

# D

## Digital Technology and Inclusive Learning



Hayley Sparks

The Mind Lab, Auckland, New Zealand

Critically reflecting on the role of digital technologies to overcome barriers and respond to diverse learning needs has been the focus of considerable research and practice inquiry. Over time, technologies have developed, and the potential for technologies to promote and facilitate inclusive learning and educational equality has been realized and debated. Broadly speaking, introducing technologies is an opportunity to rethink teaching and learning practices. It is argued that digital technologies, if utilized appropriately, can constitute a new context for learning and teaching. However, there are risks associated with conceptualizing technology as a panacea for the realization of inclusive classrooms and educational equality. With these tensions in mind, this entry critically examines the underlying practices of inclusive learning, traces the trajectory and scope of digital technologies used to promote inclusive education in the classroom, and highlights some of the potential risks and mitigating factors that need to be acknowledged for the potential of digital technologies to be realized.

## Introduction: Diversity, Inclusive Education, Technology, and Universal Design for Learning

Diverse learning needs can be complex and the result of a range of individual and social factors which intersect. For example, ability, race, class, gender, age, religion, geographical location, and sexuality can all influence learning journeys. Adding complexity to learners' needs, everyone comes from different family and socioeconomic backgrounds and has different cultural origins, different academic skill levels, different first languages, and different life experiences (Westwood 2018). This complex web of intersecting factors that shape learners' attitudes, behaviors, and actions means that they may be difficult to reach and disengaged or have special learning needs. Managing different needs and abilities and ensuring that all learners have equal opportunity to succeed and flourish have prompted the conceptualization of frameworks to revise current educational practices to move toward more inclusive educational systems.

Inclusive education can be defined as practices which engage all learners who achieve through being present, actively participating, learning, and feeling a sense of belonging. UNESCO (2019) promotes inclusive quality education systems that "remove the barriers limiting the participation and achievement of all learners, respect diverse needs, abilities and characteristics and that eliminate all forms of discrimination in the learning

environment.” To achieve this goal, systems and practices need to be flexible and responsive to diversity, rather than expecting learners to be flexible. Inclusive learning should be understood through a social model lens, where impairment or learning difficulties are not biologically determined but created by the context within which learning takes place.

Traditional teaching approaches for learning activities and some learning environments can lead some learners to feel disengaged and excluded. In response, UNESCO’s global “Education for All” movement sought to transform systems and institutions to facilitate inclusive education by 2015. This movement has been followed by the “Incheon Declaration Education 2030: Towards inclusive and equitable quality education and lifelong learning for all” (UNESCO 2015). Now, almost all education systems are committed to enacting policies of inclusion, where schools are expected to meet the learning needs of all learners, regardless of ability (from giftedness to intellectual impairment). This mandate means that all educators are encouraged to develop curriculum, activities, and assessments that recognize and respond to the needs of all learners. For many, digital technology plays a critical role in these practice changes.

Technology, defined broadly, has always been a part of teaching and learning practices. As Beetham and Sharpe (2013) note, paper, chalk and print, overhead projectors, television, educational toys, and writing instruments were all technological innovations once. Digital computers, mobile, and wireless technologies are just the latest innovations being incorporated into teaching and learning practices. Bruner’s (1966) text *Toward a Theory of Instruction* highlights the way in which misunderstandings and knowledge gaps related to technology prompted changes to curriculum and that continued technological change would require constant redefinition of education. This constant redefinition has been seen clearly in many educational contexts and teaching practices. Technology can be characterized as utopian and liberating, as removing social, educational, and physical barriers to full participation in society (Foley and Ferri 2012). Digital technology can

be used to stimulate interest, sustain motivation, support creativity, and create collaborative learning experiences for all learners. Within learning environments that utilize digital technologies, learners are able to connect with their passions through a more responsive approach to teaching. Leaving behind the exclusion of learners with special needs who were once physically and educationally separated from mainstream education, with different schools and curricula, the goal for many education systems now is for special education learners to have access to, participate, and succeed in mainstream education. For this to work, the design of learning environments and practices must be inclusive to all, and digital technologies are a key tool for educators. However, diverse learning needs are not going to become inconsequential differences in society by primarily using technology. Instead, technology must be considered an additional tool in an educator’s toolbox to assist with the development of learning environments, curriculum, and practices that are universally designed.

The use of digital technologies for learning is often linked to the universal design for learning (UDL) framework that is used by educators to support the design of more flexible and inclusive learning environments. The idea of “universal design” first emerged in the 1950s and became a prominent concept in the USA, Japan, and Europe in relation to the construction of obstacle-free environments to enable universal access for physically impaired people. From these origins, universal design became a core tenant of many professional practices over time, although education was slow to take up this approach. Rose and Meyer (2002) offered a seminal text on universal design for learning that is premised on the idea that individual learners are not the cause of educational failures, but that failure and inequalities reflect learning systems that do not meet the needs of all learners. UDL involves a systematic, research-based approach to identifying barriers to learning and participation that are hidden in teaching practices. The overarching goal of UDL is designing the least restrictive environment for all learners, of which differentiation is a part. However, the need for extensive differentiation

can be reduced when learners are able to customize their learning in environments and practices framed through a UDL lens. Linking UDL to digital technologies, it is argued that UDL is possible because digital technologies make it possible to design and develop learning materials and environments that are more flexible. For example, multimodal representations of content are central to UDL, and digital technologies can provide this as digital media is inherently more flexible than traditional media such as textbooks. However, educators need to be aware of how to leverage the flexibility inherent in digital technologies to achieve inclusive learning.

### **The Benefits of Digital Technology for Inclusion**

Inclusive practices and institutions often have characteristics that foster a sense of community, have universally designed assessment practices, promote learner agency by letting learners take ownership, provide authentic and meaningful learning experience, encourage collaborative teaching and learning, and allow learners to develop collaborative problem-solving. Digital technology has been shown to aid in the development and maintenance of these characteristics. Technologies may be hardware-based (such as computers, mobile phones, players of downloadable audio, or games consoles); or they may be software-based (such as web applications, social networking spaces, computer games or, chat sites) (Abbott 2007). There are many widely understood benefits of utilizing digital technologies for education. For example, mobile technologies, games, and the Internet can provide opportunities for learners to connect, communicate, and collaborate. Other benefits include motivating learners, deepening engagement in learning, enhancing creativity, allowing independence, and enhancing support from parents and caregivers. However, as the utilization of digital technologies differs, different forms of technology can have benefits for different groups of learners along the spectrum of ability. Learners are able to manage their learning and make things harder or easier, which is

possible as digital technology is more flexible and malleable than static pencil and paper. At a simple level, for many learners, but particularly those with autism and ADHD for whom time management can be a struggle, the presence of a digital countdown timer visualizing the passing of time can support their self-management. Looking deeper, considering learners with different levels of impairment or learning needs, technology with strong visual elements such as videos and multimedia can be effective for those whose literacy levels may be low. Barriers to reading can be minimized by reading books online, with audio, visual, and graphics assisting with repetition, planning, and sequencing. Videos can be replayed, and learners can revise material independently until they understand. All these interactive media can be utilized on mobile technologies such as tablets and smartphones which also allow learners to learn anywhere. With this flexibility, mobile technologies can also be useful for learners for whom attending school might be problematic for family or cultural reasons. In this way, the walls of classrooms are becoming increasingly broader and more transparent (Beetham and Sharpe 2013). Videoconferencing can also link learners and educators to other schools, experts, and community members. This can assist with extending the learning opportunities for all learners, but particularly for gifted learners. For example, the personalization of learning opportunities for learners with different abilities can be aided by allowing them to upload and download content that matches their interests and experiences. Podcasts, blogs, online communities, games, and learning platforms have been shown to realize these benefits (Abbott 2007). A common thread underlying the use of digital technologies for inclusive learning is giving learners agency to learn in ways that are personalized and fit their needs. Digital technologies provide flexible tools for learners to be able to engage with curriculum content and assessment in ways that encompass their strengths and allow the effect of weaknesses to be minimized.

Combining the use of many different types of digital technologies, and of benefit to all learners, virtual field trips are another approach to

technology being used in classrooms globally. These “field trips” provide an opportunity for those learners who might not be able to participate in field trips (due to physical or financial limitations) and to learn about processes, cultures, and other phenomena in distant places. For those gifted learners whose thinking needs to be challenged, virtual field trips can provide opportunities for them to extend their skills and knowledge. For example, virtual field trips to Antarctica can use multimedia to show videos and photos, experts can communicate with the classroom through virtual conferencing services, and interactive activities provided for learners to complete. These trips and multidimensional learning processes provide experiences to learners that would otherwise not be widely available or possible otherwise.

### **Thinking Critically About Digital Technology for Inclusion**

While the design and use digital technologies have been shown to promote education equality for some learners and in some contexts, it is important to not romanticize the role of technology for inclusive learning. There is a growing awareness of the ways that learning is socially situated. Learning difficulties can be created or fostered by inadequate teaching, inappropriate pedagogy, or insufficient resources. A more social and inclusive model of learning only takes place if the appropriate context has been created. In this way, it is important to avoid the risk of technological determinism when thinking about how technology can assist with the development of inclusive teaching practices.

Building on this tension, the extent to which technologies are changing classroom practice continues to be debated. For example, the pedagogical effectiveness of digital technologies for teaching and learning has been questioned. It is as easy to teach ineffectively with technology as it is without it. The successful incorporation and presence of technology in a classroom is dependent on changes to practices as well as the introduction of hardware and/or software. In this way,

understanding the limitations of technology is an important part of maximizing the benefits. To contribute to continued inclusion in education, it is critical that an understanding of how digital technologies can influence classroom dynamics is central to initial teacher education. For example, Beacham and McIntosh (2014) note that student teachers allow learners with additional support needs to use technology believing that it improves access to learning materials and therefore increases achievement. However, it has been shown that this practice can exclude learners, especially when learners are doing activities unrelated to the rest of the class (Beacham and McIntosh 2014). In this way, technology is not merely a substitute for existing practice, but teacher’s beliefs and attitudes toward the use of technology for inclusion can undermine aspirations for inclusion. Educators need to be equipped with the confidence and competences to use digital technology to address the diverse needs and preferences of learners. A blended learning approach where classroom and online learning opportunities are provided can help to promote choice and autonomy. Educators’ competences for using and implementing digital technologies in the classroom must be enhanced if the positive impacts of technology for inclusion are to be realized.

Digital technologies can contribute to UDL learning approaches and promote inclusive education, but technologies cannot be taken at face value as being widely accessible and positive additions to classrooms. For example, while the use of the Internet, websites, and apps has become commonplace in classrooms, all features of these tools are not always usable by all learners. Those with sensory, cognitive, and physical disabilities for example may not be able to read the text, use the device, or navigate the browser. There are many apps and extensions that can be used to remove barriers embedded in technologies; by changing fonts to be more accessible to dyslexic learners, screen readers can assist learners who find reading difficulty or prefer to learn by listening, voice recognition apps can assist learners who find writing difficult, and color enhancers can alter the color of webpages to make them

more accessible to those who are color blind. Specially designed assistive technologies can promote inclusive learning, for example, speech synthesizers, braille translators, and video enlargers. However, more flexible curricula and teaching practices can reduce the need for these technologies but will not eliminate the need as very particular needs for individual learners can be met with these tools. Adding complexity to the role of assistive technologies for promoting inclusive learning, the burden to be included remains with the learner to use these technologies. Some studies even suggest that there is no evidence that digital and assistive technologies had any impact on reducing social exclusion for disabled people. In this way, it is important to understand the broader social context within which digital technologies are used in the classroom to be able to realize the potential role they can play in inclusive learning practices.

One of the key barriers to realizing the potential of digital technologies for inclusive learning is access to hardware and software, especially for low socioeconomic groups. Many initiatives have emerged to try to empower learners through digital technology, including the “One Laptop Per Child” project which has provided a connected, low-cost laptop to over three million children and teachers in countries predominately throughout Latin America and Africa (REF). This project aims to provide marginalized children with a tool to learn and access knowledge and resources that would otherwise have been invisible to them. While this project has been praised for contributing to the transformation of education, there have also been criticisms which reflect broader concerns about the implementation of technology in the classroom. For example, teacher training and ongoing support and the difficulties associated with connecting the use of technology to effective pedagogy in the local context. Thus, providing access to devices alone is not enough, but broader systems and processes need to be put in place. As Traxler (2018) indicates, there is a clear need to develop sustainable, contextually specific, and authentic foundations for learning with mobile technologies in the Global South.

Continuing to think critically about the role of digital technology for inclusive learning, it is not just the place of technology in the classroom. The practices surrounding the use of the technology, which while having the best of intentions, can also have unintended consequences that can be exclusionary. The concept of the digital divide is pertinent here, as there can be an uneven distribution in the access to, use of, and impact of technology for different groups. Distribution can be based on socioeconomic or geographical criteria and can perpetuate existing inequalities when individuals and groups are unable to access or utilize digital technologies. There can be divides between but also within schools and communities. For example, if the burden of purchasing a laptop falls with parents to ensure that their children have access to digital technology in the classroom, there are going to be some families who are not able to make the financial commitment. This idea of “bring your own device” places extra pressures on families and can construct new forms of barriers for some children. Similarly, less well-resourced schools are not going to be able to provide the same level of integration of digital technology into the classroom as schools that have access to a wide variety of technologies. Technologies that are familiar to learners outside the classroom are argued to offer meaningful learning opportunities in school and could signal a means to address elements of the digital divide. For example, there have been recent calls to explore how informal technology use, such as mobile phones, can contribute to achieving formal educational goals. However, this is a contentious call and in contrast to debates about prohibiting the use of mobile phones in schools. Understanding the context within which digital technologies are being introduced is important. The nuances and complexities of wider social systems within which schools are located, and within which learners lived realities play out, can influence the ways in which digital technologies are integrated and afford benefits for inclusive learning.

## Conclusion

Technology can disrupt norms, challenge assumptions, and allow for the development of new, innovate forms of learning activities. Further, digital technologies are shaping the future of teaching and learning, providing learners with unprecedented opportunities for creativity and exploration. However, there is a danger of continuing “business as usual” strategies supplemented with digital enhancement. There is a need to think critically about how digital technologies are integrated into classrooms as part of efforts to promote more inclusive learning. Educational pedagogies, educators’ attitudes and competencies, and the wider social context can shape how digital technologies are accessed and utilized, with unintended barriers and additional exclusions sometimes resulting. Despite these realizations, the extent to which classroom practices are changing remains open for debate and consideration. There is opportunity for further research exploring digital technology and inclusive learning, as technology continues to rapidly develop and as pedagogies and understanding of inclusive learning evolve.

## Cross-References

- ▶ [Adaptive Personalized eLearning](#)
- ▶ [Digital Inclusion in Early Years Education](#)
- ▶ [Gender and Digital Learning](#)
- ▶ [Mobile Digital Technologies Across the Curriculum](#)

## References

- Abbott, C. (2007). *E-inclusion: Learning difficulties and digital technologies. Futurelab series, report 15*. Bristol: Futurelab.
- Beacham, N., & McIntosh, K. (2014). Student teachers’ attitudes and beliefs towards using ICT within inclusive education and practice. *Journal of Research in Special Educational Needs, 14*(3), 180–191.
- Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Foley, A., & Ferri, B. (2012). Technology for people, not disabilities: Ensuring access and inclusion. *Journal of Research in Special Educational Needs, 12*(3), 192–200.
- Traxler, J. (2018). Learning with mobiles: The global south. *Research in Comparative and International Education, 13*(1), 152–175.
- UNESCO. (2015). Incheon Declaration Education 2030: Towards inclusive and equitable quality education and lifelong learning for all. World Education Forum. Retrieved from [http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ED/pdf/FinalVersion-Incheon\\_Declaration.pdf](http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ED/pdf/FinalVersion-Incheon_Declaration.pdf). 11th June, 2019.
- UNESCO. (2019). Inclusion in education. Retrieved from <https://en.unesco.org/themes/inclusion-in-education>. 1st June, 2019.

## Key Resources

- Beetham, H., & Sharpe, R. (2013). An introduction to rethinking pedagogy. In *Rethinking pedagogy for a digital age: Designing for 21st century learning* (2nd ed., pp. 1–12). Routledge: New York.
- Rose, D. H., & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Association for Supervision and Curriculum Development. Alexandria, VA.
- Westwood, P. (2018). *Inclusive and adaptive teaching: Meeting the challenge of diversity in the classroom* (2nd ed.). Routledge: New York.