



Digital Learning: A Bright New Dawn for Learning and Development

*Claire Gubbins, Thomas N. Garavan,
and Elisabeth E. Bennett*

Abstract There has been a steady increase in the use of digital learning media, a trajectory which was accelerated in recent years due to a myriad of factors. Definitions of digital learning are quite diverse but generally can be categorised into formal, informal and blended. Empirically and practically, the emphasis has been on formal digital learning. In this chapter we focus on the drivers, opportunities and challenges associated with digital learning as an approach to achieving organisational learning and development goals. Specifically, we discuss the drive for shorter, faster and cheaper

C. Gubbins (✉)

DCU Business School, Dublin City University, Dublin, Ireland

e-mail: claire.gubbins@dcu.ie

T. N. Garavan

Cork University Business School, University College Cork, Cork, Ireland

e-mail: tgaravan@ucc.ie

E. E. Bennett

Concordia University Ann Arbor, Ann Arbor, MI, USA

e-mail: Elisabeth.bennett@cuaa.edu

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training and learning methods and consider the impact on learning quality. We discuss digital learning in the context of learning pedagogy and consider the evidence and implications if digital learning methods are not designed with learning pedagogy in mind. Finally, we acknowledge the re-ignited emphasis on informal learning or learning in the flow of work and consider if digital technologies can facilitate such learning.

Keywords Digital learning • Learning and development • Learning pedagogy

9.1 INTRODUCTION

Digital technologies have restructured many facets of organisational human resource (HR) practices, and learning and development (L&D) is no different (Nachmias & Hubschmid-Vierheilig, 2021; Anderson, 2020; Garavan et al., 2020a; Li, 2013). The impact of digital technologies on L&D depends on how they are implemented; at one end of the spectrum having the potential to disrupt existing L&D activities and at the other end incrementally supporting and complementing tried and tested classroom-based practices (CIPD, 2021; Garavan et al., 2020a). The evidence to-date points to significant growth in digital learning. For example, pre Covid-19 data indicated a steady usage of various forms of digital learning with, for example, estimates that over 57% of organisations in 2020 (pre-pandemic) implementing some form of digital learning (CIPD, 2020) compared to 29% in 2015. Prior to the pandemic many organisations were using digital learning to deliver L&D in areas such as compliance, sales, ethics and desktop application training (Training Magazine, 2019). LinkedIn Workplace Learning Report (2020) showed budgets were continuing to shift from instructor-led training (ILT) to online learning pre-Covid with 38% of those surveyed already considering a decrease in ILT versus 58% increasing online budgets. There is no doubt that the pandemic accelerated the use of various forms of digital learning (CIPD, 2021) in what was an already occurring shift to digital and online learning (Cedefop, 2020).

Digital learning has emerged as a contemporary and future trend in organisations, the L&D practitioner literature and to some extent the growing academic literature. As a relatively new phenomenon, there are variations in the terminology used. The terms “digital” and “online”

learning are being used interchangeably (Belaya, 2018), yet there are important distinctions and overlaps between both concepts. There is limited empirical evidence concerning digital learning such as, for example, how digital learning impacts the learning experience, the extent to which digital learning transfers to the job, the effectiveness of digital learning platforms for facilitating informal learning, the overall effectiveness of digital L&D and what it all means for the future roles of L&D professionals. The purpose of this chapter is to define and conceptualise digital learning and consider some potential drivers and challenges associated with digital learning as an approach to achieving organisational L&D goals.

9.2 CONCEPTUALISING DIGITAL LEARNING

The lack of a clear definition of *digital learning* is something that continues to pervade the academic and practitioner literature. For example, Anderson et al. (2016) highlighted that the term *digital* defies definition, and this results in a lack of clarity concerning the competencies required of L&D professionals and the capabilities, resources and abilities required of L&D functions. Much of the academic contributions to-date have focused on the field of Human Resource Development (HRD)—a field which studies learning and development—and the role of technology in HRD (McWhorter, 2010, 2014) under the umbrella term virtual HRD (VHRD). Bennett (2009) describes VHRD as a “rich and culturally relevant web environment that strategically improves expertise, performance, innovation and community building through formal and informal learning”. Bennett (2010) also argues that VHRD does not displace the traditional focus on HRD in terms of its purposes but instead shifts the paradigm in terms of how HRD operates. VHRD incorporates career, organisation and technology development (Bennett, 2010). Thite (2022, p. 88) states that “digital HRD deals with the nature, role, and contribution of technology in strategically managing talent in a digital world. It incorporates social, mobile, analytics, cloud (SMAC) and other emerging technologies including big data, artificial intelligence (AI) and analytics for efficient and effective delivery of on-demand HRD services”. This definition is all-encompassing; however, conceptualisations within L&D have a more general focus. For example, Belaya (2018) defines digital learning according to three broad and overlapping categories:

1. **Formal Digital Learning:** This type of digital learning uses technology to deliver formal training with limited support from or interaction with L&D professionals. It typically takes the form of narrow skills areas with clearly specified learning objectives and end-point assessments.
2. **Informal Digital Learning:** This type of digital learning envisages the use of technology to provide opportunities to support informal learning in organisations. It focuses on communities of practice and knowledge sharing. The emphasis here is on the role of the learner to seek out knowledge.
3. **Blended or Supported Learning:** This category of digital learning combines the formal and informal. It combines traditional in-person or classroom learning with online delivery options.

With respect to informal learning via digital technologies, Clark et al. (2018) add further layers. Informal learning can be (1) organised and intentional such as on-the-job training, mentoring and communities of practice or (2) everyday informal learning which is unstructured and occurs in daily work life via trial and error, learning by doing and modelling others. This further classification of informal learning results in Clark et al. (2018) identifying a continuum of informal learning opportunities which can be classified according to those that are high-touch or low-touch in terms of human interaction (high-touch) or technological interaction (low-touch). As such, when viewed through a low-touch lens, mobile technology with its ubiquitous access to information regardless of time and place has created opportunities for informal learning (Brown & Mbatia, 2015).

Digital learning is also conceptualised as that which occurs through (1) synchronous engagement where learners are doing the same thing together at the same time or (2) asynchronous engagement where learners learn separately and at different times (Cleveland-Innes & Wilton, 2018). The latter envisages that learners have independence, flexibility and the ability to self-pace, whereas the former envisages a facilitator or trainer presence, immediate feedback and significant peer interaction. Other conceptualisations of digital learning highlight four distinct strands: *individual learning* whereby learners only have access to the digital learning materials provided; *trainer-assisted learning* where online learners are supported and facilitated by a trainer or instructor; *collaborative learning* which is learning that takes place via a virtual community; and *blended learning* which is conceptualised as a mixture of these different forms.

What emerges from the L&D literature is that digital learning is defined in a rather general all-encompassing way. Table 9.1 summarises a selection of digital learning technologies that come within the umbrella term of digital learning.

9.3 DIGITAL LEARNING: DRIVERS AND CHALLENGES

There are many factors driving digital learning and transforming how learning is designed, delivered, enabled and engrained in the fabric of organisational functioning and individual's day-to-day work. Equally, for every driving factor there are challenges that require significant consideration in progressing a digital learning strategy or approach to learning within organisations. We highlight a number of these here, namely shorter, faster and cheaper training and learning methods; learning in the flow of work; and digital learning pedagogy.

9.3.1 *Shorter, Faster and Cheaper Training and Learning Methods*

Globalisation and technological advancement have pushed organisations to become more flexible and cost-effective when it comes to the delivery of learning (Okano et al., 2018; Thite, 2022). The ever-changing skills requirements that flow from globalisation and automation point to major shifts in the skills required of employees, thus driving the need for increased training activity. For example, the 2020 LinkedIn Workplace Learning report found that L&D professionals considered the need to close skills gaps as a key strategic priority with more than half of UK L&D professionals planning upskilling and reskilling programmes. The practitioner literature identifies that organisations and managers are demanding shortened programmes, faster novice-to-expert development time, mechanisms to train employees at scale (Scott-Jackson et al., 2015) and learning methods that are integrated into an employee's day job rather than requiring significant off-the-job attendance (Ferguson et al., 2017). These pressures, alongside a need to find cost-effective ways to deliver training, are driving the adoption of digital learning (CIPD, 2020, 2021; Cleveland-Innes & Wilton, 2018).

However, concerns still exist as to whether there is a trade-off between the quality of the learner experience and learning outcomes, on the one hand, and the need by organisations to reduce the costs and increase the

Table 9.1 Common L&D technology-based applications

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Artificial Intelligence (AI)	Computer simulation of cognition to solve problems	Evaluation	Provides domain-specific data analysis that is either too difficult or time consuming for humans to do	It needs to be trained by humans or big data; it can have built-in flaws and biases; ethical concerns regarding the consequences for humans; general intelligence not yet achieved
Augmented Reality (AR)	The overlay of digital features to enhance the real world	Delivery	Learning more motivating when combining real elements and more senses; can include game-like design	Learner may dislike wearing VR headsets; time is needed to orient and acclimatise; may cause motion sickness; harder to do sporadically versus manual instruction
Learning Analytics	“The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occur” (SoLAR, 2022, para. 1)	Needs analysis Evaluation Assessment Re-design	Allows for continuous improvement during and after a learning event; often uses social network analysis	Validity issues if smaller numbers of data points; continuous improvement may make statistical significance problematic; depends heavily on proper instructional design and learning objectives; data could be misinterpreted and misused

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Learning Management System (LMS)	Software system used to design, deliver and assess eLearning	Delivery Assessment Evaluation	Tools for delivery of formal courses, typically used for asynchronous learning, but offer synchronous tools; can link to external technologies and offer a wide variety of software partnerships; incorporate common features such as organised content, assignment submission, feedback, gradebooks and small groups; have been used as rudimentary intranets for VHRD in schools	Requires self-direction; expensive and cumbersome to maintain; may be overkill for smaller organisations and limited-use trainings; substantial instructor and participant learning curve; may become tedious if repetitive; software is typically hosted on another company's website or in the cloud, so confidentiality and accessibility must be addressed

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Massively Open Online Learning (MOOC)	Open access web-based course designed to allow a virtually unlimited number of participants	Delivery Assessment	Large-scale training; flexible start time; can incorporate micro-credentialing; can be curated by organisations as recommended ways to fill learning gaps	Given the volume of learners, interaction with instructors and fellow learners may be limited; assessment may be very basic and weak at assessing learning objectives; knowledge and skills may not transfer to the workplace; difficult to authenticate the learners; content may be biased for profit-making

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Online Training	Designed courses and learning encounters delivered via digital networks	Delivery Assessment Evaluation	Increasingly common, especially for onboarding and mandatory training (e.g., safety, sexual harassment, policy awareness); human designed but may or may not be instructor-led; may be linked or loaded to corporate intranets, allowing for internal or external access; can incorporate all levels of learning, including organisational culture and values	Some training activities may not translate well in online delivery; requires a different set of design and delivery skills from traditional training; relies heavily on advance design and may be difficult to adjust on-the-fly; may impede relationship-building or sense of belonging; isolated use of online training alone may not be enough for performance improvement

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Social Media	A broad term for web-based digital tools and platforms that allow members to create and share content as well as interact and learn within a networked community (Bennett, 2022)	Delivery Evaluation Re-design	Easily incorporated into L&D events and LMS through internal software or external links to commercial programmes. Support knowledge sharing, group problem-solving, reflective activities as well as community building	Potential for off-topic distractions to cost time and attention from corporate needs. Culture building could lead to us versus them identification. Comments can be misconstrued
Videoconferencing	A meeting that uses video and audio technology to facilitate interactions between two or more physical locations	Delivery	Provides a synchronous human connection across space and time; may be recorded for future review; can incorporate features, such as emotion expression through icons, hand-raising, chat, screensharing and breakout rooms; provides opportunities for information exchange, learning, building a social fabric	Social connection and knowledge sharing may be hindered if culture is unsupportive; improper meeting facilitation may reduce effectiveness; ethical concerns with how meetings are run and recorded; humans may experience fatigue being on video for an extended time

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Virtual Reality (VR)	Fully immersive digital technology that simulates the real world	Needs analysis Delivery Re-design	Allows training of high-risk skills in a relatively risk-free environment; method can be interesting and motivating; can use branching scenarios to simulate variations in responses and outcomes; allows for both linear and non-linear learning pathways; future VR may include more sophisticated haptics that improve sensory and body-based learning	Costly to produce and equip; may be overkill for basic training needs; typically requires expensive equipment; significant learning curve for trainees and may cause motion sickness; bots may seem unreal; concerns that avatar use for interactions can result in unacceptable behaviours

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Virtual Instructor-Led Training (VILT)	Training that is instructor-led in a classroom-like experience, often synchronous but may also be asynchronous (note: overlaps with online training)	Delivery Evaluation Re-design	Designed and led by human instructors that can adjust of course design, provide feedback and facilitate meaning making; instructors provide extra help or enrichment; allows for learners at multiple locations to benefit from instruction that may be housed in another geography; ensures consistency of content	Learners may get overlooked if there is a high ratio of participants to instructors; depends on strong instructional design and technology skills; may attempt to replicate traditional classroom techniques in ineffective ways; trust-building between learners and instructors may be overlooked as an important first step

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Virtual HRD	“A media-rich and culturally relevant web environment that strategically improves expertise, performance, innovation, and community-building through formal and informal learning” (Bennett, 2009, p. 364)	Design Delivery Evaluation	Views technology as an environment in which work and learning occur fluidly; recasts the role of HRD/L&D professionals and trainers as learning environment designers; emphasises the social and cultural facets to organisational technology; inclusive of but not limited to online training	HRD/L&D have been slow to adapt to the environmental view of virtual HRD; research is lagging behind practice
Webinar	A term produced by the combination of web and seminar, or a seminar delivered via internet technology	Delivery	Allows for efficient presentation of information and some discussion, often through controlled chat; can be recorded for later viewing	Often has highly specific foci; interactivity with learners difficult to achieve

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Table 9.1 (continued)

<i>Strategy</i>	<i>Definition</i>	<i>Supports L&D</i>	<i>Benefits</i>	<i>Concerns</i>
Wiki	Hypertext knowledge base managed by members whom curate and update knowledge	Delivery	Inclusive and dynamic knowledge management process that captures expertise, common terms and processes; allows anytime access to informal learning and problem-solving; searchable	Information may be stale; subject to sabotage; may reveal proprietary information; conflict may occur to determine who is able to edit; accuracy of content questioned

flexibility of delivering learning, on the other. The limited empirical evidence on the effectiveness of digital learning by comparison to traditional face-to-face learning formats points to learning disadvantages. One of the issues concerns dropout rates, which are higher than for traditional learning environments. For example, completion rates for MOOCs would appear to be particularly low (Kizilcec et al., 2020) and dropouts in asynchronous distance education substantially higher than synchronous (Bernard et al., 2004). Additional issues include: (1) the lack of familiarity of learners with digital learning platforms; (2) the inability of learners to engage in self-directed learning due to limitations in self-direction, time management and personal planning skills; (3) the lack of personal supports; (4) feelings of isolation in asynchronous digital learning contexts; (5) limited digital literacy in using hardware and software; (6) limited cognitive skills for searching, retrieving and interpreting data; (7) a need for continuous retraining to keep pace with technological developments; (8) psychological costs incurred by those required to learn in digital environments whom lack the preference or skills to do so and (9) lack of learner motivation, etc. (Montgomerie et al., 2016; Zaidi et al., 2018; Cleveland-Innes & Wilton, 2018; CIPD, 2020; Benson et al., 2002; Choudhury & Pattnaik, 2020; Ali et al., 2018).

On the other hand, further developments in the technology available for digital learning point to the potential to address some of these issues (LinkedIn Workplace Learning Report, 2020). These include: AI and machine learning to achieve more accurate personalisation of learning; virtual and augmented reality which may enable social learning and gamification; and live streams/live video and learning embedded in business applications, which could potentially enable better transfer of learning to the job.

9.3.2 *Learning Pedagogy and Digital Learning*

The digital pivot in the context of learning has major implications for how we view pedagogy (Anderson, 2020). Central to adult learning theory (Garavan et al., 2020a; James & Pollard, 2011) are such principles as (1) promoting active engagement of the learner in the learning process; (2) building on the prior experience and learning of trainees; (3) recognition of informal learning as central to the learning process and (4) promotion of continuous learning. Digital learning design requires significant consideration of how to enact these principles. However, the evidence points to a lack of acceptance of digital learning by trainers and facilitators, a lack of ownership amongst instructors of digital learning and poor technological skills (Garavan et al., 2020b; Huismann, 2020; Anderson, 2020). Educators often do not have a learning experience design approach that is supported by the recent findings of learning sciences and instructional design models with which to develop engaging, interactive and beneficial augmented reality learning experiences (Czerkawski & Berti, 2021). ILO (2020) suggested that poor preparedness of trainers and L&D professionals was particularly evident during the pandemic where L&D functions had to make very rapid shifts to digital learning platforms. CIPD (2020) highlighted that almost 50% of UK L&D professionals lack the skills to facilitate social learning online. A further difficulty is that a considerable amount of digital learning delivery is asynchronous, which minimises the potential for these principles to be embedded in the learning process.

The effective integration of many of the fundamental principles of pedagogy has to-date not received the attention that it merits in L&D and digital learning research and practice, and yet it is fundamental to designing digital learning solutions which are as effective as traditional learning approaches. It is also identified that empirical research on digitally enabled

education focuses more on learning outcomes than attitudes or process skills (Antonio, 2022), and some research (e.g., on distance learning) is found to be methodologically weak and so solid conclusions can't be drawn (Bernard et al., 2004). Some meta-analyses conclude that it is not the delivery media that is most important in determining whether participants learn, but rather it is the instructional methods used (Sitzmann et al., 2006). As such if the same instructional methods are used, then web-based and classroom instruction are equally or more effective depending on the learning outcome in question (Sitzmann et al., 2006). The use of active versus passive instructional methods is found to determine whether simulation game groups or comparison groups learn more (Sitzmann & Ely, 2011). A meta-analysis on blended learning identified that the incorporation of constructivist learning strategies such as inquiry, cooperative learning, guided discovery, problem-posing strategy and game-based learning elevated the effectiveness of blended learning approaches for achieving learning outcomes. Such research illuminates how the success or failure of digital learning could be predicated on the extent to which the principles of pedagogy are considered in design.

9.3.3 *Learning in the Flow of Work*

A re-ignited view of learning is taking place with the emphasis being less about traditional training and a knowledge-push approach to learning (Gubbins & Dooley, 2021) and instead greater recognition that learning takes place in multiple settings and contexts from the formal to the informal, including from the community, family and the workplace (Natriello, 2007). Learning is a “cradle to grave” phenomenon and is diverse in terms of when, where and how it occurs. In fact, it is argued that the majority of learning in the workplace occurs through experience and informally (Tannenbaum & Cerasoli, 2013), with estimates ranging from 70% to 90% of learning taking place informally (Cerasoli et al., 2018). This reassertion of the centrality of informal learning or learning in the flow of work contrasts with approaches where learning is an “activity” divorced from work or that takes place in a classroom.

As such, perhaps the real value of digital learning technologies may reside in enabling informal digital learning. However, the sophistication of such technologies is still at exploratory stages (Anderson et al., 2016) and the empirical evidence as to its effectiveness is still very much in its infancy. Discussions around how games and simulations facilitate digitally enabled

learning refer only to episodic learning. Equally or more important is the environment around these learning episodes that facilitates interaction, conversation and learning between learners via social networks (Downes, 2010). Here learning and learning needs are identified by the learner not the content provider. A preliminary piece of research comparing virtual worlds focused on gaming, social interaction or a mix identifies that structural virtual world community social capital differs significantly depending on the purpose of the virtual world (Nazir et al., 2018). As such the extent to which informal learning via social networks can occur via virtual worlds may vary according to the focus of the platform.

Virtual 3D workspaces have the potential to enable informal learning via learning from others (see Purdy, 2022) because they enable social connection and are considered more effective than 2D technologies. NextMeet, for example, includes features that permit “bump into” experiences where avatars can engage with learners in real-time for water-cooler type conversations and related informal learning. The platform has live status tracking so that just as in a physical office space, one can walk around (the virtual space) to identify who is “in” and free for a question/chat informally. Platforms, such as UneeQ, also permit connection between avatars of real-world colleagues and AI-powered human-like digital bots who can converse in natural language facilitating human-technology social interaction and learning. Informal learning behaviours which focus on observing others doing a task could be replaced with virtual reality technologies that simulate role-plays, gameplay and 3D models of technologies in the workplace which avatars can engage with. For example, Bosch and Ford developed a VR tool for electric vehicle maintenance. Medivis uses VR technology to train medical students using 3D anatomy models. The use of technology-mediated platforms for social interactions facilitates real-time online data collection which can further inform the development of both the technologies in use and the social networks of individuals and organisations. PWC’s (2020) four potential future worlds emphasise how organisations and individuals need to be strategic in analysing and cultivating social networks for idea generation and execution, for innovation and for performance. There is therefore a need for sophisticated and continuous analysis of individual employee data, which could include analysis of organisational and individual social networks. Such data collection and analysis are more easily conducted in digital environments.

Despite the possibilities for informal learning inherent in the design of these platforms, the focus tends to be on the technological possibilities

instead of being aligned with learning theories and informal learning principles. As previously stated, such a foundation is required in developing effective digital learning platforms and ensuring they promote and understand learning processes occurring in organisations and social contexts (Tynjälä & Häkkinen, 2005; Wang, 2011). Research on using technologies for informal workplace learning beyond Web 2.0 applications seems to be rather limited (Schumacher, 2018). Berisha-Gawłowski et al. (2021) use Tynjälä's (2013) 3-P Model of Workplace Learning to consider how digital twins, for example, could enable each of the workplace learning principles. The review concludes that there is still a lack of empirical research and challenges in technology being able to replicate in the form of digital humans or in technology being able to work with invisible but relevant learning factors. These include human autonomy, beliefs, cognitive processes, emotions, team learning, social interaction, creativity and the interrelations between these components and informal learning.

9.4 CONCLUSION: IS DIGITAL LEARNING THE BRIGHT NEW DAWN FOR LEARNING AND DEVELOPMENT?

The current environment that organisations operate in has driven the adoption of digital learning and organisations are increasingly implementing digital learning solutions. However, there are many unanswered questions concerning its effectiveness. Much of the research to-date has focused on formal asynchronous digital learning and given less attention to synchronous and informal digital learning capabilities and effectiveness. Furthermore, the research to-date has focused on educational settings (Anderson et al., 2020), which limits insights into what types of workplace learning objectives can be addressed using digital learning, the extent of retention of learning and most fundamentally, the extent of transfer of learning into day-to-day job behaviour. Thus, the evidence base is not yet sufficiently robust to reach conclusions concerning the effectiveness of digital learning.

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