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Learning from digital adaptations to the pandemic: enhancing work-based higher education

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Abstract

Purpose – This paper examines how the Covid-19 pandemic has accelerated digital developments in apprenticeship and work-based learning in higher education (HE), focusing on practices that have ongoing value.

Design/methodology/approach – A literature review was carried out on the theme of HE work-based and work-integrated learning during the pandemic, followed by minimally-structured interviews with UK university staff responsible for apprenticeship and other work-based programmes.

Findings – The pandemic has accelerated adoption of online and digital methods to support work-based and apprenticeship learning. There has been progress from emergency measures to more pedagogically consistent ones. A blended approach is becoming common, with the learning and logistical benefits from digital methods ensuring their continuing use. Progress is uneven and there is still a need for improved digital pedagogy and better integration of theoretical and practical learning.

Practical implications – More attention is needed to digital pedagogy and to effective use of online methods to support work-based learning with corresponding implications for staff development. There are institutional implications in terms of ensuring that systems and structures support what is, particularly for work-based learners, likely to be a permanent move towards digital, blended and online learning.

Originality/value – There has been limited research on the impact of the pandemic on work-based learning, with most of the literature focusing on placements and projects. This paper presents findings at a point when universities are considering how technologically-supported methods will be employed on a more permanent basis.

Keywords Online learning, Work-integrated learning, Work-based learning, Higher and degree apprenticeships

Paper type Research paper

Introduction

Since early 2020 education and training activities worldwide have experienced unprecedented disruption due to public health measures implemented in response to the emergence and rapid spread of Coronavirus Disease 2019 (Covid-19). The most obvious effect, at least for periods when the most restrictive measures were in force, was the widespread transfer of learning from face-to-face methods to technology-mediated means; Lawson (2021) describes the need to study or work from home as having accelerated many organisations' digital strategies by three years or more. For programmes that involve or are based in work an additional challenge has been created by parallel disruptions to working life including reductions in physical proximity, home working, paid leave ("furlough"), redundancy and fewer training posts and placements. While the impact of the pandemic now appears to be

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lessening, adaptations and innovations geared to overcoming its challenges have other potential advantages including improving efficiency and effectiveness, widening access, enabling interaction between physically distant (including international) participants, improving accessibility in remote areas and across geographically dispersed occupations, and widening catchments. Drawing on worldwide literature along with experience from the United Kingdom (UK), this paper reviews responses to the pandemic from a higher education (HE) work-based and work-integrated learning perspective. It focuses on points that have ongoing application and extend beyond the initial "panic-gogy" (Dean and Campbell, 2020) of simple technological substitution.

Context

Over the last three decades work-based and work-integrated learning has become a progressively important part of HE in the UK (Nixon *et al.*, 2006) as well as worldwide (Bezerra *et al.*, 2021). Work-based learning (WBL) can be defined as "all and any learning that is situated in the workplace or arises directly out of workplace concerns" (Lester and Costley, 2010, p. 562), while work-integrated learning (WIL) has been explained as "approaches and strategies that integrate theory with the practice of work within a purposefully defined curriculum" (Patrick *et al.*, 2008, p. iv). WBL/WIL programmes in HE span a broad spectrum of activities, but they are united by combining practical and theoretical learning as well as enabling learning at or through work to contribute directly to academic recognition. Programmes can be organised for instance as "full-time" courses with substantial work placements or work-based projects; with a balance of linked "on-" and "off-" job activity, as with apprenticeships and professional training programmes; or involve individuals and employers negotiating individual and small-cohort programmes, learning principally through workplace activities and projects.

One specific approach to work-integrated higher education, Degree Apprenticeships, were introduced in the UK as a national initiative in 2015 (BIS, 2015). Learners on these programmes are employed, undertake training to a nationally-defined standard and complete a university degree at bachelor's or master's level. Increasingly the degree is integrated with work-based development rather than running alongside as in traditional day- or block-release; the UK Quality Assurance Agency describes Degree Apprenticeships as furthest along a spectrum of integration compared with project- and placement-based WIL (QAA, 2018). They have become a positive driver for change in the relationship between HE and business (Crawford-Lee and Moorwood, 2019), and now form the fastest-growing and most dominant form of work-based HE (Bravenboer, 2019). Degree Apprenticeships are open to existing workers of all ages as well as new entrants and are being used for entry to professions, to provide access to graduate careers, for supporting progression within organisations, and aiding the professionalisation or modernisation of occupations from sales to policing (Lester and Bravenboer, 2020). As discussed by Talbot *et al.* (2019) there has been a corresponding decline in negotiated WBL in the UK, partly explained by the more favourable funding arrangements for Degree Apprenticeships.

Methods

This review was conducted as one of several pieces of research undertaken in 2021–22 to inform a European Erasmus+ project on post-pandemic digitally-mediated learning, in this case with the aim of providing a work-based and work-integrated learning perspective. Initially it was expected that a literature review would be sufficient to provide a reasonably up-to-date picture of adaptations and practices in WBL/WIL, but it became apparent that most published papers referred to placement- or project-based WIL rather than the more work-based end of the spectrum. To provide a partial remedy to this situation a small-scale

qualitative study was set up to gather relevant information and perspectives from UK universities involved in WBL.

The literature search was carried out in July and August 2021 using Google Scholar, with the search terms "work integrated learning", "work based learning" and "apprenticeship" coupled with "higher education" and any of "pandemic", "covid" or "coronavirus", restricted to articles in English from 2020 and 2021.700 discrete titles and short descriptions were scanned, 72 abstracts or summaries examined and 59 full papers downloaded and reviewed with three being rejected as not sufficiently relevant. The criteria used were that papers should concern, or be relevant to, WBL/WIL at HE level and include discussion of digital measures in response to the pandemic. Of the 56 items that were included, 45 were refereed journal papers, six research or practice reports, two conference papers, two guidance documents and one a book chapter. Fifteen referred to Australia, 11 to the UK and 5 to the USA, with the remainder spread across much of the globe. Most papers discussed WIL in the sense of courses incorporating work experience, internships or placements; five were concerned with apprenticeships or work-based professional entry, and one with post-experience WBL.

The qualitative study involved approaches to ten UK universities identified via the authors' organisation. This led to twelve interviews in September and October 2021 with relevant programme leaders or heads of apprenticeships or WBL (see Table 1). Potential participants were approached by one or other of the authors, informed about the purpose of the project, and invited to take part on the basis that they and their institutions would be anonymised. The themes for the interviews, as notified to participants in advance, are given below; the interviews themselves lasted between 45 min and two hours, taking the form of conversations around these themes led by the experiences and concerns of the participants:

(1) How have you had to adapt apprenticeship/WBL delivery, particularly in terms of remote teaching/learning, remote working, and TPRs [tripartite reviews]/liaison? We're not so much interested in immediate responses to the pandemic but things that have ongoing application. Does this differ between programmes, e.g. those where learners have been able to continue working "as normal", where they have moved to working from home, and where they have been put on furlough?

Ref	Institution type	Programme type(s)*	Field(s)
1a	Post-1992	DA, entry	Health, policing
1b	Post-1992	DA, WBL	Sales, general
2	Post-1945	DA	General
3a	Post-1992	DA, entry	Policing
3b	Post-1992	DA	Policing
4	Post-1992	DA, WBL	General
5	Post-1992	DA, WBL	General
6	Research-intensive	DA	General
7	Post-1992	DA	General
8	Post-1992	DA	Supply chain
9	Research-intensive	DA	Architecture
10	Post-1992	DA	Health, policing, general

Table 1. Interview contexts

Note(s): *DA = Degree Apprenticeship, entry = other entry programme using WBL principles, WBLs = other work-based learning

(2) To what extent, and in what way, do you envisage these continuing after any pandemic-related measures are no longer needed? What will practice look like in five years' time?

(3) What are the implications in terms of (university) staff practice, areas of competence, and development? Have you made use of any specialist support, e.g. learning technologists?

All ten universities were involved in providing Degree Apprenticeships, and four also commented on other WBL programmes or WIL-based entry programmes. In the text, institutions are numbered [1]–[10], and multiple interviewees from the same organisation distinguished as for instance [1a/1b].

The literature and interview findings are presented together in the following five sections.

The impact of the pandemic

The most widely reported impact of the pandemic on education generally has been to move teaching and learning online. Particularly where the focus had previously been on on-campus learning this initially resulted in what has been described as "emergency remote teaching and learning" (ERTL) (Aumjaud, 2020; Bowen, 2020; Gautam and Gautam, 2021; Robinson *et al.*, 2022) and less charitably as "panic-gogy" (Dean and Campbell, 2020), i.e. transferring teaching and learner support online without changing the basic pedagogical approach. Using the SAMR (substitution – augmentation – modification – redefinition) model (Puentedura, 2014) this constitutes substitution, i.e. moving existing methods to digital platforms without making any other adaptations or improvements.

The interview participants concurred that the main impact from universities' viewpoints had been the transition to online activity, both for teaching and learning and to aid managing programmes and reviewing progress. Several commented that their institutions were fairly well set up for this transition with remote methods already widely used in WBL. One already had a flexible delivery strategy with a "digital first", workplace-based approach and for instance provided apprentices with tablet computers so that they had common devices and software for their programme [1]. Another [10] had introduced a blended approach prior to the pandemic with digital resources, scaffolding and online discussion facilities, requiring little change to move to a fully digital model. In some others learners and staff were already familiar with working digitally, the only transitions needed typically being to move the remaining face-to-face inputs, tutorials and reviews online [2, 4, 6, 9]. Assessment methods also varied pre-pandemic, and those institutions that had already adopted work-oriented methods appeared to be in a better position than those that relied on written exams [2, 6].

Nevertheless, moving to online methods at the start of the pandemic posed challenges to institutions. Several participants discussed ERTL measures such as putting up slides with voice-overs, simple recorded lectures, or replicating classroom sessions using videoconferencing [1, 2, 3, 7, 8]; a typical comment was "everything went online overnight without a pedagogical background or digital strategy in place to back it up" [7]. One [5] discussed a rapid move to online learning packages, but commented that these were based on a traditional distance learning model that has since remained unchanged. Other challenges that were reported included changing platforms to accommodate a fully digital model, ensuring accessibility to all learners and integrating with systems used by employers.

For WBL/WIL an equal or greater impact was caused by changes in the workplace. From a survey of 150 UK employers Doherty and Cullinane (2020) summarise the effect on apprenticeships in the early stages of the pandemic as including redundancy (8% of apprentices in their sample), being placed on furlough (36%) and problems accessing (off-job) education and training (17%). The impact on HE-level apprenticeships has been smaller, with

a 3% reduction in new starts during the first four months of the pandemic compared with 45% for apprenticeships overall (Foley, 2021). A more widespread issue for all kinds of WBL/WIL has been changes to the way work is carried out, including remote working, physical distancing in the workplace, and (particularly in the health sector) acute and ongoing operational demands; as Bravenboer and Crawford-Lee (2020) comment, the pandemic has had profound consequences for the world of work and on skill development (Bravenboer and Crawford-Lee, 2020). As a result some types of learning opportunity have been curtailed, made more challenging, or required to adapt to changed working environments, while others that might not have previously been considered have been created (Zegwaard *et al.*, 2020; Park and Jones, 2021; Wong *et al.*, 2021).

The interviews indicated that the impact of the pandemic on learners' work varied across occupations. In nursing, policing and leadership learners typically remained in the workplace and were often under high levels of pressure, creating challenges for integrating learning and for using synchronous methods. In business-to-business sales a straightforward transition to remote working was reported, with the challenges of "going digital" creating learning needs that fed directly into the programme. Some fields had a proportion of learners on furlough, with mineral products particularly badly hit [4]. Although delayed starts and breaks in learning were noted, there were few reports of learners leaving programmes permanently. On balance there was recognition that WBL/WIL models have proved resilient to the disruptive consequences of the pandemic, and they have retained the support of employers (Leek, 2020).

Beyond emergency remote teaching and learning

As the coronavirus pandemic has progressed, institutions' initial responses (essentially substitution) have generally been replaced by more considered and sophisticated approaches involving augmentation, modification and to some extent redefinition. Some of these have accelerated changes that were already taking place, some are producing practice that is more effective generally, and others are offering alternatives that though geared primarily to the pandemic have ongoing value for specific applications. A key factor in moving beyond ERTL has been realisation that learner behaviour online is not the same as in a face-to-face learning environment. Approaches need to be rethought for online learning and sessions and programmes redesigned according to a consistent pedagogical framework (Anderson, 2020; Abu Talib *et al.*, 2021; Khamis *et al.*, 2021). The interviews indicated that a major theme has been developing blended models that, while they may be provided or initiated via digital channels, integrate different components, make sense as a package, and promote active learning [1b, 3b, 4, 6, 8].

Fanguy *et al.* (2021) and Emms *et al.* (2021) comment that the "flipped" or "inverted" approach, where learners come to a session equipped with the relevant factual learning and use the time for discussion and application, translates well to online learning. More generally there is some consensus that the most effective practices involve well-designed combinations of asynchronous activities of various kinds with synchronous ones for discussion and questioning (Anderson, 2020; Gamage *et al.*, 2020; Rook and McManus, 2020). Examples of online learning in WIL programmes are provided that are essentially learner-centred, collaborative, and involve critical enquiry (e.g. Aumjaud, 2020; Gamage *et al.*, 2020; Rook and McManus, 2020; Robinson *et al.*, 2022). There is also a need for appropriate structuring and learner support, including signposting through a course or package, supporting learners according to their individual needs and contexts, and strengthening their capacities for self-direction and for integrating between theory and practice (Anderson, 2020; Bowen, 2020; Carmody *et al.*, 2020; Hodges and Martin, 2020). The use of user-friendly, highly navigable online learning platforms is also reported as critical (Taylor and Flaherty, 2020).

Mixing asynchronous and synchronous elements was also reported in the interviews as good practice [1b, 3b, 4]. The pandemic also provided an impetus to move away from traditional pedagogies, aiding the development of more active learning methods and connecting learners through online learning communities [4, 6, 7, 8]. Lillis and Bravenboer (2020) discuss the need for pedagogical practices, such as recognition of prior learning, negotiated learning agreements, good-quality mentoring, online support, and assessment that reflects work practices, to be mutually supporting. They comment that integrating practices introduced in the pandemic, such as decentralising assessment, online mentoring and involving employers in the online environment, can improve the quality and resilience of the overall programme.

Interview participants also noted specific ways that learning had been aided via digital media. In some cases the move to online learning was used to enable greater access to external contributors, sometimes bringing in topical matters drawing on the ongoing situation [1, 6]. Other interventions included providing inductions to digital platforms; ensuring that platforms were used in a consistent manner, so that for instance resources would always be in the same place; and using discussion boards rather than email (also reported as reducing pressures on staff) [3, 4]. There has been recognition of the need to avoid making assumptions about learners' digital fluency or access to resources, with both training and technological support offered where needed [1, 4]. Greater use has been made of educational or learning technologists and digital pedagogy specialists, as well as additional staff to support digital delivery for instance as facilitators [5]. Among other things specialists have been used to help staff with appropriate pedagogies [6], edit and format materials to put online [4], make digital interfaces more sophisticated [5], support staff development [8] and develop an online community of practice [6]. One participant commented that moving online has resulted in greater shared working with learning support staff, learning technologists and librarians as well as academic colleagues [1b].

Integrating work and learning

An important part of supporting WBL/WIL programmes generally is ensuring that work and learning are integrated (Lester and Bravenboer, 2020), creating additional challenges in the move to remote working and learning. Although there are some commonalities the pressures on placement-based WIL have been slightly different to those on apprenticeships and other work-based programmes. For the former, measures to overcome changes to work opportunities and working patterns can be viewed on a spectrum of the least to the most change. Bayerlein and Jeske (2018) distinguish (1) physical internships or placements, (2) "e-internships" based on remote working, and (3) simulations, but recent practices indicate a more subtle continuum that includes in addition digital adaptations to conventional work patterns and the use of real-world projects as an alternative to, or within, placements. At one end of the spectrum jobs are carried out on site, but there is some transfer to online working or learning to facilitate social distancing. At face value these are principally pandemic mitigation measures such as live-streaming work interactions (Pennell *et al.*, 2020) and online supervision and peer learning (Salter *et al.*, 2020), but they do have an ongoing value for instance in reducing travel and increasing accessibility where learners are geographically dispersed.

A more common situation has been for real placements, internships or work-based training to continue but with remote working and learning facilitated by digital tools. While some of this has little currency outside of a pandemic environment, some aspects are innovative and are expected to remain in use. Learner experiences are different from those offered by physical internships, but they can still be high-quality and have benefits including being able to offer a wider range of experiences, improve self-management and technology-

related skills, provide improved accessibility to geographically dispersed learners, and provide international experiences and perspectives without the need for travel (Briant and Crowther, 2020; O'Connor *et al.*, 2021; Hayes and Cejnar, 2021; Park and Jones, 2021). Programmes of this kind can have limitations for developing some kinds of skills, but they can still provide deep immersion in work practices (Dean and Campbell, 2020; Hodges and Martin, 2020), and can be better at involving learners in communities of practice (Briant and Crowther, 2020). A major factor in making them work is the presence of strong academic-employer partnerships (Lillis and Bravenboer, 2020).

In some cases it has proved impossible to set up placements or training in the normal way, even remotely, and a project-based approach has been adopted instead. Examples include learners working collaboratively on projects for organisations (Morley and Clarke, 2020; Rook and McManus, 2020), short assignments for small firms (Alanson *et al.*, 2020; Kay *et al.*, 2020), or developing start-up enterprises (Zegwaard *et al.*, 2020). Good academic-employer partnerships are again generally critical to success (Kay *et al.*, 2020). Finally, where it has not been possible to access real training opportunities or projects, simulations have been used. These are common in the health sector (e.g. Carmody *et al.*, 2020; Roskvist *et al.*, 2020; Taylor and Flaherty, 2020) but also appear elsewhere (Bilsland *et al.*, 2020). There is a debate about whether they can be regarded as WIL, but some have been designed according to WIL principles both pedagogically (e.g. Taylor and Flaherty, 2020; Gamage, 2021) and by involving employers. Advantages of simulations include covering a wider range of situations than would occur in real-life contexts, providing more controlled conditions, and introducing work practices in a safe environment (Bilsland *et al.*, 2020; Taylor and Flaherty, 2020). They nevertheless have limitations particularly to the depth and extent of experience that can be offered, and post-pandemic they are likely to be used as preparatory or augmentory tools (Hudson *et al.*, 2020; Zegwaard *et al.*, 2020).

For apprenticeship and fully work-based programmes the interview participants placed less emphasis on the university acting to engineer work experiences, although simulations have been used in health and policing in the ways outlined above [1, 3, 4]. Participants discussed various means of linking work and academic learning, including bringing in workplace examples to discuss in synchronous sessions [5]; a strand running through the programme requiring learners to apply their knowledge at work, supported by staff skilled in using relevant interventions [4]; and a module that scaffolds reflective practice and develops it to become an ongoing part of work [3]. Supporting work-based learning through one-to-one conversations was seen as expensive, hence an emphasis on online group discussion and three- or four-monthly reviews [5] with some use of more frequent tutorials [9]. One participant commented that WIL is less about "delivering" than "facilitating" [1b], something she observed is not necessarily well-supported by university digital systems that focus on the provision of content.

The use of remote (institutional) support and supervision has also been a major feature in apprenticeships and it is likely to become standard practice post-pandemic. Tripartite reviews between learner, employer representative and tutor are a central feature of many WBL programmes (and mandatory for apprenticeships in England). They have sometimes been treated as a primarily administrative exercise but they are increasingly used as conversations to drive and support workplace learning and develop the university-employer relationship at a practical level [1a, 1b, 4]. Online reviews were reported as being more effective than face-to-face: easier to arrange with fewer cancellations, less wasteful of time and resources and easier to fit in with work patterns [1, 2, 3, 4, 6, 8]. Learners were also reported as more confident to put their own viewpoints and less deferential to their supervisor or tutor [3a]. Disadvantages included not getting the same feel for organisational culture and context that a physical visit would give [5] and the difficulty of reading body language online [4]. On balance participants

expected most reviews to stay online, with some mixed models and only one ([3], for a specific programme with a single local employer) returning to all face-to-face.

Looking beyond the pandemic

The interviews provided an opportunity to explore emerging expectations for working as a sense of normality returns. One interviewee commented that the last eighteen months had accelerated digital development "in the direction that it was already going but pushing forwards faster" [4]. Different rates of progress were reported, with for instance health and policing more advanced and engineering less well-developed in integrating work and learning. Some institutions are adopting a digitally-based default for apprenticeships, thought to be a good fit with "sustainability, and a wider picture of how the university will work … more digital and less lecturing and offices" [5]. In summary institutions were reported as planning to build on advances during the pandemic, typically blending methods in "a thoughtful fusion of face to face and online" [6]. Online methods were seen as having unequivocal advantages in two types of situation: for one-off inputs, large-group lectures and masterclasses, and for one-to-one tutorials and TPRs where videoconferencing had clear advantages as described above. For small group work and discussion a return to classrooms (or on-site locations) was envisaged or already taking place across several institutions, but the use of online learning communities and fora was also expected to continue [2].

An exception to this move to what might be termed a digital-first blended model was described in one institution for its policing programmes [3]. Here the participants felt that there was a strong preference among learners and supervisors for face-to-face meetings, with online methods being too formal and missing serendipitous encounters; a return to the classroom/training room was reported as imminent. Nevertheless it was planned to keep the most successful digital elements online, including big lectures, one-off inputs, TPRs and one-to-one tutorials.

Finally, two participants raised ethical and legal questions about aspects of digital learning. These included the ownership of recorded materials; to whom they could be made available; the ongoing currency of videos and podcasts; the ethics of recording learners (e.g. "I don't record questions and answers" [1b]); and the rights of sessional staff when their inputs are available for repeated re-use. A need for up-to-date and easily understood policies and practices on digital learning and artefacts was indicated.

Evaluations and implications

The literature is generally positive about the increased use of online and digital solutions. Abu Talib *et al.* (2021) found that well-executed online learning is efficient, cost-effective, as effective as traditional methods, and slightly preferred by learners despite the loss of face-to-face interaction. They also comment that it provides an impetus for pedagogic innovation and change. There is a significant advantage in terms of flexibility and accessibility, particularly when asynchronous modes are used; this has a positive effect on reducing travel, overcoming distance, and fitting in with flexible work schedules (Pretti *et al.*, 2020; Gautam and Gautam, 2021). Finally, benefits are reported in terms of learning and skill development, including opportunities to engage with technologies relevant to work (Abu Talib *et al.*, 2021; Gautam and Gautam, 2021) and increasing work-relevant skills and attributes such as independence, self-management, collaboration, adaptability and flexibility (Pretti *et al.*, 2020; Rook and McManus, 2020; Hayes and Cejnar, 2021). At an overall level Lillis and Bravenboer (2020) indicate that well-integrated online solutions can improve the resilience and success of programmes into the future, and Bravenboer and Crawford-Lee (2020) comment that they can offer an enhanced way to engage with employers and meet their skills needs in the context of emerging economic changes.

Challenges are also identified, both technologically and in terms of effectiveness and pedagogy. Different levels of both technological proficiency and access to equipment and fast internet connections are highlighted by Abu Talib *et al.* (2021), Gautam and Gautam (2021) and Gamage *et al.* (2020). Factors such as burnout and "screen fatigue" can be experienced by both learners and staff (Hayes and Cejnar, 2021; Abu Talib *et al.*, 2021), and limits to digital and online learning are noted, both in relation to informal or spontaneous communication and to enabling the development of practical skills (Gamage *et al.*, 2020; Pretti *et al.*, 2020; Abu Talib *et al.*, 2021). Both Abu Talib *et al.* and Gautam and Gautam comment on variable technological and digital pedagogical literacy among staff, and that the effectiveness of provision can depend on individual readiness to engage with online approaches.

There are also significant implications for staff and institutional competence. Anderson (2020) comments that "universities face a challenge of achieving the equivalent of a ten-year digital learning strategy in mere months" (p. 453). While the literature indicates variable levels of competence in moving to more advanced online and digital approaches, some common themes are emerging. Beyond being able to use the relevant applications and platforms effectively, these include familiarity with digital pedagogies; the ability to create effective digital content; and proficiency in designing and running courses that support effective online and blended learning, including through incorporating social interaction and self-direction (Gamage *et al.*, 2020; Schweiker and Levonis, 2020; Khamis *et al.*, 2021; Robinson *et al.*, 2022). For WBL this extends to support for work supervisors as well as academic mentors or link tutors (Lillis and Bravenboer, 2020). The need for development activities that go beyond courses and workshops is emphasised, for instance through collaborative learning (Khamis *et al.*, 2021); developing e-learning resources to support pedagogical practice and programme design (Lillis, 2018); developing a strong online community that shares innovation and assists tutors to adopt practices relevant to their contexts (Anderson, 2020; Kay *et al.*, 2020); and pairing digitally experienced tutors with less experienced colleagues via online platforms (Fanguy *et al.*, 2021).

The interviews indicated that the level of staff competence relating to both technical matters and digital pedagogy was variable at the outset of the pandemic. This was partly an individual factor, and partly dependent on the extent to which the institution (or relevant unit or faculty) was already using online methods. Technical needs included getting up to speed on the relevant software, bridging between different systems particularly when working from home, and being able to overcome glitches, the latter potentially a pedagogic or management skill as much as a technical one. As time went on more specific needs arose covering areas such as recording, making videos, mobile devices, understanding and employing the capabilities of different platforms, optimising the use of break-out spaces, and matters relating to confidentiality and data protection.

Pedagogically, an initial need was being able to "move beyond transferring lectures online in existing form" [1a] and to learn to teach effectively using online tools; as previously indicated, some institutions were already at this stage while in others rapid learning and adjustment were needed. Improving beyond basic practice brought up the need for effective learning design, and for skills in working with groups online – things such as "getting a conversation going and sustaining it" [2] and managing the dynamics between group members [3a]. The digital transition also raised other matters of good WBL/WIL practice that were brought to the fore by moving online, such as adopting work-related assessment practices [5, 6] and using TPRs as learning conversations [1a, 2].

Various interventions were described that aided staff getting up to speed in online provision. Initially these tended to take the form of technical training and development sessions, followed by working with learning developers and technologists, online courses for staff, and scaling up existing virtual learning environments and e-portfolio platforms to support staff development. One participant commented that for longer-term effectiveness

there is a need to develop digital scholarship and philosophy, and "give practitioners time to do it and relate it to practice" [1b].

Concluding comments

The study confirms that the pandemic has accelerated a move to online and digital pedagogy in work-based and apprenticeship learning, beyond simple adaptations that are designed to avoid face-to-face contact and can be discarded as Covid-19 becomes more manageable. It is likely that for most programmes the post-pandemic norm will not be fully digital but blended and potentially "digital first"; online methods will be used where they have clear benefits, whether pedagogically or from a perspective of efficiency and logistics. "Flipped" or "inverted" approaches, a mix of synchronous and asynchronous methods, judicious use of simulations, online tripartite meetings and online learning communities are likely to feature, and increasingly accessible technologies such as augmented, mixed and virtual reality may play a larger role as their potential becomes recognised.

A major need in work-based and apprenticeship programmes is integrating theoretical and practical learning, requiring the institution to become involved in prompting, facilitating and supporting workplace learning in partnership with the employer. The effectiveness of institutions in doing this varied pre-pandemic (Lester and Bravenboer, 2020), and this is carrying over into online approaches; some programmes are adopting the digital equivalent of day-release while others are focused on the workplace as the primary site of learning. Different levels of progress are also apparent in moving beyond "ERTL", with initial progress – for instance creating well-packaged but unexciting learning packages, or well-produced online lectures – not always being followed by the development of more diverse approaches geared to the needs of work-based learners. Attention is also needed to the choice of hardware and digital platforms, ensuring that technology is suitable for work-based applications as well as delivery-based online learning, fully accessible from home and work as well as from the institution, and supportive of accessibility principles such as universal design (Nottingham, 2021; Wilkens *et al.*, 2021).

In terms of individual development needs, three key areas can be identified. The first is about understanding and using the available technology effectively. While this was an urgent need early in the pandemic and remains essential, there is an indication that it is reducing over time as digital approaches become mainstream. The second is developing capability in digital and blended learning pedagogy, both to support the design and delivery of individual sessions and components and to aid design at programme level. The third is fluency across methods that make use of digital means to support learning at work, including through reflection on practice, undertaking projects, systematic enquiry and reviewing learning (Garnett, 2020); this is something that will typically involve employer as well as university personnel, and relates to the more general need to improve engagement with the work environment as a primary source of learning.

Finally, institutional systems, policies and management need to support emerging practices (cf. O'Connor *et al.*, 2021). Regulations, guidance and frameworks for quality, ethics and accessibility need to be updated to reflect digital teaching and learning; staffing structures may need to change to accommodate more collaboration both across academic staff and between subject-specialists, WBL tutors, work-based mentors and coaches, learning technologists and information specialists; and assumptions based on learners as full-time students physically attending campuses need to be challenged. Garnett (2016) comments that even in universities where WBL is well-established, systems and procedures may be "preconfigured towards the full-time undergraduate population" (p. 312); without structural change, the flexible practices necessary for digitally-facilitated, work-based and work-integrated learning may still have "a continual struggle to align with university structures and administrative procedures" (Garnett, 2016).

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