Stories of technology-enhancement in higher education – a critical approach

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Abstract

There is a large body of research on technology-enhanced learning, but questions related to the educational effectiveness of technology use still needs to be questioned. In this paper, I argue that digital innovators' stories about technology enhancement may constitute a rich source for understanding this complex educational phenomenon both in relation to teachers' daily practices and the implementation of ICT in higher education at large. Based on biographical interviews with "digital innovators", the aim of this paper is to investigate how [their] digital competence is used to enhance teaching and learning in higher education. This paper asks; how do digital innovators approach the use of ICT to enhance students' learning and what are the organisational conditions for this approach? The findings suggests that technology-enhancement is linked to nine key characteristics: different educational models, authenticity, pedagogical added values, meaningful student activities, changing approaches to feedback, assessment and connection with the outside world, as well as holistic planning, supportive leaders and strong micro-cultures. This paper proposes a more nuanced understanding of the term technology enhanced learning and suggests strategies for educational development and further investigations related to this phenomenon in higher education.

Keywords: Technology enhanced learning (TEL), digital competence, digital innovators, educational development, higher education

Introduction

The educational potentials of using information and communication technology (ICT) brings new possibilities and constraints when facilitating *or* in the facilitation of student learning. In higher education, the term technology-enhanced learning (TEL) is often used to describe the interface between digital technology and higher education teaching and the application

and effectiveness of ICT (Kirkwood et al. 2014, Bayne 2014). According to Goodyear's (2015 p. 30) definition teaching constitutes "*any activity, which is undertaken with the intention of helping somebody to learn*", thus the educational potentials of ICT may involve infrastructure, teaching related technology, and new forms of digital media. Expectations related to how ICT could enhance teaching and learning in higher education, have been clearly expressed in both international and national policy documents over the last 15 years (Fossland 2015a, NOU 2000:14, St. meld. no. 27 2000–2001, p. 8). However, findings from national surveys like the survey *ICT Monitor for higher education in Norway* (2008, 2011 and 2014[1]) demonstrate that educational development within this field is still driven by enthusiastic teachers – "lone riders" with digital competence and a special interest in using ICT. The general use of ICT in higher education is prevalent and it has been implemented with little variation to enhance student learning (op.cit). In their critical research review on how TEL is interpreted in recent literature Kirkwood and Price (2014) argue that it is often taken for granted that technologies can 'enhance learning' (op.cit). In this paper I investigate how the ways experienced and dedicated teachers – digital innovators – use ICT to enhance their students' learning – and the organisational conditions for this. In closing, I discuss whether the digital innovators' complex stories may contribute to new thinking as far as organisational requirements related to technology-enhancement within Higher Education are concerned.

Developing technology-enhancement in higher education

When referring to change and development of pedagogical practice in higher education, frequent use is made of terms such as academic development, faculty development or educational development (Taylor and Colet 2010). According to Gibbs (2013 p. 5) educational development can be defined within an institution by "the sub-set of change mechanisms in use that they are responsible for (and also, by default, the sub-set others are responsible for)". Educational development may include teachers, students, educational leaders and strategic plans – all of which are considered important points of departure when rethinking the use of digital technologies. Change mechanisms such as TEL may be defined as 'Enhancing learning and teaching through the use of technology', thereby identifying three levels of potential benefits that TEL might bring (HEFCE 2009, 2):

- Efficiency – existing processes carried out in a more cost-effective, time effective, sustainable or scalable manner.
- Enhancement – improving existing processes and outcomes.
- Transformation – radical, positive change in existing processes or introducing new processes

In their systematic approach to the various conceptions of enhancement Kirkwood and Price (2013 p. 11) identified the following desired enhancements in the research literature focusing [either] on: (1) 'operational improvement' in teaching and learning (for example, increased flexibility); (2) 'quantitative change in learning' (for example, increased engagement or time-on tasks), or (3) 'qualitative change in learning' (for example, improved reflection on learning and practice, deeper engagement or richer understanding). Kirkwood and Price (2014) also argue that many general characterisations of what technology-enhancement means are unclear and often limited to the use of ICT in itself. Technology-enhancement may be understood as "effective teaching", as defined by Fry (et.al. 2009 p. 3) as follows:

> effective teaching (and supervision, assessment, planning and so on) has to be predicated on an understanding of how students learn; the objective of the activities is to bring about learning, and there has to be insight and knowledge about learners' needs for teaching to be successful.

Technology-enhancement in "quality guidelines[1]" for online learning is often described as a one-dimensional phenomenon rather than a complex social, technological and pedagogical issue or educational driver for educational change (Fossland and Ramberg 2013). Daniel and Uvalić-Trumbić (2013) have identified the following common quality aspects regarding online learning: institutional support (vision, planning, and infrastructure), course development, teaching and learning instruction, course structure, student support, faculty support, use of technology, evaluations and student assessment and examination security. The complex fact that the use of ICT relies for instance on the teacher's pedagogical beliefs and online teaching practices (Owen 2015) as well as both students' and teachers' digital competences is often omitted. Ferrari (2013, p. 4) argues that digital competence involves five key elements: information, communication, content-creation, safety issues and problem-solving skills. Whereas these general aspects are undeniably important enhancing students' learning, the exact nature of technology-enhancement still requires specification and a more critical approach. Guidelines needs addressing the complex aspects related to students' learning processes and the way teachers facilitate their students' learning through the use of technology. As suggested by Bayne (2014) the need to investigate the term technology enhanced learning is pressing, as the instrumental assumptions embedded within the terminology of TEL. He argues that the concept has been accepted as an "apparently useful, inoffensive and descriptive shorthand for what is in fact a complex and often problematic constellation of social, technological and educational change" (op. cit. p. 5). This paper argues that technology-enhancement is in itself a complex phenomenon, and this raises the question of whether it is possible to approach it by large-scale quantitative methods.

Price and Kirkwood (2014b) argue that technology-enhancement has been a matter of debate ranging from positivist medical and natural-science perspectives to a tendency towards greater contextualisation and realist perspectives (Clegg, 2005; Hammersley, 2003, 2007; Hargreaves, 1997; Oakley, 2001). Educational effectiveness is often the focus in meta-analyses and systematic reviews of quantitative studies (Hattie & Marsh, 1996; Slavin, Lake, Tamim et al., 2011), or considered more in terms of changes in marks' (Elliott, 2001). Research based on the notion that teachers' practice cannot be approached through large-scale quantitative experimental studies, highlights the limitations associated with such approaches as they fail to provide insights into actual practice (Clegg 2005). Harvey & Green's (1993, p. 10) perspectives on quality as a complex, subjective and relative phenomenon may enhance our understanding of technology-enhancement. In the next section, we will consider the reasons why a biographical approach may be of benefit to the educational discussion as far as developing technology-enhanced learning environments is concerned.

Methods and modes of inquiry

In recent years, "the biographical turn" has comes to refer to both a growing interest of stories in everyday life and a shift towards biographical methods within social sciences. This turn reflects a tendency to embrace a more humanistic research approach (Chamberlayne et al, 2000, Alheit 2005, Fossland and Thorsen, 2010). According to Price and Kirkwood (2014 b), a range of perspectives and methods is required to reveal evidence that may provide answers to difficult questions about human behaviour. This methodology challenges positivism and its objective and scientific approach where individuals are reduced to numbers and statistics (Barababesch et.al.

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[1] Like for instance European Foundation for Quality in e-Learning[1] (EFQUEL), the European Association for Quality Assurance in Higher Education (ENQA).

2014). Oliver and Conole (2003) discuss approaches to evidence in higher education and say:

> if teaching and learning are seen as being more complex than the application of technology, this approach (evidence- based methods) becomes problematic. (p. 392–393)

While the term *life history* expresses and captures the subjectivity of a person's whole life, the term biography encapsulates the written or told account of a life, or specific parts of it (Fossland et.al 2010, Fossland 2015). The biographical approach encompasses a range of methods and theoretical perspectives which shape the way biographical interviews are conducted, as well as the analysis and presentation of the stories[2]. According to Bertaux and Kohli (1984) a biographical approach can:

> ...give the researcher access to the actor's perspective: his or her values, definitions of situations, and knowledge of social processes and rules that he or she acquired through experience (op.cit. 1984, p. 216).

General critical aspects in biographical methods are often connected to subjectivity or aspects of generalisation (Fossland et.al. 2010). The advocates of this method would argue that it has the potential to give insight into educational practices as personalised generalisations, since they help the researcher to understand the complex experiences of participants and their culture. Biographies provide unique data that unites societal, personal and relational aspects (op.cit). The approach to the interviews and the digital innovators "educational stories" was inspired by Goodson (1992, 2000), involving a special focus on their use of technology, to really dig into the complexity of how ICT was used in facilitating and supporting the student learning process. Each interview lasted around 1 hour (some a little longer), and were all conducted in Norwegian.

To select the digital innovators I used "purposive sampling" (Cohen et al., 2011) or "information-rich cases", defined by Patton (1990, p. 169) as "those from which one can learn a great deal of central importance to the purpose of the research". The twenty-five digital innovators from different universities also had the following characteristics: 1) they had long extensive experience with using ICT for educational purposes, 2) they were all *innovators* (those who love to be the first with the latest and the greatest) or *early adopters* (those who see how new technology can revolutionize practice and want to be the leaders in this revolution) (Roger's 2003). As I strategically selected them through leaders in their respective institutions, I knew some of the teachers, but not personally. One additional selection criterion was that I searched for digitally competent teachers, with a reflective and critical approach towards the use of technology in their teaching to enhance their students' learning.

These interviews provided rich empirical material that was recorded and then transcribed. After familiarising myself with the data, a number of themes were identified by coding small pieces of data with brief descriptions. The analytical categories were found through a hermeneutic approach to the biographical interviews, with some similarities with grounded theory, as the themes were typically data-driven. The themes on the teachers' practices were developed as new data were analysed. This process continued until a good fit was found between a substantive set of the coded data and the themes. In line with Haavind (2000) I searched both "lengthwise" through all the stories and "in depth" in each story to find the traits and interwoven connections in order to understand their complex use of ICT, searching for characteristics in their approach to enhance student learning. I was interested both in traits throughout the stories, but also in exceptions to see how teachers solved challenges individually. Because of my selection strategy the study doesn't cover problems "normal" or inexperienced teachers may encounter.

Findings

To answer the particular research question: *how do digital innovators approach the use ICT to enhance students' learning and what are the organisational conditions for this approach?"* I present the main findings from the analyses of the digital innovators' stories. As the chief purpose of this first article is to present the main categories, several sub-themes have been merged into larger main categories.

Authenticity and different educational modes

The digital innovators' experiences in the different blends of face-to-face-learning (so-called synchronous learning) and asynchronous learning (indicating a time lag between teacher and student interaction) emerged as an important organizational condition framing their approaches towards student learning. The overall finding in terms of 'teachers' approaches' towards technology-enhancement was the importance of different educational models and authenticity when facilitating student learning. Many of the digital innovators had experienced teaching within different educational models and they expressed the importance of different modes of context awareness and authenticity following the different educational models found in the digital innovators' stories: 1) "*The campus model*", when ICT is used in campus based settings, happening at the same time and place; 2) "*The blended model I*", characterised by the use of digital ICT suitable when the students meet only online, at the same time from different places; 3) *"The blended model II",* where students combine online meetings and meetings in person (like much vocational education where students practise in schools or hospitals); and finally, 4) *"The online model",* where students work mostly online, and "meet" asynchronously (e.g. different online educations like MOOCs). One of the digital innovators described the different dynamics and approaches to teaching and the facilitation of students learning in relation to the different educational models in which he was involved as follows:

> It all depends on what the purpose is and how the students' teaching and learning processes are organized. Sometimes I have exactly the same groups of students, but some of them follow face-to face teaching and others a blended approach. My experience is that these two groups have extremely different needs – both related to fellow students and my role as a teacher (DI$_{10-25}$)

Many of the digital innovators considered the importance of authenticity – especially in their online university teaching – with regard to the students' personal engagement, and their academic development and studying in an academic fashion. This is in keeping with Kreber (2014), whose book "*Authenticity in and through teaching in higher education*" explores the particular engagement required by teachers in their teaching in order to foster the students' own authenticity and autonomy, when they did not engage with the student in face-to-face settings. The digital innovators' move towards greater authenticity involved for instance the promotion of personal and authentic elements into their use of ICT, thereby involving and engaging the students personally in their approach to the learning process.

Another finding related to blended models was the perceived importance of creating a safe learning environment, namely an environment where students could speak up and participate as learning partners and gain reciprocal respect. Although the active presence of teachers at all times was by no means essential, the facilitation of personal connections between the teacher, students and fellow students, proper instructions for collaboration, rules for communication, and contributions appeared to be important. One teacher describes the facilitation of a blended learning model in business as follows:

> Students need clear instructions, support and examples on how to behave in an online learning environment. The collaboration does not happen automatically. They need to "break the ice" quickly to have a constructive

collaboration throughout the year. I facilitate a group-discussion on different "prototypes" concerning online students' behaviour so the students reflect on the importance of their own contributions as students – as a starting point to create their own rules (DI$_{11\text{-}25}$)

Nearly all the teachers with students in blended models pointed out the impotence of social presence when it came to the teachers' role (engagement, personal/ authentic attitude, engaged in sharing and caring). Some reported different needs among different student groups in terms of age, experiences and sometimes gender. For instance, different needs related to groups with young students or older students following a blended educational model later in life. The latter group were more experienced as far as understanding working life and practical examples were concerned, but less confident when it came to studying in an online learning environment. They needed a more clearly defined presence and instructions from the teacher (especially at the beginning) to feel safe and efficient in their studies. The findings suggest that other students in blended models (with younger students) coped with the need for belonging and social presence with others through the teachers' facilitation of social networks, like Facebook;

I create a closed Facebook group for all my student groups. They even get the address for this group before they meet physically and I explain to them why I think the social dimension is important. The result is that before I talk to them the first time, they have already communicated and shared a lot about their expectations and personal information about themselves. I find this very useful (DI$_{7\text{-}25}$)

Some teachers indicated that publishing a filmed personal comment every week sufficed to make the students feel professionally motivated. This activity also allowed them to benefit from a sense of belonging through some personal comments from the teacher. In MOOCs, authenticity and social presence were approached in a completely different way. The teacher was important, but it was also essential that the flexibility needed by many students within this educational model was addressed/taken care of (Fossland 2015a). One teacher sums up his role as a facilitator of the students' learning in a MOOC as follows:

Every week we videotape a session, specially made for students who want to follow some sort of progression. Here we commented and summarised the weekly theme and activities as well as introducing the following week's theme and steps in their learning process. This gave the students a feeling of the teachers' social presence that was not at odds with their need for flexibility (DI$_{16\text{-}25}$)

The quote illustrates that the sense of belonging and authenticity is also seen as important in relation to MOOCs – students in this educational model both needed to be included with others as well as being independent. The stories also narrated teachers with experiences from MOOCs with a very loose connection with the students, characterized only by delivering content and automatic tests to the students, without any contact between the teacher and the students. The dropout rates of these models were glaringly obvious. This illustrated how social presence was important in all four educational models – including the most independent and flexible ones – even though the facilitation varied in very different ways. Whether flexibility was important and the constructive way the students' learning outcomes were achieved depended largely to a real extent on different student groups. The findings demonstrate the importance of authenticity and social presence, as this must be seen in relation to the actual educational context, and the need for communication, belonging, and interactivity in the different educational models identified in the stories.

The importance of pedagogical and academic added value

One of the primary findings in the digital innovators' stories is that they do not use ICT without a clear motive. There has to be a clear pedagogical or academic value or purpose added. The stories revealed diverse empirical examples of the use of ICT to enhance teaching and learning when it promoted stimulating and challenging examples or tasks, variation, new possibilities for exam revision, student engagement and preparations. Even though the use of ICT facilitated involvement, taking control of the learning process and motivation – that also had the potential to "move" and challenge the students' academic development and learning – this was only a part of the picture. Even if pedagogical and academic added value was the goal solid planning was required and challenges had to be faced. One teacher expressed as follows:

> Today, the new challenges within higher education with unmotivated students, large classes and students that are used to being entertained, the use of ICT can give great assistance to stimulate and challenge the students in flexible ways (DI_{19-25})

Another finding connected to pedagogical added value was related to effectiveness, in terms of ICT enabling the teachers to devote more time to pedagogical approaches. Examples of this are students taking automatic digital tests to identify their own weak spots before meeting with peers, and flipped classroom models, where working on the learning material in advance frees up classroom time to be spent on problem solving or engaging in discussions with fellow students. One of the teachers put it like this:

> When I use flipped classroom I feel that I "save time". I know what the students find problematic and I always send out some filmed material before I meet the students in class. The ones who need special support to understand complicated content can read through my introduction several times or do their own preparation before we meet. I use this to support the students' approach to difficult topics in their reading, or to give them an overview, or just to motivate or inspire them before they meet (DI_{2-25})

This quote illustrates that flipping the classroom is more time effective as well as having the potential to improve existing processes and outcomes and creating positive changes in existing processes (HEFCE 2009 2). Several of the digital innovators said that when they used ICT to flip their classroom (use ICT to develop the students' understanding before they arrive), they could use time in class to solve problems, discussing and enhancing their students' knowledge. Fulton (2012) reports that the flipped classroom has the potential to provide students with greater control over their learning processes, provide teachers with more information about students' problems and approaches to learning – as well as increasing their engagement, interest and learning outcome. My data do not provide information about the students' learning outcomes, but the digital innovators expressed the importance of facilitating it. Fulton (op.cit) also mentions challenges related to for instance insecure students, those who do not prepare, or those for whom working alone is problematic.

When the digital innovators use the principles of the flipped classroom to present for instance difficult concepts or topics before they meet the students for discussion, they argue that the pedagogical added value of using ICT also encourages the students to start their own reflections and understanding. Many of the digital innovators also underlined the importance of flexibility and the value of sharing. According to one of the teachers:

> The most important thing is that the use of ICT increases accessibility and flexibility – they can approach the content and challenges whenever and wherever they want. When using online discussions you need to follow some clear instructions concerning requirements for the discussion, for instance how long and original the students' contributions should be – you can get some really good, prepared discussions shared among the students (DI_{10-25})

As the quote illustrates, digital innovators use ICT to facilitate a more active learning process. Also in the case of asynchronous tasks, the intention is to facilitate the students' growth and their capacity to study efficiently, but in order to succeed discussions must be well prepared and planned. Another finding in relation to how ICT could enhance student learning was the importance of challenging [their] students as creators rather than consumers. To promote more active forms of student learning, such as inquiry-based, problem-based, and more authentic approaches to learning, some of them used for example social media or filmed cases as a starting point for critical discussions. This could potentially facilitate a more authentic and active approach to the student's academic journey. Many of the digital innovators stated that social media is changing the way people interact, present ideas and information, and judge the quality of content and contributions. Some of the digital innovators found for instance wikis to be a perfect way of facilitating the creation of the students' content. As one of the digital innovators observed:

> It's all about taking part, being involved and taking charge of your own learning process. I use wikis in nearly all my language courses – and find this as an excellent way for facilitating the students' development of their own understanding. They use language through creating their own knowledge production together with others in different kinds of wiki communities (DI[7-25])

The digital innovators state that blogs and social media provide new arenas in which students can express what they have learned, get feedback from others by using different digital tools to underline their message. Many of the digital innovators argued that content creation strengthens the students' sense of ownership of their own learning process. By using ICT to enable the students' learning through creating and editing their own content, many of the digital innovators underlined the potential to encourage students' commitment to their own creative process in order to develop their own "academic voice" (Fossland 2015b). ICT was also used to solve didactical and motivational issues in large classrooms. One of the digital innovators used social media to engage 350 students in a marketing class. One task involved taking a picture of their view of one marketing challenge and to post it on Instagram:

> As a teacher it was easy to show all the students' images to the whole group, and make them proud of their contribution by asking and commenting on their own "products". This is an excellent starting point for involvement and discussion – as well as easily providing me as a teacher with a lot of relevant examples from real life. It's a win-win situation (DI[19-25])

Many of the digital innovators provide different examples of student activities and content creation to facilitate active learning processes. The aim is to allow students to participate through problem-solving, dialogue, actions and reflections, rather than acting as passive recipients of knowledge. The present findings demonstrate that technology-enhancement is concerned with a number of ways of challenging students' practical-theoretical understanding, sharing knowledge, and working more effectively.

Changing approaches to feedback, assessment and connection to the outside world

Issues of assessment and effective feedback are significant in the digital innovators' stories. Whitelock (2010) cites different examples of using web 2.0 in assessment, ranging from multiple-choice polls to approaches involving the use of e-portfolios. The digital innovators' stories demonstrate that the use of ICT gives them not only an opportunity to follow their students' learning processes more closely, but also to assess other parts of the students' knowledge, skills, and general competences. The digital formats makes it easier for them to facilitate peer-assessment, written assignments, net-based discussions, essays, net-based quizzes, multiple choice questions, collaborative work assignments, debates, and digital e-portfolios for summative or formative purposes. Some of the digital innovators used feedback before,

during, or after their teaching sessions to test, raise the students' consciousness about a topic or the especially difficult aspects of a topic – to give both themselves and the students a sense of what they need to prepare. One of the natural sciences teachers put it as follows:

> I use Learning Analytics before every session with my students. It gives me vital information on how I should organise my teaching so I can give the students the very best help. I need to know what they struggle with, and how they respond to the challenges I give them before we meet – to prepare myself (DI$_{3\text{-}25)}$

Following the students' activities and progress more closely *would* also allow digital innovators to receive a lot of feedback during class. ICT was used to get feedback, initiate discussions in class (peer, group, or plenary), challenge the students' thinking, illustrate different opinions, or to give students opportunities to reflect on their own learning. Using technology also facilitated a closer connection with the students in the case of some of the teachers, as it made it possible to reach out to every one of them quite easily. In line with Hattie (2008), the digital innovators argued that feedback combined with effective instruction may be a powerful tool for enhancing learning. One teacher who used video feedback for written assignments explained it as follows:

> I give the students a five-minute filmed comment on their texts using the freeware program Jing. The students like to get personal feedback at the same time as they can see their text and hear my comments as we go through them systematically. I save a lot of time as I do not have to write all my comments, and the students can listen to my comments several times. They get time to think things through and can contact me if anything is unclear (DI$_{24\text{-}25)}$

This quote demonstrates how the use of ICT can enhance learning and save time. Many of the digital innovators consider their provision of timely and expert feedback to the students as significant for (a significant stage in) the student learning process. The stories of the digital innovators also demonstrate how the use of ICT opens up new possibilities for rethinking the role of assessment, since technology provides an opportunity to test a whole raft of students' competences. One of the digital innovators gave this example:

> In the first part the students were given randomized questions in a multiple choice test, where the students' had 30 minutes before it closed – without any supporting material. In the next part they discussed theory, and were allowed to use any supporting material for 1½ hours. In the last section, they were supposed to watch and analyse a videocase. The point was to observe, analyse and apply theoretical and practical knowledge, skills and general competences (DI$_{14\text{-}25)}$

Digital innovators who used ICT to assess broader aspects of the students' learning outcomes reported that changes in both formative and summative assessment had also altered the way the students prepared and approached their studies throughout the term. This finding is in line with Havnes (2002) and Boud and Falchnikov (2007), who argue that assessment is one of the main determinants of how students approach their studies. For this reason, they see assessment methods as being of prime pedagogical importance. The stories of the digital innovators demonstrate that ITC had the potential to change assessment methods that enhanced the students' learning as well as it making it more effective and efficient compared to the previous traditional assessments they used earlier. They had an opportunity to enhance the students' learning through assessing broader aspects of what they had learned.

Another important finding concerning the way digital innovators use ICT to enhance the students' learning is how this opened up new possibilities to encompass relevant workplace elements or connect the students to the outside world. ICT allowed them to a) connect students with researchers, staff or

employees from outside the institution, b) facilitate and use available digital learning resources and authentic digital material relevant from other universities or workplaces, c) use social or other forms of media to address and facilitate or illustrate current topics in ways that had the potential to stimulate the students' development as society-oriented academics. As expressed in one of the digital innovator's stories:

> There is a need to connect with others and the way things work in "real life". The students are motivated by authentic problems, people or workplaces. For me the goal is that they should feel they can use what they have learnt at university once they leave. They also need to be prepared for the digitalized society (DI$_{17-25}$)

As the quote illustrates, workplace relevance is also a matter of developing digital literacy and the requisite skills for the 21st century with the potential to enhance the students' thinking, flexible problem solving, collaboration and communication skills (Ferarri 2013). In line with Barnett (2004), many of the digital innovators wanted to prompt students to think more broadly and they used ICT to connect them to the outside world, since the students felt the need to belong and to build relationships relevant to their lives after graduation. The provision of new ways of collaborating stimulated the sharing of resources, new forms of national or international collaboration by means of, for instance, relevant networks, key academic personnel or other relevant staff having the potential to enhance the students' learning were all considered to be important aspects. In line with Fossland (2015b) this gave rise to new arenas where students could train their own academic voices. Some teachers encouraged students to participate in networks such as Twitter or Facebook, where the teachers exercised no or only limited control, as they saw it as way of opening students' minds. Moreover, it was considered to be a potentially effective way of enhancing students' communication skills and their ability to relate.

Holistic planning, leadership and the lack of strong micro cultures

When answering the question: "*how do digital innovators approach the use of ICT to enhance students' learning and what are the organisational conditions for this approach*", several findings were related to the importance of planning, leadership and the development of strong micro cultures. The planning aspects included the different aspects considered, such as the importance of authenticity/social presence, pedagogical added values, workplace relevance as well as feedback and assessment. However, these all need to be created within a balanced work. In line with Biggs and Tang (2011), many of the digital innovators were interested in the alignment between formulating student learning outcomes, learning activities, assessment methods. This can also be connected to what Mishra and Koehler (2006) calls holistic planning, that technology, content and pedagogical knowledge should be considered together when facilitating the student learning process. In other words, when facilitating the student learning process it is of paramount importance that content, technological and pedagogical knowledge are considered together:
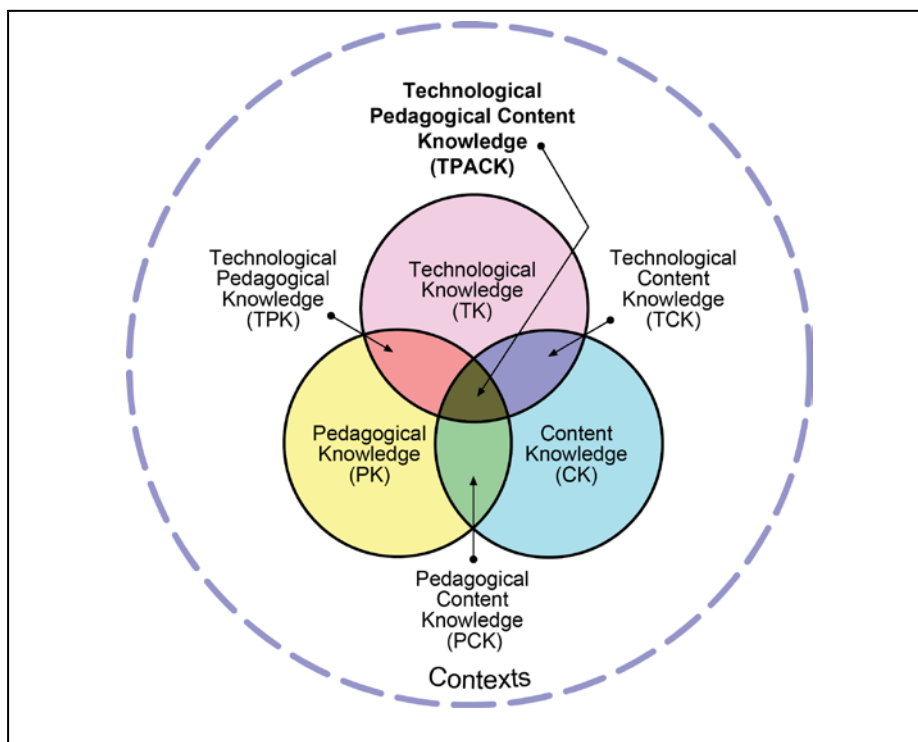
Figure2: TPACK by tpack.org

Common aspects of quality, such as institutional support (infrastructure/ICT-support), continuous course development, clear teaching and learning instructions, clear, motivating and intellectually challenging course structure, and sufficient use of technology were seen as important. Other important aspects highlighted by several of the digital innovators included plans for continued evaluation, student assessment, and examination security. One teacher had the following comment:

> It's important to think of the whole situation for a student – to understand what the students need from day one until they finish. This requires a holistic approach – and that teachers share their experiences so they can learn from their evaluations and challenges all the time (DI$_{9-25)}$

Even though the digital innovators were knowledgeable, motivated and autonomous ICT-users, several of them mentioned the importance of faculty support. They also revealed that there was a lack of what Roxå and Mårtensson (2011) call strong micro cultures, namely a group of people working together on an academic project. This means that the digital innovators often operated as "lone riders" when it came to the planning of how to use ICT rather than in a collaborative spirit with colleagues. Some of them stated that the lack of concrete work on strategic plans for teaching and learning at their own institutions often represented a stark contrast to the stated aims of their institution related to teachers' and students use of ICT at large. As far as their everyday teaching was concerned this seemed mainly a matter of private reflection. Roxå (2014) and Mårtensson, (2014) demonstrate the importance of micro-cultures as a starting point for systematic academic development at the organisational meso-level, and suggest increasing the number of significant relations within and between micro-cultures as an effective strategy for academic development.

Technology-enhancement as a complex educational phenomenon

In this paper I have questioned the large body of research on technology-enhanced learning, and demonstrated why this concept still requires further consideration. The findings have revealed how digital innovators' stories about technology enhancement can provide a rich source for understanding this complex educational phenomenon – both in relation to teachers' daily practices and challenges related to the implementation of ICT in higher education at large. The findings suggest that technology-enhancement may be linked to the importance of nine key characteristics: authenticity, different educational models, and pedagogical added values, meaningful student activities, changing approaches to feedback and assessment, connection with the outside world, holistic planning, supportive leaders and strong micro-cultures. This explains why technology-enhancement should be understood as a relational and complex educational phenomenon.

In line with the systematic approach to conceptions of TEL which Kirkwood and Price (2013 p. 11) are exponents, the digital innovators' stories also revealed how existing teaching and learning processes carried out had the potential to improve existing processes and outcomes a more time effective, sustainable manner when using ICT. This might involve 'operational improvement' in teaching and learning (increased flexibility); 'quantitative change in learning' (increased time spent on collaborative tasks, assessment possibilities), or 'qualitative change in learning' (for example, improved reflection on learning and practice, deeper engagement or richer understanding). The interviews also demonstrate the possibility to move beyond learning and address students as individuals and people honing their intellectual skills and future members of the workforce. However, the main massage to emerge from the findings is that technology-enhancement is not to be taken for granted, as the assumptions in this concept suggest. It is all too easy to describe (TEL) as the interface between digital technology and higher education teaching and the application and effectiveness of ICT or just to define it as effective teaching. The use of technology cannot 'enhance' learning or ensure that learning is taking place just because technology is involved. If students' learning is to be enhanced - or if students are to move beyond learning - hard work, planning, dedicated and digitally competent teachers and students are required. These findings support Baynes' (2014) argument that there is a need to revisit the term itself as well as the instrumental assumptions embedded inherent in the terminology of TEL.

Further, the findings demonstrate the need for educational development, leadership involvement and educational strategies to increase teachers' use of ICT. In the introduction to this paper, I argued that in order to promote technology-enhancement through ICT we need to radically rethink educational development. Recent research has shown that unless individual effort is supported by an organization educational development is unlikely to occur (Fanghanel 2012). Leaders need to support and value not only digital innovators, but also the development of teaching and the implementation of change. Leaders at all levels appear to be important –including both heads of departments and leaders of institutions and programmes. The findings indicate that several levels of leadership and educational development initiatives within higher education must be involved. These aspects require further investigation. The institutions' approach to the involvement of leaders at all levels seems important as well as addressing strategies for teaching and learning within the organisation. These findings indicate that there are further avenues to explore. Thus, in order to enhance student learning a more systematic approach to the use of ICT seems essential. There is also a need for in-depth studies on educational leadership and knowledge regarding the way strong micro-cultures might strengthen a systematic approach to educational development and the use of digital technology. Although not all teachers will wish or have the chance to become digital innovators, the findings in national

surveys and digital innovators' stories, indicate the need for effective leadership, strong communities, and motivation to develop "normal" teachers approaches to ITC to enhance their students' learning. It is possible that the digital innovators' stories and the above-discussed aspects related to technology-enhancement may contribute significantly to a more systematic approach to the use of ICT. In order to reveal further organisational requirements additional research into the subject is required.

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[2] For instance the Chicago-school and symbolic interactionism (including "Grounded Theory", Strauss 1987, Strauss and Corbin 1990, 1998; German phenomenology (Schütze), Ffrench structuralism (Bertaux 1981) and poststructuralism (Foucault 1982), sociology (Mannheim 1952), cultural studies" (Wengraf, Chamberlayne and Bornat 2002) and the Bbritish interpretative methods (Roberts 2002, Wengraf, Chamberlayne and og Bornat 2000), to mention a few sources of inspiration.