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Understanding Digital Personalization

Introduction

Imagine that it is your niece's fourth birthday and you want to buy her something special. You would like your gift to be personal and unique, something special that is made just for your niece Lucy. You google the keywords 'personalized gifts' and thousands of options come up. You click on the popular website 'I see me' to browse a range of personalized gifts: Personalized Storybooks; Personalized Board Books; Personalized Puzzles; Personalized Ornaments; Personalized Colouring Books; Personalized Placemats; Personalized Stickers; Personalized Growth Charts; Personalized Music; Personalized Lunch Boxes. You decide to get Lucy a pyjama set with her name emblazoned on the trousers, together with a set of pencils with each having Lucy's initials engraved on them. You also get her a personalized book titled *All About Lucy*. The book contains text modified according to Lucy's date of birth, first name, surname and home postcode. There is also a picture of you and Lucy on the final page of the book. With a few taps, you have your 'personalized gift' ready for Lucy.

This cameo illustrates some of the many possibilities of digital personalization in the twenty-first century. Personalized books, personalized gifts and personalized experiences are part of a nexus of practices, products and processes termed 'digital personalization', which can take various forms and formats and fulfil various purposes in early childhood. Together with personal touchscreen devices such as smartphones and mobile phones, practices such as taking and sharing selfies, as well as creating and sharing personalized texts, are new and so far little studied and understood phenomena.

As the reader will discover, the title of the book could be misleading, in that in this book, I do not focus on all of these aspects of digital personalization. Instead, I centre on specific aspects of digital personalization in early childhood and provide some estimation of their impact. I therefore caution, right at the beginning, against the inference that this book provides an all-encompassing view of personalization in early childhood. This book is concerned with personalization and personalized learning facilitated by technology, an approach termed 'digital personalization' in early childhood studies and 'technology-enhanced personalized learning' (see Fitzgerald et al., 2017) in secondary and higher education. I discuss how digital personalization

differs from non-technology-based personalized learning, and how the two enrich each other. The book's focus is on the kind of digital personalization that is enabled by smartphones and tablets, and which directly affects an individual (i.e. is personal) but also connects them to others (i.e. is shareable). Such digital personalization has significantly influenced not only consumerist lifestyle and business practices but also education.

At the time of writing, digital personalization in early childhood is an uncharted area, awaiting to be established as a specialist area with its own methods and theories. To develop a robust and comprehensive theory of personalization in early years, we need decades of rigorous, independent research. This process will take years and many groups of researchers. However, children are already using personalized books and personalized education is increasingly implemented in schools worldwide. While we wait for the results of empirical studies, we can draw on related concepts that have been studied by educationalists and psychologists before. These concepts include studying children's creativity (which I will explore in detail in Chapter 8) and identity (see Chapter 9). A psychological perspective on identity can offer insights on the mechanisms that underlie personalization behaviour. An educational perspective on creativity, on the other hand, foregrounds the practical application of personalization for a specific purpose and explains how personalization relates to learning. Informative findings can be also gleaned from self-referential effect studies with undergraduate students and adult learners, and market research looking into consumption practices related to digital personalization. The findings from these studies can give us some important insights into the possibility of engagement, application and design of digital personalization for young children.

As I explain in the book, digital personalization is an emerging interdisciplinary field of research, with application to a variety of areas including children's design, toy, education and publication industry. The key focus of this book is on education and educational resources, which have undergone important changes with the 'personalization revolution' in the early twenty-first century. In order to narrow down the range of personalization options for young children, emphasis is placed on personalized resources (e.g. personalized gifts, personalized books) rather than services (e.g. personalized subscription libraries, personalized nutrition programmes).

Key themes and fields

The main theme for the book is the search for a definition and operationalization of personalization and digital personalization and their emerging and possible future impact on children's development and learning. Personalization is a difficult concept, associated with commercial and political agendas rather than pedagogy and actual early years of practice. I interrogated studies and research involving children of preschool and lower primary school age (2- to 8-year-olds). This age group is of particular interest to me because of the recent sharp rise in personalized products

developed for this age range and because of the known importance of early childhood experiences for later life.

Given my own research in this area, the concept of digital personalization is narrowed down to touchscreens and digital personalized stories. With the heightened focus on personal and personalized approaches to children's learning and entertainment, researchers have begun to wonder whether these resources might have an influence on children's formation of identity and on their socio-emotional development and cognitive skills. Scholars working in the fields of human-computer interaction, psychology and education shed some light on these questions and provide different perspectives and backgrounds to the study of digital personalization. I often draw on insights from all three disciplines but, given my psychology/education background, I will mostly revisit the fields of psychology and education in this book.

Operationalization of terms

This book is interdisciplinary and I purposefully use the terminology used by the authors whose work I reference, to stay true to their own conceptualizations, and to the disciplines these authors represent. However, I do not compromise on the term 'personalization' and its related term 'customization'. The word 'personalization' is used loosely and imprecisely in the industry, which is often confusing for educators and researchers interested in personalization and child-centred approaches. For example, according to some advertisements, parents can 'personalize' family trips to Disneyland or their children's school lunches. What the advertiser means in this instance is that parents can choose a specific package for their holiday or order a specific meal from a set menu. They use the word 'personalize' to imply choice and selection. This understanding of personalization is different from how researchers, including myself, define 'personalization'. In my understanding of the word, parents are, in this example, not personalizing but *customizing* the trip schedule and the content of a school lunch for their child. The focus of this book is not on basic customization, and the choices parents make on an everyday basis in an effort to give the best to their child. Rather, the focus is on *personalization*, which carries a personal meaning, a personal significance or a personal sign. Customization is relevant for groups of people, while personalization is relevant for an individual.

Personalization can take various forms: at its simplest level, it can be in the form of a child's name or his/her initials written on top of a book or engraved into an object. In these forms, personalization is used to indicate ownership. At a more sophisticated level, personalization can be in a multimedia format with options for adding users' own audio-recordings, pictures or texts. In these forms, personalization is used to enable authorship and authentic content production. Alternatively, personalization can be used to expand the possibilities for a child's agency and active participation in an activity. In such an approach, personalization is used to honour children's choice and voice. Children don't need to create something new but are given the choice in, for example, the story ending of their favourite story or a theme for a classroom activity.

In addition to these individual forms and approaches of personalization and personalizing, personalization can be also happening on an intrapersonal level, between two people. Although seemingly paradoxical, intrapersonal personalization happens all the time in a dialogue. It can happen orally, if, for example, a parent *personalizes* a story in a book to the child's personal experience (e.g. a parent commenting that the child in the book wears the same jumper as the child did yesterday). It can also happen in non-digital format, if, for example, a mother decides to use the child's pictures and photographs to decorate the fridge. In this instance, the mother would *personalize* the fridge with the child's images. Intrapersonal personalization is thus an extension from the individual-centred process of personalizing something for one's own pleasure, to personalizing something for someone else or for both.

Digital personalization is personalization enabled or facilitated by digital technologies and/or digital media. Digital technologies can be used for personalizing overtly or they can run in the background, during the production process. For instance, for the creation of a printed *Lost My Name* book, users don't need a digital device, the personalizing process happens in the background. On the other hand, when personalizing the *digital* story in the *Mr Glue Stories* app, the child needs to customize all elements using an iPad or a tablet. Given that both books were produced with technology, they would count as part of digital personalization.

The literature fluctuates in relation to three related terms: 'narrative', 'story' and 'book'. Researchers have been studying narrative for many decades. For Bruner (1985), narrative has always been a fundamental mode of thought. Langer recognized in 1953 that narrative acts as an 'organizing device' (p. 261); and Hardy wrote that narrative is a 'primary act of mind' transferred from life to art (Hardy, 1977). I borrow from Bruner's definition to define narrative: 'Narrative is an account of events occurring over time. It is irreducibly durative. It may be characterizable in seemingly nontemporal terms (as a tragedy or a farce), but such terms only summarize what are quintessentially patterns of events occurring over time' (Bruner, 1991, p. 6). This definition implies that a narrative can take on several forms, but it needs to relate to events occurring over time. The principal form of a narrative is a story. A story can be of either an autobiographical or fictional character or a story drawn from current events (news) or historical archives (history).

With the multiple digital and non-digital ways of representing a narrative, we also need to agree on a definition of books. To define what a book is, I follow this logic: if a story is a particular form of narrative, then a book is a particular form of a story. A book is a story that appears in the format of a set of several pages (digital or printed) bound together with a physical cover, or compiled as one digital file. If the book's final form is a digital file, then it is typically called an e-book or digital book, and it is often based on a combination of modes, including text, pictures and audio sounds. Digital books for children also contain short games, videos and possibilities for children's interactions (including personalization). Such digital books can be downloaded as apps or programme computers and include various levels of interactivity. There is no agreed nomenclature for this kind of digital books. In the early literacy literature, readers will find related terms such as 'children's e-books', 'ibooks', 'story apps' or 'multimedia and

digital stories'. In this book, to make the distinction clearer between digital books and printed books, I use the term 'digital story' for digital formats and 'book' for printed formats. In the literature reviewed in this book, I describe stories, narratives and books, but I exclude non-narrative books; that is, I exclude any personalized poetry books, selection of artworks or encyclopaedia.

Another important terminology concerns the concepts of text-making, art-making, sign-making and story-making. Readers approaching early education from an interdisciplinary perspective would be familiar with all these terms and would know that they often relate to the same activity, despite the different noun preceding the word 'making'. While the actual activity could be the same (e.g. composing a digital video), it would be described and understood as 'sign-making' in multimodality theories (Kress & van Leeuwen, 2001) or as digital (or multimodal) text-making by researchers working in the areas of visual methodologies and the New Literacy Studies (e.g. Pahl, 2008). In all fields, this kind of making is considered to be a process that requires a personal and active involvement of the child (as the verb 'making' indicates). Even if the final product is not personal but shares a general template, its content has been changed through the child's investment in the making process. To stay true to the terminology favoured by a particular discipline and, at the same time, to provide a practically useful account, I refer to the individual activities using the terms employed by the individual researchers in their studies. Where possible, I describe in detail what the individual activities involved to avoid misinterpretations.

I follow this terminology strategy also when describing some of the groups of children I had worked with. I have been involved in studies with several special needs schools in the United Kingdom, and have focused on children who had an intellectual impairment and, at times, also a physical disability (I have not worked with children who had a physical disability only). Some scholars might describe them as children with special educational needs, or children with additional needs or children with complex needs. Other scholars use the terms 'children with literacy difficulties', or 'children with learning disabilities' or, simply, 'children attending a special school'. I have always found official and general labels problematic and prefer a detailed description of the children's unique talents and differences. This may not be possible in this book because I only have the space to present study summaries and often need to use a generic term as a shortcut to refer to these children.

On this note it is worth pointing out the fluctuation of terms when it comes to the description of children more generally. I focus on children aged between 2 and 8 years. Readers working in the early childhood area would know that this age group is sometimes referred to as 'younger learners', 'preschoolers', 'early years age group' or, simply, 'young children'. I have used all these terms interchangeably in my work, but for clarity, I specify the children's actual chronological age (if it's known from the data).

Lastly, a short note on the term 'education': even though in practice and some literature personalized education and personalized learning are often not distinguished, I follow the definition that learning is about learning, while 'education is about teaching as well as learning' (Moore, 2007, p. 57).

Aims and objectives of this book

This book is not a monograph that would present new results of one large study. Rather, it attempts to bring together, in a comprehensive and accessible manner, the literature available on digital personalization and clarify, analytically and theoretically, some of the key dilemmas of this emerging field. It aims to help scholars and professionals understand the connections between personalization and literacy, personalization and education, and personalization and community (or wider social issues).

Broadly speaking, I aim to explain theoretically and with emerging research evidence, the influence of digital personalization on young children's lives. The book is in part a research-based and in part a conceptual book, with a critical discussion of the gaps in the literature. The book's aim is to develop original insights from my own and others' research concerned with digital and non-digital personalization and to discuss in a clear and critical way the thinking, research issues and practical implications of digital personalization in early childhood. My motivation to write this book is to share in an informed and systematic way what is already known about the topic and to highlight areas of future research. This, I hope, will ensure that digital personalization is better defined and better rooted in the historical process of its development and that data can be collected through a sound assessment of its implications for early childhood.

This book is primarily an academic text applying theoretical frameworks and existing research to studies and phenomena; it sets out research findings and expects a certain level of familiarity with the academic jargon and early childhood literature. At the same time, however, it also aims to speak to educationalists, teachers and early childhood experts, who are interested in finding out more about the interesting and important developments in digital personalization and how they impact on early childhood.

Empirical basis of the book

I have been studying personalization and digital personalization in children's early literacy development in my master's studies, and in my doctoral and postdoctoral research. In this book, I bring together the evidence detailed in my research articles, blog entries, book chapters, a Minibook published by the United Kingdom Literacy Association and the articles I had written for educational professionals. The data I draw on represent young children in the United Kingdom (South of England) and Spain (the Madrid area) and are in parts available from the funders of the individual research studies. The analyses of the data are reported in detail in peer-reviewed articles and referenced in the References section at the end of the book. All research cited in this book was approved by the Ethics Committee at The Open University, the United Kingdom, and follows the British Educational Research Association's Revised Ethical Guidelines for Educational Research (2004). In addition to my own work in this area, I report international research related to personalization or digital personalization in early childhood. The diversity of the international research

presented here is intentional; it fulfils my aim to accent the main themes of my own research with a strong literature base and mixed-methods empirical research. For this purpose, small case studies are presented alongside larger studies, with both qualitative and quantitative methodologies.

In many studies and in most products designed for children, digital personalization is presented as a universal phenomenon, as something that is believed to appeal to all children. It is worth highlighting that our knowledge about the impact of personalization techniques on young children is built on studies with selected groups of children, predominantly from white, North American or UK background. Research and documentation of digital personalization from the Majority World (e.g. China, Africa, India and Indonesia, that is, from countries where the vast majority of children live) lack in academic literature overall and in this book specifically. All readers, but particularly readers from these countries, are invited to contextualize the book's main arguments in relation to their own and the children's specific socio-cultural and socio-technical environments.

Delimitations

In this book I focus on personalization and digital personalization in relation to specific products and objects (digital books and digital stories) and to the practices associated with these products and objects. For example, I discuss personalized books and the practice of authoring a personalized book. I do not focus on personalized and on-demand services.

'Digital' is understood as relating to technologies and media, that is, digital tools that include desktop computers, laptops, touchscreens (also known as interactive media, tablets, iPads and smartphones) and other digital devices. I deliberately refer to technologies in terms of physical devices or tools, rather than communication networks such as the Internet, cloud, computing or social media platforms. This is because I look to ensure a constructive discussion of *affordances* (Kress & Van Leeuwen, 2001), which are the possibilities of physical tools to orchestrate certain behaviours, communication and networks.

Structure of this book

Personalization can be an unhelpfully vague and amorphous concept, and my aim is to break it down into a set of concepts, empirical avenues and theoretical components. Theory without data is a naïve theory, and data without theory are open to subjective bias. I therefore discuss the two throughout the book with chapters alternating in theoretical and empirical focus. I do so in this order as such a structure allows for a more comprehensive explanation of the ways in which research and theory inform and impact each other.

In order to explain the various kinds of personalization approaches and in an effort to streamline the examples into a coherent volume, I use the disjuncture of

macro-, meso- and micro levels, inspired by Bronfenbrenner's ecological systems model (originally published in 1979 and updated in 2006). This model called attention to the environmental and societal influences on childhood environment and effectively integrated the influence of multiple contexts on children's lives. Adopting Bronfenbrenner's work in this book allows me to focus on the individual (or personal) influences, on the interpersonal (family, peers) interactions, on school and other learning environments, on the community and societal influences and how these micro-, meso- and macro systems impact on the child directly and indirectly, short term and long term, in relation to personalization. In addition to considering the importance of the relationship between context and learning in all personalization studies, I think of personalization and digital personalization as being part of what Bronfenbrenner termed the 'Process-Person-Context-Time (PPCT)' model in his bioecological theory (Bronfenbrenner & Morris, 2006). In this model,

characteristics of the person actually appear twice in the bioecological model – first as one of the four elements influencing the form, power, content, and direction of the proximal process, and then again as developmental outcomes – qualities of the developing person that emerge at a later point in time as the result of the joint, interactive, mutually reinforcing effects of the four principal antecedent components of the model. (p. 798)

In other words, context is embedded in development, and research needs to take into account the interconnection between context and ecology, not privilege one or the other. My position also resonates with Bronfenbrenner's call for a reciprocal relationship between scientific research and community practice, as explained later in this chapter.

Overall, there are twelve chapters in the book. This introductory chapter is the longest chapter in the book. I provide a broader introduction to the key topics of the book and lay the conceptual groundwork for the chapters to follow, by specifying the key theoretical frameworks that have guided my interpretations of the literature and of my own research.

In Chapter 2, I begin my enquiry into the origin and nature of personalization at the meso- and macro levels. I re-examine the changes to education and everyday lives in the past two decades, touching on the societal issues that contribute to the rise of interest in personalized education in the first half of the twenty-first century. This overview is intended to help with the development of a definition for personalized education. I approach the task systematically and consider the 'who, what and why' questions of personalized education across Chapters 2 and 3. In Chapter 2, I discuss the *who* of personalized education, that is, the main agents or stakeholders who make personalized education personalized, ranging from educators, to technology companies, to children.

In Chapter 3, I build on the historical perspective of personalization in the twenty-first century and outline the reasons for *why* there is a need for personalized education in the society. In alignment with current work in this area, I argue that the present

models of personalized education are dominated by, rather than enriched with, technology. This argument provides a way for my rationale to return to established empirical traditions and theories (such as Vygotsky's theory). These traditions can help us understand what personalization could mean for education than the current technology-driven education models. I present some interesting work in the psychology and education literature concerned with the personalization effect to illustrate the range of possible applications of personalization to education, especially in relation to educational resources.

Chapter 4 zooms in on two such educational resources: personalized books and digital personalized stories. A review of the various types and kinds of digital and paper-based books is provided, with specific attention paid to commercially produced personalized books. A rubric for assessing personalized books is said to include not only different levels of personalization but also a number of author-related factors, embedded in the final book products. Such an in-depth look motivates a theoretical treatment of the phenomenon, as explored in Chapter 5.

Chapter 5 provides a walk through theories concerned with digital personalization and personalized learning environments. I draw on both psychology and educational approaches to the study of personalization in formal learning environments. Although these theories were developed in relation to learning with older children, they indicate the main elements and underlying structures of digital personalization, and therefore provide important insights into digital personalization in early childhood. Based on these theoretical insights, I argue that personalization is not the same as customization and explain how the business and education approaches to personalization differ from each other.

In Chapter 6, I present five key theoretical themes of personalized education: autonomy, authorship, aesthetics, attachment and authenticity. These '5As' can be understood as a framework that was developed in relation to personalized books/ literacy materials but, as argued in the chapter, has wider applicability and enables us to tackle broader, 'macro' questions around personalization. Based on the philosophy of Tzvetan Todorov, I contend that the 5As are best thought of as anchored in the humanist principles. I then illustrate the basic principles of each of the 5As through selected examples from my research concerned with personalized books and personalized digital stories. As such, the 5As encompass digital and non-digital personalization and contemporary examples of personalization in early childhood.

Chapter 7 takes us from theoretical discussions to empirical findings and offers a summary of empirical research concerned with personalized books and digital stories, synthesizing the findings from my predoctoral, doctoral and postdoctoral work. In terms of focus, the chapter mirrors Chapter 4, which was exclusively focused on personalized books and stories. Collectively, the studies summarized in this chapter show that in educationally supporting contexts, personalized books can be beneficial for children's language development, positive parent-child exchanges during book reading, child's authorship (which is linked to writing and digital literacy skills) and children's engagement in traditional school subjects. They also highlight the importance of asking some provoking questions around

personalization. Notably, the question of balance between the personalized and non-personalized 'dose', which would be necessary for a successful learning experience, is highlighted in the chapter.

Chapter 8 continues the book's theme of seeking a definition that would appropriately delineate the field of personalized education. Following on the 5As presented in Chapter 6, I spotlight a specific aspect of education: creativity. I outline how the 5As of personalization relate to theories and empirical work concerned with creativity and ponder the influence of personalized education on children's individual and collective creative skills. As such, the chapter builds on the learning outcomes noted in the previous chapter in relation to personalized books and extends them to children's creative skills with a range of educational resources.

Chapter 9 examines personalization from the developmental psychology perspective. The key focus is on identity and a close examination of how digital personalization might contribute to children's concept of self. Given the close, almost intertwined, relationship between identity and narratives, I explain how narratives shape children's selfhood and their internalization of socio-cultural norms, values and practices, and I consider their connection to the 5As. Insights from the diversity and multimedia theories help to explain the interaction between identity and personalization.

Chapter 10 employs the metaphor of a playground to refer to the multiple possibilities of personalized education with touchscreen devices. Empirical work focused on tablet-based personalized education is reviewed in relation to its impact on children, the context and content of their learning (the so-called 3Cs as conceptualized by Guernsey, 2012), and the specific affordances of touchscreens. Emphasis is given to the pedagogical innovation brought about by touchscreens' affordances to personalized and traditional (non-personalized) educational environments. The use of touchscreens in early childhood classrooms is examined in relation to the pedagogies that guide (or don't guide) their deployment.

Chapter 11 extends the theme of effective pedagogies and new affordances related to touchscreens. It spotlights the pedagogy of design, pedagogy of embodied learning and pedagogy of democracy as examples of effective pedagogical techniques for personalized education. Design pedagogy is considered in relation to the agency question and who should personalize children's education. It is argued and illustrated that design pedagogy works best in communities of creators and that digital making and content production can be successfully undertaken not only by children, but also by their parents/caregivers, teachers and whole communities of users. Community-based content production is aligned with democratic and humanist principles of early education and the chapter concludes with research-based examples of effective personalized education.

Chapter 12 presents a discussion of the findings and conclusions of the research presented in this book. In this final chapter, I integrate the insights from the socio-constructivist theory and some innovative research studies to argue that the effective pedagogy for personalized education is not focused on the 5As in isolation from the humanist values, but integrates it in a personalized pluralization model. From touchscreen-based personalized education and research with personalized

books presented in the individual chapters, I distil the key ideas that could form the basis for a preliminary assessment of the merits of personalized education for children's learning.

Disciplinary orientation of the book

As I will describe later in this book, digital personalization in early childhood is a new phenomenon. Just like with any new phenomenon, it is important to ensure a synthetic and convergent orientation in developing an understanding of its key features, possibilities and implications. Given that personalization itself is diverse, with multiple meanings, uses and implications, it makes sense to approach it from several theoretical stances. Therefore, the fields on which I draw in this book are quite disparate: they include social psychology, linguistics, sociology, philosophy, developmental psychology, human-computer interaction and educational research. I work with colleagues from all these fields and enjoy exploring the different angles they bring to digital personalization. I firmly believe that it is only through collaborative and interdisciplinary research that scholars can create a comprehensive account of the impact digital personalization might have on young children. However, given the specific remit and constraints of this book, I foreground two disciplines: educational research and developmental psychology. This is because both disciplines are concerned with the topics of childhood and learning, and because of my own familiarity with these two fields. I understand developmental psychology as 'a broad and inclusive field of study dealing with the course of behavioural and psychological change' (LaBarba, 2013, p. 5) and as a study that focuses on *developmental* and not '*differential* behavioural variables or events' (Wohlwill, 1970, cited in LaBarba, 2013, p. 8). I do not draw on one particular branch of education research. Instead, I explore a range of theoretical approaches concerning children's learning with digital and personalized resources, applying a socio-cultural, child-centred and, at times, philosophical lens. The literature review includes descriptive, correlational and experimental studies and qualitative, quantitative as well as mixed research methodology. The book is thus deliberately characterized by a theoretical and methodological diversity.

Without a doubt, education and psychology have different foci of study and different disciplinary origins. They often follow different theoretical orientations and scholars working in the two fields use different methodologies. Nevertheless, the two fields have always been closely related, or related enough, to afford educationalists and psychologists opportunities for mutual enrichment in terms of theoretical frameworks, ideas and practical solutions.

Before I delve deep into how the two disciplines approach digital personalization, it is useful to establish the disciplinary boundaries of education and psychology in relation to childhood and children's development. To do so, I present the educational and psychology perspectives on children's development first, followed by their take on personalization. In these descriptions, I separate education and psychology into two sections.

I recognize that such a separation might appear parsimonious, given the disciplinary overlap of developmental psychology and education. Indeed, my research has always drawn on studies from both fields and has been inspired by their *intertwined* influence on children's learning and conceptualization of childhood. Throughout the book, studies and ideas from both fields are presented in relation to the topic discussed rather than the discipline they come from. I separate them only in this chapter for explanatory purposes.

Educational research and early childhood

The research and knowledge we have about children's development is, by and large, based on the understandings developed and studied in the Western Minority world, which includes countries such as the United States, the United Kingdom, Canada and Australia. The experiences of children growing up in these countries are economically and culturally different from those who live in the Majority World. This implies that we cannot make any universality claims or assume that the effects we observe in, for example, London preschools would be the same in an African classroom. Across the world but also within individual countries, there are not only different practices in early care but also different understandings of childhood and children's development. These different understandings are reflected in the many ways in which childhood is regulated through government laws, as well as in the national differences concerning provision for children's education, including the education provision at home and in school. In addition to these macro-level influences, the different ways in which childhood is conceptualized are manifested more visibly through the different physical spaces designed for children (e.g. children's playgrounds and waiting rooms at doctors). To a large extent, new technologies, especially those that create digital classrooms and rich banks of educational resources, can unify the disparate elements of children's education. As will be discussed in Chapter 3, some professionals believe that adaptive courseware and customizable educational resources (both of which are part of technology-mediated personalized education) could overcome differences in educational provision across the world and offer each child an appropriate level of support and choice in learning. In practice, however, technology-mediated education, including digital personalized education, is still part and parcel of the macro-influences on childhood. The particularities of social norms and expectations, embedded in the specific places where children play and learn, can be changed, but not in one generation and with one piece of technology. My epistemological stance is therefore to value and validate the educational differences and their implications for educational practices, including those with personalized resources.

In the Western Minority World, educational research has historically focused on children as learners. This approach highlights a specific orientation to childhood (which may appear as narrowly focused to some), but it has made great progress in the educational arena. Children's learning has been predominantly studied in relation to the support adults provide to children, which includes children's teachers (actual teachers in the classroom but also children's parents, friends, siblings, grandparents or other family members) as well as in relation to specific resources supporting children's

learning (e.g. books and building blocks) and in relation to the role of peers. More recently, the definition of a teacher and educational resource has been expanded to include virtual teachers and intelligent software programmes, which provide user-responsive, 'personalized' teaching.

In its early days, approximately a hundred years ago, educational research was dominated by quantitative research methods and aimed at developing objective measures of learning achievement. Since then, the field has made significant progress, with an expanded set of research concerns. These were summarized by Catherine Snow (2016) as three non-exclusive tendencies of educational research. As Professor Snow writes, the key question for future research is to understand the direction of these tendencies:

The burning question for me is the direction in which those shifts in the concerns of education researchers take the field. Do those concerns represent a trend toward greater rigor, toward more urgent attempts to convince the world that education research is as methodologically sound and as concerned with important issues as research in the biological and physical sciences? Is there an increasing focus on the need for research to inform education policy? Or is there a trend toward greater concern with relevance to education practice, with making education research useful and usable in the world of schooling? (Snow, 2016, p. 64)

These three tendencies of educational research could be understood as inherent in action research, positive research and interpretive research. All three contribute to a rich basis of educational research more generally and personalization research in particular. In my own work, however, I'm most interested in responding to the last concern raised by Professor Snow: educational research making a difference to practice. I therefore foreground work that privileges action research and design-based research practices, that is research conducted in dialogue with community of users. I term such an orientation 'community-based research', for lack of a better term, to acknowledge the important role communities play in the research process.

Community-based educational research

The tradition of design-based research and formative experiments conceptualized by David Reinking is close to the core of community-based research. Researchers have used other terms to describe similar tendencies, for instance 'translational research', 'outreach research', 'publicly engaged scholarship' and 'responsive research'. I deliberately use the word 'community' to establish the notion that educational research should be nested in communities, and should be collectively negotiated with the diverse practices, beliefs and attitudes characterizing this community.

My aim is to engage in research that is 'community-centric, collaborative, humanizing, and guided by equity and justice' (Kinloch, Larson, Orellana, & Lewis, 2016, p. 95). 'Community-based research' is a broad umbrella term for the kind of educational research that aims to document learning and teaching practices and

advance our understanding of them, but, in addition, which aims to make a change to the community involved in these process and to ensure 'that knowledge contributes to making a concrete and constructive difference in the world' (Loka Institute, 2002, online). The orientation towards community-based research implies close collaboration with children's educators, policymakers and industry representatives, that is to say stakeholders who can create, release or support the use of educational resources and stakeholders who can facilitate or legislate best practices. It is possible to involve these stakeholders at the end of a research project, and indeed, many educational researchers reach out to communities at the stage of research dissemination or implementation. In my understanding of community-based research, however, knowledge and research are co-created with the key stakeholders who need to be involved as much as possible in all stages of a research project.

For example, in my doctoral research at The Open University, I worked closely with children's app producers to develop a smartphone/tablet app (called Our Story). I consulted designers when working on the initial concept of the app, discussed with them the possibilities of embedding personalization features into a tablet device, and reflected together with them on different design scenarios for a young user group. I exchanged countless emails and shared many coffees with teachers from local schools discussing the design ideas. Before the app became publicly available, a group of us at The Open University (including my PhD and master's supervisors) tested it with children and consulted with groups of parents and teachers. Their feedback was invaluable in refining the app design. When the app was finished and we wanted to understand how it impacts on children's literacy and language, again, the children, teachers, parents and app designers were key to helping our understanding of the app's actual use and its value in real contexts. As a researcher, I felt I have the necessary knowledge concerning research methods and children's language and literacy development, but I needed a close and frequent conversation with the teachers and children's parents to better understand the extent to which the app constitutes a resource that is not only interesting but also useful and which supports children's personalized story-making. Often, ethnographic methods of investigation were more useful than holding focus groups as they allowed me to gain a deeper and genuine look into the ways the app was used in children's homes, what worked and what didn't work. One-to-one interviews were useful in gauging children's interest in the app and getting their views on what could work better. In my conversations with the children, I was open and frank and typically asked them questions such as: 'What do you think could be improved in the app? What would you change in the app if you were the designer? What do you like about it? What do you dislike?' Such an approach enabled me to gain a deeper insight into not only the app itself but also the actual stories children and adults created with it. These stories were often family and personal stories, and it is unlikely that the participants would readily share their stories with me if I adopted a different research approach. In addition to these qualitative and open-ended research methods, I also studied children's responses in studies that followed an experimental paradigm and objective quantitative measures. However, collaboration, partnerships, open communication and iterative research

responding to user-generated issues were key ingredients in the success of the Our Story projects.

In my postdoctoral work, I adopted a different approach to community-based research: For a year, I worked together with professors Cremin and Littleton on a Knowledge Transfer Partnership project that contributed to the work of a major literacy charity of the United Kingdom called 'Book Trust'. Although in this project the focus shifted towards children's digital books and e-reading more generally (as opposed to the focus on personalized digital books as was the case in my Phd), the close collaboration with teachers, parents, children's designers, developers and publishers, as well as the employees of Book Trust and other national literacy charities, continued. The project led to the development of educational criteria for the evaluation of children's digital books and grew into a number of offshoot activities, including the creation of a web-based tool facilitating the selection of children's digital books (see <http://literacyapps.literacytrust.org.uk/>), the establishment of a national award for best children's digital books (see <https://ukla.org/awards/ukla-digital-book-award>) and the development of a free, international guide for teachers interested in the use of digital books in their classroom (see <http://www.meshguides.org/category/meshguides-published/literacy-mesh-guide/digital-books/>). The impact of these activities is wide and long lasting because it involves community of users and their own contributions to the project. Such an impact could only be achieved through a community-based approach and by humbly acknowledging the limitations of research that is caught up between subjectivity and objectivity.

Researchers interested in adopting a community-based approach to the research of children's digital books (and apps) can find more details in Kucirkova (2016a). In the next section, I describe why I consider developmental psychology crucial to a thorough understanding of all child-related phenomena, including personalization, and how it complements the orientation of educational research that I have outlined here.

Developmental psychology and early childhood

Similarly to the origins of educational research, developmental psychology started with a strong motivation to find universals and followed an objective scientific enquiry in pursuing this aim. At the beginning of the twentieth century, the discipline was characterized by research employing objective scientific enquiries. This methodological approach has been criticized for taking objectivity to the extremes, at the detriment of children's agency. The concern was raised that in early stages of research, developmental psychologists failed to recognize children's own influence on their development and their methods were not socio-culturally responsive (see, for example, Woodhead & Faulkner, 2000).

For me and very many other researchers who work within the psychology paradigm and deeply care about sensitive research methods and recognition of children's agency, this methodological criticism is an important point. Research that fails to acknowledge the role of context in the observed phenomena has a low ecological validity and is in stark contrast to the aforementioned community-based

research and Bronfenbrenner's theory. However, although early developmental psychology research could be criticized for adopting generalized and normative accounts of development (and perhaps a few contemporary studies still do), the majority of developmental psychologists have moved 'into a new post-Piagetian phase, in which the results of detailed studies lead to revisions of grand theories' (Butterworth & Harris, 1994, p. 76). In contemporary developmental psychology, strict stage theories are rarely adopted uncritically, with many developmental psychologists recognizing exceptions, irregularities and individual differences within general patterns and individual stages. In relation to methods, headway has been made through the inclusion of novel, multimedia and multidimensional ways of studying children's behaviour in recent years. It is this kind of innovative work in developmental psychology that inspires me, and that I consider to be compatible with the community-based educational research.

Most psychologists would agree that the broad aim of developmental psychology is to identify typical patterns of development to predict future development and within this broader aim to provide some clues about the mechanisms underlying a specific behaviour. Although developmental psychologists recognize individual differences and the uniqueness of each individual, they are predominantly interested in what children have in common. They want to understand the normal range of variation, typical patterns of human growth and how these vary between different groups of children (grouped, for example, by gender, socio-economic background and other broader shared characteristics). Such an approach helps developmental psychologists estimate developmental delay and provide recommendations for further development or adjustments to current development; that is, it produces results directly relevant for practice.

A particular contribution relates to the concept of developmental milestones which help to contextualize a certain aspect of behaviour and concretize the effect digital personalization might have on children's development. Typically, developmental milestones are used clinically to screen for developmental delays and help parents understand what behaviours to expect and how to best support their children's developmental trajectory. I hasten to insert a caveat here that despite the universal tone associated with developmental milestones, the vast majority of clinicians know that milestones are not fixed points in time, that there is considerable variation within each stage and that sometimes some stages can also occur in parallel. Some children develop milestones at different times and some children follow different patterns in their development, and individual differences can be accentuated in different contexts of development. Milestones can provide a useful framework and comparison point when discussing behaviour (typical or atypical) and when considering the possible influences of a new phenomenon – such as digital personalization on children's development. Therefore, when thinking about how digital personalization might impact on children of different age groups, stages of children's development can provide some helpful clues. I often refer to them when interpreting results of my own studies. However, although I apply concepts of developmental psychology to specific effects, I always strive to interpret the overall impact in relation to the context and circumstances in which the effects occurred. In this way, developmental psychology

can widen the scope of research and provide the necessary conceptual foundations on which to build the new agenda of digital personalization.

To guide my thinking in interpreting these related influences, I draw on a well-established theory of learning: the theoretical framework of social constructivism built on Vygotsky's theory. I detail this theoretical orientation in the next section.

Theoretical orientation of the book

It is rarely the case that one theory can provide answers to several aspects of human behaviour and incorporate influences from both psychology and education. Lev Vygotsky's (1896–1934) social constructivist ideas achieve this remarkable synergy and continue to inspire both developmental psychologists and educational researchers worldwide. Vygotsky's visionary ideas on children's development have made a significant contribution to both fields. There are dozens of books describing and further developing Vygotsky's theory. In this book, I select a few aspects of socio-constructivism to help with the conceptualization of personalization and digital personalization for early childhood. My selection of Vygotsky's ideas spotlights some key aspects of his theory, which are particularly useful in explaining the aspects of personalization discussed in this book; that is, they should not be read as my overall interpretation of Vygotsky's theory. Furthermore, a selection of concepts from a rich theory runs the risk of oversimplification and selective attention. I intend to minimize this limitation by outlining specifically and explicitly how selected aspects of Vygotsky's theory apply to the observations I make. A concise overview of the key aspects follows.

The first aspect of social constructivism theory relevant for my work is the notion of socio-cultural influence on learning. As the name *social* constructivism suggests, social constructivism recognizes the social context in which learning occurs. This context is not passive but it actively mediates children's development. Researchers and practitioners working from the social constructivism perspective therefore create environments that are meaningful to young children and actively support their learning. Effective learning environments are environments that scaffold children's understanding and that are adjusted to children's unique socio-cultural backgrounds, needs and preferences. According to socio-constructivism, learning and knowledge acquisition do not happen in isolation. Rather, there is a dynamic negotiation between the learner and teachers and the learner and his or her wider environment. For an understanding to occur, there needs to be a knowledge exchange between a personal/individual and shared/collective mental representations. The learning process is facilitated by a shared set of symbols and signs, with language being the most powerful sign system for learning.

Emphasis on the social aspect of learning is related to the importance of adults and significant others in supporting children's learning. In this book, major emphasis is placed on learning which occurs between children and their parents. Vygotsky's notion of zone of proximal development (ZPD) provides a broad framework for evaluating the learning opportunities within adult-child exchanges. The notion of

ZPD relates to Vygotsky's idea that adults, older peers or other 'more knowledgeable others' (MKOs) structure activities in a way that enables children to engage in more complex behaviours than they could on their own. Through their verbal feedback, MKOs provide support according to child's current knowledge and gradually increase the task complexity, extending and 'scaffolding' children's learning (see Wood, Bruner, & Ross, 1976). Although many digital producers claim that their products can support children's independent learning, social constructivism reminds us that it is only through real human beings that children develop holistically and are ready to function in the complex world around them. This is because parents (and children's primary caregivers or other adults who are close to children) can contextualize the information children receive from external stimuli (be this from educational resources such as digital books or the wider environment), and they can link these experiences to children's previous experiences as well as to the wider world. They can make a strange concept personally meaningful to an individual child by, for example, asking them: 'See this red shirt? That colour is called fuchsia. It's the same colour as our carpet at home.' Adults can link local and global knowledge. For example, while reading a book, a mother comes across the word 'fuchsia', which she explains to her 5-year-old daughter in the following way: 'Remember when we went to Turkey for holiday? The flowers in the garden were called fuchsia. They were the same colour as this shirt. That's where the name comes from. ... Do you know anything else that has this colour? Think of Aanya, your friend from pre-school. You know her mum's Salwar suit? Which colour does it have?' Such a process of contextualizing– some would say, *personalizing* – the learning process has its origins in Vygotsky's theory and is believed to effectively support children's long-term learning.

In addition to human support for learning, educational resources (including digital technologies) play a vital role in scaffolding children's understanding. Vygotsky emphasizes the role of 'tools', with a broad definition of what a 'tool' could be: a tool can refer to a physical object (e.g. book) but also an intellectual activity (e.g. language parents and children use during reading). Vygotsky further argued that these tools allow us to mentally frame our perception of reality, which is why advanced language (and cognitive capacities more generally) are subject to historical and technological changes (see Bruner & Lucariello, 1989; Lucariello, 1995, for an account of cultural influences on this process). With Vygotskian tool metaphor, one can think of various tools being used at different levels during shared book reading, ranging from books in traditional paper-based formats to new electronic formats with which parents and children interact at home. The metaphor also suggests that knowledge mediation can take various forms, and is therefore subject to contextual and individual variation.

Before we study how children learn with or through personalization, we need to consider how children learn more generally. For Vygotsky, language is the 'primary psychological tool' (Farenga & Ness, 2015, p. 971), the 'tool of tools' (Saljo, 2011, p. 60), essential for thinking, communicating and learning. As a powerful system of symbols, language enables us to organize our own thoughts and make sense of what others think. For Vygotsky, thoughts are verbal and social – they are formed and shared in response to others; there is no such thing as a thought void of language. This understanding of language led Vygotsky to his socio-cultural development theory,

in which he distinguishes between inner and outer speech. Inner speech refers to the internal dialogue when a child begins to speak or an adult processes aloud a thought she/he might have. Outer speech is the speech we share with others. The distinction is most pronounced with young children who often speak to themselves with no apparent audience. It does, however, not imply that there is a clear division line between social and private speech, as illustrated by this quote (cited in Daniels, Vygotsky's scholar, 2005, p. 129): 'Even when we turn to mental processes, their natural remains quasi-social. In their own private sphere, human beings retain the functions of social interaction' (Vygotsky, 1981, p. 164). Vygotsky's early work has done a lot to pioneer the research interest in language and language is still one of the principal ways in which psychologists and educationalists, including myself, study children's learning progress and thinking process. Later on in the book, I discuss the amount of self-related 'personalized' speech between parents and children as they share different kinds of books together (Chapter 7) or engage in toy play or reminiscing conversations (Chapter 3).

The notions of verbal thought, of inner and outer speech and language as powerful symbolic systems, bring us to Vygotsky's concept of intra- and inter-psychological functioning. Intra-psychological (i.e. inner or private) functioning is in constant dialogue with inter-psychological functioning (which happens externally and socially). Culture plays a major role in how and what children process concepts intra- or inter-psychologically and how and why they internalize some concepts more than others. Young children adopt practices and thoughts of those around them; they internalize the language spoken by other children they interact with and adults who spend time with them. This also applies to the various objects children interact with in their play and learning, and the language and thinking embedded in these objects. Importantly, the media (TV, magazines, books) that children are exposed to and the various toy characters children play with influence their thinking. It follows that children's inner language is always influenced by what children heard, saw or experienced elsewhere – it doesn't occur in a vacuum. Expanding Vygotsky's views, Barbara Rogoff wrote that there is no such thing like 'pure' knowledge or understanding, 'behaviour does not involve abstract, context-free competences that may be used generally across widely diverse problem domains, rather, it involves skills tied to somewhat specific types of activity in particular contexts' (Rogoff, Gauvain, & Ellis, 1991, p. 318).

Viewing learning and development as influenced by a specific cultural context is a powerful theoretical tool. Particularly so when it comes to discussing technological determinism and the claims of some technology developers that their personalization tools could 'transform children's learning', 'teach children language', regardless of where or with whom the children use them. The socio-cultural perspective cautions that any technology-centric interventions, which focus on universal tools and sideline teachers and other 'more knowledgeable others', are likely to fail in the long run. No digital tool can replace a loving parent and the unique personal, sensitive and socio-culturally relevant scaffolding such a parent can provide.

This brings me to affection, which is part of the social context and environment in which learning occurs. Although this aspect of Vygotsky's work was not fully developed because of the scholar's untimely death, he was aware of the importance of emotions for

learning and emphasized the role of feelings in shaping social interactions, language and thought. Children experience the social context around them on a cognitive-emotional level, they internalize the emotions available in a given context and these processes then become the way in which 'a child becomes aware of, interprets [and] emotionally relates to a certain event' (Vygotsky, 1994, p. 341, cited in Kozulin, 2003). To capture his thinking on children's emotions and learning, Vygotsky used the term 'perezhivanie'. Perezhivanie is, as several English writers recognized, difficult to translate into English, because it captures both cognition and emotion within one word, something which does not exist in the English language. As Ferholt (2015) explains, for Vygotsky 'perezhivanie' was the link between the child and the wider environment, the connector between cognition and emotion, between self and others. Ferholt (2015) further writes that 'Vygotsky makes more explicit that perezhivanie is the relationship between individual and environment, and therefore that this phenomenon is central to his theory of development. ... Vygotsky then explains that perezhivanie is methodologically essential in the study of human development' (p. 62). Affection and social environment are linked in Vygotsky's theory of learning, and the two aspects are also part of the personalization theory of Oulasvirta and Blom, as explained in Chapter 5. Vygotsky offers the concept of perezhivaniez while Oulasvirta and Blom bring to the foreground aesthetics and the need for relatedness when it comes to emotions and personalization. Both highlight the tight relationship between affect and learning, a concept worth pursuing in relation to personalized learning.

Despite the comprehensiveness of Vygotsky's theory, there is no discussion (or at least no apparent mention in the currently available translations of Vygotsky's works) of how personalization impacts early childhood and what its broader implications might be for children's development. This book aims to address this gap to some extent. The first step in this process is to attempt to explore and fully define the concept of what personalization is and what it might mean for early childhood. This conceptual development begins in the next chapter, in which I attempt to narrow down the broad semantic scope of personalization in relation to education and early childhood.