management <- board of director’s relationship, where a practitioner takes an opportunity to work on an issue rather than in it. This method was put into practice and is further developed in the second part of this report, where I address my development as a teacher, but before that, I would like to discuss the paradigm I found myself in at UCN.

1.5 Active Learning Environments.
The literature is rich on the subject of the modern learning environment adapting to changes in the use of information and communication technologies (ICT). The evolution is driven by societies use of social media and portable electronic devices (Lawless & Pellegrino, 2007) and a drive to better fit into society (Kukulska-Hulme, 2012). UCN, like many of its contemporaries is placing an increased emphasis on partially online (blended) courses. One of the first meetings pre-semester I attended at the department of Energy and Miljø (EoM) was one concerning the plan to move an energy management course into the blended space. The discussion was centred around making the course content packaged into discrete modules however almost no discussion was had on the content required for this environment. I made a commitment at that meeting to explore the content question and report back to the group.

It is tempting to think that a blended course can simply be access to lecture content online. These are common and known as massive open online courses (MOOCs) however they tend to have high dropout rates and low achievement levels (Adamopoulos, 2013; Hone & El Said, 2016). Further it is clear from a massive study at the Open University of London (OU), that the lesson design is more important than the embedded content for online or blended classes (Rienties & Toetenel, 2016). This was quite new to me as I approached the move to blended where now I was being informed that lesson design was critical whereas before the structure and curriculum encouraged to ensure I have covered the curriculum points as a priority. This was no dichotomy, rather a realisation that I incorrectly understood my true role in the classroom. One educational approach which I learned about in the literature was touted to promote critical thinking skills and active learning rather than memorising or absorbing information. This is described as important for the modern teaching environment and better prepares students for their working life (Van Weert, 2005). The rich environment for active learning (REAL) is based on constructivist principles such as collaboration reflectivity and engagement (Lebow, 1993). The basis of the constructivist approach is to place the student at the centre of the learning process. This enables students to feel responsibility and autonomy in the learning process (Piaget, 2013). Moreover, REAL’s promote reflective and critical thinking due to the problem based nature of the instruction (Lebow, 1993; Savery & Duffy, 1995).
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The principles behind REAL’s are completely in harmony with my natural tendencies as a businessman and leader and dovetail nicely with the core PBL learning approach of UCN. In a REAL, students should be encouraged to work with lesson plans and goals, trying to solve a problem. The students tend to discover knowledge rather than have it presented. Teachers can be considered facilitators of the thinking process rather than the distributors of knowledge (Dunlap & Grabinger, 1996; Fetherston, 2006b). It is this reflection that added the fuel to change my practice and is the basis of chapter 3.3.

1.6 Experimenting with blended learning and flipped classroom pedagogy

Research explains that lectures are not the best way to transfer information to students (Freeman et al., 2014) and so much can be read about new approaches to do with the integration of information communication technology (ICT) in the classroom. From research studies, we now know that the smart use of ICTs can support a learner centred approach to teaching (Means & Olson, 1994). However, this is not so easy to achieve, especially if teachers simply use ICTs to replace more traditional teaching tools or merely add them into existing practices in a superficial manner (Oliver & Herrington, 2000). This would mean for example that teachers who have introduced video recorded lectures to their teaching to replace this with their teaching would need to think very carefully about how to go about this. They have to think about what video recording offers to students and also what it demands from students in terms of paying attention. To achieve a successful infusion of ICT into teaching it is necessary to evaluate pedagogical practices with knowledge about ICT resources. In the literature, this has been described as technological pedagogical content knowledge or TPACK (Koehler & Mishra, 2008; Mishra & Koehler, 2006; Schmidt et al., 2009). TPACK describes the social and technological dimensions of teacher pedagogy when they use technology to support their teaching, but teachers need to learn how to plan their teaching with supporting technology in mind.

The smart introduction of ICT resources such as video etc that students can access in their own time has been described as flipped class or

![Figure 3: TPACK teaching in context from TPACK.org](image-url)
sometimes blended environment and has been ascribed with the potential to improve teaching and learning (Raths, 2014). One of the problems facing a new teacher is trying to apply literature across fields of study. The academic nature of published articles describing flipped classroom, or a blended environment are at times focusing on practices to do with different age groups, different topics of study, in different educational environments and countries. However, there is no reported research on using a flipped classroom approach for energy technology classes. This does not mean that the findings of that research have no value. Rather, it implies that I needed to take a structured approach to applying some selected findings from the abovementioned papers and introduce them in such a manner that it is robustly clear that the benefits are accruing to both myself and the students.

My interpretation of flipped classroom is based on and refer to the process of making knowledge available to students in methods other than lectures, but not necessarily video, and basing most of the class time on an activity where they apply knowledge. This comes in many forms but primarily doing small research tasks, reflections and assignments. For one class, we had a debate for example. The blended aspect takes the form of utilising the learning management system to enable the students to access the content outside the class and submit material while not being required to participate on campus.

There is tremendous synergy between the flipped classroom and the blended teaching and my approach to one informed the other and my in-house practice evolved very quickly.

1.7 Discovering my role

The curriculum for the lector qualification asks that the applicant develop, design and implement business-or profession-oriented and development-based teaching. (Annex 1, (a), BEK nr 990) It is with this in mind that led me to evolve my practice over the last 18 months. I tried hard to think about the information most pertinent to the job seeker and new recruit rather than regurgitating page after page in a book. I tried to make simulation-based activities that would be relevant in the working environment such that students would have that ‘competency’ moving into the workforce. The development required by the curriculum has been documented via my business development strategies (my toolkit) and since it replicates action research methodology, it is presented under this framework and is described in chapter 2. Further, Chapter 2 also provides the reflections, theory and the interplay of theory and practice. Chapter two is presented as three changes to my practice and reflections on each. The order they are presented demonstrates the development.
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The lector curriculum refers to the requirement for the applicant to “independently and innovatively work with the institution’s development tasks, and vocational or professional development in practice” (Annex 1, point b, BEK nr 990). Developing my own practice in the classroom led to a valuable skillset for making video content. Specifically, I worked hard on providing a simple way to take existing PowerPoint content and recording a video from that. Because so many staff at UCN use PowerPoint I felt that the techniques that I was developing would be of value to colleagues. I worked closely with a colleague to formalise the learning, create a workshop, reproducible across other subjects and with specific learning outcomes. As of writing, this workshop is published under the banner ‘Easy as 1-2-3’ and available via the Learning Academy (LA), where the techniques can be disseminated to the rest of UCN staff.

In the interest of readability and flow, next I will describe action research methodology and how I applied it to my development that leads to the Easy as 1-2-3 workshop. Because it tracks my own development and growth and is the basis for the research part of my job it is important to state the process by which my practice developed.
2 Taking advantage of the opportunity

The aim of the adjunct program is to engage in a reflective process and from page 12 of the guide can be complimented with an approach such as “The assistant professor’s responsibility to actively take advantage of the real opportunities that the institution made availability” (Danish University Colleges, 2014). Towards this end, I have combined the requirement to ‘research his own approach’ and, the am mindful of the fact that researchers are working together with actors in relevant networks and reflecting upon their interactions with them. My intention is to draw conclusions from these reflections which could be useful in planning out subsequent steps in the development of teaching skillset. This approach may be viewed as action research. After the description of the methodology, I will refer to iterations of the research process that specifically highlights each learning step I have taken throughout my employment. This will make it clear how the development proceeded and also will further clarify my research efforts.

2.1 Action research

The Action Research methodology (ARM) is commonly applied to case studies. As the name implies, the methodology encourages active involvement of the researchers in the case being studied. The concept of the “action research spiral” was introduced in the book “Doing Critical Participatory Action Research” (Kemmis, McTaggart, & Nixon, 2013). Action research methodology is an iterative implementation of act, observe, reflect and plan. The spiral describes the hermeneutic process in which the researchers involved review the results of an action which has taken place, interestingly, the initial action may be one in which the researchers participated in or one which has been presented to them (Kemmis, McTaggart, & Retallick, 2004). Researchers analyse those results and pinpoint where and how problems are arising, propose a solution to these problems, and perform an intervention in which the proposed solution is applied. The iterative nature of the action research spiral implies that researchers are able to flexibly adjust their approach or alter earlier practice to effect change. The action research spiral is pictorially represented in figure 3.

Of critical note here is the iterative process, the repeated cycles of observing and reflecting on the actions taken to improve practice. ARM is common educational research methodology as it provides the ability for researchers to effect change as one proceeds. The ARM closely describes my actual process and therefore is the correct methodological structure upon which to hang my efforts to improve

Figure 4: The action research spiral. (Valencia College professional development course. 2016)
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practice within the classroom in line with my obligations as participating in the adjunct program.

In cases where the ARM is utilised, the researchers, or another entity acting on their behalf, will stage an intervention, with the intent of making a measurable impact on the outcome of the case being studied. As the outcome of an intervention cannot be known beforehand, researchers who employ the ARM have the potential to affect those involved in a case study in a positive or negative way. It is therefore the intention to be, in so far as is possible, objective in the analysis and problematization of actions which have taken place in order to make informed decisions about the future interventions which I proposed.

To raise the level of objectivity, the measure of the success or failure is obtained from course meta data, the collection of which is improved by moving teaching into a digital platform. Objective measures including viewer time, and LMS interactions for example provide a dataset, however no information as to why or even if that data is informing us about the intervention specifically. This understanding requires a reflective analysis of the impacts of an intervention.

2.2 Project Diary
For researchers who practice the ARM, it is highly recommended to keep a journal of the events which have occurred during the study of the case of interest (Kemmis et al., 2004). Accordingly, I have kept a project diary. The diary contains the main action or interventions taken and some of the classroom activities engaged, with a reflection on the impact.

Following is a structured description of developing my teaching practice based on the above methodology.
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3 Developing my practice.
In the following sections I will describe the process I used to develop my teaching practice. Because I do not have education nor experience as a teacher, I utilised my existing toolkit drawn from project development setting. This toolkit includes a rapid plan – implement – measure - review process that, in upon reflection, looks similar to action research. This is the process I went through to develop my own competency in teaching and it is presented in chronological order. References to learning theory are mentioned in reflection toward the end of a description or the section. I describe several main iterations of the action research cycle. There are more interventions than described here, however these are the main ones. Each iteration will be labelled as the intervention I made in the cycle and will also describe the reflections, plans and actions for each.

3.1 Iteration 1 – Recording a lecture.
During a blended learning planning meeting in November 2015 it was described that teachers in energy management would be asked to provide content for the online environment. The plan was formulated that teachers would prepare videos for the class.

There were 10 teachers involved in the course, none of whom had recorded videos for teaching before. They in the majority, rejected recording their own videos. While this reluctance to record is undefined it does signify that there were a number of barriers perceived by the teachers. Therefore, the initial approach was that the existing teaching material was to be given to an external person with video recording experience.

Two test videos were recorded and passed to the team to provide feedback. After having watched the videos the team realized that they did not suit the course. There were several objections:

- The videos tended to be long and quite monotonous
- The visual content was the same as the spoken content
- Some of the content selection omitted critical elements of the curriculum.

These comments reflect broadly the recording process. Because the videographer had no topical knowledge, he was not able to move off script. It was discussed that teachers could prepare a script; however, this was rejected out of hand due to lack of time and resources. Also, the voiced slides type of lecture is quite common, however in the case under review the content did not really suit the presentation style making them monotonous. It was clear that a student would not be able to sit through a 30-slide video of an hour or so, so some slides were removed, however this led to incomplete content delivery. So, the above represents the observe part of the ARM and what follows serves as the reflection phase.
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The team decided that: the videos should really be recorded by the teachers competent in the topic, should include an element of engagement and that the teachers would have to do the recording themselves. However, as mentioned before there are barriers to this process, and once it was realised that storyboards, scripts are the bywords of recording (Halili & Zainuddin, 2015) the blended learning program was placed in jeopardy.

Upon reflection the responses reflect a fair response to not knowing what blended learning required, and a paradigm largely reflective of lecturing in the classroom. Barriers to recording as observed and supported by literature (Zellweger, 2007), refer to a lack of time for preparing storyboards, scripts, and recording. In addition, there was resistance to new equipment and software, and a fear of being recorded.

At this time, I found a small addon to Microsoft PowerPoint, MIX, that enables the user to record a lecture. The process is quite simple, and the file remains a PowerPoint, so it can continue to be used as such. I recorded my first lecture using MIX and shared it with the course coordinator. The output is a simple MP4 file compatible with any video player software on any platform. I.e. it can be viewed on the phone for example. I realised the potential to use this technology for flipping the class and blended learning and proceeded to record more lectures for my obligations for the e-course. I shared my little videos with the team and offered assistance with commencing the recording process.

My reflection process identified that the feedback from the teachers reflected a fear of the unknown. These fears are expressed as barriers to the uptake of technology (Zellweger, 2007) which appeared to be our case too. Further, that fear can be treated with an incremental exposure approach (Heimberg, 1995), and that it would be beneficial to utilise familiar software for the purpose of recording, thereby using the technology to mediate a calm response rather than a stress one. One of the interesting reflections on this process is how much easier it was to bring my colleagues to a PowerPoint addon than a video recording software like Camtasia or Panopto. Our faculty makes a wide variety of software available and professional development in their use. The reflection on this lead to one of my research papers (Free Flowing Content) described in the last section of this report.

The significance of this development was multifaceted. While the capture of voiceover presentations is a simple method, the primary significance was that teachers did not have to actually be on the video. Unless specifically enabling this feature, there is no picture of the lecturer, although it can be added. In the context we used the technology, there was no requirement, further teachers were normally glad that this feature was disabled. In addition, the slide recordings are done in PowerPoint which is a software designed to be edited slide-by-slide. This lends itself to slide-by-slide recording with a break after each one. This enables the teacher to gather their thoughts, and perhaps more importantly, to
simply stop and rerecord if an error was made. We observed that teachers tended to make many mistakes early in their recording experience and the ability to simply abandon the recording and start again eased the stress associated with the new environment. This self-editing was beneficial for those teachers were reluctant to embrace recording process because they could substantially lift the quality before sending the video to the course coordinators and editors.

Utilising this approach my colleague and I (hereinafter ‘we’) introduced the team to the MIX addon and a simple recording process. It was possible to take an existing PowerPoint presentation and produce from that a 10-minute video in around 15 minutes. This approach addressed the main barriers of; lack of time to prepare; not using new technology, hardware or software; and creating content or scripts. In summary, I identified the problems associated with providing lecture content, formed an intervention by looking to Information and communication technology (ICT) affordances provided by my institution, measured the outcome as successful by being able to implement the same solutions for others and the outcome is a method for teachers to record lectures and many of the objections were overcome. This completes the cycle. The next stage was to look at the quality of the videos and determine how to make them more engaging.

3.2 Iteration 2 – Attention retention.
Online lecture content as video comes in four broad categories (Chen & Wu, 2015). Lecture capture format is a format based on the simple recording of an in-class lecture. The voiceover presentation or ‘talked slides’ are the simple recording played over an automated slide presentation, and is the category offered most simply by MIX, but is not limited to this format. The picture-in-picture method, which shows the presenter and captures slide annotations is the kind of capture that is offered by Panopto or some similar software and can be offered by MIX. Finally, animated video with a voiceover, signified by animated drawings or diagrams and only keywords or lists being shown as text. This last type is also known as the ‘Khan Academy type’ (Chen & Wu, 2015).

These broad categorizations do have common components but in general allude to different production techniques. Where some online courses (e.g. Stanford Online) are almost exclusively lecture capture, others are noted for their signature style of animated video like the Khan Academy.

The literature does not clearly state if learning is improved specifically by differentiating these types (Zhang, Zhou, Briggs, & Nunamaker, 2006). Mostly, studies compare one production style to another and commonly finds positive results for each style. Commonly though, the use of video is reported to be beneficial in online teaching (Kukulska-Hulme, 2012) as well as in a variety of face-to-face and blended environments (Shephard, 2003). Rienties and Toetenel from the Open University London (2016) describe that content is less important than learning design aspects in a study involving over
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150,000 students over hundreds of courses. This fact may account for the mixed results in video content type studies but alludes to a freedom in producing suitable content for e-learning if that content is embedded in a structured learning environment.

Nevertheless, video is important to the success of online courses and is suggested as one of the main ways to present information for flipped or blended classes (Chen & Wu, 2015; Zhang et al., 2006). This leads us neatly to basis of the next iteration, or specifically how do we take a potentially long and boring slide presentation and transform this into an interesting video that students will watch. This intervention is the basis of another publication I co-authored entitled Attention Retention and focused on modifying PowerPoint presentations to better suit a movie rather than a lecture. As Palloff and Pratt (2003 p. 23) note, “Faculty members cannot be expected to know intuitively how to design and deliver an effective online course” and that often “faculty members have not been exposed to techniques and methods needed to make online work successful”. This is consistent with my experience, and so I turned to the metadata for numbers to help me assess how my videos were being used and is described next.

3.2.1 The story from the metadata
In order to support the reflections, we made regarding a ‘good video’ first I need to provide some context into the data we collected. When recording a video using MIX, it is possible to upload it to the MIX server and embed that MIX in the Learning Management System (LMS) system we use Canvas. The process is not relevant; however, it does provide the opportunity to harvest detailed metadata in the viewing habits of the students. Mix shows the amount of time each viewer viewed each slide compared with its duration. An early video we produced showed a poor ability to hold the viewers’ attention (Figure 4).

It can be seen from the viewing times that particularly slides 2 and 3 in figure 4 shows that most viewers are not watching the whole slide. This is due to the ability to fast forward a video, an option not available to students in a lecture. In looking at detailed metadata, it could be seen that viewers watched the first few seconds and ‘skipped’ forward and landed on average ¾ of the way through the next slide. The reflections and interviews with students about this habit uncovered the fact that...
students already knew the name of the lecture and who was giving it through the LMS where they obtained access. This skipping behaviour continues for the duration because when a student drop’s into the mid-sentence of a slide, they cease to listen and start reading the text.

It appears that students heard only about 10-15 seconds of the first slide then decided to skip and absorbed content by reading the text. If students used the video in this way, it seems a shame to go through the process of recording one. The viewership of the third slide, the one with the main point was down to \( \frac{1}{7} \) of the duration, and most viewers missed the point entirely.

Upon reflection this video lesson failed to pass on the knowledge required for the lesson. This approach is demonstrably wrong under almost any learning theory. Illeris would highlight the lack of interaction, where students fail to even watch your lesson (Illeris, 2009). It was out point of departure to try to get viewing times consistent with slide duration as a gauge of engagement.

The remedy was to eliminate the first slides with the name and learning goals and place this information in the LMS as text. In this way it was possible to start the video with the most important facts and this had the effect of helping retain viewers in the video. The metadata survey shows that students are watching the videos more completely and multiple times after the intervention (figure 5).

After the intervention, the students engaged with about 90% of the slide timings. The result almost never got higher than that number because students tend to view the videos multiple times and skipped to interesting bits which has the effect of lowering the average. Utilising video has several benefits, namely the collection of metadata. Metadata is the trace left by networked computers, derived by the networks obligation to tract and address data flowing between the nodes. When a student watches a video hosted by a LMS the network registers the data stream’s outbound path and address, similarly a pause or skip forward is similarly registered. This is primary data, and although does not supply information on intentionality, is a powerful way to reveal viewer patterns.

We used the change in viewer patterns to expose if our interventions were effective but can make no claim to the qualitative reasons behind the change. This data came from informal observations and interviews that we used during the reflective phase of the iteration.
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This paper really is limited to a reflection on my process, and in order to cut through endless iterations of activity, the table below summarizes the iterative process as we developed videos. The progression of video development starts at the voiceover presentation, the simplest expression of capturing classroom practice and moving it to the online environment. While monitoring the viewer retention we shortened videos, added annotations and also developed tighter links to activities and exercises the class participated in that in some way replaced the information sharing. This part is further developed in the discussion of the next iteration, but this summary is useful to get an overview of activity and the development of techniques used in class and e-learning.

Table 2: Results of the action research iterations showing the accumulation of techniques.

<table>
<thead>
<tr>
<th>Iteration</th>
<th>Video features</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1x 42m, VoP</td>
<td>Long and boring lacked engagement</td>
</tr>
<tr>
<td>2</td>
<td>3x 7-12m, VoP with A</td>
<td>Long introduction, poor learning outcomes (figure 1)</td>
</tr>
<tr>
<td>3</td>
<td>7x 5m, AV</td>
<td>Great introduction, Well integrated</td>
</tr>
<tr>
<td>4</td>
<td>25x 5-17m, AV, IV, FL</td>
<td>Improved class atmosphere</td>
</tr>
<tr>
<td>5</td>
<td>22x 5 - 12m, AV, IV, OL</td>
<td>Good outcomes, better engagement</td>
</tr>
</tbody>
</table>

Key: x – Number of videos  m – Minutes duration, VoP – Voiceover Presentation, A – Annotations, AV – Animated Video, IV – Interactive Video, FL – Flipped Class (video watched outside the classroom), OL – Online class

The development for our videos from simple voiceover presentations started with the first step of trying to sync the reading and the voiceover. This resulted from the reflection that slides with a lot of text tended to be skipped towards the end. Implying that viewers had not listened to content but read it. By animating the text to appear at the press of a button while recording this tendency could be eliminated. We also used a technique of covering a diagram or picture with solid boxes that hid parts of the image. These boxes were also animated to disappear revealing the image behind, and this also reduced skipping tendencies.

The next step was to remove nearly all the text except for single keywords that appeared for emphasis. The pictures were layered and faded in such a manner to appear as if animated. We are not talking 25 frames per second animation like some cartoon, more like 1 frame per minute, but the effect was the same, with far less text and imagery that is constantly changing and being edited with the pen strokes. This animated video holds the viewer’s attention almost completely. Upon reflection we noticed that videos where the pen is moving nearly all the time while talking were viewed for longer. We interpret this that both the visual and aural systems should be engaged harmoniously to hold attention, otherwise it becomes a distraction. With no visual stimulation a viewer is easily distracted, a simple pen stroke can refocus them to the information being presented aurally and make them look at the relevant part of an image. This repeated action, becomes an interaction when the viewer is involved, just not a contemporaneous one.
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One interesting discovery, which rather confounds the reflections above was that we had better viewer times when each slide started completely blank. It is hard to imagine why but in looking at videos recorded by others, I find myself looking at a blank page and listening to the voice with a rising expectation of something to come. Then when the image does arrive, it is oddly satisfying. This is a personal observation and reflection and not grounded on any empirical data however it is interesting that even long periods (5-10 seconds) of blank screen will not cause skipping forward to the next slide.

3.2.2  Summary of the second iteration
The second iteration deserves a summary because there are multiple steps or sub iterations of the process which have been combined here to demonstrate my teaching development and improvement of teaching practice. After the discovery that videos could be easily produced, the focus was then on how to make the videos watchable. We used the metadata metrics to measure how students watched the videos and to do this we made assumptions that students were watching a video if it was shown as playing in the metadata. While it is possible that the videos played to no audience, but we discounted this as unlikely. Also, we assumed that skipping leads to problems because if one lands in the middle of a slide you have to read to catch up and therefore do not listen; that videos should contain one major point and that’s it.

The resulting videos are what we call animated videos, they contain almost no text, lots of animated images and busy use of the pen to highlight key things. They are normally focused on one particular thing, and they are almost always under 15 minutes long. A video longer than 5 minutes does more than make a point though, they are explanation videos when I go a little deeper into a complex phenomenon and try to explain it clearly, often I will use several examples from different angles and this does take longer.

So now we have really good content to put into the class environment especially for e-learning, and now I have videos, I can also use them in flipped classes at campus. But how does this work? The next iteration explores how I developed my skillset away from lecturing and set about making a more student centred active learning environment in class. The literature review part is closely based on an article we have published in this topic.

3.3  Iteration 3 - Rich Environments for Active Learning
In section 1.3, I refer to the RPL approach, and mentioned how the lecture is not the only way to provide information, and for this iteration, this is the central theme. Because my teaching is grounded in this RPL approach to the classroom environment can be developed and explored to its logical implementation. The goal of RPL is to get the students active because it is the only way we can provide for our obligation to give them some experience (from the Danish competence. - Chapter 1.3). One
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Educational strategy that can promote critical thinking skills and create active learning is the use of Rich Environments for Active Learning (REALs). An education in a REAL is based on constructivist values as collaboration, reflectivity and engagement (Lebow, 1993). While competence is wholly consistent with the RPL approach, it goes further because constructivism in learning environments places the learner in the centre of the learning process. This refocus enables students to feel autonomy and responsibility for their own learning (Piaget, 2013). Moreover, REALs promote critical and reflective thinking due to the problem-based nature of instruction (Lebow, 1993; Savery & Duffy, 1995).

There are several principles listed here that help understand how to design REALs.

First, in such environments, teachers become facilitators of thinking process, not presenters of knowledge. It is a revelation and a relief to realise that you are not responsible for providing information. A revelation, because it is the primary way we communicate with students at a HEI. A relief because there is no way to give them all the information, it is filtered through what I think they need and have the time to give. The difference is that students should work with lesson plans and objectives trying to solve a problem and discover knowledge rather than be given that knowledge directly by the teacher. REALs based on this principle can improve learning (Dunlap & Grabinger, 1996; Fetherston, 2006a).

Secondly, learning has to occur by interaction. It is common to read in educational literature about the benefits of peer-to-peer interactions. An example of a REAL principal is that students should work cooperatively in teams. Team activities make students analyse their own and others’ knowledge and reflect upon others’ interpretations. According to Vygotsky (1978) most important learning occurs through social interaction. Moreover, interaction with peers in the class are as important as interactions with instructor and interaction with educational content (Moore, 1989). It could be argued that REALs feature the role of instructor as one to encourage interaction, so higher order thinking such as analysis, synthesis and evaluation become involved (Bloom, Krathwohl, & Masia, 1964).

Thirdly, there must be space for critical and reflective thinking, which is dialogic in nature (Dunlap & Grabinger, 1996; Mulcare & Shwedel, 2017). An example of this principle in action would be for teachers to ask such questions as: “What methods did you use? What worked? What did not? Are there any other methods you would use next time?” According to Walberg (1984), such instructional interventions as reinforcement, cooperative learning, tutoring, feedback and adaptive instruction have the highest effect on learning.
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It is obvious that the traditional lecture does not sit well within this new paradigm, I must point out that RPL does not mean REAL’s must be created, this is just one strategy that I found that suited the content I was prepared to make and need to justify that it sits well in the border context of getting an education at UCN.

What is really up for discussion here is how did I implement this approach in my teaching. The final iteration discussed in this report concerns utilising the educational theory of REAL’s in my teaching. As I reflect on this process it was the discipline of providing content for the online environment that keyed me into the possibilities of creating REAL’s in my own class. The issue that faced me was how to take slide presentations of thirty or so slides and prepare this information for use in the e-learning courses. Once you take the advice of educational researchers mentioned above you realise that a slide providing a list of information about ISO 14000 for example can be replaced with a quiz. So long as the quiz requires information sourced from ISO website, then the students will go and obtain the information themselves. The trick I found was to take each slide and decide what future it had in different contexts. For example, if it was a main point, then make an animated video out of it and its neighbours; if it was a list of points, then maybe an exercise utilising padlet would harvest the main points too. At each slide I asked if it was essential if the information came from me, or if I could devise an activity where the students would be responsible for finding the information.

The first principle of REAL’s is that the teacher act as facilitator and leadership is essential, and I discovered that merely asking for the students to complete some exercise had a minimal response. The reflections on this were that there was a poor incentive structure in place. I began to use more and more of the facilities of our LMS- Canvas and placed the incentives within each activity. Even discussions are graded under this system. This provides two main positive benefits, one, the students compete for points, and the teacher has a good overview of participation, (via the metadata) and two; the marking provides an opportunity for the teacher to provide feedback. Canvas’s marking and feedback system – ‘Speed-grader’ is the perfect tool for efficiently managing this flow of information.

3.3.1 An example lesson
One class I taught was on the subject of wave energy converters, which harvest the energy from the sea. I am very familiar with the technology know personally some of the projects and have a great deal to say on this topic. It is important because wave energy features in nearly every energy plan, but nobody has actually built one yet. In the first year I made a two-hour long lecture about all the engineering involved, the technologies developed and talked through the 7 or so major test units undergoing trials. First, only half of the class turned up for the lecture, so this is problematic, and I put the presentation on the LMS for them to view later.
Thinking about this lesson, I repeated the same class a year later and, based on my ability to record video, changed tactics and tried to create a REAL so started the class with an assignment. They, in two groups, had three hours to develop a design for a wave device. Of course, they had no idea where to start, so this started a discussion about what waves were and how the energy is carried in them. Essentially the first several slides of my old presentation. I discussed with each group that waves were different depending where you want to build your device. This forced them to choose a location based on criteria they thought would be important. This lead to some concrete research about wave patterns and intensity in different locations. This research provided a fair proportion of my lecture and was probably a bit deeper in detail than what I might provide to a general overview. One thing that this class gained over my lecture style class was the opportunity to actually use some of the technical language in group discussions and put the concepts into a priority, it was probably not a useful priority in an engineering sense, but they did think about the information that they were looking for and considered it’s important to their little assignment. This clearly satisfies the second and third principles for a REAL.

Then we kicked around several ideas and finally each group then set about drawing a rough blueprint. The only tools available were drawing tools and A1 paper. The groups then had to present their ideas to the other group, who with surprising gusto asked some challenging questions. Then I pointed out some things about each design that were good and some that were bad. Then critically, I made the groups take a picture of their design and upload it to the LMS so that I could both ascribe participation to those attending class, give points for the students and link to a discussion and reflection page so they could record their final thoughts and this data would be recorded in the metadata of the course so I can analyse it.

The material that the class would not have ready access to was my knowledge about actual projects, and I took my large collection of photos and made a lovely 10 min animated video about the current state of tidal. I asked the class to watch this after the class had finished in a sort of ‘back flip’ and all of them did.

As part of the action research process, the reflective process opened my eyes to the benefits of creating the REAL, but the data available to me is still subjective. I wanted to access some support for the effectiveness from metadata, and for that I turned to the LMS system. In order to collect metadata, the students must interact with the LMS. The difference between a more traditional lecture and a REAL can be determined only if the teacher takes the time to create space for the active part of the REAL within the LMS. In canvas, this means that the teacher should have quizzes and assignments, or graded discussions and other reflective practices set up and advertised to the students. We found
it was important to not only create an assignment, but to add an incentive for participation. Incentives as mentioned before are the competition for marks and points which can easily be set up in an assignment. While it is physically easy, it is harder to plan-out and ensure the students are made aware of the grades, so it is still quite rare amongst our team, but the benefits are the collection of data such as figure 6 which clearly shows the effect of taking the same content over different years from a lecture style to a REAL. In data extracted from course analytics of our LMS we show that on the week ending 28th February 2016 students were less engaged with the course. The light grey bar shows page views only, whereas the dark bars shows students participation, i.e. interaction via educational content in form of assignments and quizzes (figure 6). Students will view the front page several times per day to access lecture material, but if they do nothing more than view LMS pages then then it can be said with clarity, that there is no pathway for them to participate in the LMS. Whether or not it was made available in the class is more difficult to ascertain. In reviewing my dairy, I can see that I was teaching around half of the classes in this course during this week. There were no assignments, quizzes nor discussions, however I was lecturing around for 12 hours. A year later as can be clearly seen in the data, the whole course is far more REAL oriented. The two weeks show roughly the same course content and are different due to schedule changes (teaching modules) but the content aligns. What can be seen is the engagement is much higher. Also, the page views raise from 300 to over 1800 indicating that the students have more incentive to go online therefore do so, further, there must be much more to do, because the class is in fact 1 person smaller in the latter year.

![Figure 7: Course analytics showing weekly page views and participations. Left - guidance by educator in class, right - with guidance embedded in LMS.](image)

In summary, a REAL can be an effective teaching environment however the principles must be observed. Placing the student at the centre of the lesson plan, providing incentives for participation and feedback are the keys to success. Most importantly, the teacher should ensure that there is the space for participation and activity. The way I found to do this was to take my lectures and go through the slides and ask if that information could only come from me, or if I could think about how the
student could obtain it on their own. This realization that I am not anymore, the arbiter of content and knowledge is empowering. My role has shifted from provider to facilitator, and I plan my lessons about some goals and aspirational targets (such as designing a wave device) and then a strong interactive component. I spend my face to face time with students in discussions and answering questions and the students respond by measurable participating.

The example given above is complimented by several other interactive processes, and over the last year, my classes have changed drastically. For example, in one module I teach, instead of learning about why and how companies implement energy management systems, I made the class find out what UCN’s (our own institution) policy was. We discovered to everyone’s surprise, that UCN did not have one. So we set about writing one with a full justification. The result was presented to management and has gone up to the executive for incorporation into the official policy for UCN. It is this kind of REAL that provides the competence required to satisfy the RPL framework as without doubt the students now do have competence as required by the curriculum, where this no way for this to be achieved by listening to me show examples and lecture on the philosophical and legal frameworks of making an energy management plan.

3.3.2 Summary of chapter.
I started this chapter by emphasizing that my life experience has taught me that constructing a logical approach to acquiring new skills is similar to ARM. Therefore, based on that structure, I have led you through several iterations of my development process, with referenced underpinnings, to expose this process and show why I made changes to my practice. The chapter then explores my current teaching style and how I have been able to affect participation and course management through the acquisition of the metadata. Then finally I have worked through two examples of REAL’s in action in my class.

In the following chapter I utilize the ARM to provide data for my own FoU work where I have co-authored 3 peer reviewed papers for publication. The research work closely follows what I have been presenting in the previous chapter, and many of the references originate in that work which is why it is quite developed.
4 Professional Development and Research.

One of the key requirements to be included in this paper is “Participation in R & D activities or other project and network activity aimed at generating new knowledge or summarizing and disseminating new research-based knowledge within the field of education” which is a rough translation of the guidelines for this work. So, the following is a summary of my activities that have led to the publication of three peer reviewed articles each attracting BFI points. This work is co-authored, so I will often use the term ‘we’ in deference to the collaborative aspect, and recognition that I was not alone, nor played a leadership role. The publications are supported by the participation in several international conferences where we have delivered papers or workshops. I will include the three abstracts for the papers in this text, and the full text can be found as attachments.

I have continued to develop my professional skills, and published a paper ‘When Creativity Meets the Practice of Sustainability’ (Zhou, Otrel-Cass, & Cass, 2016) that addressed some of the cultural and social impediments to renewable energy developments. This work is largely based on my thesis for my M.Sc which was largely based on the Winds of Change project I had been developing. (To view this publication please see references.) Much of this work preceded my joining UCN, therefore it is not mentioned further, however does represent strongly that I am currently research active in a professional sense.

I have included the abstract here in so you can see it is professionally relevant.

Abstract:

This paper focuses on the research question: how does the interplay and cooperation between diverse actors in a system of creativity development influence the application of creativity to the practice of sustainability? Regarding creativity as a pathway to managing sustainability inspires this angle theoretically. To do so we are using a systems view and examine creative behaviors through the interplay between three dimensions including domain, field and individuals. The analysis of a Danish renewable energy project called Winds of Change (WoC) reveals the challenges and dilemmas of developing the WoC project in practice. Using this example we conclude that a better sustainable world requires a creative culture where the different actors should contribute to their cooperative efforts in a co-creation process.

[1 American spelling required for this publication]

What follows is a synopsis of this year’s active research, and since it is based on my own professional development in the last two years, the structure mirrors that of the research and methodology that was used, the ARM, and consequently covers similar material.
4.1 Attention Retention

The first paper to be accepted for publication:

Attention retention: Ensuring your educational content is engaging your students

Maria Kravchenko¹, Andrew K.Cass¹

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Abstract. As teachers look for ways to improve practice and enhance student engagement, referral to the literature leads to a dichotomy between specific activity and heavy academic research on metadata and learning analytics. This paper is intended to tread the pathway between the two so that teachers can, using the findings, introduce video for flipped classes, or online teaching. Taking five iterations of an action research approach the authors present the techniques and principles for making an interactive video and clear examples of lesson design. The research was conducted at a Danish higher education institution in technical subjects, but the methods are applicable to most teaching situations. The outcomes are, that paying attention to the process of recording existing lecture content leads to interactive video. This new content can be embedded in a structured lesson design and can greatly improve educational outcomes and student engagement. The researchers’ goal was to create Rich Environments for Active Learning in both online and in classroom environments, and utilize existing content across both platforms.

I have shown this as it is printed to emphasize the attribution. As you can see this paper is closely related to the ARM iterations I addressed in chapter 3.2. This paper was presented to the KES International Smart Digital Futures conference in Villamoura, Portugal, during 21-23 June 2017. I presented the paper for the conference and discussed digital content creation and answered many questions on our recording process. The paper is directed towards teachers who are looking for processes to improve viewership of video material. The basis of the research has been well covered as well as the outcomes, so I will move directly to the second published article.
4.2 Free Flowing Content.

Free Flowing Content: Unlocking the full potential for engaging learning environments at the institution scale

Andrew Knox Cass\(^1\) and Mariia Kravchenko\(^1\)

\(^1\)Department of Energy and Environment, University College Nordjylland - Aalborg, Denmark
adk@ucn.dk

ABSTRACT
Higher education institutions are moving to exploit information and communication technologies by increasing the use of videos both online and in class. This is led, by definition, by ‘early adopters’ and most of the research into this process reflects this. Increasingly, institutions are making strategic decisions to move courses online however some teachers involved are not well equipped to transition. The barriers are reported to be time constraints and a lack of familiarity with the technology to make video. Also, there is a fear of the ‘presented self’ where teachers may initially resent the idea of being recorded. This paper is the result of a search and research process where researchers looked at teacher’s embedded practices to discover hidden skillsets and content. Teachers who were intimidated by moving from the presentation style lecture to video based flipped or e-learning are focused on the process and sometimes do not secure the integrity of the learning. This paper sets out the methods used to assist teachers take the maximum benefit of their existing content as presentation style lectures and utilize them in both flipped and online classes. A central theme is removing the fear of the presented self and enabling participation in creating active learning environments. This unlocks the potential for whole institutions to make course and department wide moves towards better classroom practice and e-learning opportunities.

This paper was presented at the 18th Biennial International Study Association on Teachers and Teaching (ISATT) Conference 2017, at the University of Salamanca, Spain on the 3rd to 7th of July. The conference theme of search and research made the case for teachers to observe their teaching and research it, which fortunately, was exactly the process we had utilised, and we found that via the ARM we had a suitable methodology for obtaining the results. We were led to the paper by very high scores from the reviewers (8/10 and 10/10) and so invested the available FoU hours in producing this paper.

The point of departure for this research comes from the fact that technology uptake is complex but most research on it focused on volunteers. This has led to a potential gap in our understanding because it turns out that a very low percentage of teachers are innovative or early adopters of technology (Kelly, Lesh, & Baek, 2014) and so the learnings from volunteers might not apply generally. This point was made clear as UCN department of Energy and Environment proceeded to implement
an online course, but the project was potentially delayed due to a bottleneck in the supply of content for online teaching.

The paper’s title Free Flowing Content describes when this bottleneck is released, and a teacher is able to take existing content in the form of presentations and transform them into video content, allowing a teacher’s existing content to flow into the e-learning context. The paper is based on some of the techniques we used in our development of recording videos for e-learning and takes elements from all three of our ARM iterations as discussed in chapter 3. The paper focuses strongly on how to modify existing content to suit the recording paradigm and is directed towards teachers who want to maintain strong pedagogical underpinnings in the new paradigm.

4.3 Overcoming the Fear of the Presented Self

**Overcoming the fear of the presented self**

Andrew Cass\(^1\), Mariia Kravchenko\(^1\)

\(^1\)Department of Energy and Environment, University College of North Jutland

E-mail: [adc@ucn.dk](mailto:adc@ucn.dk)

**ABSTRACT**

Using an agency theory approach, the article reflects on the forces acting on the teacher as a lesson is created for the e-learning space. Brownlee (2015) describes that there are two sides to the presented self; the presenter and audience, and that both mediate a story. The point of departure for this approach is that the presenter and the audience is the same, however mediated by external actors and agents such as the video. The teacher’s preconceptions to the presented self are fundamentally negative and the researcher’s interventions in the video recording process describe a process of altering the agency of actors on the presented self. The preconceptions of the presented self are based on a very real fear of loss. Marris parallels this with a bereavement when there is a realisation that things that were once known are shown to be wrong (1978). This leads the researchers to hypothesise that the fear of the presented self cannot be shown to be wrong, however that a process of self-discovery mediated through technology can lead to discovering new knowledge to fill the gap left by old practice, and attention to how this process plays out is equally important to attaining the desired results as instituting new practice. This is especially relevant to institutions attempting to make wholesale department-wide change for improved practice, when entrenched practice, and the fear of loss, leads to change resistance.

This paper was presented at the 2nd Association of Video Pedagogies Conference (AVPC), held in Aalborg on June 17-18, 2017. The conference theme had a focus on ‘visuality’ and specifically invited “all who take an interest in discussing and exploring: Video/visuals for education” among other things. We decided that based on our activities that exploring deeper the relationships between the
Appendix 1 Working Portfolio

technology and the fear expressed by some of our colleagues to the task of recording lectures was interesting. The study was a more longitudinal study of two colleagues who had demonstrated quite a strong reluctance to record lecture content, however after spending several workshops dealing with the technology, found that they were self-motivated to bring new techniques to the classroom.

It is based on interviews (recorded) that focused on a reflection of their journey through the recording process and how they are now using video in their normal face-to-face teaching. The participants were chosen because they have begun to heavily modify their in-class practices based on they have discovered how the ‘free flow of content’ enables flipped and blended learning. The target audience is both teachers and leadership who are planning to implement blended and e-learning in courses. It addresses how the negativity of top-down decisions pushing teachers out of their comfort zone can be mitigated cost effectively.

These three publications represent only some of this year’s research activity the other part of my professional development is also a product of this activity and it consists of the development of a workshop that we can use to promote the techniques. The background format and experience of this workshop is up next.

4.4 Workshop – The Free flow of Content

FREE FLOWING CONTENT

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Email: adc@ucn.dk

Abstract

Higher education institutions around the world are exploiting information and communication technologies by increasing the use of videos both online and in class. This move was initiated by the ‘early adopters’ who by definition are I.T. literate and favor ICT innovation. However increasingly it is institutions making strategic decisions which impact departments or courses. Consequently there are many teachers involved who are not well equipped to transition. The literature is rich with case studies and quantitative research on implementing video in the classroom based on adopting new techniques, although by design they focus on the early adopters and ICT literate. The fallacious assumption that all teachers are IT literate and prepared for this new form of teaching is illustrated by Brecht for example “Using a personal computer, an instructor can create them quickly and easily” (2012p. 75). At a management level, asking teachers to radically change practice could cause anxiety in those for whom ICT is intimidating and this can lead to uncertain outcomes. The purpose of this workshop is to discuss how barriers to implementation can be removed. Participants are expected to be a mix of educational researchers and institutional leaders. It is hoped to expose the researcher, who by enlarge will be early adopters of ICT, to concerns of the management in imposing radical technological change. This paper sets out the methods used to assist teachers take the maximum benefit of their existing content as presentation style lectures and utilize them in both flipped and online classes. At its core, the practical part of the workshop is about removing the fear of the presented self and enabling participation in creating active learning environments. The methodology utilized in the workshop unlocks the potential for whole institutions to make course and department wide moves towards better classroom practice and e-learning opportunities.
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This workshop is presented to the Education and New Developments (END) conference in Lisbon, Portugal 24 – 26 June, 2017. The workshop will recreate the workshop we do on campus here for the learning academy (LA) and is directed towards teachers looking for creative ways to turn existing content into e-learning and flipped classroom content. The extended abstract (3 pages) is published in the conference proceedings contemporary with the conference.

4.5 Workshop – Easy as 1-2-3

Over the last year I have with my colleague developed a lot of techniques and methods to transform our teaching. We used the opportunity that one of our combined courses moved to e-learning from in-class. We led the local skills development with one on one workshops to teach the techniques that we had learned. Contemporaneously we initiated the ARM to formalise our understanding. This process allowed us to gain a deeper understanding of what was happening and forced us to look at academic research during our reflection phases.

Once we had established a functional methodology we decided to formalise the workshop. This was due to time pressure, where taking colleagues one by one was not efficient enough for modifying practice across the department. We worked on a workshop covering three sessions each tailored to address one of the key understandings that we had gained over the year. These three key points were; One – to remove the fear of recording or approaching the technology. Two - to help teachers modify their content to make better quality videos. Three – to make an REAL either in class or online as a way to improve outcomes from teaching. These three key points are essentially the basis for our three publications and the publications came to life via our work on understanding the process and also tracking progress under the ARM.

In January 2016 we decided to contact the LA to see if they were interested in hosting the workshop. This initiative was a consequence of the departments need for external funding. In a staff review meeting (MUS) I was advised that I could have time bought by external departments which would both help the departments finances and my own development. Our proposal for the workshop was accepted and placed into the LA regular program in April and May with the following schedule:

<table>
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<th>EasyAs 1-2-3</th>
<th>Session 1: An easy way to a video lecture: An instructor’s experience</th>
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</thead>
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<tr>
<td>Date:</td>
<td>Torsdag 27 april kl. 12.30-15.30</td>
</tr>
<tr>
<td>Location:</td>
<td>Studio Sofiendalsvej, og SD4.0.61</td>
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</table>

| Session 2: Delivering enriched and learner-oriented content |
| Date:          | Torsdag 4 maj kl. 12.30-15.30                                      |
| Location:      | Sofiendalsvej, Lokale SD 4.0.61                                    |

| Session 3: Providing enriched platform for student learning: course design and Canvas |
| Date:         | onsdag 10. maj 12.30-15.30                                          |
| Location:     | Sofiendalsvej, Lokale SD 4.0.61                                     |

Figure 8: Copy of program from the learning Academy for the Workshop Easy as 1-2-3.
Appendix 1 Working Portfolio

The workshop was designed as a ‘walk the talk’ process for learning. We set up our own workshop course in canvas, and utilised flipped classroom technique to try to ensure that everyone had the correct software installed for the class.

![Canvas course structure](image)

*Figure 9: EasyAs 1-2-3 course start example.*

As is shown in the clip from our course, the very first thing that faces our participants is a short quiz. This yes-no style form determines if the participants have the correct software and depending on the scores, directs the participants to the instructional videos for each problem utilising the Mastery paths features of Canvas. The welcome to the course only appears after the instructional videos have been completed.

You can also see that access to the first session is locked off until all the participants have completed the first module as shown. There are three ways to complete this module, all dependent on how you answered the quiz. For most of our participants, this was the first time they had seen Canvas operated in this way and also it set a precedent for how the workshop would be operated.

The first session was arranged that every participant would approach their first recording during the session. We set up three recording studios and utilising information from the quiz, had streamed the participants into three groups with some requiring additional instruction in using the interactive whiteboard facilities.

This approach was chosen because specifically, we were unsure if the content would be pitched at the correct level, however because we had not prepared long presentation style shows, but rather worked in more intimate 4-person groups and had tried to create a REAL we had ample opportunity to deal with each participant at the level they required. The lessons were activity based i.e. the participants actually recorded a video of their own work and got some familiarity with the technology. While they did this, the intimate group setting was great for peer to peer support and knowledge transfer. As instructors we had the ability to move between groups and speak with individuals and try to help them get the most out of each recording opportunity.
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For the second session we focussed on developing editing skills and utilised the same groups and peer to peer sessions. A strong component of these first two sessions, was the room we created for the peer to peer sessions.

Figure 10: creating space for peer to peer learning by open forum for sharing the videos created during the workshop.

In Figure 10 you can see that we have set up an exercise where participants can upload videos and instructions to participate in the peer to peer process. Please note that we have also included a video and embedded it in this section. This does two things, one we can demonstrate the alternative use of video in the LMS and two, we can demonstrate our videomaking skills utilising what we are trying to teach. You can see from the opening image that this video also gets straight to the point and short and sweet it is at 90 sec. In this way participants get a demonstration, however being embedded it has a reason to view it. We received some comments about the video from participants that they were drawn to watch even though they knew how to upload video but wanted to see if we had some sort of shortcut (alas no). Further, in the top right you can see the number of participations which is 29, and this from a class of 12. This indicates that participants are really engaging in the activity we have planned.

We planned this workshop to be stretching the participants and took time to ensure that the content could be tailored to suit the various levels of competence in using the technology. Also, the active learning involved is quite new for us and student feedback although positive, there is a student – teacher context that underpins the information. Of interest to us, was the feedback from similarly trained teachers, our peers, also teaching in technical subjects and facing a variety of different paradigms and issues. We were interested to ensure that we had targeted the information to the correct level and that teachers got the most out of our workshop.
From the response to the survey you can see that the adaptive nature, flexible style and high proportion of activity-based learning made it appear to the respondents that the course was very well suited to their own needs and the corollary of this is that they were engaged in their own learning based on their own material so this makes it seem like it is exactly matched.

From the survey respondents, we see that they were very satisfied or satisfied with both the technical component and the style of teaching which indicates that the process that we have embarked on is functional and beneficial. This survey from our peers is strong evidence that this workshop is relevant and needed and that the active learning environment that we created is working for them as students. It was very important to us that we walked the talk and made sure that this workshop employed the techniques and did not only lecture the results of our previous years’ work. Perhaps the most important aspect of teaching a course in a competitive environment where there is a cost to participation is the word of mouth value, or would you recommend the course to others. This is especially important to our particular workshop because structurally, it might seem too personally tailored, where you could see benefit to yourself, but not to others. The results of the survey showed however that the structure and the student-centered approach, the active learning spaces we created and the knowledge that we generated over the last year combined together to make a course that all the respondents thought would be really beneficial to all teachers (figure 13).
4.6 Summary of research activity and knowledge sharing

In this chapter I have outlined my research activities and the workshop designed for my teaching colleagues to disseminate the learning about utilizing video and creating active learning environments. The first paper demonstrates that I am also research active professionally, publishing in an engineering journal subject specific content directly related to my teaching topics. My research activities have earned 4 BFI points for UCN this year and international exposure at five conferences in Europe. The peer reviewed papers speak of relevant research discoveries based on ARM methodologies that enabled me to develop new knowledge. While gaining new knowledge is valuable personally, it is more important to disseminate this knowledge amongst colleagues at UCN, and this has been done under the LA program with excellent results.

This completes my summary of research activities and the next chapter takes a look forward to the next year and beyond and discusses the plans I have made to continue growth and development as a teacher and researcher.
5 The future.
In this section I will provide an overview of the activities that I am currently involved in. Each of these items has occupies different portions of my current workload and as future plans they are a little uncertain as to how they might actually plan out. The format in this section is a short introduction to the activity, a look at how they fit into my current workload and a short assessment of their likely impact both on me and this institution. Much of this chapter is inspirational however my business history shows me that this is a numbers game and that you need to start many more projects than you intend to carry out, so that when they become inviable, there is no loss in productivity in letting it go and investing in the next likely thing.

5.1 The workshop
Due to the success of the workshop hosted by the LA, I am negotiating with the LA to host up to 4 repeat sessions in the next semester. Due to teaching load, this will be a lot however, the demand for this knowledge is quite high and the future plans for many departments at UCN is to look towards e-learning to lower costs and improve quality.

Further, each year sees all staff attend the EFRA professional development seminar and planned for this year’s event is a special workshop directed towards management of other UC’s in Denmark. The aim here would be to sell our workshops to other institutions and to help them set up studios for recoding. This would bring external funding to the department which is critical to assist to balance the budget this year.

At the time of writing the offer has been made by the LA that we can program in 4 workshops in the fall semester. This has a very high likelihood of happening.

5.2 Research Activity
An application for hours for research will be made to fund new research in a study combining metadata acquisition and quality assurance. While surveys are the existing method for quality assurance, this method has some major drawbacks. It is interesting to me to see how our ARM utilized the metadata and learning analytics available to us in Canvas and enabled us to respond in real time to the class development. I would like to spend some time formalizing a process for this method to quality improvement and also publish again next year some results.

This research is quite relevant and a continuation of our current work, so I hope it will be funded 25 hours this semester however funds are tight this year, so I give this a moderate chance of success.
5.3 Teaching internationally
For the second year I have been selected to travel to Finland to participate in student exchanges and assist with the teaching of sustainable energy modules at VAMK in Vaasa. I am very interested in developing further student exchanges and ensuring that the students get a lot out of the experience, because for many this is quite an expense. This year we will focus on sustainable energy technology involving wind energy and the integration of variable supply in main or micro grid structure.

5.4 Building UCN profile in African
In a development of my networking I am in contact with businesses in Ghana who are looking for opportunities to save money on diesel generators and embed renewable technologies. A logistics company is searching for a greener profile as is a newly planned fish farm. I am going to offer these projects to students to do guided research projects and maybe an internship.

In a recent development, I have been selected to join a ‘go and see’ tour from UCN to Ghana and building relationships with KNUST, a large university of technology and science in Kumasi, Ghana. During this trip I will offer my workshop (see chapter 4.5) in making videos and propose a joint effort developing renewable energy projects with student involvement.

5.5 E-learning in Africa
One of the opportunities for development in Ghana would be offering e-learning courses specifically tailored to be suitable for students to participate via a smart phone. Throughout our development of active learning environments, it became apparent that we as teachers placed a high value on written work. Assignments essays, reflections quizzes etc. are mostly uploaded via text entry or word documents. During my courses, I specifically made allowances for alternative ways for participants to submit work. For example, during the wave energy lecture (chapter 3.3.1) I specifically asked the students to draw their designs on A1 paper. This was to they could hang it on the wall of the class and discuss and get feedback from the whole class, but then I asked them to upload a picture for giving points. Again, in the workshop (chapter 4.5) I asked the participants to post video for comment. These and other examples places similar activity within the accessibility of those without a computer. I have examined and presented to others the possibility of offering such a module in sustainable energy and received positive feedback. While in Ghana, I intend to explore the opportunity to commence this approach in a blended course in association with the local university.

This is a little blue sky and probably will not be an activity for next year, but I will be promoting the idea for the future as it has intriguing implications for external funding.
6  Summary
The final summary is built on the structure of the handbook for the lecturer qualification which gives the following roles to be fulfilled for qualification:

6.1 Participation in setting goals,
I have fully embraced the goals set by my department and team in introducing e-learning. Moreover, I have been active in developing my own skillset to improve the chances for success and also been active in assisting my colleagues in implementing the goals in a successful manner.

6.2 Coordination with management and other teachers of the overall efforts in the education
I have demonstrated strong participation and leadership regarding the development, preparation, implementation and documentation of teaching and guidance activities. I have been part of a collaboration on all aspects of the program's operation and ensured its overall quality is optimized for the student and the education recipients. I have not only ensured that the processes are implemented and documented sufficiently systematically to fulfil UCN Technology's obligation for this but extended the departments capacity and capability.

6.3 Participation in R & D activities
I have participated and or led project and network activities aimed at generating new knowledge and packaging this in a workshop, disseminating new research-based knowledge within the field of education.

6.4 Development, preparation and delivery of continuing education services
I have been at the forefront of the development, preparation and delivery of continuing education for this department with activities in research, workshops and also improved the class practices of my colleagues for the beneficiaries of the program / relevant industries - and other collaborative activities with the business community. In addition, I have ensured that UCN Technology contributes to the development of competence and participates in dialogue about the competence and needs of the relevant industries, in peer reviewed publications in engineering periodicals.

6.5 Ensuring systematic documentation
The implementation of the ARM covering most of my activities (both education and knowledge-based) has ensured quality and this has led to quality measurements above that which would be in accordance with both the institution's and the area’s specific objectives.

6.6 Representation of the education or the field
I have strongly represented UCN and am currently active in participating in networking, project and collaboration relations, internally at UCN and externally in relation to collaborators. My trip to Africa
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as the sole representative for the department of technology is a strong indication that I am fulfilling this duty.

6.7 Summary
I believe that I have met or exceeded the expectation of my employment at UCN and have fulfilled my duties as summarised above. I am enjoying my teaching, developing new strategies for increased participation and am looking forward to the future as a Lektor at UCN.

7 List of Citations


Appendix 1  Working Portfolio


Kemmis, S., McTaggart, R., & Retallick, J. (2004). The action research planner.


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Lektorkvalificeringsforløb

Arbejdsporfolio

Navn Andrew Cass
Ansættelsessted UCN - Associate Professor
Uddannelsesmæssig baggrund MSC Sustainable Planning and Management
BSC Geology, Geography
Adjunktvejleder Lise Poulsen
Oprettet 24/8/2015
Opdateret 20/05/2018

Arbejdsporfolioen should reflect his/her learning and development through Associate Professor qualification process. Assistant Professor should thus work with portfolio through the first 2 ½ years of his Assistant Professor period. Reflections in arbejdsporfolioen will be a big help when the Assistant Professor must prepare his lecturer's request, since many of the reflections in the arbejdsporfolioen related to the reflections included in an associate professor's request.

The purpose of the qualification is that the Assistant Professor through Associate Professor Assistant Professor period must develop its theoretical, professional, educational and vocational and professional oriented competencies as well as apply and develop its competences in relation to research and development activities in order to be able to perform the tasks for which appointment as Associate Professor requires for teachers at vocational colleges, University colleges and the Danish School of media and journalism (BEK no 762 of 25/06/2013).

In relation to the purpose of the qualification process and Associate Professor Assistant Professor's existing knowledge and experiences should yield of course help to strengthen the participant's knowledge, skills and competencies with respect to:

· Set goals, select content, produce educational materials, select training type, implement education, evaluate and develop their own teaching.

· Analyze the teaching and learning processes.

· Reflecting on own teaching practice.

· Developing own teaching, taking into account the changing educational conditions and target groups.

· Participate in the research and development tasks at a University College.

The following points can be of inspiration for the Assistant Professor's reflections
1. In General

What subjects or professional areas I teach in
Business Economics, Sustainable energy, Energy Technology, energy management.

My experience with own teaching within the profession
I have no prior experience in teaching apart from the occasional guest lecture in Business.

What has worked well for me in relation to my various teaching activities
My approach has been to ensure that I am teaching within my own professional areas. Also I have taken advantage of the fact that Canvas offers a comprehensive student management system and enabled a fresh approach to content delivery. I have been preparing video of content and reserved the majority of the lecture time to interactive activity.

What has worked less well for me compared to my various teaching activities
It is working well.

What I mean by good teaching
Good teaching can be achieved by engaging students. I try to inspire them to do some work and provide clear instructions as to what is required. I think that the lecture not a good method for engaging with students, it is too linear. My time with students tends to be less structured, goes deeper as it follows the direction we find during discussions.

How I see the students' role in teaching
The students need to take an education, one cannot and will not be provided. If students are not prepared to do some work there is not much hope that they will learn much of value. The students should have opportunity, goals and motive to participate, and we need to be better at providing flexibility so disadvantaged students do not find further barriers towards their goals.

How I foster the students' learning processes, including the development of students' personal, professional, educational and social skills
I am proactive in my guidance activities. I start the supervision by providing a document that shows what my expectations are. I try to ensure that they have a good problem formulation as this will inform thinking process and assist planning. Further, I will try t support the students when they face issues, especially when it is not of their making.

2. Basic training activities

Description of my duties in basic education
Create a coherent lesson plan, and ensure it is coherent with the curriculum.

See which parts of the curriculum are best served via lecture, activity, project, assignment or game play.
Appendix 1 Working Portfolio

Sort the lessons accordingly.
Deliver content early and in a relevant format.
Build on content delivery with targeted assignments and activities.
Ensure adequate specifications of project work and relevance to course material.

Descriptions of and reflections on craft and educational context, including professions current challenges

The flipped class is a new approach to teaching. The lecture is often provided by way of PowerPoint slides. However when I reviewed the slides of the teachers that proceeded me, I found that a lot of the content could easily be provided by providing the original book or paper the slides were generated from. In my first few lectures I quickly found that the class was disengaging after a short period. Additionally, it is common to ask the class to reflect on every lesson. This is largely unhelpful and there is a dearth of convenient reflections platforms that don't require a serious effort to supervise and mark. Reflections from students were largely occupied by copies of the actual lecture and not their reflections on the lecture content. There would be advantage in improving the reflections process and ensuring that it is aligned with the wider goal, that students are actually thinking about and critically processing information presented to them.

Description of and reflection on how I involve the students' assumptions in my teaching (lift to a concrete teaching)

It is important to understand the student’s contextual milieu. Especially in sustainable energy and associated technology, it is important to unpack the origins of the messages that they have received in mass media, which is largely distorted out of context or downright maliciously false. This easily leads to rather nuanced discussions and questions and it sometimes revelatory, giving a sense of awe of the true situation and

Description of and reflection on the impact of my choices of content, didactic teaching and organizational forms for student learning outcomes have mm (lift a concrete teaching)

My choices will have a large impact because the teaching style is such a departure from the normal methods. While I am aware that different styles will suit some rather than others due to the continuum of student preferences, it is unlikely that more students will be affected, only different students. International research shows that

Description of and reflection on my own participation in interdisciplinary and international activities

During my first 18 months, I have gained quite a strong skillset in producing video content in lieu of lectures and flipping the class. Because I had no experience in such techniques I attended several international conferences on the modern class.

Friday 20 November 2015 – Workshop on reflective Praksis læring UCN Internal.
Monday 14th March 2016 – First training sessions on studio use and video recording
Tuesday 3rd May 2016 – Conference on ICT in the class.
Friday 24th June 2016 – Initiate international connections to Africa, UAE.
Thursday 11th August 2016 – EFTRA Training
Appendix 1 Working Portfolio

Tuesday 23rd Wednesday 24th August access2innovation International conference business in poor economies.

Wednesday 7th September LASI international conference in learning analytics

Tuesday 13th September Big Data conference AAU

FOU application, 100 hours for writing a paper for submission to international conference regarding office Mix.

Description of and reflection on the theory-practice-interaction, including the importance of students’ practical training/clinic in teaching

My teaching has evolved to demonstrate that activity in the class is as important as activity outside the class and I have drawn from my blended classroom environment to inform my classroom environment and implemented REAL therein

Reflections on my role as teacher

My role as a teacher is no longer the knowledge giver and more a motivator, facilitator and leader.

3. Continuing vocational training activities

Description of and reflections on my tasks in continuing vocational training Department

As a part of my vocational training, I was discouraged by the traditional way material was presented and have set about creating a hands on course that I felt better reflected the evolving teaching role in the modern classroom. I now hold regular classes in our own internal vocational training department and have initiated plans to offer this nationwide via our Act2learn department at UCN

Description of and reflections on how I involve the students’ assumptions in my teaching (ift to a concrete teaching)

I am no longer a giver of knowledge, therefore most of the students’ assumptions are incorporated in every task they do. This constructivist position lies at the heart of all my lessons

Description of and reflections on the impact of my choices of content, didactic teaching and organizational forms for student learning outcomes have mm (ift a concrete teaching)

My reflections on the impact of my choices is limited, because I do not generally choose content, that is a teacher centred concept and I have migrated away from that to a student centred model. This means that I start with the learning outcomes and allow the content, didactic form and organisation to form about the goals and the students have a large input to this process. It is important to have strong feedback processes and to nudge students towards the outcomes you want.

Reflections on the importance of the interdisciplinary participation have for my teaching

Multi level perspective theory is informative about the importance of interdisciplinary participation and my classes are often asked to reflect on a perspective from bird’s eye view for example to open
their minds. What importance it might have is of course a case by case question, but it often helps
them think ‘outside the square’ and deepen their understanding.

**How do I see my role as teacher and/or consultant – and possible consequences**

I see my role as one fighting a massive bureaucracy, badly administrated by pedants. I try to help the
students see past the ridiculous rubbish paraded out as knowledge by the unqualified, to seek the
truth, ask the right questions, keep a healthy scepticism and define their own path. This has
potential negative consequences in that I generally do not fit into administrative categories and will
antagonise anyone who potentially reads this and documents like it.

4. **Research and development activities**

**Description of and reflections on my research and development tasks**

In the last year, I have published 4 peer reviewed papers, one professional and three in education.

The research has largely been based on my development as a teacher and so go to the core of this
process and show in explicit terms the evolution of incorporating blended and flipped classroom
practices. I am currently writing a book as part of an educational book series on creating ‘rich
environments for active learning’ and am trying to develop a coherent strategy for teachers to
improve practice. The act of research forces one to read lots of literature from various contexts to
draw on theoretical approaches. It has been very instructive to do that and has helped very much my
development as a teacher.

**Reflections on challenges and trends in business and profession, as well as research and
development activities**

In my field of expertise, it is unfortunate that the industry s heavily constrained by large investments
in infrastructure, and very large international corporations which actively discourage innovation and
disruption. Most of the research is trivial compared with the prescient changes that need to be
made to the system. Unfortunately, all the technology has been discovered that can lead to
sustainable future, it is just that there are 4.7 trillion in subsidies paid to the incumbent industry who
are very protective. So, I actively disengage in research and focus on political activity.

**How can my research and development activities help to develop, translate or disseminate
knowledge to develop industry/profession, as well as basic training**

There is no way that could happen, it is a political and societal change that is required. Hence the
paper on CSR about a renewable project that did not go ahead because of overt action by the
incumbent. I hope the students will pick up on the fact that they have a tough road ahead and avoid
dishonest market participation.

**Reflections on project management, cooperation agreements, budgeting, implementation and
reporting of projects**

Students require a lot of support and to improve results I implemented rubrics and other
management techniques as part of the marking process to improve teacher-student communication
about not only our process, but theirs too.
How do I see my role in relation to research and development and possible consequences

I am lucky to be one of the 2% of innovators in regard to ICT use and development in an educational setting. My role is therefore shaped by the fact that I will be in a position to assist my colleagues to develop skills. My research focuses on technique and implementation based on that role.
# Teaching Summary

## Fall '17

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Kompetenceudvikling (KOMP)

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# Appendix 2 Teaching Summary

## Fall '16

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FREE FLOWING CONTENT

Andrew Cass\textsuperscript{1}, Maria Kravchenko\textsuperscript{1}
\textsuperscript{1}Department of Energy and Environment, University College Nordjylland -
Aalborg, Denmark
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Abstract

Higher education institutions around the world are exploiting information and communication technologies by increasing the use of videos both online and in class. This move was initiated by the ‘early adopters’ who by definition are I.T. literate and favor ICT innovation. However increasingly it is institutions making strategic decisions which impact departments or courses. Consequently there are many teachers involved who are not well equipped to transition. The literature is rich with case studies and quantitative research on implementing video in the classroom based on adopting new techniques, although by design they focus on the early adopters and ICT literate. The fallacious assumption that all teachers are IT literate and preapred for this new form of teaching is illustrated by Brecht for example “Using a personal computer, an instructor can create them quickly and easily” (2012p. 75). At a management level, asking teachers to radically change practice could cause anxiety in those for whom ICT is intimidating and this can lead to uncertain outcomes. The purpose of this workshop is to discuss how barriers to implementation can be removed. Participants are expected to be a mix of educational researchers and institutional leaders. It is hoped to expose the researcher, who by enlarge will be early adopters of ICT, to concerns of the management in imposing radical technological change. This paper sets out the methods used to assist teachers take the maximum benefit of their existing content as presentation style lectures and utilize them in both flipped and online classes. At its core, the practical part of the workshop is about removing the fear of the presented self and enabling participation in creating active learning environments. The methodology utilized in the workshop unlocks the potential for whole institutions to make course and department wide moves towards better classroom practice and e-learning opportunities.

Keywords: flipped class, online teaching, active learning environments, video lecture, recording lectures.

1. Introduction

Higher education teachers often use lecture style in their teaching because it is relatively simple to prepare (Kozma, Belle, & Williams, 1978; Watson, 2006). Presentations seem convenient even though the role and effectiveness of lecturing is highly debated (Williams & Fardon, 2007). Affordances offered by ICT, an increasing number of higher education institutions (HEI) across the world are transitioning from traditional “on campus” classes to partially (blended) or fully online classes (Welsh & Dragusin, 2013) while aiming to maintain and improve active, engaging and rich learning environments (Keengwe & Kidd, 2010; Van Weert, 2005). Integrating ICT and pedagogical practices can improve students’ learning via the affordances they offer (Webb*, 2005). As with any change environment, the early adopters have high motivation and are continually evolving practice. However, problems arise when entrenched practice needs to evolve too.

There are barriers that entrenched practice must overcome when integrating technology into teaching and learning. Many faculty members are reluctant to convert their traditional on campus routines to an online format (Keengwe & Kidd, 2010; Kukulksa-Hulme, 2012) because it requires a change in teaching practices, when teachers not only have to adopt a more student-centered teaching approach, but also simultaneously develop new
technological skills which can be time consuming and frustrating (Davis, 2016). Not only do teachers spend more time on learning technology (such as a new recording software), they also have to develop new skills in designing online courses and providing on-time feedback to students (Kukulska-Hulme, 2012; Lawless & Pellegrino, 2007). Methods applied in a traditional class do not fit an online class as the environments are entirely different (Keengwe & Kidd, 2010; Kim, Kim, Khera, & Getman, 2014). Moreover, according to Nelson and Thompson (2005) and Allen and Seaman (2008), lack of faculty time and workload, lack of support, assistance, as well as training, by institutions impedes teachers’ engagement in online teaching practices. Such impediments are barriers to implementation because teachers cannot or will not participate fully which will lead to inconsistent outcomes. The aim of this workshop is to discuss an approach used to remove the barriers to using technology for flipped and online teaching.

Rienties and Toetenel (2016) describe that content type is far less important than learning design aspects which allows for teachers to experiment with different recording techniques. The approach to be discussed is moderated by utilizing their existing skillsets in a familiar environment which goes a long way to removing the barriers and sets up the free flow of content for use in e-learning.

2. Design

The workshop will proceed with a demonstration of a methodology for removing the perceived barriers for teachers who are reluctant to record their lectures. The methodology will be available for participants to try in the workshop with their own material. Participants will make their own videos and adapt such an approach for themselves to know how barriers can be removed.

Every institution has its own cultural setting and this will also be discussed in the group. This will be followed by an interactive session where techniques are discussed and examples from the participants relevant for their setting, are solved live in the workshop.

3. Primary Objective

The primary objective is for participants to engage with identifying barriers. By combining the early adopters with those who are more hesitant to make recordings, or try new software, it is hoped to expose the barriers. The discovery period will expose that the barriers experienced are both individually and institutionally specific. The workshop explores that moderated via the technology the perception of the self is illusory, and when users start from a safe environment and are using the technology before they realize the implications, the barriers are effectively removed.

3.1. Participant Objectives

The participants’ objective will be to solve some of the dilemmas associated with the institutional move into flipped, blended and e-learning. This change requires a rethink about the lecture format and its suitability for these new environments. The dilemmas are created by one of the following:

- The resistance to changes directed by leadership and improving staff moral as they approach radical changes in practice
- The fear of the presented self
- How to best utilize content already existing as presentations, no planning, scripts etc.
- Where does one fit this into a busy schedule, or the perception of additional work.

The participants will have the opportunity to hear how these dilemmas can be resolved in different context, utilizing different strategies.

3.2. Main Participant Take-aways
Appendix 3 Workshop – Free flowing Content

Most participants will achieve some recorded videos to take away with them. More importantly the experience from multiple institutions and a variety of context will make the methods relevant for most situations. Participants will also be able to reflect on their existing practice, and look at their existing content in a refreshing and inspiring way. After the workshop it is expected that:

- new teachers will be able to learn how to produce video for a variety of contexts, such as flipped, blended and e-learning
- Experienced teachers will be able to utilize the vast store of existing content and quickly and easily turn them into fun and inspiring video
- Researchers will be able to expand research from the early adopters, advanced ICT users and the highly motivated to those who are reluctantly evolving practice.
- That the free flow of content from existing presentation formats to video, inspires an increase of flipped classes and blended environments being practiced in every participant’s classes.

4. Summary

Teachers approaching a new paradigm face uncertainty and are reluctant to embrace video recording technology, especially if it is forced upon them. We found it was possible to harness existing content by transforming presentations into animated videos simply and easily, and teachers could achieve the change within the time allocated for their current teaching. Teachers are experienced at delivering their content so often feel that no additional preparation such as script writing is required. The methodology discussed in the workshop opens the door for the free flow of content into new formats better suited to flipped, blended and e-learning.

The methods utilized in the workshop reflect the requirements of changing whole departments or courses and including teachers that are not comfortable with radical changes to their lecturing environment. The research behind the methodology was based on a longitudinal study in action research at a Danish HEI. The results showed that the very real fear of the presented self is a perception, and the only way to break that perception is via the technology, because both the presenter and the audience are the same. However teachers who are reluctant to embrace technological change or find it stressful are stuck, with heightened fear, sensitivity to the complexities of what is being asked of them. The outputs on which this workshop is based focuses on familiar technology, in a familiar space, where a teacher finds that recording takes no additional technology, no additional practice and before the fear sets in, have a successful recording in the hand. This process exposes the perceptual nature of the barriers to participation allowing teachers to focus on making content better suited to new contexts.

References


ABSTRACT
Higher education institutions are moving to exploit information and communication technologies by increasing the use of videos both online and in class. This is led, by definition, by ‘early adopters’ and most of the research into this process reflects this. Increasingly, institutions are making strategic decisions to move courses online however some teachers involved are not well equipped to transition. The barriers are reported to be time constraints and a lack of familiarity with the technology to make video. Also, there is a fear of the ‘presented self’ where teachers may initially resent the idea of being recorded. This paper is the result of a search and research process where researchers looked at teacher’s embedded practices to discover hidden skillsets and content. Teachers who were intimidated by moving from the presentation style lecture to video based flipped or e-learning are focused on the process and sometimes do not secure the integrity of the learning. This paper sets out the methods used to assist teachers take the maximum benefit of their existing content as presentation style lectures and utilize them in both flipped and online classes. A central theme is removing the fear of the presented self and enabling participation in creating active learning environments. This unlocks the potential for whole institutions to make course and department wide moves towards better classroom practice and e-learning opportunities.

KEYWORDS: flipped class, online teaching, engaging learning environments, video lecture, organizational learning and change.

0. INTRODUCTION
Many institutions are encouraging new teaching practice based on learning outcomes, while trying to adapt to the digital age (Dodero, Fernández, & Sanz, 2003; Olapiriyakul & Scher, 2006). It has been argued that change is necessary to provide for a society that is influenced and driven by information and communication technologies (ICT), with widespread social media services and portable electronic devices (Kukulska-Hulme, 2012; Lawless & Pellegrino, 2007; Pellegrino, Goldman, Bertenthal, & Lawless, 2007).
As with any technological change, the early adopters have high motivation and are continually evolving practice to overcome barriers as they appear. However, many faculty members are reluctant to convert their traditional on campus routines to an online format (Keengwe & Kidd, 2010; Kukulska-Hulme, 2012). The move requires a change in teaching practices and developing new technological skills which can be time consuming and frustrating (Davis, 2016). As Palloff and Pratt note (2003 p.23), “Faculty members cannot be expected to know intuitively how to design and deliver an effective online course” and that often “faculty members have not been exposed to techniques and methods needed to make online work successful”. Teachers have to spend more time on learning technology, develop new skills in designing online courses and providing on-time feedback to students (Lawless & Pellegrino, 2007). Moreover, according to Nelson and Thompson (2005) and Allen and Seaman (2008), lack of faculty time and workload, lack of support, assistance, as well as training, by institutions impedes teachers’ engagement in
online teaching practices. Such impediments are barriers to implementation because teachers cannot or will not participate fully. This can lead to inconsistent outcomes.

The point of departure from current research on online teaching practices, is the recognition that voluntary participants in e-learning will not experience such barriers. However, when an institution makes a top down decision to implement an online approach, such barriers can threaten the viability and success of a strategy. The hypothesis was that by allowing the free flow of content from its existing format, into one suitable for the modern online environment, teachers will be able to focus on the course and building an active and engaging learning environment. This paper focuses specifically on the production of videos for e-learning as a means for addressing major barriers to e-learning, that technology mediates a pathway.

1. BACKGROUND

Unsurprisingly, an increasing number of higher education institutions (HEI) across the world are transitioning from traditional “on campus” classes to partially (blended) or fully online classes while aiming to maintain and improve active, engaging and rich learning environments (Keengwe & Kidd, 2010; Van Weert, 2005; Watson, 2006). Integrating ICT and pedagogical practices can improve students’ learning via the affordances they offer (Webb, 2005). Using video is said to be beneficial in online teaching (Bishop & Verleger, 2013) as well as in a variety of face-to-face and blended environments (Shephard, 2003). Online video content comes in four major types: lecture capture format, voiceover presentation, picture in picture, and animated video with a voiceover (Chen & Wu, 2015). The literature is undecided if learning is improved specifically by differentiating these types (Zhang, Zhou, Briggs, & Nunamaker, 2006). Rienties and Toetenel (2016) describe that content is far less important than learning design aspects which may account for the mixed results video content type studies. Nevertheless, video is seen as important to the success of online courses and is suggested as the main way to present information in the online environment (Bishop & Verleger, 2013; Chen & Wu, 2015).

Top down change is set against a background of fear experienced by teachers approaching the unknown because it is they who are expected to deliver content, often videos. This is expressed as a barrier to change when teachers contemplate recording a video and is associated with the complex equipment and environment (Bennett, 2012; Brunsell & Horejsi, 2013; Fuller & Manning, 1973; Raths, 2013). Also, many teachers are put-off by their own voice when they hear a recording. Because it is so different to how they perceive themselves, there is an immediate aversion to the ‘presented self’, when seen in video format (Fuller & Manning, 1973). Barriers also exist for teachers when it becomes obvious that storyboards, scripts and scene preparation are the bywords of video production, hence demanding more time from teachers (Halili & Zainuddin, 2015; Şengel, 2016).

The new challenge is the expected rate of implementation of institution wide online teaching. Wilson and Stacey (2004) provide an inspiring list of different formats for staff development pathways into online teaching which are all based on voluntary participation. However, when institutional decisions have been made to move teaching online there is sometimes little regard for how the individual teacher makes this happen.

This paper discusses the approach used to remove the barriers teachers faced after an institutional decision was made to migrate from face-to-face lectures to online teaching.

2. METHODOLOGY AND CONTEXT

This study was a qualitative research since the idea was to include the perspectives of the local population it involved. Since the investigation was undertaken at one institution we needed to take note of culturally specific details of people’s values, opinions and practices (Cohen, Manion, &
Morrison, 2011). Both researchers were part of a ‘community of practice’ (Wenger, 1998) who wanted to improve existing practices. For that reason, this study was done as an action research project to respond to existing problems and provide future guidelines for the implementation of online teaching (Kemmis, McTaggart, & Retallick, 2004). Both researchers were therefore also teachers involved in the case being studied.

The action research took account of three major interventions led by the researchers to change practice within the HEI. Results of each intervention discusses separately and focused on researchers’ role, actions and reflections on the results. The research utilized a grounded theory approach (Corbin & Strauss, 2008) based on document analysis, field notes from team meetings, observations of 10 teachers recording videos, semi-structured discussions with individual teachers about barriers and their experiences.

**Context**

This investigation took place at University College North Jutland (UCN), a Danish HEI. UCN offers courses under the European Credit Transfer and accumulation system (ECTS). In 2015 UCN made the decision to offer a 2-year full time, 120 ECTS course in a technical subject in an online mode that included four, three-day on campus seminars.

UCN uses a Study Activity Model (SAM) (Hansen & Hatt, 2016) to calculate the workload of both teachers and students. The weighting varies from semester to semester however for the research period the lecture load of 330 hours is calculated on activity in section K1, being the “teacher led instructional time”.

Investments had been made in a Learning Management System (LMS) that can support online teaching, the teachers were responsible for the migration of content into the online environment. The use of video was heavily encouraged. The teachers were not given additional preparation time from their normal face-to-face preparation and lecture schedule due to budget constraints.

None of the teachers had recorded videos for teaching before and in the majority rejected recording their own videos. It was clear that there were a number of barriers perceived by the teachers. Therefore, the initial approach was that the existing teaching material was to be given to an external person with video recording experience.

Two test videos were recorded and passed to the team to provide feedback. After having watched the videos the team realized that they did not suit the course. There were several objections:

- The videos tended to be long and quite monotonous
- The visual content was the same as the spoken content
- Some of the content selection omitted critical elements of the curriculum.

In response, the team decided that: the videos had to be recorded by someone competent in the topic, should include an element of engagement and that the teachers would have to do the recording themselves. Set against this background, the action research process commenced, the results are given below.

3. **RESULTS**

**Intervention 1**

Both researchers used an add-on for Microsoft Office® - MIX. This enables one to speak to the already planned slides, sound and animations plus annotations are recorded and embedded into the normal presentation slide. The result was that within a 15-minute session, both researchers were able to produce a 5 - 10 minute video ready for dissemination.

The key to the success of this intervention was the focus on utilizing existing content, and staying within the software suite that all the teachers in the department were so familiar with.

**Intervention 2**
6 out of 10 teachers identified that: recording of video, seeing yourself onscreen, and losing the teacher student in-class interaction during a lecture as barriers. The minutes showed that the implementation of the online course was delayed and non-viable. The two researchers presented the technique they had developed in intervention 1 to address these barriers. The researchers acted as peers to their colleagues and one by one introduced the recording process. Specifically, it was observed, that the teachers did not need to prepare a script. Teachers, who came to the recording studio showing physical signs of stress, such as defensive body language or shaking, quickly relaxed and recorded videos in their first attempt. They were comfortable working within a familiar software environment.

Intervention 3
The researchers then implemented workshop training to assist the team to adapt their presentations from voice over style to animated videos and take full advantage of the interactive whiteboard technology to heavily annotate their slides. The teachers expressed to researchers that this activity felt normal because it was their normal practice in class. Heavily annotated slides were preferred by students in class to watch as opposed to simple voiceover presentations. 4 teachers were observed to continue recording additional lectures on their own after providing videos for e-learning.

4. DISCUSSION

The main barriers to video production that were identified were classified as follows:
- The lack of time to prepare scripts
- Fear of the recording process
- The lack of competency in recording and editing
- Fear of the ‘presented self’

Because the recording environment was familiar to teachers, fear of interacting with the slide environment for video recording purposes and the need for scripts was eliminated. It resulted in the teachers focusing on pedagogical approaches rather than being preoccupied with technical challenges and barriers. The technique had quite a strong effect on teachers who were negatively predisposed to recording their videos (intervention 2). Teachers who expressed fear of the presented self were quickly able to use the equipment alone and were comfortable with the in-built editing and error correction possibilities.

Once the teachers could easily record a video and make it animated and interactive, they realized that there was an immediate supply of material that could be used to create a more active and engaging lesson (Keengwe & Kidd, 2010). This supply of material is labelled here the ‘free flow of content’ and describes the ease with which existing content can be formatted to suit the online or flipped class. The free flow of content is not about the details of producing pedagogically sound online courses but rather removing barriers so that teachers can focus on quality teaching.

5. CONCLUSION

The authors hypothesized that the barriers faced by teachers at UCN would be similar as those discussed in the literature. Teachers approaching the new paradigm faced uncertainty and were reluctant to embrace video recording technology. The reluctance for teachers to record video lectures threatened the success of an institutional move to offer courses online. The researcher’s interventions effectively removed the barriers and enabled the free flow of content. The key to success was utilizing a familiar software working environment and known content.

It was possible to harness existing content by transforming presentations into animated videos simply and easily. Teachers could achieve the change within the time allocated for their current
teaching. Because they were experienced at this content delivery so felt that no additional preparation such as script writing was required. The ability to easily record existing content starts the free flow of content. Free flowing content allows teachers to focus on the pedagogical requirements of flipped or online learning. The realization that content could be produced and no major shift in practice endured, effectively removed perceived barriers of having to cater to the online requirements, although making lesson plans and moving lessons into the virtual space does require a lot of planning and preparation. A direct outcome from this research is that the approach discussed above has now been introduced for the pedagogical training at UCN.

6. REFERENCES


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Appendix 4 Paper - Free flowing Content


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Appendix 4 Paper - Free flowing Content


Summary of Changes from Review Process.

This does not form part of the paper.

<table>
<thead>
<tr>
<th>Reviewers Comments</th>
<th>Actions</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>The aim could be more connected to research. As it stands it seems to refer a case without sufficient elaboration on how the study contributes to the research field in question, and how the case is relevant.</td>
</tr>
<tr>
<td>1a</td>
<td>Theoretical background – low significance</td>
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<tr>
<td>2</td>
<td>More careful description in the method would be helpful.</td>
</tr>
<tr>
<td>3</td>
<td>The authors refer to the study as an action research project, but I lack references to method literature.</td>
</tr>
<tr>
<td>4</td>
<td>The role of the researchers was somewhat unclear. If it included self-study such literature should be referred to</td>
</tr>
<tr>
<td>5</td>
<td>If the section was divided into sections covering consideration of method, selection, procedure and analysis, this would give the reader a much better view of what was actually done in this study.</td>
</tr>
<tr>
<td>6</td>
<td>The results and discussion are well written and could be improved by fuller descriptions</td>
</tr>
<tr>
<td>7</td>
<td>The main improvement will lie within a more explicitly written argument for why this is not just faculty development but a research study.</td>
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</tbody>
</table>
Attention retention: Ensuring your educational content engaging your students

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Abstract. As teachers look for ways to improve practice and enhance student engagement, referral to the literature leads to a dichotomy between specific activity and heavy academic research on metadata and learning analytics. This paper is intended to tread the pathway between the two so that teachers can, using the findings, introduce video for flipped classes, or online teaching. Taking five iterations of an action research approach the authors present the techniques and principles for making an interactive video and clear examples of lesson design. The research was conducted at a Danish higher education institution in technical subjects, but the methods are applicable to most teaching situations. The outcomes are, that paying attention to the process of recording existing lecture content leads to interactive video. This new content can be embedded in a structured lesson design and can greatly improve educational outcomes and student engagement. The researchers’ goal was to create Rich Environments for Active Learning in both online and in classroom environments, and utilize existing content across both platforms.

Keywords: rich and active learning environments, online learning, flipped classroom, interactive video, lesson design.

Introduction

Tertiary education is undergoing a substantial change driven by a need to adapt to the digital age. This is signified by a drive to fit into society that is influenced and driven by information and communication technologies (ICT), with widespread social media services and portable electronic devices (Lawless & Pellegrino, 2007; Kukulska-Hulme, 2012). In response, Higher Educational Institutions (HEI) across the world are transitioning from traditional “on campus” classes into partially (blended) or fully online classes with an extensive utilization of multimedia materials (Keengwe & Kidd, 2010; Mayer, 2001). Indeed, many online courses rely on multimedia content, usually available in format of a video lecture (Chen & Wu, 2015). Research asserts that integrating multimedia and pedagogical practices can enrich learning experience and improve students’ performance (Mayer, 2001;
Appendix 5 Paper – Attention Retention


However, incorporating videos into courses is not sufficient to create an engaging and active learning environment and improve learning (Berge, 2002; Zhang, Zhou, Briggs, & Nunamaker, 2006). Many studies on online learning and Massive Open Online Courses (MOOCs) conclude that relatively high rate of early stage drop out and low performance among students are caused by unclear course design and lack of interactivity in the course (Adamopoulos, 2013; Hone & El Said, 2016). Simply put educators often underestimate the importance of a course structure and the necessity of facilitating interaction in a systematic and organized way. This paper addresses the importance for educators involved in blended or online teaching to produce an interactive video and ways to embed such in the course so a more active, richer and engaging learning environment is created.

Background

Education has been constantly adapting new forms of teaching and learning in order to be able to satisfy the demand for knowledge in a society in which usage of products of development, such as ICT, is omnipresent and ubiquitous (Watson, 2006; van Weert, 2005). According to Tom van Weert, such a society places three demands upon its citizens and workers, namely lifelong learning, knowledge development through practical research and knowledge sharing.

HEI are often asked to carry all the responsibility for preparing people to be productive workers and members of society (Dunlap & Grabinger, 1996). In order to meet the society’s demand as according to van Weert, the educators have to ensure that students develop critical-thinking skills instead of developing memorizing or information absorbing skills (2005).

One educational strategy that can promote critical thinking skills and create active learning is use of Rich Environments for Active Learning (REALs). An education in a REALs based on constructivist values as collaboration, reflectivity and engagement (Lebow, 1993). Constructivism learning environments place learner in the center of the learning process, which enables students to feel autonomy and responsibility for their own learning (Piaget, 2013). Moreover REALs promote critical and reflective thinking due to problem based nature of instruction (Lebow, 1993; Savery & Duffy, 1996).
There are several principles for designing REALs. First, in such environments teachers become facilitators of thinking process, not presenters of knowledge. For example, students should work with lesson plans and objectives trying to solve a problem and discover knowledge rather than be given that knowledge directly by the instructor (Dunlap & Grabinger, 1996; Fetherston, 2006). Secondly, learning has to occur by interaction. For example, students should work cooperatively in teams. Team activities make students analyse their own and others’ knowledge and reflect upon others’ interpretations. According to Vygotsky (1978) most important learning occurs through social interaction. Moreover, this interaction is not only limited to interaction with peers in the class, but also to interaction with instructor and interaction with educational content (Moore, 1989). Thus, the role of instructor is to encourage interaction, so higher order thinking such as analysis, synthesis and evaluation is involved (Bloom, Krathwohl, & Masia, 1956). Thirdly, instructors have to create a room for critical and reflective thinking, which is dialogic in nature (Berge, 2002; Dunlap & Grabinger, 1996; Mulcare & Shwedel, 2016). Instructors can ask such questions as: “What methods did you use? What worked? What did not? Are there any other methods you would use next time”. According to Waller (1994), such instructional interventions as reinforcement, cooperative learning, tutoring, feedback and adaptive instruction have the highest effect on learning.

**Online education and multimedia learning**

It is argued that constructivist learning environments can be replicated to an online course to create active and rich learning environments (Berge, 2002; Paloff & Pratt, 2001). However, educators must remember that online environment and traditional classroom environment are different and faculty members need training and support in designing, delivering and maintaining online course and content (Olapiriyakul & Scher, 2006). Notably literature on retention rates and students’ perceived effectiveness of distance education shows lack of clear course structure and content. Lack of interaction with and feedback from instructor are major factors of low retention rates in MOOCs and online courses (Adamopoulos, 2013; Dron & Ostashevski, 2015; Hone & El Said, 2016). Also many (Halili & Zainuddin, 2015; Keengwe & Kidd, 2010) highlight that it is not the actual course content that affects the level of student’s engagement, but as much the instructor’s “presence”, support and facilitation during the whole course period. Students need to be provided with a clear course structure, outcome expectations and be systematically guided through the course. As Berge (2002), Paloff and Pratt (2001) and Rienties
and Toetenel (2016) state, course design is one of the most important factors in online course retention and higher student engagement.

A successful course planning is a balance between three elements: learning goals, learning activities and feedback and evaluation (Berge, 2002) and course designing should consist of five main phases: course content design, course development, course implementation, course evaluation, and course revision (Paloff & Pratt, 2001). When it comes to learning activities and course content in online education, educational content is usually available in format of a video lecture (Chen & Wu, 2015). Video instruction is seen as an important element in both e-learning and blended learning environments, as it enriches students learning experience and gives flexible management of learning (Mayer, 2001; Webb, 2012). Video helps students to create a sense of autonomy for own learning and better manage working memory as students can freely self-pace recorded lectures and analyse the content (Abeysekera & Dawson, 2015).

Although there exist various video lecture formats, such as lecture capture, voice-over, picture-in-picture or Khan-style video, there is no conventional standard to create a video lecture. Also, none of the video lecture formats is more superior to another due to the fact that they benefit various learner types (visualizers and verbalizers) differently (Chen & Wu, 2015). Although videos containing a combination of animation (moving images and/or direct handwriting) and narration (text and/or audio recording) show more positive effect on students attention, learning experience overall (Zhang, Zhou, Briggs, & Nunamaker, 2006). Thus interactive videos, containing both animations and narrations as opposed to videos containing either of those, significantly improve students’ performance and show higher learning satisfaction and engagement (Chen & Wu, 2015; Zhang, Zhou, Briggs, & Nunamaker, 2006).

Methodology

This research is based on analysis of authors’ direct participation in creating video content for an online course, video integration in the course and course design in LMS. As authors were directly involved in the process themselves, this study resides on an action research approach. In an active research, it is crucial that researchers collaborate with other researchers/ participants and engage in the situation, while focusing on problem solving via practice followed by critical and reflective learning (Agyris, Putnam, & MacLain-Smith, 1982; Checkland & Holwell, 1998). As a result,
researchers contribute both to the practical concern in a given situation and provide an increase of knowledge.

The data is derived from the metadata available for viewing videos online. One of the advantages of the ICT environments is the ability to collect metadata and use it for statistical analysis. A simple comparative analysis is carried out based on recorded viewing times. In total, the researchers were involved in 10 classes spread over four different courses. The courses were a mix of flipped on campus classes and blended e-learning classes. The classes are of mixed size with between 4 and 15 students enrolled. The total number of videos created for individual lessons is 58 and vary in length from 5 minutes to 42 minutes. The videos are presented via several multimodal methods as direct downloads and embedded in the LMS. No metadata is available for downloaded videos other than the students feedback.

In addition to the video metadata, a qualitative analysis is carried out based on informal interviews and discussions and results from student support meetings (studerendes udviklingssamtale, originally in Danish – SUS). SUS are quality assurance meetings held regularly throughout the semester. They comprise of a short questionnaire related to course functioning and a chance for an open dialogue with the students. Using the action research approach, the researchers take feedback from class SUS and reflect on the responses. SUS meetings were held twice during the semester. By far the bulk of the feedback was from informal class feedback meetings. While several authors indicate that Learning Analytics (LA) should take a social LA perspective (Ferguson & Buckingham Shum, 2012), traditional theory acknowledges the power of communication and collaboration (Vygotsky L. s., 1980).

The output of this paper are techniques that can be utilized by educators in order to create a “better” interactive video as well as principles to be considered when designing a course.

Results

The first iteration of videos produced by the researchers was a simple voiceover presentation of a slide show. The video comprised of 30 slides equivalent to the material the researcher had used for a two hour lecture period. The video was embedded in a flipped class style lecture where the first period was spent watching the video and the second part was doing an exercise based on the content. The feedback from the class was not particularly good. The video was 42 minutes long and the researcher was compelled on several occasions to stop the video and add
commentary. After 30 minutes, the researcher stopped the video and reverted to the slide presentation due to the lack of attention from the class. It was observed that while the researcher could lecture for long periods, the class lost interest without the two way interaction of the lecture style. The researchers discussed the implications, and based on research of best practices, agreed that videos should be limited to one specific topic and exercises should be dispersed throughout the lesson block.

The second iteration used three videos between 7 and 12 minutes in length. The shorter videos focused on one topic. The first minute of each video was spent explaining how that video related to the other two. Additionally, every video would begin with researcher introducing him/herself and the course the video relates to. Each video was followed up by a quiz or an assignment where students were asked to research some specific aspect of the topic and send their findings to the researchers within the LMS platform. The findings from the second iteration were that students tended to skip first video slides, as they knew same introduction was coming, often missing the topic presentation and it’s key points consequently (figure 1). Notably, the students enjoyed video follow up assignments; however, their research results were variable due to lack of understanding about research techniques and evaluating sources, since the researcher did not provide a written guidance on such.

The remaining iterations are summarised in the table below

<table>
<thead>
<tr>
<th>Iteration</th>
<th>Video features</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1x 42m, VoP</td>
<td>Long and boring lacked engagement</td>
</tr>
<tr>
<td>2</td>
<td>3x 7-12m, VoP with A</td>
<td>Long introduction, poor learning outcomes (figure 1)</td>
</tr>
<tr>
<td>3</td>
<td>7x 5m, AV</td>
<td>Great introduction, Well integrated</td>
</tr>
<tr>
<td>4</td>
<td>25x 5-17m, AV, IV, FL</td>
<td>Improved class atmosphere</td>
</tr>
<tr>
<td>5</td>
<td>22x 5 - 12m, AV, IV, OL</td>
<td>Good outcomes, better engagement</td>
</tr>
</tbody>
</table>
Appendix 5 Paper – Attention Retention

Key: x – Number of videos  m- Minutes duration, VoP – Voiceover Presentation, A – Annotations, AV – Animated Video, IV – Interactive Video, FL – Flipped Class (video watched outside the classroom), OL – Online class

Figure 1: Metadata slides showing standard presentation slideshow and showing low retention figures.

The results from the metadata survey show that students are watching the videos more completely after the third iteration (figure 2). In the last iteration, the students engaged with about 90% of the slide timings. The result almost never got higher than that number. The class represented in figure 1, had 10 students and the number of viewings is higher due to review viewings.

Figure 2: Metadata showing slides without text, introduction and heavily annotated multi layered slides and showing very high rates of viewer retention.
Data extracted from course analytics show that on the week ending 28th February 2016 students were less engaged with the course. The light grey bar shows page views only, whereas the dark bars shows students participation, i.e. interaction via educational content in form of assignments and quizzes (figure 3).

![Course analytics showing weekly page views and participations. Left - guidance by educator in class, right - with guidance embedded in LMS.](image)

After the third intervention with integration of educational content into LMS and researcher’s guidance and facilitation, the students’ participation rate was high and constant (figure 3 -right).

Discussion

The researchers’ goal was to analyse videos and their integration in the course within an institutional LMS so it boosts students’ engagement and learning interest. The researchers had to define what would make a “better video” through the action research methods. The learnings from the first iteration were instituted as making the video shorter. Long videos were too monotonous as often the visual content was the same as the spoken content, so the students quickly lost interest. Thus, a general guideline was adopted that presentations that are in excess of 10 slides should be divided into multiple videos. Also long videos become unwieldy (large file sizes not shareable by email). Many articles on online education and online video design suggest that teachers should consult literature on the aspects
of making a video and designing an online course prior implementation (Keengwe & Kidd, 2010) and this is strongly supported by our findings.

The second iteration reinforced the findings of the first and the importance that videos have to be kept short. As Raths (2014) and Zappe (2009) suggest videos can be as short as 4 minutes and preferably no longer than 15 minutes depending on the students grade. Another finding was that the material should be honed prior to recording to remove any superfluous content. This requires teachers to review the existing material and identify the important slides that can be converted/adapted to a video. This process is time consuming, but gives a long term advantage as the content can be reused next time (Matamoros, 2015). Often a short video was followed immediately by a research style investigative exercise that added context to the point, but this was student driven and then shared peer to peer. These lessons were appreciated by the students and scored highly on the SUS reports as they operated autonomously and were actively engaged in the topic. Thus providing evidence for the researchers that a REAL had been created.

Another outcome was that researchers introduced annotations using interactive whiteboard system. This made video content versatile and made students maintain their attention to the whole video.

The third, fourth and fifth iterations focused on the point that video should be interactive: contain a mixture of text, pictures and animations. As Bergmann and Sams, (2012) and Evans and Mathur (2005) indicate that every video should excite students, so there is no harm in including humour (a comment or a picture). The researchers took this aspect to the highest level and moved from presentation style slides to animated videos, where there was almost no text. The ability to annotate a picture and have multiple pictures fade in and out created animated videos with a very high attention retention where all students would watch the entire videos.

The results showed that students would watch the videos multiple times, and the average time per slide would go below 100% only when students watched for a second time. It was surmised that the students were looking for a specific item in the video, but interestingly, the average time per slide was consistently higher towards the end of the video indicating that they would skip a slide or two, but would continue to watch to the end once started.

The presentation teachers normally showed in class commenced with a title slide, followed by the learning goals or an agenda. When transformed into a video however, the metadata showed that students tended to skip past this section.
Iteration three in particular was implemented after the researchers went looking for inspiration on YouTube. Namely, the videos, that have high viewing numbers, are often those which start with the main point, like a teaser. The researchers applied this practice, and instead of presenting an introductory slide containing who is talking in every video, the authors stated main points of the topic/lecture within the first few seconds. It is noted that the teachers were reluctant to change this practice departing from their already prepared lecture. However, this practice is only applicable if the video is embedded in a comprehensively prepared LMS where the student is locked into a learning pathway, unlocking videos by completing previous sections. A critical element here is how the video is embedded within the LMS. The student comes to the lecture already knowing the subject and the context in which it is being applied. This enabled the teacher to focus on a key point, present it, then follow up with an activity.

Lecture plans and teaching material are made available for students via the institutional LMS platform, Canvas by Instructure. In reflecting on the LMS, you can see here (figure 4) how the educational content fits into a structured lecture and activity lesson plan.

![Figure 4: Embedding educational content into a LMS in the first iteration.](image)

In the course analytics, as shown in figure 3 - left, the low ranking for engagement related to the lesson design as shown in figure 5. The researchers inferred from the results of interviews and feedback that the lesson design was not able to keep the students on track due to a lack of guidance as to what was required. This could be interpreted that the students forgot or constructively dismissed the activity. However, during the reflection phase of the iteration, the researchers realised that
there was no space created for the students to participate actively and this was a fundamental flaw in this lesson design.

Figure 5 shows learning design menu structure the embedded videos, followed by activities to complete the lesson. This lesson relates to the course analytics as shown in figure 3 - right. The results show high and constant activity throughout the lessons. The researchers inferred that the increased participation was due to the improved lesson design where activities are integrated with educational material. This activity can, for instance, be a short quiz, which can, first, encourage students to watch the video as they know the teacher will follow up on the quiz. Second, the quiz is an excellent way to take the main point made in the video and add sub-context or get the students to extend their knowledge. The activities can as well be a discussion panel or an assignment. It was found that the students preferred activity in class and the classroom became a more engaging place with
students devolving into working groups to work collaboratively. At the end of the topic or course, there is an afterword page, where instructions for reflections or follow up activities are issued. For example, the teacher can give some indicative questions to be considered once students are asked to reflect upon the course or topic. There, as well, can be an advice to consider applying knowledge from the course in a project. This supports the findings in the literature review, and was the key to the success of creating interactive learning environments, where peers, instructors and educational content combine for reflective practice based learning.

Conclusions

The action research method was ideal for this research methodology as the researchers were able to make multiple interventions of normal teaching practice and gain immediate feedback about the results. The process of moving to REALs utilising video is a complex one and has as with all technological innovations had mixed results because it is more than simply adding technology to the classroom (Zhang, Zhou, Briggs, & Nunamaker, 2006). In order to gauge student engagement with video content the researchers used a combination of feedback systems including viewer metadata.

Throughout the period of the study, the researchers were able to see a rapid development in the engagement of the students that was complimented with researchers’ skill at producing videos. A key breakthrough in making students fully engage with a video was to eliminate the introductions and get straight to the key point of the video. Additionally, the educational material had to be thoughtfully revised and all the superfluous content had to be eliminated prior video recording, thus making videos short and relevant. Using shorter videos was beneficial to the overall lesson because more time could be spent with activity based learning exercises. Short videos are preferable in the learning environment (Raths, 2014), and this is supported by our findings. Also a combination of narration, animation and annotation ensured the videos were as interactive as possible, thus improving students’ performance and increasing learning satisfaction and engagement.

The goal of the research was to create REALs that have the properties of collaboration, reflectivity and engagement (Lebow, 1993). Embedding videos in a course does not inherently engender these properties. The researchers return to these properties and ensured that the engaging videos were accompanied by collaborative and reflective exercises thus creating rich and active learning
environment. Importantly, lesson design played a major role in the success of introducing video into the blended and online environment, and this is supported by major quantitative studies (Rienties & Toetenel, 2016).

References


Appendix 5 Paper – Attention Retention

Overcoming the fear of the presented self

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ABSTRACT
Using an agency theory approach, the article reflects on the forces acting on the teacher as a lesson is created for the e-learning space. Brownlee (2015) describes that there are two sides to the presented self; the presenter and audience, and that both mediate a story. The point of departure for this approach is that the presenter and the audience is the same, however mediated by external actors and agents such as the video. The teacher’s preconceptions to the presented self are fundamentally negative and the researcher’s interventions in the video recording process describe a process of altering the agency of actors on the presented self. The preconceptions of the presented self are based on a very real fear of loss. Marris parallels this with a bereavement when there is a realisation that things that were once known are shown to be wrong (1978). This leads the researchers to hypothesise that the fear of the presented self cannot be shown to be wrong, however that a process of self-discovery mediated through technology can lead to discovering new knowledge to fill the gap left by old practice, and attention to how this process plays out is equally important to attaining the desired results as instituting new practice. This is especially relevant to institutions attempting to make wholesale department-wide change for improved practice, when entrenched practice, and the fear of loss, leads to change resistance.

INTRODUCTION
Many of today’s higher education institutions (HEI) are adopting digital teaching tools while shifting their attention to attainment of learning outcomes (Dodero, Fernández, & Sanz, 2003; Olapiriyakul & Scher, 2006). This is where Information Communication Technology (ICT) is hoped to bring about positive changes, from supporting interactive presentations styles through tools like interactive whiteboards (IWB), to challenging traditional “on campus” classes through the adoption of flipped and/or partially (blended) or fully online classes. These transitions are considered necessary not only to change teaching styles but also to respond to a society that is influenced and driven by information and communication technologies (ICT) (Kukulska-Hulme, 2012; Lawless & Pellegrino, 2007). There is a wealth of research concerning these transitions in order to maintain and improve active, engaging and rich learning environments (Keengwe & Kidd, 2010; Van Weert, 2005; Watson, 2006).

Integrating ICT and applying ICT specific pedagogical practices requires that teachers are aware of the affordances ICT offers (Webb, 2005). Webb explains that the term affordance “describe(s) opportunities provided for users in ICT-based learning environments” (p. 707). Unless teachers are aware of those themselves they will struggle to be certain that they are apparent to their students. If the affordances of ICT stay hidden to teachers they will find it difficult to see the potential benefits in using ICT and will be less inclined to be using ICT, if they have a choice to do so. Not only do teachers need to see the potential...
benefit in using ICT they also need to understand that they play a key role in implementing ICT informed approaches (Webb, 2005).

The existing research predominantly reports on studies that involve voluntary participants and this means in most cases early ICT adopters or those who are willing to ‘give it a try’, thus people who are motivated to explore the affordances of ICT. This may result in the fallacious assumption that all teachers are ICT literate and/or prepared for this new form of teaching. For example referring to the production of video content that can be used for flipped or blended learning approaches Brecht writes: “Using a personal computer, an instructor can create them [video] quickly and easily” (2012 p. 75). Aldunate and Nussbaum (2013) show that while nearly 75% of teachers identify themselves as innovators or early adopters, only 34% invest more than an average amount of time in using technology. This is similarly reflected in the handbook of design research methods in education which reports a meta analysis result of 2.5% of participants as innovators and 13.5% of early adopters (Kelly, Lesh, & Baek, 2014). Early adopters have the traits of being self-organizing and self-learning with motivation to evolve practice. Based on a negative educational technology adoption scenario from Zellweger (2007) they are unafraid to make errors. Zellweger goes on to say that it is only the innovators (representing around 5% for that particular study) which had the motivation to improve practice and all the remaining participants tended to abandon new technology.

In this paper, the reference is specifically to the challenges experienced by teachers who can be described as late adopters, who are on a spectrum, reluctant to adopt to ICT supported approaches. More specifically the interest is focused on the production of video content that supports, complements or replaces traditional lecture style teaching. Next is a brief description on using video to support University teaching.

**VIDEO TO TEACH CONTENT**

Video lecture content comes in four broad types (Chen & Wu, 2015): Lecture capture format, based on the simple recording of an in-class lecture; The voiceover presentation or ‘talked slides’, simple recordings played over an automated slide presentation; The picture-in-picture method, which shows the presenter and captures slide annotations, and finally, animated video with a voiceover, signified by animated drawings or diagrams and only keywords or lists being shown as text (Chen & Wu, 2015).

The literature is undecided if learning is improved by differentiating these types (Zhang, Zhou, Briggs, & Nunamaker, 2006). However, the incorporation of video is said to be beneficial in online teaching (Bishop & Verleger, 2013) as well as in a variety of face-to-face and blended learning environments (Shephard, 2003). Students value the use of videos as resources especially if they represent “short, concise video content that is immediately relevant to the topic at hand” (Tiernan, 2015 p.88). Rientes and Toetenel (2016) describe that content is less important than the learning design which may account for the mixed results video content type studies. However, the production of video content represents a challenge to teachers who have to adopt new ways of content preparation.

**IMPEDIMENTS TO VIDEO PRODUCTION FOR TEACHING**

Examining the literature on the topic of ICT adoption and implementation, including that of video production and use for education, shows also that there is little work available that examines those who are resisting or avoid technology uptake. To deal with this research turned to parallels from studies dealing with other ICT implementations. One example was the uptake of interactive whiteboards (IWB) where, despite the growth in IWB hardware acquisition, there is no consensus that there are sustained benefits of using IWBs for teaching (Van Laer, Beauchamp, & Colpaert, 2014). Van Laer, Beauchamp and Colpaert found in their study that in HEIs there were typically fewer than 5% advanced users of IWB even though the technology had been an integral part of the classroom set up for years. While IWBs are widely available in modern HEIs they are rarely used to record lectures and their annotations nor does it...
seem to be widely known that IWBs can be used to record slide presentations using PowerPoint and that advanced adoption and usage of IWBs is still relatively low (Al-Qirim, 2016). Those who are less motivated to adopt ICT must overcome this to successfully integrate technology into their teaching. Many faculty members are reluctant to capture their traditional on campus routines for an online format because it requires a change in teaching practices i.e. teachers should adopt a more student-centered teaching approach (Keengwe & Kidd, 2010; Kukulska-Hulme, 2012). Video has been suggested as a suitable means to move content into the online environment (Bishop & Verleger, 2013; Chen & Wu, 2015). However, since video represents a form of online teaching Palloff and Pratt note (2003 p. 23) “Faculty members cannot be expected to know intuitively how to design and deliver an effective online course” and that often “faculty members have not been exposed to techniques and methods needed to make online work successful”. Other barriers include the perceived requirements to prepare storyboards, scripts and scene preparation, hence demanding more time from teachers to prepare (Davis, 2016; Hallili & Zainuddin, 2015; Şengel, 2016).

There is another important issue that affects the implementation of ICT, specifically video content that is not often discussed because, as mentioned before, research often utilizes volunteers. When one considers recording a lecture or some instruction it is implicit that there is an element of ‘one’s self’ in the recording, typically either through the recording of one’s self or the capture of one’s voice. Many teachers are put-off by their own voice when they hear a recording since it is different to how they perceive themselves, and this creates an immediate aversion to the presented self, when seen in video format (Fuller & Manning, 1973). This ‘presented self’ is a term coined in psychology connected to one’s self-image in relation to esteem and behavior. Brownlee (2015) writes that there are two sides to the presented self, the presenter and the observer and the teacher who records himself will experience the presenter and the observer as the same person. Research found that negative emotions such as guilt, fear, shame and anger are expressed more often by teachers watching themselves recorded than watching others (Fiske & Taylor, 2013) and they tend to be more critical of themselves than others when viewing others and their own teaching (Kleinknecht & Schneider, 2013). These studies and others point to the existence of a ‘fear of the presented self’ experienced in varying intensity by up to 85% of teachers who are not innovator’s or early adopters of ICT. The literature reveals another barrier to recording videos for education, that of the fear of using new technological equipment (Bennett, 2012; Brunsell & Horejsi, 2013; Fuller & Manning, 1973; Raths, 2013). Zellweger (2007) goes as far as to say that fear prevents adoption of technology and increases the early abomination of it.

Untreated, these fears may hamper efforts for HEI’s to undertake modernization and integration of videos in teaching at an institutional scale. Commonly, techniques used to reduce fear are variants of incremental exposure techniques (Heimberg, 1995). The hypothesis under consideration here is if incremental exposure can be used to reduce the fear of ICT and the presented self in teachers who are asked to record lectures on video, and whether this also reduces rates of abandonment of technology and practices by the non-early adopters?

METHODOLOGY

This paper is based on a larger study (Cass & Kravchenko In Press) which took an action research approach to include researcher work as a teacher practitioner and subsequently involved other teachers at the same HEI. This approach allowed the researchers to follow closely people’s changing practices, how they interpret their practices, and the conditions of those practices (Kemmis, 2009).

This research is a longitudinal approach focused on two participants, selected because they have continued to record videos for use in in-class activities rather than what was required for the e-learning. The participants were ‘late adopters’ labeled in accordance with Kelly Lesh and Baek (2014), not based on self-assessment but on observations. This study adopted a qualitative approach using video-recorded interviews. Since the investigation was undertaken at one institution it was necessary to take note of culturally specific details of the participants’ values, opinions and practices (Cohen, Manion, & Morrison,
2011). In addition, the study utilized field notes, action research logbooks and informal discussions with all participants.

The interview was a semi-structured interview with open-end questions, which was preceded by observations, which allowed to develop meaningful and relevant questions (Edwards & Holland, 2013). The interviews were designed to uncover aspects regarding teachers’ perceived growth of technical skills, their own opinions about the videos and the reactions of their colleagues to their new practices and how they have adapted their teaching to the use of video specific ICT.

RESULTS

‘Late adopters’, showed signs of reluctance to even enter the recording studio, evidenced by teachers who would miss appointments for the recording session, reschedule, or find that their calendar did not have a spare moment. However, after having initial positive experiences their enthusiasm for this new technology was evident through the feedback that was received. These participants tended to seek and follow advice from the workshops more deeply and attended more workshop sessions. Their output tended to be refined ten minute videos, where they focused on one point or single concept, utilized advanced features such as animations or annotations.

The video recording training workshops were carefully planned to deal directly with the largely negative preconceptions to recording video (Kravchenko & Cass in press). The teachers preconceptions were that scripts and storyboards were necessary for recording video which is consistent with literature (Halili & Zainuddin, 2015; Şengel, 2016). The first workshop was centered on one primary concept, namely that the easiest way was to recreare exactly what was done in class thereby eliminating the need for storyboards and scripts. It turned out that using existing PowerPoint presentations, slides became the storyboards, and the text became a script for what should be covered in a video. The teachers had used the same material in traditional classes before, so the material was also considered as being rehearsed.

After having success making their first video they reported that: “I was really happy to find out it was so easy” “it’s not difficult as I thought it would be”. In addition, they were reflective about possible shortcomings in some of their videos, for example “I found I could not use the PowerPoints directly because they were simply too heavy”. This expresses the late adopters’ reflection on their own practices and once they found that the recording was easier than previously feared it opened the door to experimenting with the delivery of content. The late adopters attended more workshop sessions and learned techniques on how to shorten videos to a single topic, remove text from slides and add animation.

The results were videos that they found more engaging.

Utilising the PowerPoint also meant that teachers did not feel they had to record themselves lecturing as one of the teachers expressed: “I am glad I do not have to record myself but can use my PowerPoint slides.”

One of the interviewees reflected that this process exposed weaknesses in his classroom approach, and now in a modified approach, this teacher uses video to make specific points in his classes. “It completely changed my classroom practice, I now play the video with the sound off and speak to them [students] my stories”. One theme identified by the late adopters was that teachers felt less need to provide highly detailed information to their students and that the video production resulted in them concentrating on providing key points and then facilitating support to the students finding detailed information themselves.

DISCUSSION AND CONCLUSION

The workshop results and teachers reflections about producing video material was tied closely to the affordances of using the Office MIX add-on to PowerPoint. It characterized the nature of the ICT-rich environments and how this could “support current pedagogical and curriculum innovations within a framework for pedagogical practice (Webb, 2005, p.732). Since familiar software was used as a starting
point the fear of increased workload was reduced and the teachers’ competency in using PowerPoint as a presentation format became a tool for eliminating the fear associated with time and effort. Interestingly, it seemed that middle adopters were quick to uptake the technology but due to feeling securer with the technology they did not modify and adapt their teaching practice which was also pointed out by the work of Kelly Lesh and Baek (2014). In contrast the late adopters found that the recording was easier than previously feared. This opened the door to experimenting with the delivery of content and this is reflected in research that the late adopters are more self-critical (Kleinknecht & Schneider, 2013).

The presented self as a concept helped in this study to better understand the processes teachers go through when they are asked to produce videos in support of teaching. This study showed that the middle adopters may require an incentive develop their practices, since they were less intimidated by dealing with the technology and felt less need to attend additional workshops. The late adopters were via the incremental exposure technique able to completely overcome their fear and produced great content for e-learning in spite of their negative predisposition.

For all groups it turned out that by building on known and familiar technology the fear of technology adoption could be reduced and addressed, and by incremental exposure this fear could be turned into curiosity and reflection of teaching practices. Utilizing the affordance of PowerPoint for video production strategically supported teaching practices and is a way to address professional development in technology adoption that is both reflective and innovative.

References


Appendix 6 Paper – Overcoming the fear of the presented self


Appendix 6 Paper – Overcoming the fear of the presented self


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Summary Statement

A passionate and active entrepreneurial approach to development and projects since my university days, I have consistently sought to advance the welfare of individuals, companies and the planet through the innovative application of technology. I bring a high energy and lead by example approach to developing new business, and an ability to step out of my comfort zone while maintaining strong working relationships. Noted for my creative flair and sound problem solving skills, I have a long and successful history of developing new business, finding arbitrage and making a sound business case in most renewable technology sectors. I strongly believe in the partnership approach, and coaching projects and new businesses through startup. I am a warm and collegial team member, who earns respect and truly believes that the real value in a company is its employees, and therefore works to get the best out of everyone involved.

Work History

Self Employed as Geo Energy Consulting. 2009 – Present

Recently I have been consulting on new Green Energy, new technology development projects as an independent consultant. Very recent projects include a 160MW wind farm development and a tender for 200-350MW nearshore wind farm. These have involved applications to EU for funding under IEEE, a H2020 and EUDP an application. After the move to Denmark I have had limited opportunities and only sporadic hours. The position spanned general management consulting business appraisal, and project development. Clients include angel investment consortiums, engineering and small start up companies. Technologies covered; large cargo vessel hull cleaning systems, vermiculture, battery regeneration, impact protection systems, fuel management, voice to data, smart grid technology, FMCG, marine hydrokinetic generator systems.
Appendix 7 CV


I purchased Jims Music Room, and operated this business until closure. Jims was a loss making entity when acquired, however strict business management and modernised product range turned the business around, with an annual growth of 40% 2005-2008 (over a negative national average for CD and music stores). Compounded by the GFC, the death of the CD as a format was inevitable so the store closed in May ’09 with no debit, and the hifi and automation part of the business was sold.

Hargrave Limited. Project Manager. May 2004- November 2004

Hargrave Limited was an independent project management company. I pitched and won two contracts, and acted as project manager for a 21 storey apartment building on Auckland waterfront during pre-project stage, and a large format supermarket. Hargrave was sold to Clifton Cooney Group in September 2004 and I was offered a position but declined, based on personal reasons.

Self Employed as MD, Whio Barges Limited, 2001 – Jan 2004

European canal barge sales and turnkey ‘BOT’ or ‘BOOT’ services exporting 12m – 20m new canal barges. See: NZ Marine Scene (winter 2002); NZ Professional Skipper, Issue 28 (June/July 2002); NZ Boating (June 2002) NZ Boating (Sept 2008)


This position was created by the success of Geo Energy’s Mokai Project and involved all aspects of the project management including the following:

- Subcontract negotiation as lead for 6 major subcontracts to the value of $56m,
- all local procurement,
- all transportation, logistics and scheduling,
- relationship management with the consulting companies, owners and regulatory bodies,
- the finances of the project and keeping a positive cash flow,
- managing 7 FT senior engineering staff,
- implementing all office systems from scratch, including the accounting package, project schedule, document tracking systems, procurement tracking and site co-ordination.

I became the site Safety Manager and was responsible for the creation, implementation and monitoring all aspects of site safety. I was responsible for the successful completion of the subcontracts, punchlist assessment and tracking variations and change orders. The project was commissioned on time and under budget and currently produces 8% over our guaranteed capacity.


This position was a full time commission only position involved in the marketing and sale of turnkey geothermal power projects. Geo Energy settled two major agreements, Ngawha January 1997, 15MW. and Mokai, Feb 1998, 60MW. I also assisted VP Ormat - Projects, to negotiate the settlement of a major construction dispute to the satisfaction of both parties. For Geo Energy I was solely responsible for the implementation of all office systems, financial systems, budgeting, marketing, customer liaison etc. The position was strongly project development oriented and involved contract negotiations and relationship management at corporate executive level, legal and technical advisor management and Maori Trusts. During this time I worked through obtaining resource consent
(EIA) on 4 major geothermal projects, submissions to two environment court hearings, and ensured project compliance with RMA and EC conditions.

**Tourism Manawatu Inc. Chief Executive Officer. Sept 1995- Dec 1996**

This position carried full responsibility for promotion, co-ordination and product development for a regional tourism organisation, being an incorporated society and a member of the NZTIA, NZTB and part of the Palmerston North City Council’s regional development strategy. This was a new organisation as was set up from scratch. The position included fundraising and financial accountability and creation and set up of all the societies business functions audited on a quarterly basis by the council subcommittees.

In the first year of operation, funding from PNCC was matched by stakeholder input of 28%, in the second year, an innovative voluntary funding scheme raised 2.5 times the PNCC funding. Activities included conference organisation and attendance, database creation, information dissemination, marketing, strategic planning and public sector accountability.

**Other Business Activities**

**Founder and Director of Deep Water Hydro 2005 – Present**

Formed from an alliance with Neptune Limited, Deep Water Hydro seeks to establish a 1,000 MW hydrokinetic generator set in the waters of Cook Strait, New Zealand. The revolutionary approach to tidal energy requires substantial technology advancement, however the engineering capability was destroyed by the Christchurch earthquake 2011. The project lies in a dormant state, however rights to testing site and technology developed to date endure.

**Shareholder and Director of Aangel Messaging Limited, 2002 – 2010**

Aangel Messaging was an I.T. start-up based on an original concept and business process. It was the world’s first successfully operating voice to text messaging service. I developed the first working prototype PC and server based service in my garage utilising modified open source software, digital recording and modified .vcd files to store text on mobile devices based on the Nokia operating system. Successful fundraising saw business grow and expand a fully commercial operating service hosted through Vodafone to 10,000 customers. Over 1 million messages were processed in NZ and over 100 million users worldwide (through provider SpinVOX) at time of sale. Patents on Aangel technology issued in America, Europe and purchased by SpinVOX Ltd., then Nuance PLC.
Other Projects Charitable

City Centre Strategy Committee TCC. City Council Infrastructure Strategy, 2008-2009  
National Jazz Festival – Tauranga NZ. President Jazz Society and Chairman, 2007 – 2011  
Tauranga Summer Arts Charitable Trust. Founding Trustee, Artweek, 2004 - 2006  
Café Scientifique. Public Outreach for science, 2005- 2011

References

Professional:  
1. Prof. Frede Hvelplund  
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Client:  
Ed Langston  
Deep Water Hydro  
Redcliffs, Christchurch.

Education


Other Achievements

1992 German Language course. Volkshochschule Salzburg.  
2006 Level One CEDIA Design.  
2008 Control 4 level 1,2,3. (Home automation design, programming and installation.)  
2013 Danish 3.1, 3.2, 3.3  
2014 Special Innovation Award -Green Brain of the Year

Strengths

• Core Competencies;  
  • Project management and business development.  
  • Renewable energy systems, Danish specific context and wider international experience.  
  • Implementing a plan via a competent, engaged and proactive team working towards common goals.  
  • Strategic planning, problem resolution for large industrial projects in renewable energy.
• Working knowledge and understanding of:
  • Danish electricity system.
  • Renewable energy resources, application and technical aspects.
  • Risk management and control, mitigation and isolation.
  • Business systems and management.
  • High level of I.T. competency
  • Environmental issues.
  • Financial analysis.

• Fluent in German language, intensive training in Danish, - wide cultural awareness
• An academic background in Earth and Physical Sciences continuing interest in IT, physical science and technical subjects.
• Strong written communications skills, competent public speaking and presentation skills.
• Business analysis and commercial acumen.