

Digital leap of teachers: two Finnish examples of rethinking teacher professional development for the digital age

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Digitisation and modernisation of education are central objectives in educational policy. This challenges to rethink teaching methods and update teacher pedagogic expertise. This article examines how two Finnish vocational education institutions are supporting transition of teacher professional development to the digital age. The comparison identified similar elements of success and areas for development. Strategic planning and leading of development for a digital leap is the starting point for success. Wireless connections must be universally available to enable use of one's own devices (BYOD). However, the key change factor is teacher transformation. Digital technology has led to professional development models being in a state of transition. Traditional face-to-face methods are not enough to modernise teacher competences. Peer learning, teacher-initiated collaborative development, online training, and use of learning badges will be key methods in teachers taking a digital leap. A promising practice is student-teacher partnerships to change practices for the digital age.

Keywords: digitisation of education; teacher professional development; digi-pedagogical competences; pedagogical and technical support; trial culture; peer learning; learning badges

Introduction: Digitisation of education

Digitisation of education is again a focal point of education development. Faster modernisation of teaching and learning methods is a key recommendation for developing the Finnish higher education system in the report of the International evaluation group (23.3.2015) commissioned by the Ministry of Education and Culture (MOEC, 2015). The significance of digital technology is also emphasised in Finland's new government programme. Finland aims to be a country characterised by a continuous desire to learn something new, with modern learning environments, and full deployment of digital education and new pedagogy affordances in learning (Ratkaisujen Suomi, 2015). The reason for this investment in digitisation is that the use of ICT in teaching and learning has not expanded as expected. Sitra's report (2015) shows that in Finland we continue to educate for a bygone world, while an EU study (ICT in Education 2013) reveals that Finnish schools have the lowest information technology utilisation rate in Europe. Finland is an underperformer in the uptake of new digital solutions in Europe (Sitra, 2015). The significance of digital technology in education has not been understood profoundly enough and there is little time left to react.

What does digital mean in an education context? Digitisation of education as a term and trend is seen as something that meets contemporary needs, but the term is cumbersome and often understood too narrowly. Therefore, it is necessary to consider how the term digital should be understood in the context of meeting an educational organisation's goals. Ryymin (2015) observes that digital in an educational context can be defined broadly or narrowly. She argues that defining digital as *broadly* as possible helps an educational organisation understand how it changes the world. Defining the term *narrowly* as part of an organisation's everyday operations helps substantialise what it means in practice (Ryymin, 2015). Ryymin (2015) analyses digital to refer to pedagogically meaningful tools and applications, or in the broader educational ecosystem, an experimental culture that enables open knowledge and the sharing of knowledge. She argues that the most important starting point for digital services is client-orientation and correspondingly in digital education learner-centeredness. Häll and From (2014) in their examination of digital education employ a pedagogic digital competence concept, by which they mean the teacher's approach and ability to design, deliver

and continuously evaluate the delivered education using digital technology. This is informed by theory, contemporary research and experience, and its purpose is to create an effective learning environment in the best possible way. The teacher needs to be able to manage content, and pedagogic and digital competence. Enhanced and improved educational practice through digital technologies is one of the main features of pedagogic digital competence (Häll & From, 2014).

What does digital pedagogic competence look like in the light of current knowledge of Finnish vocational basic and higher education? According to Lampelto (2015), digitisation is already very evident in vocational basic and adult education strategies. However not every education provider has a digital education strategy. Digitisation of education has high status in development work and its benefits include achieving more flexible operational methods, cost effectiveness and increased learning motivation. Challenges include attitudinal factors among the staff and high initial investment costs. Teachers' attitudes towards digitisation are generally considered fairly neutral. Lampelto's research indicates that digital competence of senior management, teaching staff and support personnel is at a good level, but greater investment into staff training continues to be necessary. Digital learning material, e-courses and social media are already utilised fairly extensively in vocational basic education. The objective is to increase online education, use of cloud services, develop learning environments, and increase use of mobile devices and the number of development personnel (Lampelto, 2015). Kullaslahti, Karento and Töytäri (2015) studied self-evaluations of teachers' digital pedagogic competence at three universities of applied sciences. Teachers primarily used digital technology in instructions, delivery of material and as a support in contact teaching. The lowest use of digital technology was in delivery of completely online courses or in RDI ventures implemented together with students. Some teachers worked in networks and had adopted this as an everyday practice. Kullaslahti et al. stress that the cornerstone of pedagogic competence is a comprehensive picture of the solutions and operational methods of digital pedagogy. Their research indicates that teachers feel they lack sufficient competence to produce quality pedagogic digital learning material and online solutions. Teachers continue to require digital pedagogy competence development for them to utilise diverse pedagogic approaches and develop competence based curricula (Kullaslahti et al., 2015). To develop competence both at basic and higher levels, it is increasingly necessary to focus also on developing working-life oriented learning solutions in authentic learning environments, in which learning occurs collaboratively between students, teachers and representatives of working-life (cf. Leppisaari, Kleimola, Maunula & Hothenthal, 2012).

Ryymin (2015) concludes that all in all digitisation of education requires complex factors and economic investment, for example, technological infrastructure, user-friendly services and new competences. The examination in this article focuses on new competences by considering the effective factors of and especially the operational models that support transformation of teacher competence, the 'digital leap', as a whole.

Theoretical views in rethinking transformation of teacher professional development for the digital age

The digital age requires new models of teacher professional development. Below previous studies will be used to analyse from a professional development viewpoint the factors that affect education digitisation. Digitisation of education refers to changes in culture, operational practice and engagement (OPH 2014). This requires firstly strategic leadership of pedagogic competence in an educational organisation. In examining institutional factors which impact adoption of new technologies in education, Phillips (2005) argues that an educational organisation needs to focus development efforts on three key areas: policy (strategic processes), culture (collaboration, motivation) and support (professional development, IT support) in order to attain results in educational innovation. He emphasises that major factors affecting adoption are, however, human and these can only be addressed through effective leadership and change management (Phillips, 2005). Correspondingly Lampelto (2015) stresses the importance of the teaching staff's commitment to the design and delivery of new operational models that utilise education technology. In addition to technical skills, commitment to digital education requires changes in ways of thinking and understanding, and operational practices (see Kullaslahti et al., 2015). Teaching and learning methods must be modernised to meet 21st century skills (ATC21S, 2011) and requirements, with particular attention paid to innovative educational practices. Digital competence of students already, on average, exceeds that of a school's operational practices, setting greater demands on teacher competence requirements and pedagogy. This challenges teachers to update pedagogic expertise, their way of thinking (innovation, problem-solving, learning to learn), ways of working (cooperation, team work)

and management of digital tools (cf. ATC21S, 2011).

Research indicates that the digipedagogic competence of teachers can be considered the key question in a successful digital leap. Digitisation irrevocably changes teaching. Merely bringing technology into a school is not enough; rather technology must be used to change practices and learning. This is a question of pedagogy, not devices (Sitra 2015, 12). What operational practices best support attainment of the new competence raised above? Traditional continuous education models are not considered viable solutions in bringing teachers' competence into the digital age (Leppisaari, Vainio & Herrington, 2009; Kronqvist-Hakola et al., 2015; Teräs, 2014). Brooks and Gibson (2012) conclude that the greatest challenge in teacher professional development has been determining what professional development experiences are most effective for improving teaching and learning. The catalyst for the transformation of education may lie in reimagining professional development as professional learning in a digital age (Brooks & Gibson, 2012). Without changes to the fundamental pedagogical models by which teachers teach and learners learn, technology investments have too often focused on the reproduction of existing content knowledge (Fullan & Langworthy, 2014, 30). The digital leap is promoted if professional development provides teachers an opportunity to experience a new kind of learning partnership both among themselves and with students, and the creation of new knowledge and its purposeful use in authentic contexts is central in their learning processes (cf. Fullan & Langworthy, 2014, pp. 310-311; McLoughlin, 2013). Murray and Zoul (2015) found that personalised, 21st Century professional learning strategies empower teachers to take ownership of their professional learning. Via these kinds of strategies education providers confidently learn to build a values-driven school culture, personalised professional roadmaps, and a collaboration-minded staff (Murray & Zoul, 2015).

Teacher professional development for the digital age must be integrated into everyday tasks in authentic learning environments (Leppisaari et al., 2009). Ingvarson et al. (2005) concluded in their study that it is not enough to provide well-designed professional development programmes from outside the school. According to Teräs (2014), earlier research has indicated that successful and transformative professional development is not isolated one-time workshops but collaborative and reflective long-term developmental endeavours that are seamlessly integrated into teaching practice. A good professional development programme engages teachers actively in reflecting on their practice, in identifying specific areas for development, and provides opportunities to test new teaching practices (Ingvarson et al., 2005). The relative success of programmes also depends on the extent to which they are extended in time, and planned so that they include activities that strengthen interaction and collaboration in the school (Brooks & Gibson, 2012). In order to change practice, professional development must also be ongoing, sustained, intensive and supported by modeling and coaching, it must allow educators to see and share their own and student work reflectively and collaboratively, and foster a supportive and inspiring environment for testing new teaching and learning ideas (Ingvarson et al., 2005). When teachers are able to experience a more personalised approach to learning that incorporates contemporary technologies and makes authentic connections to their practice they are more likely to take up a similar approach with their students (Brooks & Gibson, 2012).

Collective peer learning and development among colleagues has in fact been seen as a way in which permanent changes are effected in an organisation's learning and operational cultures. Le Cornu (2005) defined peer mentoring as a collegial, interactive and ongoing sharing of knowledge, experiences and support. This allows individuals to function flexibly, situation-specifically in both the role of learner and teacher. In an organisation, peer learning requires a new kind of operational culture and leadership practices (Leppisaari, Meriläinen, Piispanen & Pulkkinen, 2015; Rongas et al., 2013). McLoughlin (2013) argued that while expectations about digital education have run high, the impact of social media and digital tools in teacher professional learning has been rather limited. Digital methods do, however, enable peer learning and learning to be made visible in professional development. A new kind of learning partnership between teachers, students and working-life representatives is also seen as a pedagogic starting point of digital learning. (Fullan & Langworthy 2014, pp. 310-311). Healey (2015) called for student inclusion in teaching and learning partnerships and their development, which is often forgotten in the peer learning dimension and affordances.

The fundamental issue in digitisation of education is the change process of pedagogic operational culture. Change needs to occur simultaneously and be process-based in leadership, technology, teaching and learning. From the above review it can be concluded that in creating opportunities and

supporting teachers in the transition of teaching into the digital age, four interlinked dimensions need to be taken into consideration. These are strategic leadership in the transformation of learning culture, use of digital technology and learning spaces (infrastructure, devices, facilities), supporting teaching transformation, and encouraging and providing time for peer learning.

Comparison of two cases - four factors in transforming teacher competence for the digital age

This article is a comparison of approaches taken by two institutions to digitise education in Finland. We examine from the viewpoint of teacher professional development how a school is taken into the digital era and what kinds of actions can support transformation of teacher competence. The foci of examination are the actions taken in two Finnish vocational education institutions: one institution represents vocational basic and adult education and the other vocational higher education. In this paper we describe the solutions and operational models these institutions have implemented to support professional development for the digital age, and consider the associated challenges and affordances. Concurrently we analyse the factors which impact education digitisation and compare these from a professional development perspective. The aim is to use two cases to increase understanding of "teachers' digital leap" as a phenomena by highlighting and identifying related factors and processes which promote or impede the leap (cf. Denscombe, 2010).

Below we briefly introduce the educational institutions in our comparison and present a concise history of ICT use for teaching purposes at our case schools. The focus will however be on describing the actions taken in recent years in digital competence development.

1. Omnia (<https://www.omnia.fi/international-omnia>) was established to serve the VET needs of people of all ages in three neighbouring cities: Espoo, Kirkkonummi and Kauniainen. Espoo is part of the capital region with a population of over 265,000, most of whom live in the inner urban core of the Helsinki metropolitan area. Omnia has become a pioneer and a catalyst for aligning teaching, learning and digital and other technological solutions to changing classrooms and what goes on in them. In its vision, learning can happen anywhere, be personalised and linked with social learning, cooperative learning, problem-solving and development. Omnia is a regional education development centre with five campuses and 860 staff serving around 50,000 students and learners (10,000 of whom are VET students). Omnia's services include e.g. the following: 1) An upper secondary vocational school, 2) Vocational adult education and training, 3) Apprenticeship training, 4) A liberal adult education centre for open studies, and 5) A general upper secondary school for adults. Omnia challenges its own staff, and its students to step outside their comfort zones and embrace 21st century learning solutions. Omnia's vision of the future is that it will be digitised and continually require new knowledge and skills and new forms of teaching and learning anywhere and everywhere in both formal and non-formal settings.

2. Centria University of Applied Sciences (<http://web.centria.fi/Default.aspx>, further Centria) is a multidisciplinary, dynamic and international higher education institution, offering its students and staff an environment that is innovative, caring and multicultural. Centria is a small higher education institution in Western Finland, with 3 000 students and 250 staff members. It provides student-centred teaching and learning with plenty of practical experience. Centria offers degree programmes in five different fields: Technology, Business, Social Services and Health Care, Culture and Humanities, and Education. With over 500 international students from around 40 different countries, internationalisation is one of Centria's core values. Centria profiles as a working-life oriented school supporting development of the region's business and working-life in accordance with their needs (Centria's Strategy 2020). Averko eLearning Centre (<http://www.averko.fi/eng>) began in 1997 as a collaborative network and is today a part of Centria, and its operation supports the objectives of Centria's Strategy 2020 to develop innovative learning environments. Averko's 18 years of experience in both producing and conducting online education and R&D is of national significance. Averko offers nearly 60 online courses from different fields with over 200 credits, and over 60 teachers act as tutors on these courses. The main foci of Averko have been the following: coordinating online education at Centria with our degree programmes, staff pedagogical development, and active online pedagogical R&D. Authentic learning which meets the challenges of future working-life, utilises digitisation and crosses boundaries is developed at Centria.

Below we will compare the solutions and operational practices of Centria and Omnia in transforming teaching for the digital age based on the perspectives introduced in the theoretical examination above. The transformation landscape will be shaped on the basis of four dimensions arising from the theoretical literature on teacher professional development. These are: 1) strategic leadership, 2) technology, 3) teaching and 4) peer learning (Fullan & Langworthy, 2014; Phillips, 2005; Brooks & Gibson, 2012; Murray & Zoul, 2015; ACTS21; Ryymin, 2015).

Case 1: Omnia

1. Strategic leadership

Omnia has purposefully invested initially in developing online education and ICT skills and later in the development of mobile learning. Digital education has been rigorously developed at Omnia through further education for teachers and pilot ventures. The underpinning principle has been the learning-by-doing method, in which digital technology supports learning and helps construction of an authentic learning process. In the initial stages the focus centered on developing basic skills in online education and ICT, but gradually shifted more towards utilisation of social media and mobile devices in teaching and learning. The starting point has been activating students as producers of knowledge and creators of new solutions, which has also changed the role of the teacher into guide and activator. Work based learning methods have been developed in development projects, in which cooperation between working-life and school have been integrated and new technology utilised. In addition to educational institutions, working-life initiated studies are delivered at the workplace or genuine problems derived from working-life are resolved, thereby learning not only vocational competences, but also how to utilise technology and develop 21st century skills important for working-life. Work based learning motivates students. Omnia is endeavouring to move from pilots to a comprehensive change in its operational practices and the digital plan drawn up by the entire staff during 2014 will be rooted into the organisation's activity with systematic, pedagogic and technical support. Digitisation is strongly present in all Omnia's strategies and in addition to actual digital developers, the ICT unit, HR unit and pedagogic support staff are engaged in development work. Digital technology is not a discrete area of development, but part of everyday activity. Additionally Omnia's strategic actions involve including students as digital-support for students and teachers, and constructing a learning material bank and a library to support teachers in the development of digital education.

2. Technology

At Omnia wireless connection capacity has been strengthened and cloud services have been taken up (Office 365 and Google Edu) to support the use of modern learning environments and devices in teaching and learning. Teachers and administration staff use Office 365 software in their daily tasks, but teachers are able to incorporate any tools they wish in their teaching, for instance Google apps.

Online degrees and blended learning use the Moodle online environment, and Adobe Connect online conference system. Various social media networking tools are also used. Omnia provides all teachers with a laptop and smart phone. Teacher in-service training has improved teachers' abilities to use various apps. Teachers are not provided tablets, but a limited number is available for class use. These can also be borrowed for teaching purposes through the library.

3. Teaching

Omnia develops digital skills through continuous education. Omnia's digital support organises digital skill workshops every Tuesday afternoon. Half of each session is spent introducing the selected topic and half in practice. Teachers can come to the Tuesday workshops to ask for advice, even though their questions may not relate to the topic-of-the-day. Several trainers are present at each session, ensuring adequate guidance. The first Friday of every month is digital skills day. The digital team is available for nonstop support and degree programmes or teacher teams can invite a support team to their own unit to help in practical teaching problems. Furthermore, training in various development ventures related to topical themes such as digital learning environments, the use of game thinking and game mechanics in solving problems, mobile learning, entrepreneurial teaching and learning, and 3D printing are organised. The design thinking approach, which starts from a teacher's everyday needs, and not the views of pedagogic support staff or instructors, is used in the gathering of pedagogic support material accumulated through pilots.

Teachers can also gain competence required for the digital leap through various externally funded and internal development ventures. These externally funded ventures are often collaborative projects

between other VET schools and the corporate world reflecting the school's current development strategic needs. Participating fields of study and teachers are agreed on with degree programme heads in the project planning stage. These ventures are 2-3 years in duration. Internal development ventures are systematically called for twice a year and involve teacher teams submitting proposals on how to develop their teaching. Ventures are selected from the applications applying the following selection criteria: the venture involves cooperation, develops new innovative teaching methods and results are disseminated within one's organisation and beyond. In 2014, 12 ventures were executed at Omnia. Ten new trials were initiated in spring 2015 and a new round of applications will be called for in autumn 2015. Not only have these teacher-initiated pilots motivated teachers to develop skills, they have also served to develop new pedagogic and technical support models, and forms of education. Critical issues and areas of development in digital skills have been identified through the pilots.

4. Peer learning

Peer learning methods at Omnia have been integrated as a practice and requirement of education and development ventures. Access to technical and pedagogic support requires supporting colleagues and providing support – the together-we-are-more principle. Peer learning is firmly written into the pedagogic strategy and is a solid educational method in everyday teaching work. Peer learning is also the starting point in Omnia's internal pilots in which teacher teams develop new innovative teaching methods. A further aim is that teachers and students support each other in employing peer learning methods. The greater the transition to a BYOD environment, the greater the need for reciprocal support; one app is no longer taught, but rather the best tool for different needs is identified and there is collaborative learning to use tools and make learning visible. The value of peer learning emerges from authentic learning, voluntary sharing and also from valuing one's ability. An expert does not always recognise and appreciate his/her ability. Busyness impedes a critical and reform-oriented examination of working methods. Things are done in the accustomed way. When peers at different stages of their career meet, the result can be new insights. Successful peer work demands attunement, a climate of trust and determination. These are practiced in various contexts together with teachers and students. Students have been included in the development of new working methods and are motivating and guiding the uptake of digital methods.

Case 2: Centria

1. Strategic leadership

Centria has purposefully invested in developing online education for 18 years. Centria's open university of applied sciences operational model, Averko, has together with degree programmes produced multidisciplinary courses delivered completely online for its degree students and for the open university of applied sciences. In the new strategic policies, development work increasingly focuses on a wider development of learning environments, blended learning and entire degrees studied on the internet. Centria's pedagogical strategy (2013) outlines three areas of development: integrated learning environments, working-life oriented pedagogic practices and social learning solutions. Transforming teaching for the digital age is correspondingly examined through three windows of development: authentic learning, community, and digital technology (Leppisaari et al., 2015). Averko's R&D work into authentic learning has informed pedagogic development work (e.g. Leppisaari et al., 2009; Leppisaari et al., 2012), and fields of study, working-life and development networks cooperatively work in projects designed to enable teachers to take learning into the digital age. In early 2014 an extensive education development venture was initiated. Its guiding principle is to take Centria in its entirety into the digital age. Changes in working-life and digitisation are powerful background drivers. The venture aims to make Centria an environment that values and facilitates new digipedagogic approaches (Learning process, 2014). This strategic activity supports renewing ways of teaching, learning, and study. Online education development is integrated into multidisciplinary pedagogic development. What digital education means in practice at Centria as part of its everyday activity will be demonstrated more clearly through the ongoing pedagogic strategy update and action plan of the soon to be initiated digital team (cf. Ryymin, 2015). A strategic step forward in education digitisation will be taken in autumn 2015 when an online Bachelor of Business Administration programme will be offered.

2. Technology

Infrastructure at Centria has been updated, wireless connection capacity has been strengthened and cloud services have been taken up (Office 365) to support the use of modern learning environments and devices in teaching and learning.

Online degrees and blended learning use the Optima online environment and Adobe Connect online conference system. Various social media networking tools are also used. Centria has three smart classrooms available as Adobe Connect online conference system physical-virtual learning spaces: each campus has a furnished classroom which is equipped with a video conference system and smart tools. The classrooms are connected to each other, so that in a teaching situation the teacher is present in one classroom and participation in the learning event at other campuses is through the video conference system. Video conference systems enable participation through mobile client: the student or teacher can flexibly participate in the learning situation in real-time irrespective of place. Sessions can be recorded and shared e.g. through the learning environment. Centria provides all teachers with a laptop and smart phone. Teacher in-service training has improved teachers' abilities to use various apps. Centria doesn't provide teachers tablets, but a limited number is available for class use. Implementation of the Office 365 learning application is a timely issue and Centria offers this possibility to both teachers and students.

3. Teaching

Centria has responded to the challenge of raising the teaching staff's current level of skills to the level demanded by the digital age by initiating in cooperation with Kokkola University Consortium Chydenius a POD training programme (Update Teaching to the Digital Age) for Centria's teachers. The 4 credit learning path is spread over three semesters. The teaching staff participates in ten days of social and practical-oriented education and produces a development task in groups of 2-4. The development task is a teaching trial which updates work practices. In total, 102 teachers have participated, about 70 people per training day. The POD further education landscape and pedagogic operational models support teachers in taking a digital leap by modeling key operational forms of the updated pedagogy. The learning path concentrates on clarifying a joint vision of transformed teaching and contemporary education challenges (changing learning environments, digitisation, multiculturalism, authenticity, individual and collective learning, co-teaching). A key objective is to initiate discussion and mirror one's teaching in relation to these factors from a shared expertise (Leppisaari, Meriläinen, Piispanen & Pulkkinen, 2015). In this way the need-specific solutions and contemporary practices for digipedagogy as defined by Kullaslahti et al. (2015) are created, at whose educational digitisation core is learner-centeredness (cf. Ryymin, 2015). Teacher support activities at Centria have been enhanced by the development of a Service Path and Pedagogic Cards in early 2015. The pedagogic Service Path (1-6 consultative meetings according to the pedagogic process' progress) and the pedagogic ideas and development cards collected in the virtual learning environment offer teachers support to redesign teaching in online degrees and blended learning to build students' 21st century skills. A digital team provides various trainings and consultations in pedagogically high quality course design and delivery - from setting competence goals to evaluation and feedback (cf. Kullaslahti et al., 2015).

Teachers can also gain competence required for the digital leap through various development ventures. Current ongoing externally funded ventures include for instance MOOC-type further education in the field of renewable energy and e-mentoring at the interface of education and working-life. These are collaborative projects between several universities of applied sciences and the corporate world for creating new kinds of pedagogical practices.

4. Peer learning

Supporting peer learning among teachers and sharing good online teaching practices have been part of Averko's activities since 1997. Furthermore, in 2012-2013 pedagogic afternoons were organised. Their aim was the pedagogic peer mentoring and coaching of staff members. As a collegial and social operational culture strengthens among teachers, it is naturally reflected in the teaching operational culture also and supports the establishment of social learning solutions into everyday teaching as stressed by Brooks & Gibson (2012), for example. Teachers need their own experiences of peer learning and community in order to internalise the importance of these central dimensions of digital pedagogy in their teaching and guidance work. Peer learning was integrally linked to the development task in Centria's POD training in which teacher groups adopted a work method that reformed teaching and utilised digital technology. Collaborative working methods to complete the development task, the

sharing of the tasks, and their peer evaluation applying authentic learning evaluation criteria (Herrington, Reeves & Oliver, 2010) have, according to feedback, supported teachers in updating digipedagogical skills (Leppisaari et al., 2015). Peer learning and sharing have also been supported by research articles in which teacher groups reflect together on education trials.

Comparison of the two cases

Professional development of teachers is considered in this article as the key angle of approach and factor in digitisation of education for the digital age. Due to its scale as an area of development, organisations need to engage in development in multiple sectors, and these cannot be examined as discrete or isolated factors (cf. Fullan & Langworthy, 2014; Phillips, 2005; Ryymin, 2015). Taking education into the digital age requires changes in the strategic leadership culture and challenges an organisation to new kinds of structural solutions, decision-making and implementations (cf. Ryymin, 2015). Change needs to happen in leadership, technologies and learning spaces, and teaching and learning. Table 1 describes the digital leap phenomenon as a whole and the link between transformation of teaching and the four key development actions. Dimensions 1 and 2 create the requisites for 3 and 4.

Table 1: Centria’s and Omnia’s solutions for taking education into the digital age from the view of transforming teaching for the digital age.

Teaching for the digital age	CENTRIA	OMNIA
1. STRATEGIC LEADERSHIP	<p>Averko eLearning Centre since 1997: online courses and teaching, production teams and online pedagogy development work</p> <p>Since 2014 Centria’s digitisation strategy, online degrees and blended learning courses</p> <p>Reform of Averko’s operation and initiation of digital team: development of innovative, authentic and multidisciplinary learning environments and agile production of educational content cooperatively with fields of study, support services for production and delivery of online implementations, quality assurance and pedagogic quality work, RDI ventures on education and working life interface, peer development</p>	<p>Since 2000 various pilots and pedagogic strategies stress information and communications technology skills and significance of online education</p> <p>Since 2010 Learning solutions development team – concentrates especially on developing use of mobile devices</p> <p>2014 an organisation-wide digital strategy, focusing on four sub-areas: strategic leadership in learning culture reform, use of digital technology (infrastructure, devices and competence), training and support in transformation of teachers’ pedagogic competence and encouraging peer learning and providing time for this.</p>
2. TECHNOLOGY	Wireless access, cloud services, learning environments, BYOD, smart classrooms, technical support	BYOD, learning environments, cloud services, learning material bank, technical support, tablet hire, wireless access
3. TEACHING Support and training in transforming teaching	POD staff training model and teaching trials, piloting, development ventures, agile content production of online implementations and tutoring support: Service Path and Peda-Cards	Pilots, in-service teacher training, development ventures, pedagogic support, digital support given by students
4. PEER LEARNING Encouraging and allowing	Pedagogic peer and collective development, sharing of teaching trials, publications	Dissemination of good practices, joint competence markets, online support and cooperation network, blogs, presentations by experts, students engaged in guidance

adequate time for peer learning	Promoting openness and sharing of good practices	and motivation, expert badges
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The comparison demonstrates that both organisations have very similar procedures for developing digitisation. Both have centralised ICT support for teachers and the foci of development are convergent: more extensive technological infrastructure, resources for developing teachers' digipedagogic skills and expansion of digitisation as emphasised by management. Both organisations have observed that traditional methods of further education are no longer adequate; rather new approaches are needed, with peer learning bringing about the best results – the starting point for professional competence is an ability to deal with everyday acute problems.

Examined from a strategic leadership perspective, the objective of both Centria and Omnia is to reform practice by doing things in a new and more efficient way. The underpinning values at both schools are reform, competence, flexibility and digitisation (Centria's Learning process 2014; Omnia's digital plan 2014). An examination of Omnia's and Centria's strategic solutions shows that digital pedagogic competences of teachers have been systematically developed at both institutions (cf. Häll & From, 2014; Kullaslahti et al., 2015). Strategic weighting supports the reform of practice – reform at an entire organisational level requires time and new forms of development. Leadership of change at Centria and Omnia is evident through similar choices of strategies (Centria's learning process 2014, Omnia's digital strategy 2014): 1. Update of ICT infrastructure to support digitisation, 2. Updating teacher and other staff skills for the digital age: training and pedagogic support provides views into digital technology affordances for education, and 3. Establishment of digital teams to support digitisation of courses and modules. Several degree programmes and programme sections and MOOC studies delivered either completely or almost entirely online are being developed at Centria and Omnia.

The second dimension in transforming teaching into the digital age is technical factors. Both organisations recognise that well functioning wireless connections are the starting point for digitisation, supporting the BYOD operational model. Digitisation can best be implemented in environments in which participants can use their own devices effortlessly. In fact, the digital leap fosters opportunities for using one's own devices as the current economic situation prevents schools from providing all students with the latest technological equipment. Centria and Omnia see the role of technology as a facilitator of a new kind of pedagogy and new operational methods. Technology is not a question of devices, but people (Sitra 2015, 12). For this reason availability of support is a key factor of success in the digitisation of education. It must be guaranteed in a climate of rapid educational change. Implementation of technology should be systematic and planned. Large organisations must ensure that everyone has access to viable systems cost-effectively and sustainably. Pioneers can try and test new devices and programmes, but user-friendly solutions must be available for basic users, solutions which genuinely support the learning process and ease the teaching work. In vocational education, technology should however be at the forefront. Each course should provide an example of genuine working-life by giving an accurate picture not only of the skills required for an occupation, but also of the digital technology employed in a specific field. Today digital technology includes, for example, 3D-printing, augmented reality, big data, mobile services and the like. Every teacher must be current on field-specific digital technologic trends so that students are provided 21st century skills.

Professional development of teachers has been targeted at both schools and developed to include methods which are innovative and utilise peer learning and trial culture, as introduced above. Currently both schools are considering how to deliver professional development in the future. There is an endeavour to involve teachers more rigorously in the planning of their own development (cf. Sitra, 2015). In-service training examined in this paper has primarily been executed as contact teaching with the exception of a few online sessions. Now, however, there is a need to consider if blended models or even entirely web-mediated further education courses would most effectively support teachers' digital leap (cf. Teräs, 2014). Averko has positive experiences from previous years from its Online tutor e-course. Omnia is working with vocational teacher training institutions to deliver the programme Learning Online, in which digital skills of teachers are developed using online course methods and the teacher receives a learning badge on presenting evidence of competence at each completed level (Oppiminen online, <http://www.oppiminenonline.com/in-english/>). It would appear that e-courses and learning badges as evidence of competence motivate teachers. These models also support peer

learning. Digital education has led to professional development models being in a state of flux. Even digital education developers are slow to apply in their practice what they teach others. Therefore teachers must be given sufficient time to learn to apply new methods. There is in fact a need to continuously ask how students can be partners and change agents (cf. Healey, 2015) in the development of learning culture and seek ways in which they are more strongly employed as joint-developers of digital education.

Discussion

Our comparison of how two different educational institutions of different level and size are implementing four dimensions of education that take teaching and learning into the digital age revealed similar solutions, and a convergent direction in education technology and methods. Likewise, the problems and challenges were similar. The comparison between the two schools helps us better understand the notion "teachers' digital leap", and the factors and processes essential for its promotion. The four views we introduced also indicate how reforming teacher competence as the key factor in digitisation of education is a complex phenomenon linked to multiple sub-areas.

Both institutions have invested financially in the digitisation of education through updating technological infrastructure and providing user-friendly services and pedagogically meaningful tools (cf. Ryymin, 2015). The financial investment in the new competences is also seen in the scope of Centria's POD training for teaching staff. Convergent with studies by Teräs (2014) and Eskola-Kronqvist et al. (2015) our study indicated that isolated and discrete training for developing teacher competence do not serve teachers, but rather should be linked to a chain of in-service professional experience. The POD training is one example of a long-term development process linked to a teacher's work. A learning badge model has been implemented at Omnia, demonstrating that a collective learning process can be formed of parts (cf. Oppiminen online). Professional development discussions in which teachers with their supervisors agree on what education, development ventures and methods are needed to acquire competence form a meaningful path that supports ownership of skill development. Pedagogic and technical support must be organised in such a way that all the different parties are aware of what is available.

In addition to a teacher-initiated professional development approach arising from everyday needs, peer learning emerges in our examination as a central method through which educational organisations are brought into the digital age and through which teachers can make a digital leap. The endeavour to do together can be observed as the common factor in both examined cases. A digital leap is promoted through an open working culture, the sharing of good practices and peer learning. Convergent with Eskola-Kronqvist et al. (2015) attitude and a desire for change are pivotal factors in the new competence requirements. Particularly in times of transition they need to be present and positive in order to achieve the desired outcomes and objectives. It is difficult to change attitudinal factors, but it has been observed that the best results are achieved through doing and in collaboration with others.

Changes in learning culture at an organisational level are slow, but can occur gradually by changing operational methods (Leppisaari et al., 2015). Common to our cases was support of teacher-initiated trials and a preference for collaborative development. Trialing new things should be made easy (cf. Ryymin, 2015). For example, in Centria's POD training 23 development tasks can be seen as activators of change, as can Omnia's 22 teacher-initiated pilots. With their help teachers practice smaller and larger digital leaps that affect an organisation's learning landscape. Learning culture is reformed by supporting teachers to make changes in their work. Teachers should also have access to support as soon as a problem emerges - peer support from colleagues and students is the most effective and quickest. Including students in the development of digital working methods as support for teachers is seen as a good practice at Omnia.

New forms of professional development for teachers require the creation of opportunities. A school facilitates reform of teacher competence by simultaneous attention to the four dimensions presented in this article. A digital leap can be taken with the help of strategic pedagogic leadership, technological support, updating of teaching and peer learning methods. Phillips (2005) argues that the support role of an educational institute can be proactive and change can be led from the middle-out, through operational planning and project management, solving problems and facilitating a connection between

strategic vision and the day-to-day work of teaching in a school. Our examples also demonstrate that every teacher can affect change in his/her situation: "We cannot wait for change to begin from above or below. It must be everywhere at the same time" (Sitra 2015, 14). Increasingly, in a digitising environment we can utilise the affordances of our digitally connected world as we engage in change. Our purpose in the next stage is to broaden our examination of how conditions for a digital leap and support practices are created to three countries in our researcher network, namely Finland, Australia and Korea. This will allow observation of the effect of cultural factors in this phenomenon. Concurrently an opportunity to benchmark and refine best digital leap practices will be created.

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