

Designing Learning with Digital Technologies

Perspectives from Multimodality
in Education

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Chapter 1

Learning with technologies
in the digital age

Now and the future

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1 Learning with technologies in the digital age

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Introduction

Our edited book addresses the need to design learning with digital technologies effectively, especially in a post-pandemic education normal where blended learning will become more ubiquitous in teaching and learning. The COVID-19 pandemic has brought into the spotlight the pervasive nature of digital technologies in every aspect of our social lives (Adami et al., 2020). Communication, learning, and play have been shifted mostly online, with social media activities, digital gaming participation, and online purchases skyrocketing in the last years (Nagata et al., 2020). Technology has become visibly integral in almost every aspect of our lives. Indeed, our collective recent experience has highlighted the changed perception towards technology, from its role of support to that of enabler – and during the pandemic, sustaining the continuity of work, learning, and play (Peters et al., 2020).

The blurring of boundaries between familiar genres and novel expressions enabled by digital technologies has led to the emergence of new and hybridised text forms today. Examples of such digital text forms include gameplay and tutorial videos on YouTube, short performance video clips on TikTok, videos of TED talks, online lessons over Zoom, and live streams of product promotion on social media. There have been many studies on digital texts from a multimodal perspective. Examples include social media and multimodal representations (Adami & Jewitt, 2016), Facebook (Bezemer & Kress, 2017), Tumblr and Pinterest (Jewitt & Henriksen, 2017), Instagram (Zappavigna, 2016), and autonomous sensory meridian response (ASMR) videos (Zappavigna, 2020). While their focus has not been on the pedagogy, our volume aims to address this by drawing out the educational implications of these digital texts through a discussion of their multimodal features and a reflection of the ways they can be used in teaching and learning.

Digital technologies also shape the ways in which we communicate ideas, express our identities, and influence the ways we think and act (Jones & Hafner, 2012; O'Halloran et al., 2017). Reflecting the affordances of digital tools in shaping social practices, they are described as “semiotic technologies” by van Leeuwen et al. (2013). Examples of semiotic technologies include the

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use of learning platforms that harness artificial intelligence and analytics, virtual and augmented reality wares, and video-conferencing tools. The focus on digital tools as semiotic technologies involves consideration of the design, use, and socio-cultural context in which the semiotic practice is situated (Djonov & van Leeuwen, 2022). In the teaching and learning context, it is of interest to examine the ways in which semiotic technologies influence the nature of the knowledge communicated, the pedagogic relations expressed, and the organisation of the learning experience (Lim, 2021a). In tandem with the emergence of novel and hybrid digital text forms and tools, we argue that it is critical for educators to recognise the implications these multimodal semiotic resources can have on teaching and learning (Querol-Julián, 2023).

The pedagogical lenses adopted in this book are that teachers are designers of learning. The notion of teachers as designers of learning experiences stems from the seminal work of the New London Group (1996). Selander (2008) argues that viewing the teacher as a designer of learning experiences rather than as a knowledge transmitter or facilitator of learning can be productive. We highlight the contribution of the teacher's role as a designer of learning to student development (Putri et al., 2019). The effectiveness of a teacher is an important factor that can significantly influence the quality of instruction and student outcomes (Burroughs et al., 2019), as well as student personal development (Mitevska Petrusseva & Popeska, 2020). Like all designers, teachers would select the most apt tools and reflect on their use of material resources and the structures of power in a specific environment in their designs (Kress & Selander, 2012) to generate effective teaching. The clarion call in the multiliteracies agenda (New London Group, 1996) accentuates the importance of engaging with the student lifeworld as part of situated practice in learning. As such, understanding and engaging with novel digital text forms and tools can lead to positive outcomes. In this volume, we build on other recent efforts such as advancing the call towards a greater understanding and incorporating digital multimodal text forms and tools in all aspects of education, including the curriculum, pedagogy, and assessment (Campoy-Cubillo & Querol-Julián, 2022; Daniela, 2020; Djonov et al., 2021; Erstad et al., 2013; Hafner & Pun, 2020; Keengwe & Onchwari, 2019; Lim & Toh, 2020; Querol-Julián & Beltrán-Palanques, 2021; Querol-Julián & Crawford Camiciottoli, 2019; Rennie & Smyth, 2019; Toh & Lim, 2021).

This volume looks at the design for learning with digital technologies for effective teaching. It offers a clear pedagogical focus on the teacher's role as a designer of learning experiences, which builds on earlier work by the editors and contributors in tandem with the growing international recognition of the teacher's role as a designer of learning. It brings together thought-leaders and well-established academics from around the world. It is the crystallisation of the negotiation of multiple voices and different perspectives, and it offers a progressive step towards designing learning with digital technologies. This edited book draws out the educational implications of digital technologies in teaching and learning through a discussion of their multimodal features and a reflection of

the ways they can be used in the designs for learning. It is poised to offer state-of-the-art insights into how educators can design new learning experiences for students through the meaningful and effective use of digital technologies. The book equips readers with solid theoretical and analytical frameworks that support the pedagogical implications of the five areas of interest, or sections, in which the manuscript is structured: designing learning, digital learning designs, digital learning with embodied teaching, digital learning interactions, and digital literacies.

After this introduction, we provide an overview of the 13 chapters that complete the book. These contributions embody the current trend in designing learning with semiotic technologies. Next, we outline a forward-looking research and practice agenda that aims to facilitate the development of meaningful and effective designs of learning with digital technologies.

Mapping the now: Coverage and contributions

Designing learning

The first section, *Designing learning*, is an introduction to the fundamentals of the perspective of designing learning. It adopts a design-theoretical perspective and outlines the tenets that unify the themes in this book.

The teacher is key as a designer of learning (Kress & Selander, 2012; Lim, 2021a; Lim & Tan-Chia, 2023; New London Group, 1996). The central premise in our book is that designing learning with digital technologies rightfully places the emphasis on the teacher's pedagogies in the foreground rather than the bells and whistles of technologies. The concept of "pedagogy as design" (New London Group, 1996, p. 73) is the pedagogical lenses adopted in the book and the focus is on the role of the teacher in designing learning experiences with technologies. Notwithstanding, the teacher's pedagogies, while founded on learning theories, can be expressed differently through different learning tools and environments (Lim, 2022). The teacher's artful design of the students' learning experiences may respond and adapt to the affordances of the technologies and materiality of the medium. As such, it is productive to recognise the differences in which digital technologies can bring to enhance and enable new designs for learning.

The introduction chapter by the editors, Lim & Querol-Julián, and the second chapter by Staffan Selander, the thought-leader in the field of designs for learning, lead the other contributions in this edited volume. The introduction chapter maps the contributions of scholars around the world in designing learning with digital technologies from a multimodality perspective. While not purporting to be exhaustive, the selection of work represented in this book demonstrates the keen interest, wealth of expertise, and significant strides made in this line of research. The range of work on designing learning with digital technologies from a multimodality perspective spans across themes of digital learning designs, digital learning with embodied teaching, digital

learning interactions, and digital multimodal literacies. The introductory chapter concludes with a desideratum on further work yet to be done by outlining a research and practice agenda in designing learning with digital technologies.

Staffan Selander's chapter on designing for learning in the digital age presents the designs for learning theoretical perspective and discusses the fundamental questions this perspective seeks to address. This includes inquiries about knowledge, cultures of recognition, as well as the nuanced processes of meaning-making and identity formation. Selander argues that teaching and learning are intentionally designed activities, where the medium itself plays an active role in the flow of communication, rather than acting as a passive, neutral conduit. Selander demonstrates the significance of design considerations, which are pivotal for redefining the practice of teaching and fostering the development of future-oriented competences.

Digital learning designs

The second section, *Digital learning designs*, includes three chapters from researchers from Australia, Scotland, and Italy. Digital learning designs pave the way to show how meaningful and effective learning experiences can look like. Adopting a multimodal perspective on digital learning designs, the studies featured in this section examine the constraints and affordances of technologies and their contributions to the design of digital learning experiences. The chapters offer considerations for educators in designing digital learning resources, environments, and courses. Collectively, the contributions in this section showcase the advances in the framework, tools, and considerations in the design of digital learning.

Stafford Lumsden, Emilia Djonov, and Helen Slayter open this section with a proposal of a framework for evaluating online learning in higher education – the Multimodal Community of Inquiry. The framework combines the Community of Inquiry framework with Multimodal Social Semiotics. Their chapter presents findings from the application of the framework to the analysis of two Master of Applied Linguistics/Teaching English to Speakers of Other Languages (TESOL) teacher education courses on two Learning Management Systems (LMS). These courses, one from Korea utilising Google Classroom as its LMS and another from Australia employing Moodle, exhibit how the multimodal design of each online learning environment is influenced by the capabilities of its respective LMS and the instructor's personal beliefs and values concerning TESOL pedagogy and university-level teaching.

Frank Rennie and Keith Smyth offer a reflection on their design of heutagogical learning in online higher education modules at the University of the Highlands and Islands in Scotland. They discuss key lessons learned from their experiences in designing and implementing learning and teaching strategies that encourage and support students in leveraging online resources to enhance their educational journey. The chapter introduces a design structure and engagement method rooted in heutagogy, that is, self-directed learning, which

integrates a wide array of digital learning resources to offer online learners maximum flexibility in their educational pursuits.

The section on *Digital learning designs* concludes with the proposal of tools for monitoring metasemiotic awareness by Nickolas Komninos. The tools are used to inform the design of learning experiences and offer the potential to shape further pedagogic research through the data they generate. Komninos discusses the contributions of the tools as a pedagogical aid for devising learning pathways and strategies that target multiliteracies development in both individuals and small groups, as an assessment mechanism to monitor student progress, and as a means to measure the effectiveness of courses on multiliteracies.

Digital learning with embodied teaching

In the third section, *Digital learning with embodied teaching*, the teacher's use of embodied resources and semiotic technologies, that is, embodied teaching (Lim, 2021a) in online teaching and learning, is the focus. Awareness of how gaze operates in video-mediated spaces (e.g., popular social media videos) or how non-verbal cues – gestures and facial expression – contribute to meaning-making (e.g., when using OpenCourseWare videos) will set up the grounds for multimodal-centred teacher training programmes. Interaction is a cornerstone of both face-to-face and digital learning (Querol-Julián, 2021a). In the virtual context, digital learning interactions take place synchronously and/or asynchronously and are linked to learners' engagement (Querol-Julián, 2021b). The studies featured in this section, conducted by researchers from Italy and Hong Kong, show the role of embodied teaching in digital learning contexts. They offer implications for teacher professional learning, particularly in the areas of embodied teaching and pedagogies for digital learning.

The section opens with Maria Grazia Sindoni's discussion of how the teacher's gaze serves as an important semiotic resource in online teaching and learning. Sindoni introduces the concept of full gaze awareness, which involves understanding what someone is looking at. In digital learning, such as in video-mediated environments, gaze holds significant communicative value due to the differing nature of gaze in these digital settings as compared to traditional face-to-face interactions. She examines two intertwined aspects of gaze: visualising (the act of making something visible through video mediation) and viewing (intentional acts of looking, linked to perceptual cognition). Her chapter draws from an archive of user-generated videos from popular social media platforms, such as Facebook, Twitter, YouTube, and TikTok, and explores how the transition from offline to online environments has impacted discourse practices and ideologies by analysing the repurposing of gaze within educational scenarios.

Jie Bao and Dezheng (William) Feng explore the teacher's use of semiotic resources, such as camera angle, background music, and setting design, in online teaching videos. The chapter analyses 38 award-winning videos in a national

micro-lecture competition in China. It identifies the extensive use of semiotic resources that go beyond the traditional modes typically seen in language classrooms. Bao and Feng also observe a tendency amongst teachers to overutilise technological affordances, which may transform micro-lectures from pedagogical tools into teacher-centric showcases of technical prowess and personal charisma. They propose implications on teachers' professional learning, including their development of semiotic awareness.

The section closes with Belinda Crawford's examination of the teacher's use of gestures and prosodic signs when teaching phrasal verbs in online teaching videos and offers insights for listening comprehension in English language teaching. She analyses a dataset of video clips extracted from OpenCourseWare lectures and uses a corpus software to identify phrasal verbs and a multimodal annotation software to analyse the teacher's gestures and prosody. Crawford's study demonstrates the value of embodied teaching to support students' language development in the context of digital learning.

Digital learning interactions

Students are the focus in the fourth section, *Digital learning interactions*. Digital learning interactions amongst students can be facilitated by apps that foster the construction of online communities through different communicative modes (e.g., Flipgrid which enables video discussions), tasks and online learning platforms that promote multimodal collaboration and communication (e.g., e-portfolios), or online learning analytics platforms that enhance collaborative multimodal meaning-making (e.g., WiREAD+ which promotes collaborative critical reading online). Studies in this section include the work of researchers from Spain, Romania, and Singapore. The contributions present insights into the design of meaningful students' interactions by harnessing the affordances of digital technologies.

Alexandra Santamaría-Urbieto opens this section with her study on a digital tool, Flip, which uses asynchronous video, enabling users to initiate discussions and respond to videos created by others in the context of foreign language teaching and learning. The chapter highlights the importance of integrating social skills into online courses to foster the creation of informal communities, where individuals with shared interests and preferences can connect. Santamaría-Urbieto argues for the value of using digital tools to both deliver content and build online communities that foster a sense of belonging amongst students within these groups.

Oana Maria Carciu and Laura-Mihaela Muresan describe the design of a collaborative Internet-based exchange project between students from two academic contexts, Spain and Romania. They introduce a learning framework to maximise opportunities for students to integrate knowledge of diverse modes, media, and software for multimedia co-authoring, interaction, and communication in English as a foreign language. The digital learning interactions also encourage students to reflect on their progress.

The section concludes with a chapter from Elizabeth Koh, Fei Victor Lim, and Christin Jonathan reporting on how a learning platform developed in Singapore, WiREAD+, with analytics affordances, can support collaborative knowledge-building amongst students in a junior college. The chapter introduces the theoretical foundations of WiREAD+ and describes how the system is designed to support collaborative critical reading amongst students in an online environment. Using the perspective of WIREAD+ as a semiotic technology for learning, the authors highlight the value of technologies to facilitate students in developing critical discussions and engendering meaningful interactions in digital learning.

Digital multimodal literacies

The spotlight in the final section is on the *Digital multimodal literacies* that students need to navigate the contemporary communication environment. Topics include ways to support students' development of multimodal literacies for digital learning and engagement. In this section, we feature the work of researchers from Spain, Greece, Norway, and Singapore.

The section opens with Vicent Beltrán-Palanques' study on the multimodal genre of online video game reviews as a way to develop the students' multimodal literacy. Opportunities for multimodal meaning-making are offered as game reviewers present their perspectives by evaluating and critiquing a video game through their multimodal orchestration of various semiotic choices in their video production. The chapter highlights the pedagogical implications of using online video game reviews to facilitate students' development of critical thinking, creativity, and multimodal literacy.

Styliana Karatza and Fei Victor Lim present a pedagogic metalanguage for primary school students' engagement with hypermedia, that is, websites. Their chapter describes the translational process undertaken to develop the pedagogic metalanguage. The process involved soliciting feedback from four teachers in different primary schools in Greece. Further revisions were made based on the teachers' reflections following the implementation of these lessons. Karatza and Lim conclude with a teacher's vignette as a way to emphasise the crucial voices of the teacher practitioner in translational research, where research theories are implemented in classroom practices to develop students' multimodal literacy.

The final chapter in this section, and in our book, is Øystein Gilje's work on guiding students' development of multimodal literacy through "new writing", that is, digital multimodal composing. Drawing on empirical video data and students' final multimodal texts, the analysis of two cases, which focuses on lower secondary Norwegian schools, investigates how semiotic choices are negotiated within social interactions and manifest in the process of creating multimodal compositions using presentation tools on iPads. Gilje highlights the significance of teachers' guidance for students during digital learning and underscores the importance of students' development of multimodal literacy.

Towards the future: Desiderata for designing learning with digital technologies

Building on what has been presented in this book, this section outlines the desiderata, that is, a proposal of a research and practice agenda for the next decade, with the goal of furthering the meaningful and effective design of learning with digital technologies across educational levels and contexts. This is with the recognition that in a post-pandemic educational normal, blended and online learning and the use of digital technologies, in the form of resources, tools, and platforms, will be even more prevalent around the world. As such, we hope to contribute to the global discourse of how teaching and learning in the future could and should be.

Towards designing learning

The desideratum to advance the recognition of teachers as designers of learning with technologies involves a fundamental paradigm shift in the mindsets of policymakers, education researchers, teachers, and students about the teacher's role. Selander (2008, p. 14) challenges the prevailing notion that “the role of the teacher is to ‘bring’ knowledge to the student, and the student’s role is to remember by heart and to learn specific skills”. The recognition of teachers as designers of learning moves beyond viewing them as knowledge authorities or facilitators of learning. Rather, like all designers, the teacher as a designer of learning reflects on their use of material resources and the structures of power in a specific environment to best express their purposes (Kress & Selander, 2012). As such, the teacher, as a designer of learning, has heightened semiotic awareness (Towndrow et al., 2013) and can orchestrate embodied semiotic resources, such as speech, gestures, positioning, and movement in the classroom, as well as make use of semiotic technologies – both physical and digital – (van Leeuwen et al., 2013) in the design of students’ learning experiences (Lim, 2021a).

A professional learning agenda to nurture teachers’ capacity as designers of learning must be the focus in the years ahead. This includes advancing classroom research, such as the studies featured in this book, to better understand the significance of teacher’s multimodal classroom orchestration, that is, how digital tools are used with consideration of these resources as semiotic technologies, along with intentional use of their embodied semiotic resources. Such studies conducted across educational contexts – subjects, levels, cultures, and with the range of technologies – can offer nuanced empirical findings as compelling evidence for the paradigm shift on the role of teachers in the digital age.

Towards digital learning designs

As designers of learning, teachers are guided by research-informed considerations to make sound pedagogical decisions as they plan at various levels – the course curriculum and learning outcomes, the learning activities in each

lesson, as well as the strategies and resources for each learning activity. The desideratum in advancing the theme of digital learning designs involves education researchers pioneering and disseminating learning designs – frameworks, considerations, methods, tools, and resources – that have worked well in their contexts and inspiring other researchers to trial and adapt these learning designs in their own educational contexts. Such concerted efforts in exploring digital learning designs that have worked can avoid the wastage of efforts to reinvent what has been well-established by others in a different context and innovate on the design principles to scale them up across educational contexts.

A seminal and influential learning design is the Learning by Design Framework developed by Cope and Kalantzis (2015), which is built upon the foundations laid by the New London Group (1996). It is of interest to practitioners and researchers to collectively trial and innovate on the design principles, that is, the knowledge processes, outlined in the framework as they apply in the design of learning in their own contexts. Such replication studies will bring about a convergence of focus amongst the community of education researchers, drawing on shared expertise in multimodality, and working on similar areas. Likewise, the hope is that the digital learning designs featured in this book, the Multimodal Community of Inquiry by Stafford et al., the design of heutagogical learning by Rennie and Smyth, as well as the tools for monitoring metasemiotic awareness by Komninos, will be taken up and explored by other researchers as designs that can be adopted and adapted for their own educational contexts. The field advances as educational researchers build and improve on the digital learning designs we have now, appropriating the ideas of the present and innovating on them as new technologies offer new pedagogical possibilities for the future.

Towards digital learning with embodied teaching

The “embodied turn” (Nevile, 2015) stems from an increasing interest in the body amongst researchers on language and social interaction, attributed in part to the greater ease and accessibility of video recording. Likewise, the “embodied turn” can be observed in educational research beginning with the recognition of the classroom and teaching as a “multimodal sign” (Kress et al., 2005, p. 37). “Talk alone, or even talk supplemented by writing” (Kress et al., 2005, p. 169) was insufficient for understanding the complexity of teaching, that is, the teacher’s multimodal orchestration of semiotic resources as an expression of their pedagogy. Bezemer and Kress (2016) explain that layout, designs, and displays in the classroom, as well as the teacher’s movement, gesture, gaze, and embodiment, construct the pedagogy, a set of social relations in the classroom. The conception of “embodied teaching” (Lim, 2021a) was first used in the context of physical classrooms to understand the teacher’s orchestration of multimodal resources, both corporeal and technological, in the design of students’ learning experience. For example, how teachers design structured informality in the students’ learning experience to encourage students’ participation through specific semiotic choices

in speech, gestures, and their use of space (Lim, 2021b; Lim et al., 2012). Most recent research also focuses on embodied teaching in online settings (Querol-Julián, 2021b; 2023; forthcoming).

The desideratum for the theme of digital learning with embodied teaching is initiated by the studies featured in this book, where the conception of embodied teaching is applied from the contexts of physical classrooms to the contexts of online learning. Researchers are increasingly aware of the important contributions of multimodal resources, beyond the use of speech and writing, and the significance of the teacher's gaze and gestures, even in digital learning. Advancing research along this line of inquiry will demonstrate the importance of teachers and the differences their embodied teaching makes in the digital age of robots, artificial intelligence, automation, and analytics that bring with them the risks of greater depersonalisation and dehumanisation even as they, ironically, sought to achieve the holy grail of greater personalisation of learning, customised learning to the needs and profiles of students. Attention to research on digital learning with embodied teaching counterbalances and mitigates the risks by bringing the focus back from technologies to the teacher in teaching.

Towards digital learning interactions

Digital learning includes both learning with technology in the physical learning as well as online learning experience, both synchronous and asynchronous. The studies featured in this book offer examples of how digital technologies can support meaningful interactions both online and on site. Digital technologies enable new possibilities for student interactions in the classroom such as through the use of collective visualisation (Zhi & Su, 2015), collaborative annotation tools (Koh et al., 2023), digital games, and simulations (Selander et al., 2018). These technologies promote discussion and facilitate students' social construction of knowledge as they engage with each other's ideas and negotiate with others in meaning-making. The desideratum to advance work along the theme of digital learning interactions includes the call to explore emerging technologies and the new pedagogical opportunities they bring to the classroom. For example, the recent developments in generative artificial intelligence (Gen AI) and its implications on teaching and learning practices (Bishop, 2023; Cope & Kalantzis, 2023; Sharples, 2023) are critical areas for further research in the years ahead. Cope and Kalantzis (forthcoming) outline a manifesto for cyber-social learning to advance the profession and practice of education. Crucial amongst the agenda for action is the celebration of a "productivity diversity" where interactions amongst learners thrive on their differences in the age of algorithms and Gen AI. The desideratum is to focus on research that informs how to design learning with technologies to foster such digital learning interactions.

In online learning, the nature of pedagogic interactions between the teacher and the students and amongst students can be notably different from that of

the physical classroom. Lim and Toh (2022) observe that digital learning, such as the use of discussion boards, can shift a teacher-centred pedagogy to a relationship-centred one (Matthiessen et al., 2020). The teacher is “decentred as the knowledge source in the classroom” and the classroom is democratised as students tend to interact more with each other online in a safe environment and even the shy ones can “have their voices” represented (Lim & Toh, 2022, p. 80). The online learning experience is not the same as the physical learning experience and need not attempt to replicate face-to-face learning, as many less-than-successful online learning lessons have sought to do. Kalantzis and Cope (2020) posit that online learning opens new possibilities for learning, and when designed well, can be superior to face-to-face learning. Building on this premise, the desideratum is to encourage further studies examining the ways in which online learning can be better designed to complement face-to-face classroom learning, each achieving what the other cannot. In the post-pandemic new education normal, teachers as designers of learning should have repertoires to design for both on site and online learning with technologies in accordance with the best fit for their learning goals.

Towards digital multimodal literacies

The New London Group (1996) laid the foundation for broadening our conception of literacy beyond language learning to include multimodal meaning-making, and the “multi-” of “multimodality”. The multiliteracies manifesto has reformed the literacy curriculum in many education systems around the world, including Australia, Finland, and Singapore, as well as parts of the United States and the United Kingdom. Multiliteracies and multimodality are now explicit learning outcomes in many literacy curricula. Reflecting on their motivations, Cope and Kalantzis (2015, p. 3) explain that “we add two ‘multis’ to literacies: the ‘multi-’ of enormous and significant differences in contexts and patterns of communication”. Multiliteracies were conceived beyond the turn of the century, before the Internet, social media, and gen AI have transformed our communication environment. Today, the digital age brings with it new literacy demands on our students. In learning with technologies, students must develop digital multimodal literacies to engage with the communicative practices and multimedia texts around them.

Multimodal literacy relates to the aspect of multimodal meaning-making in multiliteracies. It is defined by “a codified set of knowledge and skills, as well as a semiotic awareness demonstrated in students through their viewing and representing with multimodal texts in contextually appropriate ways” (Lim & Tan-Chia, 2023, p. 5). The focus on multimodal literacy is about multimodality as learning (Lim, forthcoming). The desideratum for digital multimodal literacies includes identifying this codified set of knowledge and skills which can be introduced to students in age-appropriate ways, as well as developing a pedagogic metalanguage to support teachers and students in thinking and talking with multimodal texts across educational contexts (Lim et al., 2022).

The studies featured in this book illustrate the existing translational research efforts in this direction. More could be done to advance the teaching and learning of digital multimodal literacies through further design-based research (Brown & Campione, 1996). The proposition of a design-based research involves education researchers and teacher practitioners collaborating and drawing on the “expertise and experience of each party, to improve teaching and learning” (Lim, 2023, p. 651). Teachers know, through experience and practice, what works for their students’ profiles and educational contexts. Their shared ownership over the research is crucial as studies have established that educational innovations designed solely by researchers often fail as teachers do not sustain these practices after the project is over (Juuti & Lavonen, 2006). In sum, the desideratum for advancing digital multimodal literacies is the call for researchers and teachers to collaborate as equals in design-based research projects. This involves addressing the power asymmetries in their relationships, by valuing both the expertise of the researchers and the phronesis, or practical wisdom, of the teachers, as they work together to develop theoretically informed and practically grounded answers to the ultimate question of how to design effective learning with technologies for our students.

Conclusion

In a post-pandemic normal, digital teaching and learning have gained a key position in many education settings, both online and blended. This chapter presents ground-breaking pedagogies in the use of technology in education from a multimodal perspective, noticing that technologies are facilitators of learning conditioned by teacher pedagogies and that the teacher is a designer of learning and is key in influencing students’ outcomes and development.

The chapter introduces five themes where perspectives from multimodality on the design of learning with technologies are pertinent: designing learning, digital learning designs, digital learning with embodied teaching, digital learning interactions, and digital multimodal literacies. We map the contributions of scholars from around the world to the use and pedagogical implications of digital technologies in teaching and learning from the multimodal lenses regarding these five areas. Specifically, we discuss

- the theoretical framework of designing for learning and essential inquiries on the topic,
- advances in the framework, tools, and considerations in the design of digital learning,
- implications for teacher professional learning in relation to embodied teaching and pedagogies for digital learning,
- insights for the design of meaningful student interaction by leveraging the capabilities of digital technologies, and
- ways to support student development of multimodal literacy for digital learning and engagement.

We also propose a roadmap for active collaboration between researchers and practitioners as the driving force behind the design of effective learning with digital technologies:

- a professional learning agenda to nurture teachers' capacity as designers of learning,
- collective application of digital learning designs, of professionals and researchers in their own contexts,
- advance research in embodied teaching in online learning,
- exploration of emerging technologies and their pedagogical opportunities to foster digital learning interactions, and
- researcher–teacher collaboration in design-based research projects that aim to develop students' digital multimodal literacies.

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