

Re-imagining Blended Learning 3.0 in Education - Defining a New Technology-Enabled Experience Led Approach to Accelerate Student Future Skills Development

Jamie A Kelly, University College Dublin, Ireland
Victor McNair, Digital Schools Awards, Ireland

The European Conference on Education 2021
Official Conference Proceedings

Abstract

This paper argues that digital living and working has changed irrevocably as a result of the Covid-19 Pandemic and therefore, digital developments in education brought about mainly by the use of blended learning during the Pandemic needs to be converged to support lifelong digital learning. Adopting the European Unions definition of blended learning, the paper shows that a tripartite understanding of blended learning between schools, Industry and policymakers is needed to secure sustainability and transferability of digital skills from school to the workplace. The Digital Schools Awards programme is offered as a potential contributor to a digital culture of lifelong learning to consolidate the development of digital literacy across Europe so that the experiences of blended learning and teaching during the Pandemic can be harnessed and advanced. To be sustainable, blended learning must appeal to students and their teachers' pedagogical and curricular needs. The paper, therefore, promotes a continuum approach to blended learning where a range of developmental and progressive strategies are proposed as 'accelerators' for digital skills. A rationale for future work and draws on this continuum to support blended learning and the workplace as a lifelong practice. A multistakeholder, peer to peer approach to the future of learning and skills development will, we argue, positively impact the way 21st-century citizens can educate, learn and work at cross-cultural, multi-societal and institution levels.

Keywords: Blended Learning 3.0, Blending Learning Accelerator, 3Es Framework, Education Learning Continuum, Future of Work Skills, 3Es Model, Tri-partite Approach, Digital Literacies, Digital Wellness

iafor

The International Academic Forum
www.iafor.org

Introduction

This paper explores blended learning as a developmental continuum that supports the strategic embedding of digital learning skills in schools. This strategic approach, we argue, can accelerate student learning and hence better prepare them for post-pandemic digital living and working. We use the term 'accelerate' as a metaphor for increasing the levels of student digital competence in three ways. First, to exploit, and where pedagogically viable, embed the many digital developments that teachers created during the Pandemic to support remote learning to enhance their pedagogical efficacy. Second, 'accelerating' student digital skills is made necessary by the mounting pressure for flexible learning. At a policy level, the UN [2020], UNESCO [2020], the European Commission [2020] and OECD [2021a] take the view that governments must support more diverse forms of digital learning and teaching. At the workforce level, McKinsey (2020a p.2), early in the life of the Pandemic argued that; "*In just a few months... companies have accelerated the digitisation of their customer and supply-chain interactions and their internal operations by three to four years*" (authors' emphasis), with the survey highlighting an increase in remote working as the second-largest shift most likely to 'stick' through the recovery. Third, by providing a developmental road map, education organisations can recognise the scope and breadth of blended learning (defined in detail below) and therefore activate strategies to embed, extend, and enhance student experiences. Combining these elements of the metaphor, we argue, is an effective way to understand how best to support schools and students in developing appropriate, sustainable, progressive and future-ready skills for lifelong education, learning and work [WEF, 2018].

The Pandemic forced up to 94 per cent of the world's student population to change their established patterns of learning [United Nations, 2020]. Education institutions had to recalibrate their teacher-learner relationships to maintain continuity in learning [Barron et al., 2021]. The traditional classroom-based understanding of the 'lesson' had to become distributed in time and space, requiring teachers and learners to develop different digital skills to account for hitherto unknown variables such as hardware, connectivity and home physical space. They had to reimagine the nature of their human connections with their learners and develop new ways of offering support.

However, Schleicher (in OECD 2021a p. 3) observes, "*Remote classrooms ...are not the same as smart ones*". Lucas *et al.* [2020] also suggest that learning did not take advantage of the range of online tools that could support learning in the transition. Instead, they argue, teachers replicated their established forms of learning in a remote context. Similarly, learners, released from the controlling influence of the classroom, teacher proximity, school culture and corporate identity, faced learning alone, remotely, with few constraints. Without the immediacy of teacher presence and support, they may have struggled to understand their role in this new context. Eivers *et al.* [2020] found that just over half of pupils taught remotely did not have 'live' or real-time teaching but instead presented with traditional tasks such as completing a worksheet or reading. As a consequence of many of these factors, claim the World Bank, "*...the [global] impact [of the pandemic] on the human capital of this generation is likely to be long-lasting...*" [World Bank, 2021].

1. Opportunities of Post-pandemic Learning and Teaching

Despite these difficulties, forced remote learning has, perhaps inadvertently, created an innovation explosion that has all the potential to accelerate more varied and digitally-based

learning and teaching scenarios. The new education landscape has forced a rethinking of education policy in many countries. For example, calls for more flexible and resilient education systems include expanding the definition of the right to education to include '*...connectivity entitlement...*' [UN, 2020].

There is now an emerging policy agenda for building post-covid flexibility using the newly acquired digital skills that have made online learning and teaching possible [McAleavy and Gorgen, 2020]. Similarly, UNESCO [2020 p.16] argue that interest in mobile learning "*... has grown exponentially...*" and the UK think-tank Ed Tech APPG [2020] argue for traditional teaching to be coupled with educational technology to enrich the variety of pedagogical approaches. The European Commission [2020 p.3] has taken a more radical stance proposing sweeping changes to established curricular norms, arguing that post-pandemic education has the opportunity to explore how 'traditional' ways of learning and teaching can be adapted "*...from subject-based knowledge transfer to scaffolded competence development...*". (2021a) argue that classrooms are now poised to take advantages of emerging technologies such as AI and robotics.

1.1. The Digital Schools Award: An Example of Blended Learning

Blended Learning as an Accelerator

The Digital Schools Award (DSA) programme, helping schools address these calls for change, is an EU-wide self-review pilot framework that provides primary and secondary schools with strategic and practical digital learning and teaching approaches, including blended learning. While recognising the complexity of the emerging debate and the range of variations and approaches to blended learning, Singh & Thurman's [2019] helpful summary of 46 separate definitions into four common elements has supported the DSA approach. The four common elements are time (the use of synchronous and asynchronous activities), interactivity (teacher-student, student-teacher, whole-class or group activities, student-student interactions all facilitated through a variety of technology tools), physical distance and educational context.

Similarly, the European Commission has summarised its ongoing policy blending learning agenda as "*...a hybrid approach that combines learning in school with distance learning, including online learning...*". [EC, 2020 p.4].

Augmenting Singh & Thurman's four elements with the Commission's definition, the DSA programme has created a progressive and developmental continuum of strategies (Figure 1) that can support Europe-wide recognition among schools, transferability and policy consistency. At a practical level, teachers can select appropriate blended learning strategies and techniques depending on the needs and skills of their learners and the context in which they are working.

Another critical policy element of the DSA programme is its linkage in terms of language, focus and outcomes to SELFIE (2021), the EU-wide developmental school's self-review questionnaire. In the DSA Framework, development and adoption are in three stages that move from a strong classroom focus (Blended Learning 1.0) through more varied blends (2.0) to Blended learning 3.0, where education is primarily online and where digital pedagogies use tools that support a range of collaborative and independent learning activities and where teacher control is more remote.

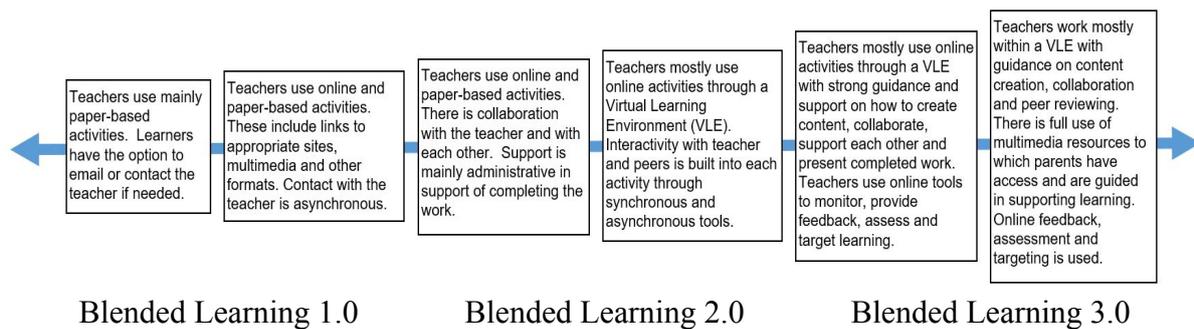


Figure: 1. DSA Blended Learning Continuum

The continuum is also augmented into a whole-school developmental framework. The core is seven key developmental areas (shown in the circle) drawn from the European Digital Action Plan [EU, 2021], which for participating schools further expand to include statements of best practice that support current government policy agendas. The areas are summarised in Figure 2 below.

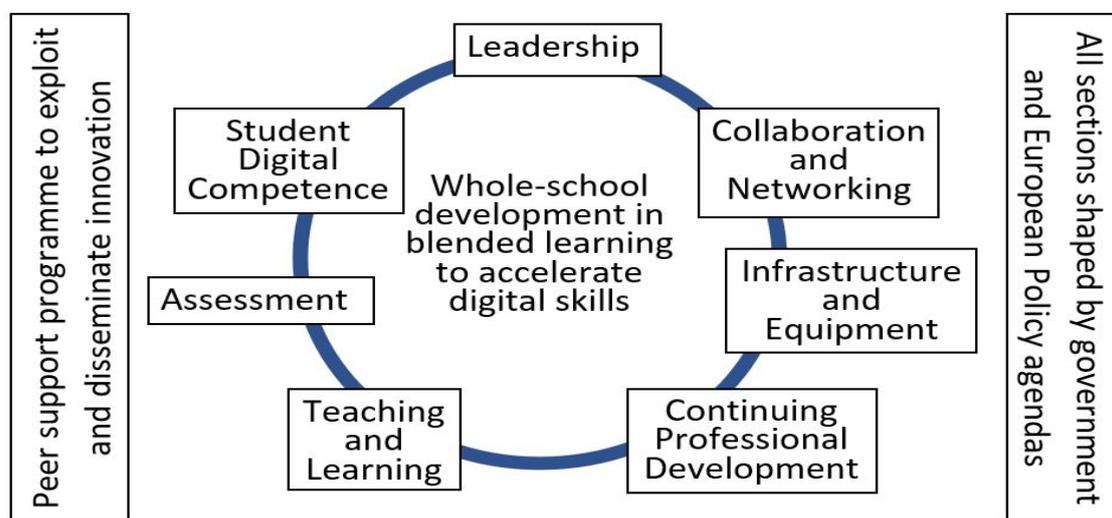


Figure. 2. Digital Schools Awards Framework.

The DSA potential for impact lies not only in its conceptual alignment with the EU Digital Education Action Plan 2021-2027 [*ibid.*] but its close relationship with the SELFIE tool [2021] itself is crucial for the plan. Furthermore, the DSA is also an incentivising tool for schools to embark on developmental trajectories that potentially lead to 'Award' status. Central to the DSA programme is a whole-school approach, implied by Castano Munoz *et al.*[2021] as essential to adding student voice to that of leaders and teachers. Reimers and Schleicher [2021 p.11] further assert that student's voice is vital to taking learning forward "... in the design of a new expanded blended ecosystem for learning, and in providing them more agency and autonomy in directing their learning ...".

DSA programme - Impact to Date

Table 1 (below) illustrates the success of the DSA's blended learning approach by educators, students and education ministries up to December 2020.

	Primary School	Secondary	Total Number of students participating in the DSA Program
Republic of Ireland	60%	5%	1.01 million
Northern Ireland	44%	24%	
Scotland	52%	77%	

Table: 1. Digital Schools Awards Schools - Adoption of online programs.

Addressing schools' developmental needs as described above, the programme draws on the expertise of the digital technology industry and the policy influence of a range of ministries of education. Along with schools, the DSA programme constitutes a tripartite knowledge transfer mechanism. The next section of the paper explores the potential of the DSA Framework for supporting developmental learning and teaching in further education and workplace environments.

2. Re-Imagined for Further/Higher Education

Unforeseen disruption in higher/further education occurred in the delivery of undergraduate courses and modules through 2020 and into 2021, even though education instruction through any number and blending learning modes for many educators was nothing new.

This sudden and disruptive shift to remote education varied by size, governance models, and disciplinary differences. Large comprehensive institutions usually found it more challenging to develop an institutional approach [EUA, 2020]. Figure 3 [EUA, 2014] details the reported finding of the level of blended learning in European universities as of 2013.

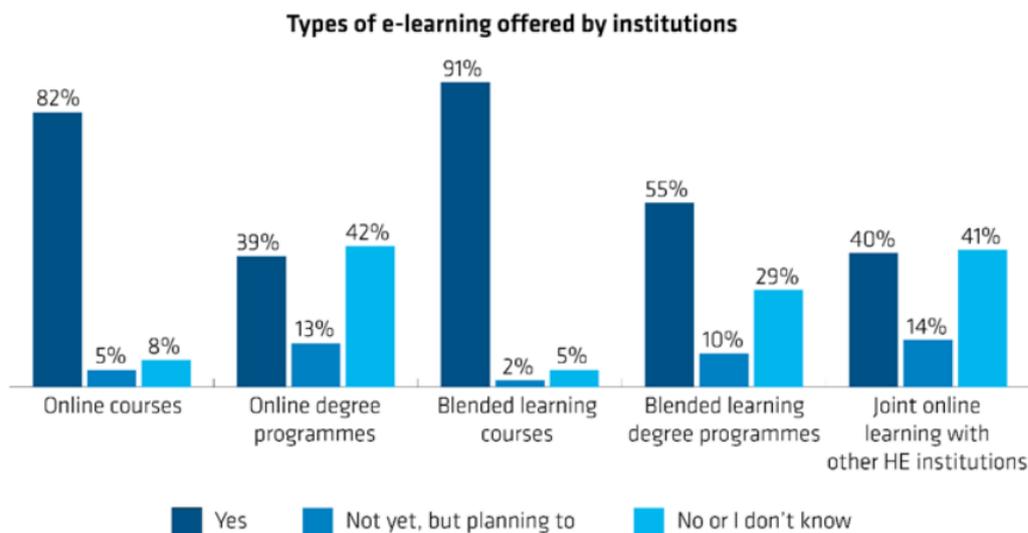


Figure. 3: European University Association Report Findings 2014.

The vast majority of institutions indicate that they have plans beyond the crisis to explore new ways of teaching (87%) and enhancing digital capacity (70%) [EUA,2020].

In the same report, the immediate and short terms (and full academic year) response from Universities focused on extending the existing educational content and modes of teaching as

used in face to face teaching to online, blended forms. This initial response in evolving education content to suit the delivery method was expected given the considerable amount of societal level disruption caused by the Covid-19 Pandemic. Still, as the Pandemic continued, this inertia contributed to students' increased dissonance, desire, and mental disconnection in their course program and progression.

As already discussed in this paper, the application of a framework approach developed and adopted by the Digital Schools Awards Program has enabled an agile "flexing" and structured approach to reduce disruption in education in primary and secondary school environments. Such an approach can be extended to further/higher education as part of a broad "digital wellness" learning policy.

The OECD Learning Compass 2030 [OECD,2021b] is an evolving learning framework that sets out an aspirational vision for the future of education. It provides orientation points towards the future we want: individual and collective well-being and was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts. The OECD Learning Compass 2030 identifies three "transformative competencies" that students need to contribute to our world and shape a better future: creating new value, reconciling tensions and dilemmas, and taking responsibility.

Such approaches could also create a defined bridge for sharing of best practices with and between Industry and the workplace as a means of knowledge transfer. The workplace equally can share learned practice, the subject of the next section.

3. Workplace Covid-19 Response to Collaborative Learning

Deloitte, a global change management consulting company, created a 360° lifecycle framework [Deloitte, 2020] that charts the different change and response phases (in office-based environments) from the initial impact of the Pandemic to the medium and long-term response. The effect was one of moving office workers from face-to-face working (and learning) to a blended working (and learning) environment. As with education institutions, this phenomenon also impacted workers' and managers' ability to maintain group, collaborative and peer to peer collaboration and productivity.

For this reason, the lens in this paper draws upon the changing nature of work and learning to understand and shape the future of blended learning 3.0 in a more distributed workplace and formal education setting, given that knowledge is bi-directional from the workplace to education and education to workplace settings.

The authors of this paper have subsequently developed an Education-focused 360° lifecycle framework using the Deloitte approach as a proxy, detailed in Figure 4 and an explanation of what the authors define as each phase in Table 2.

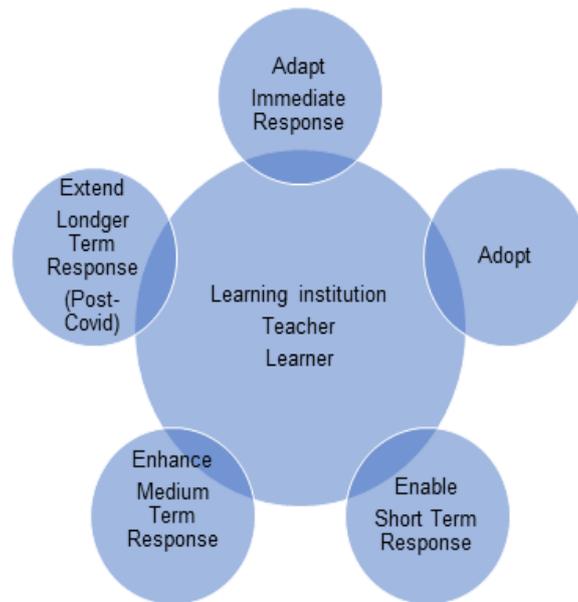


Figure 4: Authors' Visualisation of Education's Response (3 "Es" Approach).

Phase 1	Adapt	Education institutions rapid response to switch to 100% online blended learning mode. No time to assess the impact on pedagogy or learning
Phase 2	Adopt	New/updated typical business conference calls such as MS teams and Zoom increases in usage to deliver teaching/assignments
Phase 3	Enable	Increased focus on content design, formats in order to keep the audience/students engaged
Phase 4	Enhance	Adaptation and refinement in the blended learning approach at learner, user, organisation/institution level engaged
Phase 5	Extend	Move to refreshed approach, content and delivery as the initial Adopt/Adapt phases transform

Table 2: Response Phase to Learning in Schools Due to Covid-19 Restrictions.

4. Future of Work Skills - Policy, Practice, People

"Accelerated Technology development and the adoption during 2020 has opened up fractures in the workplace today." (Price Waterhouse Cooper Consultants, 2020).

Given the present and forecasted changes [OECD, 2020], it is likely that the workplace has changed forever. As with previous recessions, the current Pandemic has put increased pressure on global and European socio-economic and political institutions to find solutions, break the crisis, and adapt to accelerate where possible, usually through the intervention of digital technologies. In 2020 necessity pushed aside the hesitations of policymakers, technology companies, commerce, and others to adopt new ways of working, such as home working using new digital technologies and new forms of innovation. Institutions such as the European Commission [EC] and the World Economic Forum increasingly acted as the Pandemic's oracles. The EC vastly increased its Research and Innovation fund [Horizon, 2020] to act as a growth stimulus beyond the Pandemic. Technology moved from an enabling force in the workplace and education to a driver. While the global and European policy and research and innovation institutions were looking beyond the short-term, the

mammoth international focus on technology as the "fix" has ironically created and increased the digital divide (not discussed in detail in this paper).

Proficiency in new technologies is only one part of the future challenge. Human skills such as creativity, originality and initiative, critical thinking, emotional intelligence persuasion, and negotiation will be increasingly vital for knowledge workers [WEF, 2018].

The Futurium Report [European Commission, 2020] Foresight exercise was launched in Autumn 2012 to prime policymakers' imaginations and promote a broader debate. The aim was precise, to explore potential interactions between different technologies, human life and global resources. One key outcome was learning where boundaries will increasingly blur across other areas of life. With greater flexibility in designing individualised lifelong educational pathways within knowledge-worker workplace settings technology, education directions are likely to support new forms of learning, e.g. digitally enhanced classrooms, virtual educational spaces, and personalised, interactive, intelligent, wearable teaching systems. In this innovation environment, a blended learning 3.0 approach is applicable in education and workplace settings.

"Building the capacity and engagement of workers organisations in skills development... based on a human-centric approach... will help build a better "normal" post-Covid-19 workplace"(International Labour Organisation,2020).

This is not to ignore the enablement potential of emerging technologies such as Extended Reality [Forbes, 2019] that are increasingly a focus of attention both in the education [Brooks, 2011] and business worlds [Steelcase, 2020].

McKinsey's Global Institute [McKinsey, 2020b] draws on data from almost 1,100 local economies across EU countries. It states that the Pandemic will not be the only trend shaping the future of work. Once economies recover, they may have a shortage of skilled workers, despite a growing automation wave. More people will be working in independent and shared workspaces, "Intentional Learning" (informal learning) will become a critical new soft skill [McKinsey, 2020c]. While the most significant increase in the type of roles will be those with technology skills, the foundation for many of these roles will be in the broader "4C" (Creativity, Collaboration, Communication, Critical thinking) skills. McKinsey [2020c] highlights an increase mainly in creative and entrepreneurial skills, while technology/technical roles will be in most demand. Figure 5 highlights the critical workplace skills needed in the future [McKinsey, 2020b].

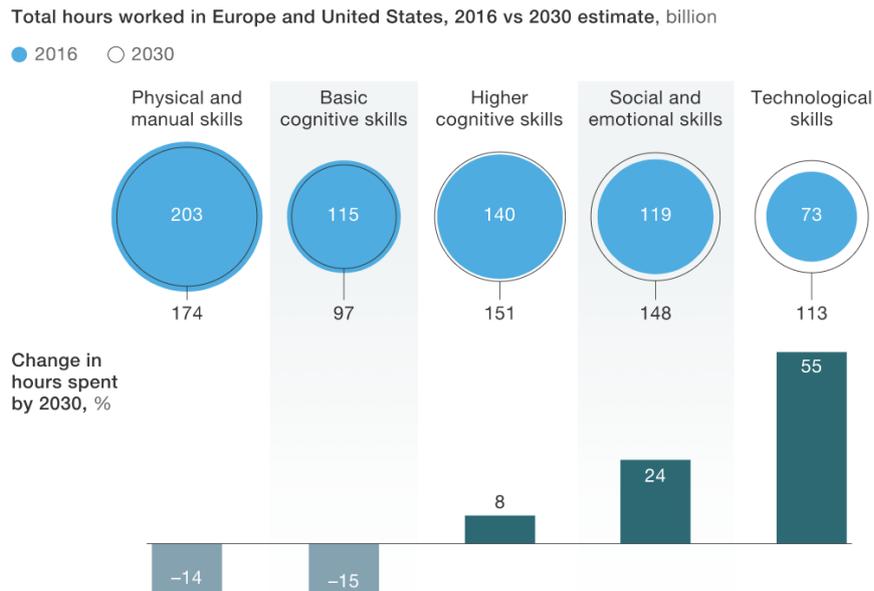


Figure 5: Analysis of critical learned skills for the workplace.

A learning workplace adoption of Blended learning 3.0 will be possible by converging theory, practice, and policy with formal educational learning settings.

The "4Cs" [European Commission 2020, 2018] are at the centre of Policy and Futures Strategy in terms of research and innovation to deliver sustainable digital futures [Wilson *et al.* 2019] and digital workplace transformation [OECD, 2018] at the societal, economic and organisational level.

The Global Business Transformation Consultancy PwC [2021] reports on the importance of informal and creative learning in the knowledge-worker workplace, of which creativity has received considerable focus.

The longer-term impact on an increased tripartite blended learning partnership will be to increase productivity in the workplace, given the "productivity paradox" [Brynjolfsson, 1993] has negatively impacted the workplace despite technology advancements [Kelly, 2020a].

The immediate and short term workplace impact up to 2022 is in an environment of flux and transformation. The future is one of a blended model combining physical presence with online work, the latter of which needs to be highly structured and rich in media [DeLuca and Valacich, 2005]. There is an opportunity to synchronise how blended learning takes place in the workplace and formal education settings.

New technological developments will also cross the chasm between formal education settings and the workplace as collaborative virtual environments first envisioned 25 years ago [Harrison and Dourish, 1996] become commonplace, thus creating a lifecycle approach and bridge between education and workplace skills.

Virtual spaces, enabled by virtual reality, will transcend and overlay the "real" spaces of the everyday world, further enhancing opportunities for blending learning. These, in turn, will accelerate peer to peer learning that introduces the idea of "experience" as the process of formal or informal education, thus supporting the "4C's" (Eraut, 2010).

The Covid-19 Pandemic has increased the spotlight on the future of work, where the workplace will be significantly more distributed and up to 30% of knowledge workers will continue to work from home [Kelly, 2020b]. Covid-19 has spotlighted the European Commission's Digital Workplace initiative (European Union, 2021) to meet critical strategic goals on workforce transformation for its staff.

Increased digital literacies in schools, further and higher education are the future foundation for the new young generation in the workplace regarding "readiness" to adopt and adapt to the future of work. Younger staff are digital natives [Prensky, 2001]. They are much more connected and react in real-time. The Digital Workplace initiative will meet their expectations and allow them to contribute to their institution's work with the tools of their culture. Curiosity being the openness to ideas and an ability to make connections between disparate concepts, is the future fuel for adopting a blended learning 3.0 model that will be powered through end-to-end lifecycle approaches that programs such as the Digital Schools Awards have championed and led.

Conclusion

Pedagogies have to adapt (Not just the channel)"... *it is now clear that transformation should include an enhanced dialogue and stronger partnerships between educators, the private sector, researchers, municipalities, and public authorities....*" [EU, 2021].

The enforced widespread use of digital technologies has opened the door to changes in education at all levels. Increased application of specific Digital Literacy Frameworks has to be adopted to define and measure the future. The DSA programme and the blended learning continuum approach offers a transferable and practicable lens to view how to take a 360° lifecycle approach in Further Education and the workplace in terms of learning. The future of blending learning is a responsibility of education, policymakers and the workplace [BCG, 2020].

This paper has argued that despite the challenges faced by schools in providing continuity in learning and teaching during the Covid-19 Pandemic and despite the need to return to face to face based teaching, there is widespread agreement that the flexibility, resilience, mobility and innovation offered by digital technologies has opened the door to change in education. Much of the change agenda is now driven by new further education, higher education and workplace patterns and practices, consolidated and formalised in emerging EU policy. Pedagogies have had to adapt. While much of that adaptation has been patchy, somewhat reactive and based almost exclusively on the skill and experience of the teacher offering the lessons, the EU call for societal engagement is now unassailable. "... *it is now clear that transformation should include an enhanced dialogue and stronger partnerships between educators, the private sector, researchers, municipalities, and public authorities....*" [EU, 2021]. The DSA programme and the blended learning continuum approach (1.0 to 3.0) offer a highly transferable and educationally proven lens to view how to take a 360° lifecycle approach in further education and the workplace in terms of learning. Furthermore, accelerating a multistakeholder peer-to-peer system to the future of learning and skills development can positively impact how we all educate, learn, and work at a cultural, societal, and institutional level.

References

- Barron, M., Cobo, C., Munoz-Najar, A. and Sanchez Ciarrusta, I., (2021): The Changing Role of Teachers and Technologies Amidst the COVID 19 Pandemic: key findings from a cross-country study, World Bank Blog.
<https://blogs.worldbank.org/education/changing-role-teachers-and-technologies-amidst-covid-19-pandemic-key-findings-cross> last accessed 2021/05/21.
- Boston Consulting Group (BCG), (2020): COVID-19 and the Great Reset: Briefing note #28, October 21, 2020.
- Brooks, C.D., (2020): Space matters: The impact of formal learning environment on student learning. Wiley. New York. 2011.17.04.2020.
- Brynjolfsson, E., (1993): The Productivity Paradox of Information Technology, Review and Assessment. Communication of the Association of Computing Machinery Dec 2020 Issue.
- Castano Munoz, J., Costa, P., Hippe, R. and Kampylis, P., (2021): Within-School Differences in the Views on the Use of Digital Technologies in Europe: Evidence From the SELFIE Tool.
- Deloitte, (2020): Workforce Strategies Post Covid-19 Report, Deloitte Consulting.
- De-Luca, D, and Valacich, J.S., (2005): Outcomes from Conduct of Virtual Teams at Two Sites: Support Media Synchronicity Theory, In Proceedings of the 38th Hawaii International Conference on Systems Science.
- Ed Tech APPG, (2020): All-Party Parliamentary Group for Education Technology: Lessons from Lockdown: What we learned about Education Technology,
<https://www.besa.org.uk/news/edtech-appg-report-published-lessons-from-lockdown/>
- Eivers, E., Worth, J. and Ghosh, A., (2020): Home Learning During Covid-19: Findings From the Understanding Society Longitudinal Study, NFER, Slough.
- Eraut, M., (2010): Informal Learning in the Workplace Research Paper. The University of Sussex UK, online 13.10.10. pp 247-273, 2010. Living Lab "Action Research". Learning spaces and psychology.
- European Commission Report, (2020): Blended Learning in School Education: Guidelines for the School Academic year 2020/21, Created by European Commission, Directorate-General Education, Youth, Sport and Culture, Unit B.2: Schools and multilingualism.
- European Commission/Futurium, (2020): Digital Futures Final Report, A Journey into 2050 Visions and Policy Challenges.

European Commission/Horizon, (2018): Transitions on the Horizon: Perspectives for the European Union's future research and innovative policies. Final report from project BOHEMIA. Beyond the Horizon: Foresight in support of the EU's future research and innovation policy. Contract no PP-03021-2015).

European Commission – Joint Research Centre (JRC).
https://www.researchgate.net/publication/326712929_Within-school_differences_in_the_views_on_the_use_of_digital_technologies_in_Europe_evidence_from_the_SELFIE_tool last accessed 2021/05/25.

European University Association, (Sept 2020): Briefing: European Higher Education in the Covid-19 Crisis.

European University Association, (2014): E-Learning in Europe Higher Education Institutions Illustrating the level of Blending learning as of 2013).

European Union Report, (2021): Digital Education Action Plan 2021-2027: Resetting Education and Training for the Digital Age, European Union.
https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en accessed 2021/05/27.

Forbes, (2019): Online article August 12, 2019, What Is Extended Reality Technology? A Simple Explanation For Anyone (forbes.com).
<https://www.forbes.com/sites/bernardmarr/2019/08/12/what-is-extended-reality-technology-a-simple-explanation-for-anyone/?sh=7afc49d72498> last accessed 2021/05/27

Harrison, S. and Dourish, P., (1996): Re-Place-ing Space: The Roles of Place and Space in Collaborative Systems. Xerox Palo Alto Research Center †Rank Xerox Research Centre, Cambridge Lab (EuroPARC).

International Labour Organisation, (2020): Skills Development and Lifelong Learning Resource Guide for Workers' Organisations.

Kelly, J., (2020a): The Sudden Requirement to Work from Home Due to COVID-19 Pandemic Restrictions: Attitudes and Changes in Perceived Value of Physical and Immersive Workspaces Paper. Delivered at the 6th Annual (2020) International Immersive Learning Research Network Conference, June 11 2020.

Kelly, J., (2020b): The New "Covid-19" Home Office Worker: Evolving Computer-Human Interactions and the Perceived Value of Workplace Technology Paper. Technium Social sciences Journal, Vol 13, 575-581, November 2020.

Lucas, M., Nelson, J. and Sims, D., (2020): Schools' Responses to Covid-19: Pupil Engagement in Remote Learning.
https://www.nfer.ac.uk/media/4073/schools_responses_to_covid_19_pupil_engageent_in_remote_learning.pdf , last accessed 2021/05/21.

- McKinsey, (2020a): How COVID-19 has pushed companies over the technology tipping point—and transformed business forever, survey October 05 2020. <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever>
- McKinsey, (2020b): The Future of Work in Europe Automation, Workforce Transitions, and the Shifting Geography of Employment, . Discussion paper, McKinsey Global Institute.
- McKinsey Quarterly, (2020c): Online Article Lisa Christensen, Jake Gittleson, and Matt Smith "The Most Fundamental Skill: Intentional learning and the career advantage, August 07 2020. <https://www.mckinsey.com/featured-insights/future-of-work/the-most-fundamental-skill-intentional-learning-and-the-career-advantage>.
- McAleavy, T. and Gorgen, K., (2020): What Does the Research Suggest is Best Practice in Pedagogy for Remote Teaching? Education Development Trust, Reading.
- OECD, (2021a): OECD Digital Education Outlook 2021, Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots, OECD Publishing, Paris, <https://doi.org/10.1787/589b283f-en>
- OECD, (2021b): Online page Learning Compass 2030 - OECD Future of Education and Skills 2030 (accesses 8.8.21).
- OECD, (2020): A Helping Hand: Education responding to the coronavirus pandemic Report <https://oecdeditoday.com/education-responding-coronavirus-pandemic/> (accessed August 06 2021).
- OECD, (2018): Science, Technology and Innovation Outlook 2018. Adapting to Technological and Societal Disruption.
- Prensky, M., (2001): Digital Natives Digital Immigrants, MCB University Press, Vol. 9 No. 5, October 2001.
- Price Waterhouse Coopers, (PwC), (2021): Upskilling for Shared Prosperity, Insight Report in collaboration with PwC, January 2021.
- Reimers, F.M. and Schleicher, A., (2021): Schooling Disrupted, Schooling Rethought: How the Covid-19 Pandemic is changing education, OECD. https://www.oecd-ilibrary.org/education/schooling-disrupted-schooling-rethought-how-the-covid-19-pandemic-is-changing-education_68b11faf-en last accessed 2021/05/27
- SELFIE, (2021): Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies https://ec.europa.eu/education/schools-go-digital/about-selfie_en accessed 2021/05/25.
- Singh, V. and Thurman, A., (2019): How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018). American Journal of Distance Education. 33 (4) 289-306.

Steelcase Global Report, (2020): Engagement and the Global Workplace, Published by Forbes.

Tech Radar., (2021): Do We Have Video Fatigue or Are We Just Tired of Meetings?
<https://www.techradar.com/uk/news/do-we-have-video-fatigue-or-are-we-just-tired-of-meetings>

Wilson, N., Thomson, A. and Holliman, A., (2019): "Understanding Inclusive Design education", International Conference on Engineering Design, ICED19, DELFT University, The Netherlands, 5-8 August 2019.

The World Bank Report, (2021): Urgent, Effective Action Required to Quell the Impact of COVID-19 on Education Worldwide.
<https://www.worldbank.org/en/news/immersive-story/2021/01/22/urgent-effective-action-required-to-quell-the-impact-of-covid-19-on-education-worldwide> accessed 2021/05/21.

UNESCO Report, (2020): Education in a Post-COVID World: Nine ideas for public action. International Commission on the Futures of Education, UNESCO, Paris.

United Nations Report, (2020): Policy Brief: Education during COVID-19 and Beyond.
https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf accessed 2021/05/21.

World Economic Forum, (2018): Future of Jobs Report., Centre for the New Economy and Society.