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Chapter 5

360–Degree View of Digital Open Badge–Driven Learning

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ABSTRACT

This chapter describes alternative credentialing practices related to competence-based open badges and their different audiences. The authors provide insights into different theoretical approaches to digital badging practices that could potentially support a competence orientation in continuous professional development and enhance lifelong learning. One aim of this chapter is to summarise the first European doctoral dissertation to address digital open badges and digital open badge-driven learning. The authors offer novel insights into reforms in education aimed at addressing students' individual interests and meeting the recognised needs of working life. They also present a set of innovative Finnish applications of digital open badge-driven learning in the context of educational research. Moreover, they describe the potential of badges as a tool to build ePortfolios. This chapter draws attention to the motivational effects of digital badging and the use of ePortfolios as an informative and interesting way to demonstrate competences in different contexts.

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INTRODUCTION

New “alternative credentials,” such as micro-credentials, digital open badges, and industry-recognised certificates (OECD, 2020a), are gaining popularity as an alternative approach to career and professional development (Ghasia et al., 2019). Digital badging provides transformative and flexible options for competence development in various educational settings from K-12 to higher education (HE). However, the digitisation of graduation diplomas, in line with the digital disruption emerging in all fields of society, is overdue (Wolz et al., 2021). Alternative credentials can be considered further documentation of an individual’s skills and knowledge in addition to traditional transcripts, such as degree diplomas (Wolz et al., 2021). In many cases, digital credentialing involves digital badging practices that reflect a complex understanding of the characteristics and specifications of digital open badges (Wolz et al., 2021). The current literature reviews (Noyes et al., 2020; Park & Kim, 2019; Wolz et al., 2021; Zsigmond et al., 2020) compare and contrast the present badge study’s findings in different contexts. Furthermore, new ways to motivate, scaffold, and assess competence-based learning processes in professional development are emerging (Brauer, 2019a).

In addition to changing working life, digitalisation is also changing educational planning and the implementation of training. It has become increasingly important to develop training that meets the requirements of digitised working life as well as unique professional needs (Brauer, 2019a). This paper will focus on the context of professional HE, representing examples from early adopters in Finland. The Finnish models discussed in the chapter contain nationally mandated best practices that are applicable for wider audiences. Digital badges are often synonymous with micro-credentials (Lim et al., 2018; Rimland & Raish, 2019), smaller fractions of qualifications. Thus, badge development and implementation can also be linked to the revision of evaluation methods and reforms of European competence classification and transfer systems, such as ESCO (European Commission, 2020) and EuroPass (Cedefop, 2020). The European Union promotes the provision of competence-oriented education, training, and learning, the establishment of good practices, and better support for educational staff (EU, 2018). Moreover, the Finnish Government (2020) has promoted the idea of the digital ecosystem for lifelong learning, gathering competence information from childhood on and serving both individuals and working life. At the core of their service development are applications that map, identify, and recognise competence acquired in various contexts. The potential of badges as a tool to build portfolios in a digital format (ePortfolios) suggests similar features (Korhonen, 2020). Modern ePortfolios allow individuals to make their competence visible in multifaceted ways using a variety of digital materials (Jewitt et al., 2016).

Earners can display and publish digital open badges using online services, digital display platforms and other tools beyond ePortfolios. Avenues like LinkedIn, personal websites, blogs and digital resumes are some options to portrait micro-credentials. Digital open badges allow open application programming interfaces (APIs), a method to connect and manage badges in different emerging digital ecosystems. It is important to create and consolidate general rules for the use and development of multifaceted badges. The rules are needed not only for technical descriptions, but also for the content and metadata of badges (Brauer, 2020). Thus, their value is real for a badge earner, an educational institution, and an employer to signify the achievement of a specific competence. Common European agreements would help to tackle the technical challenges faced in badge pilots, such as identification of the badge applicant or the authorisation and verification of the badge issuer, and enhance the quality assurance of the assessment criteria and the badge proceedings (MICROBOL, 2020). The creation of a competence-based excellence in continuous learning and flexible educational provision requires a common will and political decision-making on structural reforms, and more research on competence orientation, digital open badges, and badge-driven learning in different educational and economic sectors. In addition, there is room to clarify the role of ePortfolios and alternative digital credentials; both methods with similar goals, such as making competences visible in digital format.

BACKGROUND

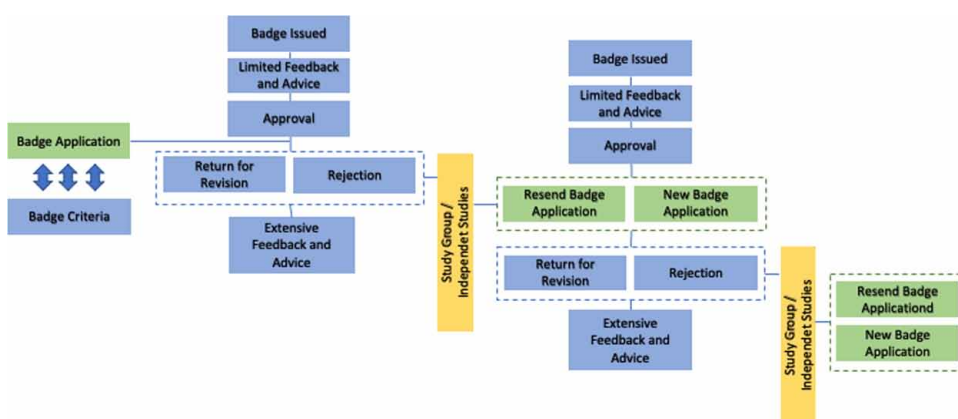
Competence-Based Approach and Instructional Badging

The concept of competence itself may be understood as an aspect of human activity (Ashworth & Saxton, 1990) or as an achievement acquired through training and development (McClelland, 1973); in other words, it is the result of a learning process (Schaffar, 2019). Moreover, competence-oriented learning activities can be compared to game scenarios involving player performance ratings (Bartel et al., 2015; Wolz et al., 2021). All of these approaches emphasise the descriptive nature of competence, as do the key features of digital open badges.

A digital open badge is “a representation of an accomplishment, interest or affiliation that is visual, available online, and contains metadata including links that help explain the context, meaning, process and result of an activity” (Gibson et al., 2013, p. 2). Institutionally awarded badges are electronic micro-credentials that can be used to identify and promote excellence and mastery (Abramovich et al., 2013). Further, digital badging is a form of competence-based assessment that offers recognition of formal, informal, and experiential learning (Brauer, 2019a).

Families of connected badges form a badge constellation built from stacks or layers (Brauer, Siklander et al., 2018). Badges can be used for gamification in learning to encourage learners, pinpoint progress, and support credentialing (McDaniel & Fanfarelli, 2016). In a competence-based approach, badges may be granted based on an application, automatically evaluated assessments or actual live demonstration of a competence. To earn a badge, the applicant must submit evidence of their competence. These badges are built to include detailed information on the expertise they represent as well as a description of the evidence required to earn them e.g., online documentation (Brauer, 2019a). Still, one’s first glance of a badge includes an identification image, graphic, or icon, the name of the badge, issuer identification (e.g., public/private sector institution or business), and other information (Bowen, 2018). Instructional badges are designed to prompt learners to demonstrate the required competences (Brauer & Siklander, 2017), and the badge criteria should inform the learner on how to proceed and include practical instructions concerning the available learning materials. The description of the badge criteria also should explain the learning objectives (Sadler, 2005), simplistic instructions on “how to unlock a badge,” and narratives and challenges that aim to promote intrinsic motivation (Hamari, 2017; Malone, 1981). Instructional badging (Figure 1) may also be realised as an assessment process in a badge management system involving badge applications and their approval/rejection process, including feedback, advice, and scaffolding from trainers (Brauer & Siklander, 2017).

Figure 1. Structure and components of instructional badging: competence-based assessment and badge management guidance
 Source: Adapted from Brauer & Siklander, 2017



The process of instructional badging includes feedback, advice, and scaffolding from the educators and trainers attached to the learning process (Brauer, 2019a). The system represents a kind of “assessment first approach” (Gunter & Mwaba, 2021), in which the badge applicant is free to apply for a badge without any previous study record. Providing feedback satisfies learners’ intrinsic need for competence assessment (Brauer et al., 2019; Jung et al., 2010) and directs their future studies by requiring learners to engage in learning activities (Brauer, 2019a). In order to save instructor/tutor resources, only a limited provision of feedback may be necessary for successful candidates upon badge approval. Applicants who fail in the assessment should receive more extensive feedback, so they can learn more and further develop the competencies needed to meet the requirements defined in the badge criteria (Brauer & Siklander, 2017). This model is similar to Gamrat et al.’s (2016) work, which recommends the provision of extensive feedback or remediation to guide learners towards a second submission. Applicants should receive the assessment “on demand” (Gunter & Mwaba, 2021) in a reasonable timeframe; the faster the assessment is completed, the more it supports and inspires learning (Brauer & Siklander, 2017).

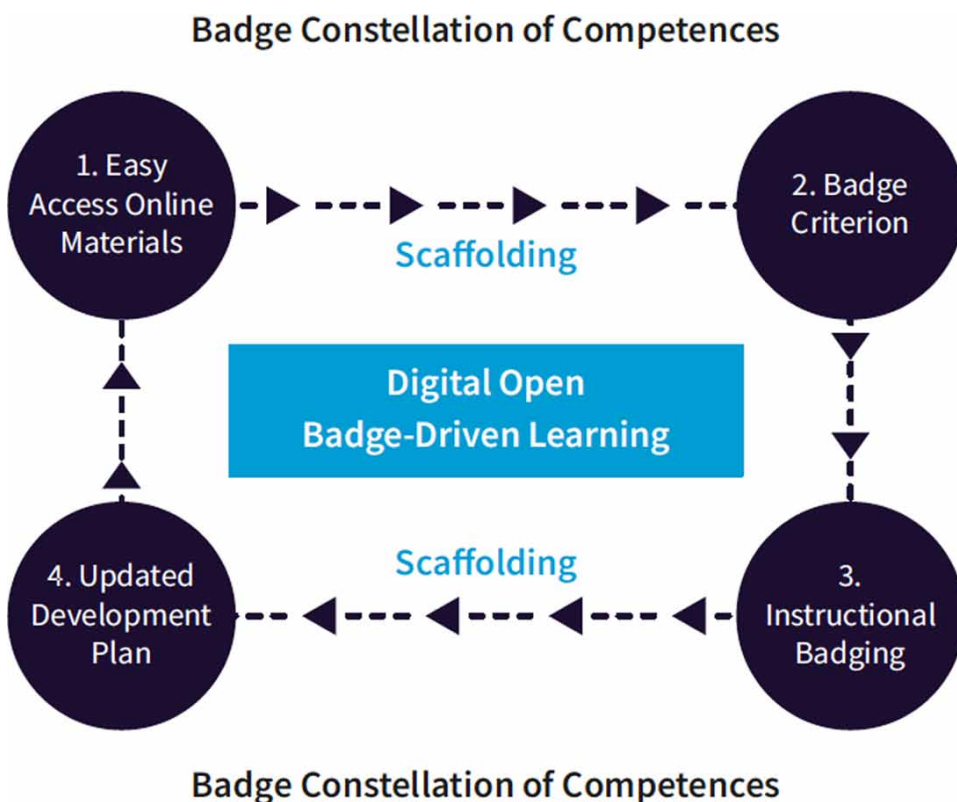
Digital Open Badge-Driven Learning

This section of the chapter explains how to use instructional badges in a structured learning process with gamification elements. Transforming assessment methods requires both design and development (Nichols et al., 2017). Digital open badge management platforms, such as Open Badge Factory (OBF, 2021), provide the infrastructure required to create and issue badges. OBF was not designed to provide a learning environment; however, the integration of badges into an active learning process allows a comprehensive system of assessment that supports learning (Brauer & Siklander, 2017). This institution-led development work is focused on motivational learning and better learning outcomes both in terms of quality and quantity. In general, information-rich digital badges and related management systems provide broader opportunities for learning than conventional credentialing on learning management platforms (Brauer & Siklander, 2017; Casilli & Hickey, 2016). Brauer’s doctoral thesis (2019) identifies open badge management platforms as new learning environments and suggests an application to design badge-driven learning. The work also draws attention to digital badging and gamification in educational contexts.

Digital open badge-driven learning (Brauer, 2019a) is a competence-based learning process grounded on the badge constellation of competences. Digital open badge-driven learning includes learning materials, badge criteria, instructional badging, scaffolding and peer support. The digital open badge-driven learning process supports the gamification of professional competence development (Figure

2). Further, the triggers of the learning process are more versatile than the triggers of gamification or online learning alone.

Figure 2. The structure of the gamified digital open badge-driven learning process
Source: Brauer, 2019a



The overall process structure allows researchers to capture and explicitly identify the triggers of gamified digital open badge-driven learning based on the concepts of gamification (Deterding, 2015, 2012; Reid et al., 2015), the triggers of online learning (Hidi, 2000; Järvelä & Renninger, 2014; Renninger & Bachrach, 2015), and gamification-triggered learning (Dichev et al., 2014; Muntean, 2011; Werbach, 2014). First, badges arouse and maintain interest until completion of the initial learning action. Second, flexible study options support self-determined studying, allowing learners to self-select the time and place of learning. Third, the option to customise studies represents another central principle: personalised study paths arouse interest and maintain learners' motivation and engagement as their studies

progress. Motivation to continue studies towards the highest possible skills set level is particularly apparent when learners are given the option to personalise their study paths entirely. Learners comprehend their pursuits in the form of a badge constellation when their study paths and progress would be difficult to understand otherwise. The prompting trigger for learning might also help learners by visualising their progress as a reward badge (Brauer et al., 2017; Fitz-Walter et al., 2011; Gamrat et al., 2016; Hamari, 2017; Montola et al., 2009; Reid et al., 2015). Learners gain a sense of excitement similar to that of playing games (Deterding, 2012; 2015). In terms of digital open badge-driven learning, the prompting trigger for learning might be realised at different stages of the learning process in various forms, including community building and collaboration facilitated by gamification, scaffolding, or criterion-based challenges. Instructors see scaffolding as an important support for learners in their effort to achieve learning objectives that they otherwise would not be able to achieve (Lajoie, 2005; Wood et al., 1976). Digital environments for managing open badges provide a forum to support learners personally in the way they need it most and at the time they need it (Brauer et al., 2019).

The process of digital open badge-driven learning (Brauer, 2019a) aims to provide badge applicants an appropriate amount of support according to their needs so that they may fulfil their educational potential (Lajoie, 2005; Wood et al., 1976). During the learning process, various scaffolding providers can be found, such as teachers, peers learning from each other, workplace mentors, and instructions in digital environments (Korhonen, 2020). The role of the educational institution is to facilitate the process. Salmon's (2011) five-stage model of scaffolding approaches badge-driven learning from the perspective of scaffolding. Badge-driven learning offers scaffolding tools for each of the model's five stages and includes elements such as easily accessible online learning materials, discussion forums for socialisation and support, carefully created badge-criteria that may even replace learning materials and make competence demonstration easy with ongoing scaffolding via an open badge management system for open badge application and issuing processes, and directed reflection activities as well as future development plans (Brauer et al., 2019). The badge-driven learning process involves numerous scaffolding elements, such as advanced searches of online materials and gamification elements that also provide support for learning. Badge-driven learning is a process of scaffolding learners as they set goals and make their competences visible. The process is implemented in an open badge application that facilitates issuing processes online (Korhonen, 2020). It offers support for individual professional development (Brauer & Siklander, 2017; Brauer et al., 2017).

What to do with open badges earned then? Badges represent expertise and evidence of achieved competences in a digital format. Next paragraphs concern desired competences, assessment methods and competence-based approach to open

badges, including recognition of prior learning. In addition, ePortfolios are brought into the discussion of making competences visible by pointing out the relationship between ePortfolios and open badges.

BADGES REPRESENT THE SET OF DESIRED COMPETENCES

The moment they are hired, recent graduates are expected to possess high levels of learning; however, employers face difficulties in recognising certain skills related to degrees (Isopahkala-Bouret et al., 2011) and do not consider educational transcripts, with their lists of titles, grades, and credits, to be useful in recruitment (Rhodes, 2012). Bravenboer and Lester (2016) note that “universities and professional bodies both have a role in recognising the knowledge, understanding and skills of individuals, yet there remains a degree of tension in terms of what each may think they are recognising” (p. 409). Rhodes (2012) highlights the need for employers to have tools to help them identify learners who are likely to succeed in their companies after graduation. Assessment results should be more public, noting the role of accrediting bodies in “promoting, monitoring, and ensuring desired student learning outcomes” (Rhodes, 2012, p. 38).

New technologies allow users to capture learning experiences throughout their educational careers (Brauer, 2021). However, Isopahkala-Bouret et al. (2011) point out that “competence is not measurable in purely objective and rational terms, although the effort to ‘make it visible’ has been highlighted in many policy documents and pragmatically-oriented research papers” (p. 36). A competence-based approach to education focuses on the learner and complex learning situations related to working life, encouraging continuous assessment (de los Ríos-Carmenado et al., 2016). Thus, the assessment practices in digital open badge-driven learning represent an ongoing learning process instead of simplistic grading (Brauer & Siklander, 2017). The results of a study by Mulder et al. (2009) indicate that “representatives of student organisations value the notion of competence development and preparation for the labour market” (p. 767). In practice, this means that learners would like to be able to connect competence objectives to actual competence development (Brauer, 2021). According to Mulder et al. (2009) a preferred tool could be personal portfolios or development plans presenting and guaranteeing competences integrated into the academic programmes, such as communication, critical reflection, information literacy, teamwork, and project management skills. Moreover, Rhodes (2012) points out that rich and robust ePortfolios or other media may deepen students’ learning and their understanding of their strengths and weaknesses.

Building an ePortfolio, digital resume or professional blog is a skill itself. Learners may feel more comfortable writing about their experiences instead of trying to

present them through videos, pictures, or figures, which would better visualise their competence (Korhonen et al., 2019). This might be a consequence of learning diary practices since ePortfolios have often been used as a learning diary (Kankaanranta 2007; Viksted 2007). A learning diary itself is a reflective tool but not necessarily an arena in which to make competences visible for a wide professional audience. In addition, learners may lack the digital skills necessary to visualise their competences and use ePortfolio tools (Korhonen et al., 2019). Strong guidance is required to explain to learners what kind of content demonstrates competence in various professions, what to pursue through ePortfolios, and what the competence goals and learning objectives of ePortfolios are (Korhonen et al., 2020).

Competence-Based Assessment by Evidence

Classical hierarchical approaches might be effective in defining technical knowledge and skills, but they might be less appropriate for assessing professional competences (Sánchez Carracedo et al., 2018). Given that transcripts fail to represent individual learners' competences, other measures and more precise tools are required to represent individual proficiency and expertise in a way that employers would recognise and understand (Brauer, 2021). Badges may be difficult to earn, but they adequately represent learning (Abramovich, 2016). Assessments may include a learner's self-assessment, peer assessments, peer group assessments, and instructors' assessments of competence development, in both face-to-face and online learning (Dochy et al., 1999). The process of instructional badging reflects an authentic performance scenario (Gunter & Mwaba, 2021) that is a demonstration of competence in a work setting or a simulation of workplace challenges. Tangible tasks include the demonstration of acquired skills and knowledge in practice in order to earn a badge (Brauer & Siklander, 2017). As Kolb, Boyatzis, and Mainemelis (2001) propose, learning should form a continuous process grounded in concrete experience and active experimentation. With competence-based digital badges, the learning process is complex and multifaceted (Brauer et al., 2017) and provides inspiring challenges to engage the learner. Moreover, badges have the potential to support recruitment and personnel planning, continuous learning, and motivation in the workplace. Digital open badges encapsulate the individual learning experience and tie performance and achievement to documentation and evidence of learning (Ahn et al., 2014; Gamrat et al., 2016; Reid et al., 2015).

The formulation of clear principles for interpretation is crucial. From the beginning, the challenges in developing competence-based open badges have been the quality and reliability of the micro-credentials. Different standards and frameworks (Kullaslahti et al., 2019) offer concise guidelines describing competence criteria. However, the competence indicated by a digital open badge should be comprehensible in

any context, at any time, without any other certification attached but the evidence associated with the badge. The badge metadata must describe the competence criteria in detail, explaining the required evidence—a tangible, practical task that engages applicants' full potential (Brauer, Kettunen et al., 2018). The criteria should inform the scale and challenge of the demonstration of competence and evidence required. Badge earners should be allowed to attach evidence to the badge issued for future purposes, such as a “work sample”. The formulation of competence objectives and badge criteria should vary, not rise linearly, both by complexity and extent to maintain and cultivate the learners' interest (Brauer, 2019a). Relatively small assignments also inspire studies regardless of time and place (Brauer et al., 2017). However, too small assignments and competence demonstration tasks may occur unmotivational to learners (Korhonen, Ruhalahti & Niinimäki, 2020). The key question seems to be how to define sufficient requirements for the evidence and motivate students to apply badges. This requires further studies on different educational levels.

It is essential that standards and guidelines are developed on a national and European level (Kullaslahti et al., 2019); however, teachers, instructors and teacher trainers hold a special position in the development of competence-oriented practices. To serve different stakeholders, trainers need to learn how to apply competence-orientated practices and further develop their pedagogical competences and practical applications. An example can be found in vocational teacher education programs (Isacsson et al., 2018): a vocational teacher's competence is, according to Toom (2017), a complex combination of knowledge and skills. The description of such competences requires profound knowledge of the profession in order to clarify what kind of evidence would best describe each competence. Shulman (1986) points out that instructors' content knowledge can be divided into three categories: subject matter content knowledge, pedagogical content knowledge, and curricular knowledge. In Finland, vocational teacher education programs are particularly concerned with pedagogical content knowledge. In order to see how pre-service instructors describe it in their ePortfolios, their practical pedagogical learning designs for their learners were analysed in a study by Korhonen, Lakkala, and Veermans (2019). For this purpose, a technology-enhanced pedagogical infrastructure framework (Lakkala et al., 2010) was exploited, and an evaluation frame for pedagogical competence was created. Pre-service instructors demonstrated their pedagogical and digital competence through learning designs and project work reports (Korhonen et al., 2019). In addition, they analysed the digital competence that is required by instructors nowadays by studying how pre-service instructors used digital tools, following Ilomäki's et al.'s (2016) concept of digital competence. The final results revealed that there is a lot of variance in the quality of ePortfolios describing pre-service instructors' competence; some were at a very high level and some were very poor (Korhonen et al., 2019). The researchers attributed this phenomena to varying levels of competence in the use of

digital tools to describe practical competences. In addition, pre-service instructors did not follow all of the instructions for the ePortfolio task. The study raised further questions about the motivation to use ePortfolios to make competences visible. Further studies have revealed that vocational pre-service instructors, a similar participant group, have demonstrated an intrinsic motivation to make their competences visible in a digital format; they show an interest in personal growth as instructors and in new technological methods for competence demonstration (Korhonen et al., 2020).

Restructuring Professional Expertise

Professional training and upskilling are a high priority in the world of work. Everyone's strengths and competences should be identified (Finnish Government, 2020). The current challenge is that there is no coherent strategy or approach to describe, identify, and recognise such competences. The identification and recognition of competence in working life differs from such processes in the formal education system. In the world of work, competences are not defined by professional skills or qualifications only, but also by a person's attitudes, motivation, learning ability, actions, and interaction skills. Professional competence is often attached directly to the content of a task in a goal-oriented way, whether that means acting alone, on a team, or with customers and partners. Key moments requiring the identification of competences include competence mapping for job hunting, recruitment, and career development. Continuous learning needs to be a strategic part of professional development and competence renewal. Guidance should be available for different upskilling and reskilling options supporting employment in different life situations. New digital solutions and supportive measures can ensure that the development of competence becomes a natural part of work or entrepreneurship for more and more people. (Finnish Government, 2020)

Digital open badges offer support for a shared understanding of the required and desired competences between different stakeholders. A 360-degree view of open badges and badging practices opens a new landscape for professional development (Figure 3), summarising the key aspects of our previous studies. This alternative approach emphasises lifelong learning and competence development throughout a professional career.

Figure 3. 360-degree view of digital open badges and badging practices



In addition to traditional education and training conferring a degree, this view is based on a kind of block-chain model of “nano-degrees” in which different competences can be acquired in several contexts. As Eraut (2004) puts it “the planning of future learning opportunities is often informal, the opportunities themselves could be either formal or informal” (p. 251). A criteria-based badge constellation provides a visual representation of layered badges, metabadges, and the final badges of mastery (Brauer et al., 2019). Course development is one meaningful aspect of digital credentials. The design of the constellation and families of connected badges relates to the intended learning outcomes defined in the curricula (Brauer, 2019a) or desired professional expertise in working life (Brauer, 2020a). The aim is to encourage desirable behaviours by prompting the learner to work towards

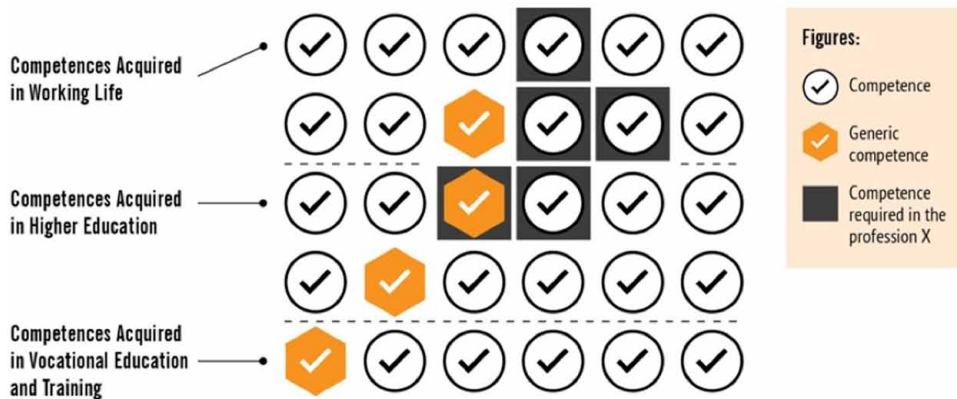
required competences and rewarding them for it (Brauer et al., 2017; Brauer, Ruhalahti et al., 2018; Gamrat et al., 2016; Reid et al., 2015). Stacked and layered badges provide practical visual aids to learners (Brauer et al., 2019; Smith, 2015) seeking to self-evaluate existing competences and plan future studies; clear and consistent badge criteria tie a learner's guidebook together, providing suggestions on how to proceed towards desired outcomes (Brauer et al., 2019). Badges offer to inform various audiences of final achievements, facilitating communication of (post)graduate eligibility and employability and even networking based on brand badges that connect alumni.

Example of Desired Competences in Games Industry

In Finland, the Chips for Game Skills project (2017–2020) aimed to define the criteria for future skills in the games industry and to cross the boundaries of educational sectors. Both universities of applied sciences and vocational education and training (VET) institutions were involved in the project that engaged also companies and non-profit associations of the games industry. Junior professionals' job search challenges and recognised competence shortage within the industry initiated the project. The main goal was to map competences required in working life. The employer perspective was brought up, emphasising how important it is for an entry-level candidate to 1) understand the recruitment process, 2) get to know the companies 3) identify individual potential and accomplishments and 4) communicate them clearly to the employer (Chips for Game Skills, 2020). The need for standardisation within the games industry was indicated as an important factor by industry professionals themselves.

The Chips for Game Skills badges met these recognised needs profiling specific jobs in the industry. Each metabadge represented proof of the required level of mastery of a specific skill. The badge constellation of competences was focused on promoting the identification and recognition of working life opportunities (the needs of working life, job descriptions) while helping individuals to plan competence development (optional study paths) as future professionals in the games industry (Brauer, 2019b). In the Chips for Game Skills project, the expertise required was represented by badges earned through work assignments based on assessment criteria and required evidence (Figure 4). The badges represented both professional and generic competences (working life skills and transversal skills). This approach is particularly useful for competence development in growth industries such as game development, as it allows positions to be filled that do not align with the curricula of degree programmes (Brauer, 2019b).

Figure 4. Different ways to achieve the competences required in working life
 Source: Brauer, 2020



The original Chips for Game Skills badge constellation was developed as collaboration between the game industry’s employers and educational institutions. The badge constellation described the emerging needs of working life and entirely new competences. On a flexible study path, personal customisation means having the option to select badges from different badge families (Gamrat et al., 2016) and the ability to accumulate credentials from various sources (Casilli & Hickey, 2016). When work and the ways of doing work are changing, professional development should be equally flexible, if the employment rate is to increase. Digital open badges and related competence-based approaches will help educational institutions to develop not only workplace training but work-integrated pedagogy together with industry players. The role of education organisers will also change when competences acquired in working life can be acknowledged.

Digital Open Badges as a Development Plan

The knowledge and skills required in working life vary at different stages of a career (Billett, 2001; Ellström, 1997). The badge constellation of competences and the recognised stages of the digital open badge-driven learning process provide different viewpoints and tools for planning professional development. Brauer, Kettunen, and Hallikainen (2018) found the competence-based badge criteria functional for this purpose, as badges enabled people to identify the individual competences needed in working life. For example, they allow self-evaluation of achieved and desirable competences based on given criteria and promote relevant remediation in accordance with instructional badging. These features allow learners to update their development plan and affect study progress throughout the process (Brauer, 2019a). Digital open

badges embody the ideal of study path customisation and personalisation in order to build individual professional development programmes. Brauer's study (2019) offers insights into the process structure and layered design used to apply a competence-based approach, digital open badges, and gamification in professional development. In addition to the changing landscape of the world of work, the main principles of digital open badge-driven learning allow design models to be focused on meeting unique personal needs, progression towards peer and community learning, and the recognition of excellence within working communities (Brauer, 2019b).

A carefully designed badge constellation allows remarkable customisation (Brauer et al., 2019). The final stage of digital open badge-driven learning (Figure 2) provides time for evaluating the final achievement, one's personal competences in relation to one's personal requirements in working life. It also provides an opportunity to restructure one's learning path if needed. As Eraut (2004) emphasises, "outside formal education and training settings, explicit learning is often unplanned" (p. 250). In badge-driven learning, a development plan is always up to date and focused. Badge-driven learning enhances progress on customised study paths, and scaffolding is the most necessary for learners who fail the task on the first try. Based on a rejected badge application and the feedback and scaffolding received, the learner continues studies and develops evidence of mastery. According to Salmon et al. (2010), the scaffolding provided to learners during the development stage empowers them to take a meta-cognitive view of their learning. In the "updated development plan" stage (Figure 2), learners estimate their achievements based on personal goals and integrate the learning experience from an online environment into working life or other forms of learning (Salmon et al., 2010). The further learners go, the more independent they become, taking responsibility for their own learning.

Success seems to relate to the ability to self-evaluate existing competences through the visual constellation of badge criteria (Ahn et al., 2014; Davies et al., 2015; Gamrat et al., 2016; Smith, 2015). The aim of scalable badges and badge families is similar to gamified constellations: allowing learners to reflect on their accomplishments and strengthen their sense of competence and progress (Deterding, 2012). Gamrat et al. (2016) call for a badge design offering both granularity and the flexibility to expand the evaluation of the degree of mastery beyond the most basic level. In working life, it is essential that new employees are able to proceed towards more challenging tasks at a good pace (Fjellström, & Kristmansson, 2016; Goller & Harteis, 2017; Rintala & Nokelainen, 2019). Research also emphasises that newly hired staff members become part of the work community by socialising with the community during tasks (Gherardi, 1998; Lave & Wenger, 1991) and engaging in available learning opportunities (Billett, 2006; 2011; 2014). It should also be noted that learning in working life is communal by nature (Eraut, 2004). Digital open badges provide detailed information regarding progressive challenges

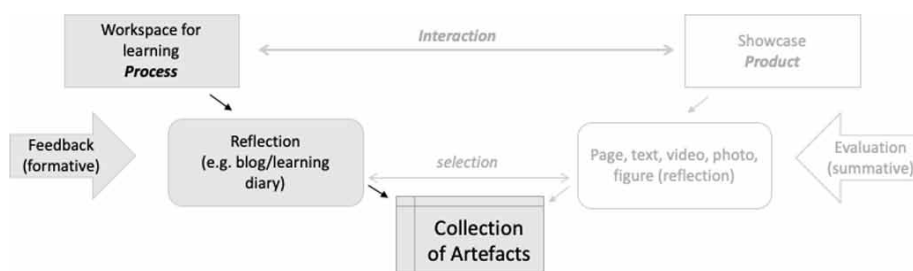
and variations in the level of required performance both individually and as part of a group (Brauer, 2019a), and they should be considered a viable tool to support both the transition to the world of work and career-long competence development.

Badges as a Tool to Build ePortfolios

ePortfolios are for making competences visible through digital documentation, in the form of text, pictures, photos, videos, or a combination of these formats in a multimodal artefact (Jewitt et al., 2016). Rico (2017) suggests that ePortfolios should be organised around competences. Barrett (2010) offers two different approaches to an ePortfolio: a workspace and a showcase portfolio. Her idea is that learners should use their own workspaces as repositories to save and share artefacts that are related to various learning processes. A dialogue between a workspace and a showcase ePortfolio begins right away, and the showcase then includes artefacts for a wider audience outside of studies (Barrett, 2010). ePortfolios are reflective tools (Huges, 2010) and are constantly assessed, however as showcases, the end product assessment is summative (Barrett, 2010). In Figure 5, an adaption of Barrett's (2010) workspace and showcase ePortfolio process is presented. During learning processes, learners often create workspace portfolios following given instructions, and showcase portfolios are often left unfinished (Korhonen et al., 2019). The present chapter discusses possibilities for improving showcases with open badges representing competence results and artefacts, which learners would find to be an interesting way to demonstrate their competences.

Figure 5. Adaption of workspace and showcase ePortfolios

Source: Barrett, 2010; Korhonen, 2020



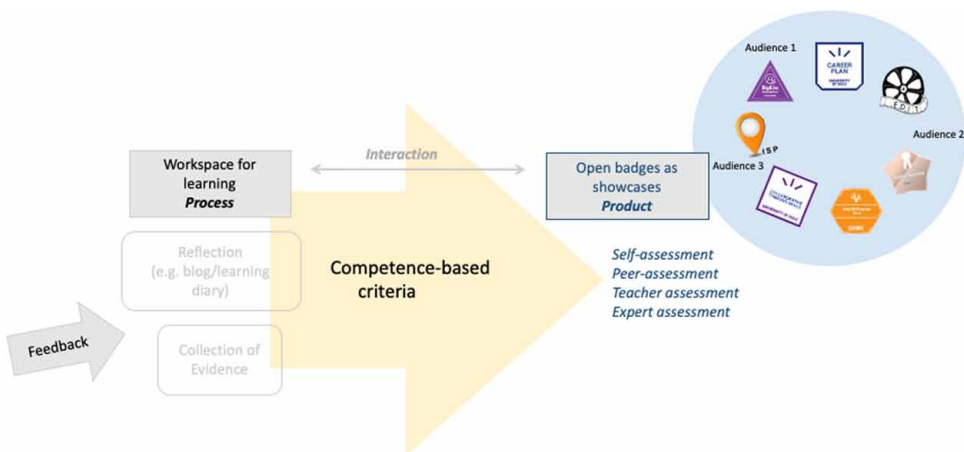
The motivation for creating ePortfolios is career advancement; they can be used in job applications and facilitate success in the labour market (Korhonen et al., 2020; Mobarhan et al., 2015). ePortfolios are therefore not only for learning but for improving a person's employability (Cambridge, 2018). According to several

studies, composing an ePortfolio is not an easy task for learners (Korhonen et al., 2019; Parker et al., 2012; Plaisir et al., 2011). Since learners aren't always aware of what kind of documents best describe their competences, scaffolding activities should involve helping learners to make competences related to their professions visible to different audiences (Korhonen et al., 2019). However, professions are not learned only during formal education but throughout an entire career (Toom, 2017). Therefore, guidance in the use of ePortfolios should be forward looking and promote continuous learning (Korhonen, 2020). ePortfolios are recommended procedure to systematically collect evidence of competences in digital format.

As previously mentioned, open badges are often described as miniportfolios. This raises several questions: First, are ePortfolios for sharing open badges? Or, second, is a function of open badges to be ePortfolios? Third, do open badges identify and recognise competences that are presented in ePortfolios? For each of these three questions, the audience matters. With whom should people share their achieved competences? Do badges allow for a formal validation of competences to be presented in ePortfolios? The concept of open badges is good in the sense that all who explore achieved badges may assess for themselves if the competences are relevant to the requirements in question each time. The relationship between ePortfolios and open badges prompts a consideration of all three posed questions within the following frame, which is based on Barrett's (2010) two faces of ePortfolios (Figure 6).

Figure 6. Balancing the two faces of ePortfolios with open badges

Source: Adapted from Barrett, 2010



The idea of open badges as showcases emphasises the ability of badges to describe different competences in detail. Barrett (2010) explains that the key features of a

showcase ePortfolio are thematically organised and offer a retrospective view of reflections, such as “Why did I choose these pieces, what am I most proud to highlight about my work and what does this work show about my learning?” (p. 10) Our model also provides the possibility to highlight all of these features, however the essential difference between it and Barrett’s (2010) original idea of a showcase ePortfolio is that criteria-based assessment of a competence replaces the summative assessment of learning. With open badges, criteria-based evidence is always attached, and it is an authentic competence demonstration.

Open badges as showcases link seamlessly to services such as Open Badge Passport (2021), where you can receive and store your open badges safely and share them with whomever you like and wherever you like. Customisation of this kind of “miniportfolio” showcase view is also about the ability to select which badges are displayed publicly for different purposes, either to social media, sent as a link, or embedded on a website. Just as Barrett (2010) describes the collection of artefacts formatted as text, photo or video, the adapted model encourages the attachment of documentation of competence—in other words, evidence—to badges as a key feature of a showcase communicating to different audiences. The challenge is to store evidence in an environment other than the badges, and ensure that it is available years from now. Different demonstrations of competence and assessments given by various parties are relevant to and meaningful for different purposes; they describe competence in multiple ways, and the value of them is context specific. For example, an assessment from a high-ranking professor as part of university studies is valuable for those interested in an academic career, while an assessment from a gaming company employee already known in the gaming industry can demonstrate important skills for employment in that field. Approaches to assessment and validation vary and are aligned to different qualification frameworks and professional and industrial standards. Presant and Fourth (2021, n.p.) list the following forms of assessment:

1. Assessment by Evidence
2. Examination (testing)
3. External Certification
4. Expert Assessment
5. Manager Assessment
6. Peer Assessment
7. Self-Assessment

Badge earners recognise the full worth of experts providing feedback and advice (Brauer & Siklander, 2017). Peer review and automatic assessment remain elusive, especially in cases where the process for badge applications includes unique claims and evidence (Hickey et al., 2015). It should also be clearly communicated whether

the badge, for example, a document describing participation in an event or an electronic duplicate of a diploma, is really a sign of competence or not. Employers use these achievements to evaluate their new hires based on their content and not as certificate replacements (Lim et al., 2018; Wolz et al., 2021). It should be noted that it is up to badge earners to set badges as private to only be seen by themselves online as motivational incentives for learning.

Advanced Digital Badging to Support Validation of Prior Learning

Globally, the central idea behind the development of digital open badges is to provide equal opportunities for continuous learning (Open Recognition Alliance, 2020). Previously acquired competence is important to individuals in the pedagogical process; when educational institutions increase their capacity to engage in the on-going assessment of competences, remarkable improvements can be achieved. When social and civic competence are taken into account in the design of badge criteria, and the material is produced with linguistic clarity, badges also respond to the educational policy goal of supporting immigrants and those with low basic skills. Digital open badges advocate transparent learning processes, equal and egalitarian assessment and relevant learning (Brauer et al., 2019). The badges promote a sense of community and enhance the experience of inclusion, equality and meaning (Brauer, Kettunen et al., 2018; Mäki et al., 2015). Public recognition of different competences encourages newcomers and immigrants to use their competences, to see new opportunities and to grow as experts (Halttunen et al., 2014).

Badges provide information on how and why competences should be validated. In Finland, national badge constellations are built to meet the requirements of different frameworks, such as DigComp (The European Digital Competence Framework) or national qualification frameworks (NQFs) that classify qualifications by level, based on learning outcomes (see *Competitive Skills*, 2021). In addition to the various frameworks supporting accreditation, the most important factor contributing to validation is still detailed badge criteria and the option to attach documentation as evidence, which allows for the clear interpretation of a competence in different contexts. This is also in line with the future development of assessment practices acknowledging the whole set of competences acquired, e.g. within the new EuroPass documentary (Cedefop, 2020).

In cases such as advocating for ePortfolios or being an ePortfolio user and having a personal ePortfolio or ePortfolios for a variety of audiences and purposes, there is a request to rethink validation regardless of how the competences in question were acquired. ePortfolios offer the ability to share open badges and promote the option of building mini-portfolios for different audiences. Validation of competences acquired

in working life is one of the key questions in badge development. With guidelines explained in detail in badge criteria, all aspects of individual competence can be identified and recognised reliably and effortlessly, and these competences can finally be validated as part of formal education and training. Through official credentialing, the competence described by a badge is transferred to school administration. This kind of verification will enhance the value, quality, and reliability of badges to the audiences that matter in work communities, academia, and the public sector.

In conclusion, digital open badges promise to promote the validation of prior learning by allowing formal validation of competences that are presented in ePortfolios. Moreover, they permit efficient use of learning analytics and inspire gamification, which supports consistent competence development as a continuum in the post-validation process. A hybrid model of competence recognition and gamified learning applications could maximise impacts on learner achievement and enhance intrinsic motivation for competence development (Brauer et al., 2017; Reid et al., 2015).

Finnish Applications of Competence-Based Digital Open Badge-Driven Learning to the Context of Educational Research

The Finnish education system is one of the most successful in the world (OECD, 2020b). The national reform of continuous learning (Finnish Government, 2020) emphasises continuous learning in working life. For Finland to maintain its remarkable performance, the educational system needs to adapt to a rapidly changing labour market. Finns have already applied competence-based open badges in different educational sectors from degree programmes to professional up-skilling and re-skilling. In practice, digital open badges offer to inform and improve both professional development and professional knowledge constructions designed to develop different competences. Teacher trainers of vocational teacher programs (Isacsson et al., 2018) are in charge of the pre- and in-service training of professional teachers, instructors working in VET. In Finland, they have been the first to implement educational reforms and to see the effects of digitalisation on different disciplines (Brauer, 2019a). As a focus group piloting digital open badge-driven learning, their experiences, views, and ideas are significant. To close this chapter, some cases from Nordic professional teacher education will be presented to explain the current state of open badges in Finland. The examples provide options to deepen the pedagogical perspective in the upcoming practical applications and may be considered noteworthy in all educational sectors and levels.

Learning Online: Professional Development for Vocational Teachers

In 2014, two Finnish schools for professional teacher education (Oulu University of Applied Sciences and HAMK University of Applied Sciences) joined forces with the VET provider Omnia, the Joint Authority of Education in Espoo. Together, the partners sought to restructure continuing professional development (CPD) and design a competence-based professional development programme (PDP) that would support VET instructors in building working life ICT skills and knowledge. The program exceeded all intended learning outcomes in the first year, both in terms of quantity and quality. By September 2021, VET instructors have applied for (and received evaluations for) 29712 Learning Online Badges, and the number of pre-service applicants is equally impressive. Since 2015, badges have been used in professional teacher education qualification programs for VET pre-service instructors, with individual schools managing their own badge factories. The nationally exceptional success of the PDP draws heightened attention to digital badging and gamification in educational contexts. The programme is funded by the Finnish National Agency for Education (EDUFI) and was awarded with a Quality Prize for improving eLearning operations and activities in Finland in 2015. The programme's outstanding learning outcomes have led Finland to develop the model on a national level within different degrees and various disciplines.

The co-created Learning Online PDP is a gamified, open badges-based MOOC (Massive Open Online Course). Learning Online aims to support VET instructors in the application of new technologies and teaching and learning strategies in online, hybrid, and face-to-face learning environments (Brauer et al., 2017). In Learning Online, digital open badges offer novel possibilities for identifying and recognising digital pedagogical competences independent of how they were acquired. The current design follows the DigCompEdu-framework (Redecker, 2017), including the meaningful use of gamification in learning and public sharing of expertise in order to support shared learning within work communities. In total, it is possible to achieve more than 50 different competence-based badges, based on the proficiency goals, assessment criteria, and competence demonstrated by the applicant. In Learning Online, the three successive stages follow a level structure: Digi-User (10 badges), Digi-Expert (25 badges) and Digi-Developer (45 badges). The levels refer to skill sets based on personal development, shared expertise, and strategic development on the organisational level.

One cornerstone of the design involved creating an educational setting that would encourage participants to apply acquired skills and knowledge in practice immediately (Brauer, Kettunen et al., 2018). In Learning Online, digital open badges visualise the requisite skill-set levels in a way that allows the participants to plan and customise their personal study paths (see Brauer, 2019a, pp. 36–39). The participants apply for

competence-based digital badges by providing the required evidence of the competence in question. Scaffolding is provided related to the rejection of badge applications and remediation. Participants are also engaged in a Facebook-based study group. In Learning Online, learning materials and badges are easily accessible 24/7 online and open to anyone interested in developing digital pedagogy and vocational training. All content is openly licensed via Creative Commons. Themed learning materials supplement instructional badge criteria and are tagged for different search options. The Learning Online landing site is an economical example of open online education implementation: it is a free Wordpress blog (<http://www.oppiminenonline.com/>), and the tools used to monitor learning were built from different gadgets available on the site and Google tools, such as Forms.

In Learning Online, digital open badges are a main feature of the game design (Brauer & Siklander, 2017; Deterding, 2015). After thorough research and comparisons of different technical settings, designers settled on Open Badges (Mozilla Open Badges, 2021) and OBF to power the game engine of Learning Online. Each basic badge belongs to a constellation of similarly themed badges, encouraging instructors to continue to develop their competences and reach the next skill-set level. Furthermore, the design aimed to foster a community experience and inclusion through the use of online study groups and competition between local teams. A live leaderboard is displayed on the site to motivate competitors “to go the extra mile” while first place competitors seek to keep their lead. Badges also promote meaningful learning experiences, such as the experience of inclusion and equality (Mäki et al., 2015). Instructors who have participated in the program have often become badge developers in their own organisations and on national and international projects (see CORE, 2020).

Teachers’ Badges Initiative

Interest in badging shows no sign of slowing down in the immediate future, with the National Initiative of Teachers’ Badges (2018–2020) following in the footsteps of Learning Online by creating and establishing a national digital badges system to support the recognition and acknowledgment of professional competences for VET instructors. To ensure instructors’ professional development, their training should be considered a competence-development continuum supporting professional growth (Mahlamäki-Kultanen et al., 2014). The challenge in opening up such a continuum in continuing professional development rests in how to support pre-service instructors in creating a personal plan for CPD—a plan aimed at motivating them to develop their competences as future VET instructors and to strengthen their self-motivation as well. Nevertheless, the objective of the initiative is to support changes to VET instructors’ competences after the reform in the vocational education and training

sector in Finland (Korhonen, Ruhalahti & Niinimäki, 2020). The project was run on a national level within several institutions of higher education with the aim of establishing a formalised recognition ecosystem supervised by the Ministry of Education in Finland and further exploring the broader sociotechnical contexts in which the badge constellations could exist.

The great autonomy of Finnish teachers and instructors highlights their responsibility to take care of their own competences. The skills and knowledge acquired during professional teacher training (60 ECTS credits are required to gain a qualification) are insufficient for the lifetime career of a VET instructor. However, the current methods of continuing professional development do not inspire instructors to continually advance their own knowledge and skills throughout their professional lives (Kools & Stoll, 2016). During the Teachers' Badges initiative, an open badge constellation was created that contained six competence areas: Learning and Guidance, Networking, Working Community, Development, Personalised Learning, and Assessment. The definition of these competences was based on several frameworks, such as the European Union's DigCompEdu (Redecker, 2017) and earlier processes, such as (2019) the digital and pedagogical badges designed by Kullaslahti et al.

The Teachers' Badges constellation is not in its final format since new competences are developed as open badges constantly in several projects in Finland. The network of Teachers' Badges designers will manage the process of incorporating new competences and badges into the constellation. The network ensures the quality of the chosen open badges (in terms of the objectives, criteria, and competence level). It seems that VET instructors are willing to demonstrate their competence via the Teachers' Badges when the objectives and criteria of a badge provide real insight into instructors' competences that are not acknowledged through the certifications of professional teacher education (Korhonen, Ruhalahti & Niinimäki, 2020).

SOLUTIONS AND RECOMMENDATIONS

This chapter has explained the main principles of the use of digital open badge-driven learning to meet unique personal needs, advance peer and community learning, and recognise excellence within working communities. Digital open badges, badge-driven learning, and ePortfolios are valuable tools for recruitment and personnel planning, continuous learning and motivation in the world of work. The results of this research support the application of a full, 360-degree view of competence-based badges in different sectors of education, continuous professional development, and lifelong learning in the world of work. Each approach comes with different applications, expected benefits, possible challenges, and infrastructure

constraints. The most likely use of digital open badges, given the current regulatory and infrastructure constraints in Finland, will focus on motivational learning and prior learning assessment led by educational institutions. An emergent trend is workforce development and industry-led programs that demonstrate the need for overall investment in up-skilling and re-skilling. The key is to approach relevant expertise through demonstrable characteristics and skills that enable and improve the individual performance. The criteria-based assessment in case of a badge application is seen as an assessment of a certain competence, not to evaluate learning acquired through instruction. The accumulation of achievements describes and directs the individual development plan.

Based on the lessons learned and the intensive development of competence-based badge constellations and research into digital badging, it would be interesting to explore the application of digital open badges in different disciplines, despite the fact that the concept of “competence-based” strategies is often associated only with vocational training and the practical skills it produces. The ongoing process of national badge development in Finland has been a journey of victories and challenges experienced in all educational sectors. The process has enabled a multidimensional conversation between badge earners, employers, educational institutions, and education developers. It is indeed true that digital open badges recognise “the expanded landscape of learning” (Grant, 2014, p. 5). In the era of digitalisation, also boundaries between different technological settings are blurring (Hamari, 2017). Open Badge Factory (OBF) provides the requisite digital open badge management platform to create and issue badges (Brauer et al., 2019), as well as a learning environment or gaming platform (Brauer & Siklander, 2017).

Criteria for the future skills and knowledge are being developed while staying compatible with nationwide administration and learning management systems (Brauer, 2019a). Technologically, digital open badges provide a model for testing and developing applications that utilise an open programming interface. As Devedžić and Jovanović (2015) put it, digital badges are “fully aligned with and supportive of the notion of Digital Learning Ecosystems (Laanpere et al., 2014)”. A 360-degree view of digital open badge-driven learning recognises abilities, actions, and interactions in relation to a variety of audiences. Future learning opportunities will offer an equally spacious view of formal or informal education. Open badges as showcases demonstrate situation-specific competences necessary to succeed in the labour market. Moreover, a showcase ePortfolio represents work experience, professional expertise, and learning at work in a reliable, criteria-based format that promotes the formal validation of competences acquired in the world of work. Open badges may be performed in ePortfolios as validation of competences. In another way around, ePortfolio pages may be linked to open badges as a digital evidence with detailed description of competences. In future, both of the showcases, ePortfolios

and personal badge collections, have their arenas and they support one another in ongoing discussion of achieved competences. Alternative credentials turn into endless alternatives to competence development in studies and during a career. From the perspective of education and labour market policy, these micro-credentials open up multitudinous alternatives to service development. However, launching new forms of evaluation may induce difficulties in terms of data management, new systems operations, and even in assessment itself (Lee et al., 2017). As with any standardised or criterion-based assessment, instructors and tutors face a large initial workload and a lack of resources (Hickey et al., 2015; Lee et al., 2017), a problem that has yet to be solved.

FUTURE RESEARCH DIRECTIONS

Instructors and their mastery of competence-oriented education, training, and learning should be put at the centre of the conversation. Flexible structures are possible when designers apply competence-oriented models suitable to their purpose. Badging, work-based learning (see Lester & Costley, 2010), and the integrative pedagogy model for educating future experts (see Tynjälä, 2007; Virtanen et al., 2012) should be studied further. It is an open question whether open badges can resolve the “tensions between the demands and opportunities provided by the workplace and the need to develop capable practice, support personal development and maintain academic validity” (Lester & Costley, 2010, p. 561). The future research of the authors will focus on asking how digital open badges, ePortfolios, and badges as showcases promote communication between working life and education on an individual, institutional, and societal level. An indisputable key factor to success is the provision of sufficient in-service training for teaching staff and also the enabling of stakeholders to participate in in-service pedagogical training and RDI activities.

CONCLUSION

The development of best practices and a common understanding of badging protocol are required to see how a competence-based approach and the opportunity to receive recognition for mastery and expertise regardless of the method of acquiring competence can affect continuous professional development. The common goal of the most impressive projects presented in this chapter has been to create and establish national digital badge systems to support the recognition and acknowledgement of individual competences during studies in higher education or vocational education and training. These projects were run on a national level within several educational

institutions with the aim of establishing a formalised recognition ecosystem supervised by the national authorities and further exploring the broader sociotechnical contexts in which badge constellations and ePortfolios could exist. After numerous pilots and experiments, the question remains, how should competence-based open badges be managed and by whom? Is the development and administration of management models and related systems the task of the government? And if so, how can such a structure support industries that are facing major changes, daily work practices, and, ultimately, individual competence?

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KEY TERMS AND DEFINITIONS

Competence-Oriented Education and Training: An efficient and sustainable way to plan and implement education based on learners' mastery of knowledge and skills and their ability to apply these in education, work, and personal and professional development.

Criteria-Based Assessment: An assessment for which criteria have been defined beforehand based on competence objectives. Criteria-based assessment focuses on the relationship between learning or competence objectives and the set assessment criteria. Criteria-based assessment can be either qualitative or quantitative.

Digital Open Badge: An electronic micro-credential that can be used for the identification, recognition, and promotion of competences acquired through formal, non-formal and informal learning.

Digital Open Badge-Driven Learning: A competence-based learning process based on a badge constellation of competences. The process involves identifying and recognising different competences using digital open badges. Digital open badge-driven learning utilises learning materials, badge criteria, instructional badging, scaffolding, and peer support. The digital open badge-driven learning process supports the gamification of professional competence development.

ePortfolio: An ePortfolio is a portfolio in a digital format. An ePortfolio describes the owner's various competences in multimodal ways. An ePortfolio is a collection of artefacts used as evidence of competences.

Scaffolding: Scaffolding is synonymous with "support." Scaffolding is providing the right amount of support to learners in order for them to achieve learning objectives that they otherwise would not achieve. There are several scaffolding providers in learning processes, such as teachers, peers learning from each other, workplace tutors, and instructions in digital environments.

Showcase: Showcase ePortfolios are carefully constructed ePortfolios containing artefacts that demonstrate their owner's competence. A key element of showcase ePortfolios is that the owner has designed various views of it for various audiences based on the audiences' interests.