Digital Personalization in Early Childhood

Impact on Childhood

Natalia Kucirkova

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Disclaimer

I mention several examples of commercial products, mainly personalized books, in this book. I'm regularly approached by personalized book producers/publishers from across the world. They often ask me to review their products, or to research their products in my studies or, even, as one app producer recently suggested, to 'endorse it on one of my blogs'. I would like to make it clear that the examples selected for this book are based on my familiarity with the individual products and an arbitrary choice based on the book's focus. They should be therefore viewed for their illustrative value, not as indicators of quality.

1

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 personalizsation. 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 marco-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 or 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.

2

The Origin and Rise of Personalized Education

Many authors and scholars are able to state what personalization is *not*, but most struggle to specify what it really is. This tautological view of personalization is particularly noticeable in relation to personalized education and learning. Scholars, including myself, have argued that personalized learning is not, or should not be, driven by technology, and that the current models of personalized education are inadequate. But what exactly do we mean by personalization, where does it come from, what influences it, what counts as personalized and what count as non-personalized?

The search for a definition of personalized education begins with some macro-level observations and a consideration of wider, societal issues. In this chapter, I answer two fundamental questions of how personalized education came about and who can make education personalized. In this overview, I consider education from a broader viewpoint: in addition to learning and teaching academic subjects, education is expanded to include skills, which might not be required or tested by the state, but which are considered crucial by the society (e.g. cooking and sewing for girls growing up in Ancient Greece and knowing how to use a smartphone for teenagers growing up in the twenty-first century). Unlike the examples of digital personalization I used in the cameo at the beginning of the first chapter, personalization is in this chapter discussed in relation to education and understood as a bespoke or individualized practice.

Tracing the origins of personalized education

I'm not a historian and what I offer here is very much a simplified historical account of how personalized education (as we know it today) might have come about. I consider the historical and societal influences on children's learning, literature and home practices in more detail in Kucirkova (forthcoming). In this section, I give a brief summary of my thoughts on the key socio-historical trends and their possible impact on the origins and developments in personalized and person-centred, or individualized, education.

Age, gender and socio-economic influences

The first references to the importance of person-centred programme of instruction can be traced back to Ancient Greece some 2,000 years ago. Although the education systems in Athens and Sparta were based on different principles, both education systems shared the premise that teaching needs to be differentiated for boys and girls and for rich and poor. This in itself shows some very basic differentiation based on child gender and background. In Ancient Rome, about 250 BC, only the rich could afford the fees of a private tutor (often employed as a slave). The educated were a significant minority – they were mostly men from rich families and constituted only about 20 per cent of the whole population. The education for this minority was bespoke and targeted the key skills necessary for these individuals, such as reading, writing and public speaking. These were skills not everyone had; indeed, they were another way of differentiating the rich from the poor (or educated from the non-educated). Other children (almost all girls) were taught at home too, but they were taught practical household skills rather than literacy and arithmetic. As such, some privileged children received quality, academically focused education that was tailored to their situation and that could empower them to become an independent citizen, while other children received standard comprehensive education. Children's background, and, put more crudely, the wealth of a family, were the decisive factors for who would receive personalized education in the ancient times. The end of the Roman Republic saw a 'two-tier education system' with a primary school for children from privileged homes and higher school for selected rich men (Kamm & Graham, 2014), again indicating some differentiation, this time based on the children's age (in addition to wealth).

If we continue the historical survey, we can see that the tale of education continued the main threads of inequality, sexism and personalization up until today, in a funnel-like shape: all three elements are still visible in today's modern era but, some argue, to a lesser extent than they used to be. More than ever before, people are literate, educated and have access to school, although it is still more boys than girls and there were still, in 2016, about 785 million adults who could not read or speak (see the global illiteracy statistics available in 'Speaking Books': http://www.speakingbooks.com/impact/overview.html). However, while inequality and sexism persist, personalization seems to have bounced to the extreme of standardization.

Historians agree that from about the sixteenth century, universal and standard education began to rise in countries currently described as Europe. In a 'universal' education system, the vast majority of children do not receive bespoke education delivered by personal tutors. Instead, they receive standardized education, presented by a 'sage on the stage', also known as the teacher. The content a teacher delivers in the classroom is not his or her personal decision – the content is based on the curriculum dictated by the school and national government. Unless a child attends a special school, she/he is taught from a standard script, according to nationally approved markers, which are checked through international testing (such as the Programme for International Student Assessment tests for literacy). The teachers can personalize the standardized curriculum to some extent: they can make links

relevant to the child's own experiences. They can encourage children to make things and take the lead in certain tasks, so that they are positioned more as makers rather than receivers of knowledge. However, the time for such personalization is limited and not explicitly rewarded through national assessment frameworks. Consequently, out of the 635 hours that an average child spends in a primary English school (or 1,096 hours in a US primary school[1]), the child's learning experience is by and large *depersonalized*.

Such standardized education happens in most industrialized developed Minority World countries. Generally speaking, in these countries boys and girls follow the same curriculum, although some gender bias persists. Notably, international statistics show that there are more female teachers in early childhood classrooms, more female than male students in higher education and this, some argue, influences children's motivation and performance levels (see some interesting observations by Brophy, 1985, on this topic). Most countries attempt to minimize gender and socio-economic differences in public education, but the success of these efforts so far has been limited. However, unlike in the ancient world, modern education differentiates the topics of instruction according to children's *age*. In terms of the extent to which the instruction is individualized or standardized, one could argue that children at preschool level receive more personalized education than children attending primary and secondary schools. While in preschools (or early years settings) children can often spend their time playing (and thus choosing their own toys and activities from the resources available), at the primary and secondary school levels this is not the case. For compulsory education (typically for children aged 4–16), the range of topics and resources supporting their teaching is pre-established by the curriculum and the classroom teacher. Children learn facts and information that are mandated by the school curriculum, not based on their personal choice or their own selection of topics. Such an approach has been reported to be demotivating for students because it has little connection between knowledge acquired through schooling and its personal usefulness for the individual children. Children's motivation to study at secondary school is notoriously low, reflected in high dropout rates at secondary schools. From a purely theoretical personalization perspective, we could expect motivation levels to rise when students enter the university level, because they are given more choice and autonomy in the subjects they can study. The reality is of course more complicated because of the many factors related to higher education including the financial barriers to university studies in many countries and the expectation that university study should be explicitly linked to the skills demanded by the labour market.

The intra- and interpersonal connections between who gets taught what and when are complex and complicated. However, let us suppose, for the sake of this argument, that in the ancient times education started as personalized, but then, in the Early Modern Period, became more standardized with the introduction of universal education for the compulsory schooling ages. We could also speculate that in the ancient times the wealth of a child's family determined whether a child's education was personalized. In the modern times, the socio-economic background and wealth of a family still determine the pathways and access to high-quality

education. However, for the majority of educated people, the years they spent in an education system (i.e. the compulsory schooling age) is characterized by a non-personalized approach. This status quo is being changed in the twenty-first century by two key trends: first, there has been a tension between the globalization and anti-globalization movements, with rising levels of nationalism and protectionism, accompanied by mass production and corporate capitalism practices. Second, there has been a sharp rise in the availability, accessibility and affordability of high-functioning multimedia portable technologies. These two key trends could be used to explain the 'personalization rise' in the education sectors in the first half of the twenty-first century.

Globalization trends and personalization

The globalized world offers many options which were not available to the previous generation. The directors of the World Health Organization summarized them as: 'unprecedented speed and volume of international travel, the interdependence of businesses and financial markets, and the interconnectedness brought on by the revolution in information technology' (Ong, Kindhauser, Smith, & Chan, 2008, p. 478). These phenomena are new; they pose new threats and risks and therefore demand new skills and knowledge. They go hand in hand with changes in the job market and innovations in the workplace. For example, there has been an unprecedented rise of on-demand services and companies, such as Uber for taxi services, Airbnb for accommodation services or Hassle for cleaning, which provide on-demand affordable services with 'a single tap'. Naturally, personalized services are more popular in some countries than others. In Western democratic societies with market-oriented economies, the drive towards autonomy and expression of an individual's voice are the norm. In the United States and the United Kingdom especially, an individual-centred approach to learning, and life more generally, might appear as a more effective solution than it would be in a more collective society, such as China. The fact remains that affordable, non-committal, flexible services create a new 'on-demand world'. Some worry that in an acutely perceived globalized world, there is an overwhelmingly independent (rather than intra-dependent) drive towards self-fulfilment. As *The Economist* (2016) writes:

> Pessimists worry that everyone will be reduced to the status of 19th-century dockers crowded on the quayside at dawn waiting to be hired by a contractor. Boosters maintain that it will usher in a world where everybody can control their own lives, doing the work they want when they want it. Both camps need to remember that the on-demand economy is not introducing the serpent of casual labour into the garden of full employment: it is exploiting an already casualised workforce in ways that will ameliorate some problems even as they aggravate others. (From *The Economist*, 2016, available from: http://www.economist.com/news/briefing/21637355-freelance-workers-available-moments-notice-will-reshape-nature-companies-and)

An example of an on-demand economy relevant to early childhood is the shopping experience I described in the cameo at the beginning of Chapter 1. Today's children frequently play and learn with personalized toys, books and other artefacts. This would not be possible some twenty years ago: while in the twentieth and early-twenty-first centuries bespoke products and personalized gifts were the domain of a rich few, personalized objects can be today created in a much easier and affordable way. Although not all personalized objects are technology based, their production necessitates some technology to run in the background. By 'technology' I mean here a suite of digital circuits, systems and devices that can run algorithms with big data and offer mass customization options to products and services. This technology became available and more affordable in the first decade of the twenty-first century and has revolutionized the manufacturing and consumption industry.

In addition to consumer industry, personalization technology has brought significant changes to the publishing and broadcasting industries. Personalization options available through news and information providers such as Facebook and Google allow individuals to customize the information and updates they receive. On the one hand, personalized news could be seen as an effective time-saving tool in an information-saturated world. Like-minded individuals can group around shared interests through social media networks and customized news feeds. On the other hand, personalized news means that people receive the information they want to receive and limit their access to alternative views on a large scale. This might soon escalate into a problem where people would proportionally spend more time reading local, personal and, very likely, subjective and restricted information. Overall, personalized news and customizable information flow is more vulnerable to state- and mass control, which raises questions about the perceived and real agency in customizing the information we receive from global networks.

These broader societal trends could be succinctly summarized as the rise of corporate individualism in the twenty-first century. Corporate individualism stands in contrast to anti-globalization movement, which makes suggestions for alternative production, business, lifestyle and education methods. Whether or not a globalization or an anti-globalization movement prevails in a particular context or perhaps for particular individuals is a question for other writers. What I'm interested in is the notion of both the globalization and anti-globalization movements placing a heightened focus on the 'self' and on children's identities. Corporate individualism seems to be painting identity in national and local colours and the anti-globalization movement in global and multicultural colours. Both bring to fore the importance of being a certain person or individual and both movements demand an individual who is self-conscious and self-aware and who is able to navigate the plethora of options for individualized services at his or her disposal. Similarly, the dynamics of social media and the unprecedented amount of easily accessible information further call attention to decision-making and, therefore, self-management. I do not view these socio-cultural influences as causal, but it is certainly the case that the globalization/protectionist trends gave rise to the need for reflecting and reconsidering one's main values and beliefs, as well as skills and abilities. Whether one votes for a right-wing national party or is an activist for local produce, she/he needs to be selective, self-conscious and

self-aware to make a stance. Similarly, being constantly connected to information source (whether this is Wikipedia feeds or Facebook updates from friends) implies a perpetual exposure to a range of views, attitudes and information, which an individual needs to process, analyse and assimilate. The pursuit for self-validation is likely to be related to these processes, especially if there are easily accessible and attractive options for experimenting with alternative identities – such as the ones afforded by the digital spaces. It is important that researchers and professionals observe and listen to these global macro influences on personalization as they engage in or evaluate personalized education.

Personal mobile technologies and personalization

In parallel to the consumerism industry developments, early 2010s have seen a sharp increase in the availability and affordability of personal digital technologies. These technologies include tablets and smartphones, and, given their touch-sensitive screen, can be collectively referred to as touchscreens. Touchscreens are equipped with powerful cameras, multiple sharing options, as well as many customization options. The possibility to take and share a pictorial or textual information easily (e.g. by taking a picture of a train journey and sharing it immediately with a group of friends with the 'What's Up' app) calls for a different mindset than that of a digitally free traveller. Some worry that the speed and nature of personal data sharing disrupts intrapersonal relationships and that it makes people self-focused and lonelier. According to others, new technologies have connected more diverse groups and made us more social. Some worry about information overflow and some others about too much surveillance. The truth is somewhere in the middle, but what is clear is that the societal changes I described earlier go hand in hand with the changing technological landscape and that they have a profound impact on young children.

New technologies affect modern working, social and private lives in new ways, summarized by Floridi (2015) in the Online Manifesto of the Digital Agenda as follows:

The deployment of information and communication technologies (ICTs) and their uptake by society affect radically the human condition, insofar as it modifies our relationships to ourselves, to others and to the world. The ever-increasing pervasiveness of ICTs shakes established reference frameworks through the following transformations:

- the blurring of the distinction between reality and virtuality;
- the blurring of the distinctions between human, machine and nature;
- the reversal from information scarcity to information abundance; and
- the shift from the primacy of entities to the primacy of interactions (Floridi, 2015).

Of course, technologies have been around for many years, and in many respects personal mobile technologies could be perceived as another technological bandwagon for schools to jump on. However, the ubiquity of technologies in young children's lives and the extent to which these technologies impact on their play, learning and social interaction are unprecedented. Today, a 4-year-old girl is likely to have access to, or to

own, a personal digital device, regardless of whether she grows up in the Minority or Majority world. Also, the device (hardware) that children from different countries use is often the same, with, occasionally, some basic language localization. However, the quality of the programmes downloaded on this device and the support provided with its use are radically different depending on the children's socio-cultural and economic background (see Guernsey & Levine, 2015). Differences in technology use mirror the differences in personalized education and the extent to which a personalized experience is truly personal to a specific child. Some of the qualitative differences in how touchscreens and new technologies affect children's learning are explored in detail in this book.

Technology-based shifts in the society are connected to the personalization trends in various ways, and they can show various external manifestations. For example, an activity, which became popular with smartphones and which illustrates a technology-driven manifestation of personalization, is the activity of taking and sharing selfies. 'Selfies' began as a vanity practice of young teens in early 2010s but, since then, have become a popular way of communication among all sections of population, including young children. Today, selfies are part of almost all occasions and all experiences, be this an outing with friends or a lonely dinner. Selfies have become subject of scholarly study as well as part of sociology courses in secondary schools.[2] New expressions have been coined to reflect the trend, for instance some writers call children born after 2015 the 'selfie generation'. Personally, I dislike this term and other generic labels given to young children growing up with technologies (e.g. 'digital natives' coined by Prensky, 2001). These labels assume a homogenous view on children and childhood and may set up the wrong expectations in the mind of a practitioner. Indeed, at several professional development workshops that I have been involved in, I have been surprised to hear the opinion that technologies make children self-centred and egoistic in their behaviour and that exclusive, self-focused products contribute to the rise of the so-called 'me generation'. I explain in Kucirkova (forthcoming) that we need to distinguish between societal trends related to personalized media, technologies and consumption and their impact on overall trends in children's development. Extremes are extremes because they relate to minorities; the vast majority of today's children do not and will not live the lives advertised by digital entrepreneurs via their self-produced vlogs[3] in the backyard of a Californian villa. What educationalists and developmental psychologists need to keep in mind is that the globalization and technology trends impact on children's learning experiences, but they are not causal. Overall, these wider influences on children's lives expand our understanding of where the interest in personalized education comes from and can help us answer the question of 'why' personalized education is on the rise in the twenty-first century.

Bringing it together: Global and technology changes in the twenty-first century

Taken together, the societal and technological changes in the first half of the twenty-first century place many demands on the self. The globalization/anti-globalization trends and changes in the new technologies arena imply two things: first, that an

individual needs to be self-aware to avoid an extreme stance, and second, that an individual needs to be selective and knowledgeable about their own needs, attitudes and expectations to benefit from the wide range of individualized options available via personal technologies.

No wonder, then, that in the last decade, personalized learning has arisen as a powerful countermovement to standardized education and is perceived by several educationalists as a lever for change to lift outdated school practices. It would be difficult to determine whether the heightened interest in personalized learning is a reflection or a manifestation of the need for personal fulfilment in a globalized world and ubiquitous presence of personal digital devices. What is clear is that the current socio-economic climate demands a fresh perspective on what we teach children in terms of skills, educational content and intra-personal values. Furthermore, with the powerful possibilities of new technologies to customize information delivery, few would argue against the need to leverage these possibilities for learning.

Unfortunately, although the globalization and technologies trends might have paved the way for a personalization revolution in education, they have not created a sustainable or holistic educational approach. This is because current models of personalized education position technologies as a countermovement to the standardized, globalized and technologized movements. In Chapter 3, I explain that the current model is a reactionary (countermovement) solution. It lacks a visionary power and guiding insight into future practices. In addition, the current personalized education model assumes that personalization works for everyone and everywhere. However, personalized education only works in certain contexts and for some children. For instance, while some children might benefit from personalized resources, others might find them confusing (see Chapter 7), and while the use of technologies can facilitate many processes, it cannot replace the sensitive guidance provided by a skilled teacher (see Chapter 11). Moreover, while it is positive to see that personalization affects students' motivation and short-term memory (see Chapter 3), it is also important to support students' long-term memory and harness motivation for solving cognitive challenges (as discussed in Chapters 9 and 12).

Young children are not alone in navigating the changing landscape of technologies and education – their teachers, parents/caregivers, designers and scholars need to process and adjust to the opportunities and challenges that digitally mediated personalization represents. The question is who to place in the driving seat of these changes. Who should personalize children's education? In the next section, I move to the consideration of the principal stakeholders, who have in the past, or who could in the future be the driving force in personalized education.

Who makes education personalized?

This section considers the different stakeholders who can influence whether a child's education is personalized or standardized. In Bronfenbrenner's (2005) ecological

systems theory, this consideration moves us from the exo- and meso-systems to the microsystem of family, school and groups, immediately surrounding an individual. I outline them as separate influences in this chapter – family, teachers, technologies and peers – although in real life, these stakeholders often work together and jointly influence the extent to which a child's education is personalized.

The family

If a parent (or the child's guardian/primary caregiver) decides that their children need private tuition for a specific subject or private lessons for a specific area of study, they are essentially personalizing their children's education. The child does not attend a classroom with a high pupil/teacher ratio, where everyone receives the same instruction, but they get one-to-one tutorials with a teacher who individualizes the instruction according to the child's particular needs and progress. There can be many reasons for individualized teaching – more commonly known as private tuition. For example, private tutoring can be used to fulfil a particular need within a child's standard education: a child might be approaching the state/national exams but is falling behind his/her peers and his/her parents decide to boost the child's knowledge through private classes. This kind of private tutoring is aligned with Vygotsky's notion of zone of proximal development and is typically presented under the banner of 'helping children reach their full potential' (i.e. enabling them to reach the boundaries of their zone of proximal development). Another reason for private tutoring can be practical difficulties. For instance, the child cannot go to the school because she/he lives in a rural area and the school is inaccessible for him or her, or the child is physically or mentally unable to access or participate in the classroom, or a natural disaster has destroyed the school or the child became long-term ill. In these examples, personalized education happens on a small, often short-term basis and it fulfils a particular need. An alternative (or, for some parents, an additional) reason for private tutoring is to offer the child something extra and special. For instance, parents might decide to invest in a private teacher because they want their child to acquire specific skills in a specific area. The child might be perceived to have a particular talent (e.g. playing the violin) and the parents decide she/he should receive special, bespoke education so that she/he has enough time to nurture her or his unique talent. Parents may also believe that the public (or national/state) education system is not adequate for their child and construct the child's entire education as a set of tailored 1-2-1 sessions. Also, for some parents personal tutoring is perceived as a marker of status and they might want to pursue it for socio-cultural reasons. Whatever the reasons behind personal tutoring, the fact remains that this kind of personalized education is currently available only to a minority of children. For some of these children, personalized education is a direct response to their unique personal and/or contextual characteristics, and for other children, it is a reflection of their wealthy heritage. From this perspective, the impact of family influence on the extent to which a child receives personalized education has not radically changed since the Ancient Greek times.

The teachers

In public schools, teachers are committed (and required by the school mandate) to teach children content relevant for standardized assessments. This commitment influences the extent of teachers' possibilities for personalized teaching. It implies that in most schools, teachers do not teach children what the children want, but what the national government and a large group of people have decided to be important for a child's general education. Within this remit, however, teachers can personalize certain aspects of children's education. Teachers can provide children with individualized learning plans; they can tailor the classroom activities to the specific needs and abilities of particular children and relate the teaching content to children's lives. Good teachers have used these basic personalization techniques from times immemorial. In the twenty-first century, technology largely influences how much and how easily teachers can customize and personalize their lessons and the teaching content. For instance, with the AirWatch Teacher Tools technology, teachers can customize each tablet used in the classroom according to individual students' needs. If, for example, Rick struggles with grammar, the teacher can decide to populate Rick's iPad with PDFs, links and apps linked to grammar exercises. For John, who might be more advanced in English, the teacher can upload texts and links that she/he knows interest John. These technological changes affect and alter teachers' roles, and shift them from content creators to content curators (see Jeff Jarvis's discussion of this point). Many teachers are opposed to technology-based personalization and perceive it as transferring their power into the hands of technocrats. Other teachers actively look for alternatives that would support their ability to customize and personalize the teaching content and materials. Adaptive courseware – such as the one offered by the Smart Sparrow platform – connects teachers to other educators in the community, enabling them to create and periodically update banks of teaching resources. Teachers can exchange and further customize content, and in this process, they become both content creators and content curators on a community level. Technology is used to support the process, but the teacher is in charge and is positioned as the principal mediator between knowledge/information and the child. This is different from models where the content and its delivery are driven by the technology.

The technology

As mentioned, an important historical shift concerning personalization options took place in the twenty-first century, with the emergence of affordable, smart, portable personal technologies. These technologies influence consumerist practices through the customization options they provide, and they can, in some instances, encourage the performance of self-promoting behaviours on social media networks. The software developed for these technologies provides children with an opportunity to experiment, to author their own multimedia content and, some argue, to learn on their own.

Technology-based education is education determined by the technology provider and developer. In Chapter 3, I make the distinction between technology-driven and

technology-mediated personalized education. Here, I 'lump' the two together to usefully connect to other literature published on this topic.

By and large, the current models of technology-based personalized education involve the following process: the teaching content is customized according to a child's profile and delivered to the child on a personal mobile device. The child's profile is created by their teachers or by the children themselves, based on a set of demographic markers and average scores on a set of teaching tasks. The teaching happens between the child and the technology; the teacher is supposed to monitor and support as and when needed. Such technology-based personalized learning is becoming increasingly popular in Western secondary schools, as well as in higher education. It is, as yet, not prevalent in early childhood education.

I wrote earlier that this model of personalized education has several flaws (see Kucirkova & Fitzgerald, 2015). One of them is that such model puts teachers on the periphery of the teaching process, undermining the powerful role they have in education. The other issue is that – as the participation data of Massive Open Online Courses show – it privileges motivated and knowledge-driven individuals who are 'young, well educated, and employed, with a majority from developed countries' (see Christensen et al., 2013, online) In his book *Is Technology Good for Education* (2016), Professor Neil Selwyn summarizes the problems of technology-based personalized education as three key issues: first, Selwyn argues that current technologies do not present students with different content based on their personal needs and preferences, but with the same content, delivered in a different sequence. Second, he argues that personalized education can work for those who know how to navigate the systems but not for all students. This means that it does not tackle the educational disadvantage caused by socio-economic background. Third, Selwyn rightly points out that technology-mediated personalized education follows the entrepreneurial model where some students thrive and succeed and some simply fail. Effectiveness is established through trial and error and reward often comes through serendipitous discoveries. These are three very accurate observations and are aligned with my own concerns around technology-based personalized education. In addition, we are concerned that education becomes dominated by technology giants rather than educators and experts. The consumer technology industry is currently ruled by four 'technology giants': Amazon, Apple, Facebook and Google (Alphabet); and there is a danger that we see the same narrow dominance in education. Although often concealed under the philanthropic veil, it is clear that technology producers want to see children use more technology so that their profit rates are higher. Their personalization models are not pedagogy driven but are based on what they believe works from their own perspective. This marginalizes the role of teachers and children themselves and is against the community-based model of education I outlined in the first chapter.

What, then, is the alternative? Some believe that children should be the ones who personalize their own education. In Bronfenbrenner's (1993) model, a child-driven model of personalized education would mean moving to the very centre of the 'Individual' circle, which is surrounded by all other external systems.

The children

Over centuries, schooling and labour have been used to suppress children's natural curiosity, wilfulness and playfulness. Today, children's rights are protected and include the right 'to health, education, family life, play and recreation, an adequate standard of living and to be protected from abuse and harm' (http://www.childrensrights.ie/). In most schools, children's curiosity, agency and autonomy are respected and welcomed, although of course there is a lot of variation depending on the school type, local environment and a particular situation. This doesn't mean, however, that children's education is personalized. In most schools, children cannot choose what they study, when and how they play or learn – the choice is determined by the teacher or the school and the curriculum followed by the school.

A prominent exception worth mentioning here is that of the Sudbury Valley School in the United States. This school was founded on the belief that children should be actively determining their own education and there should be no teacher (or technology designer) who does it for them. The school offers children a large open environment where they are free to explore what interests them and take responsibility for their own learning. Children's autonomy is supported with a variety of resources, including art materials, sports equipment and technology. Children are believed to learn best on their own, without the teacher and without receiving the correct answer. This is an interesting perspective and one that seems to work for the children and families of the children attending the Sudbury Valley School.

Another, more common way, in which children can personalize their own education, is by accessing information online. Thanks to the Internet, children have access to an immense volume of varied information, which is constantly being updated by individuals and communities, as well as groups of journalists (as it is the case in online newspapers) or a community of fellow users (as it is the case on social media networks). On its own, Internet does not provide personalized education. However, because it concentrates vast amounts of information at various levels of difficulty and in various forms of representation (videos, images, interactive chats, string of text, entire lectures from the best world universities), individuals could use it to create their own, bespoke, education. This is the case for some children and for some aspects of their education. For instance, for young children, the acquisition and advancement of digital literacy happen very much through their own exploration of digital worlds. Given that information is presented in various forms *together with* helpful guides in various formats (e.g. video tutorials as well as short texts, interactive community forums and other inbuilt 'guides' for building Minecraft), the children may not need the adults' guidance to learn from the content they access. This, however, works for only some children and some aspects of their education.

Child-driven personalized education is unlikely to work on a wider and sustained basis. Yes, people are always interested in things personally relevant to them, but we are not naturally wired to know what is not just interesting but also useful and has significance in terms of the global community we are part of. In particular, young children may not be cognitively ready to make the right choices and know what is

good for them in the long term. This is because of children's detailed focus on the immediate and the cognitive capacity required for understanding abstract concepts, relationships and time. For example, typically developing children do not master calendar and clock time until they are about 11 years old (Friedman, 1978). This partly explains why young children focus on the present and often struggle articulating a future vision. Giving children a free reign without the appropriate support would be against a developmental and age-appropriate right to education. My position should not be read as advocating for a child-deficient model. Instead, I argue against universal models of childhood and maintain that the 'who' question should be answered differently depending on the child's age, temperament, socio-cultural background and other contextual factors. It is influenced by different subjects, different learning stages and different learning contexts.

Another important consideration from the developmental psychology perspective for child-driven personalized education concerns children's ability to recognize what is best for them as an individual, and as a member of a larger community. Personalized education, which is entirely in the hands of the children, is likely to result in a tension between the individual desires and the requirements of the group – a tension children need to be taught to resolve. Therefore, the expectation that children can process the complex information available through online spaces without adult support, assumes an adult-centric perspective on child development.

There are of course aspects of education that children could and should personalize. For instance, they can be given choices *within specific activities*. This happens on a regular basis in many schools: the teacher chooses a writing activity because the teacher understands the aims and objectives concerning writing, but the children can choose what and how they write. In this vein, we could imagine self-driven personalization applied to specific tools and experiences, including children personalizing their sports activities on the playground (e.g. by deciding the game rules) or creating their own artwork. Similarly for the use of technology, children can actively contribute to the activities and programs they use.

The context plays an important role in these considerations. In the United Kingdom, there is a rich theoretical tradition of child-centred learning within primary education. To understand this tradition, we need to refer to the key theoretical antecedent of the so-called 'Plowden report' of the Central Advisory Council for Education (Plowden report, 1967). The report was a thorough review of child developmental theories and various aspects of child's development, including physical growth, language and emotional development, and it considered the role of school, home and neighbourhoods, transition to secondary school, curriculum, the learning of different groups of children (gifted, 'handicapped' or immigrant), as well as the teaching staff and their professional development. The key recommendation of the report was to develop school curricula that centre on the child's needs and interests. The recommendation was followed up through a number of further theoretical studies, but unfortunately, not much actual change in the early years or primary school practice (see Halsey & Sylva, 1987, cited and further elaborated in Pound & Buckingham, 1992). Hartley (2009) points out that personalization conceptualized as child-driven practice is not only a theoretical but also a political

concept (rather than practical approach to education). In his article, personalization is referred to as 'nostalgic revival of child-centred education' and critically examined for being a concept distant from actual pedagogy.

The arrival of new technologies, with multiple options for exercising children's agency through digital games, art and learning, has changed this reality somewhat. The so-called 'maker movement', initiated in the early 2000s, encourages young children to not only use (and passively consume) but also make their own digital projects (see Chapter 11 in which I discuss the design pedagogy and children's digital making). In education, the maker movement has predominantly focused on children's development of coding and computational thinking skills, supported through a number of coding-related initiatives and clubs (e.g. the Code Club in the United Kingdom, a nationwide network of volunteer-led after-school coding clubs for children aged 9–11; see https://www.codeclub.org.uk/about). As part of these activities, children are positioned as agents and drivers of their own learning, but they do not drive to the new territory on their own.

Thus, in line with the United Nations Convention on the Rights of the Child (1989), I argue that children, to the extent appropriate to their abilities, should have an equal opportunity to express their views and be allowed to influence issues that impact them. I assert in the same breath that children should be taught how to act sensibly and sensitively towards the needs of others and that this kind of teaching should be mediated by teachers, technology and the community. This leads me to section 'The Community', which provides my answer to the question of *who* should personalize education for children. In alignment with a community-based educational model, I hold strongly that personalized education should be personalized for the child by a community of people within a socio-technical environment.

The community

A community orientation compels me to consider the possibility of a combined influence on personalized education of all stakeholders mentioned so far – parents/families, teachers, technology designers and the children themselves. As outlined in the opening chapter, a community-based approach to educational research involves the combined influence of various community members: families, teachers, designers *together with* the children. In contrast to family-, teacher-, technology- or child-driven personalization models, a community-based approach offers a more visionary position from which to conceptualize personalized education: it doesn't draw lines between parents, teachers, technology producers and children, but brings them together in a mutually enriching relationship. It is a place where multiple, diverse and personal experiences dovetail and mutually enrich each other, very much in alignment with the classrooms researched and co-created by Barbara Comber in her seminal work (Comber, 2015). What could such a model of personalized education look like?

Let's imagine a primary school where all children cover all topics of the standard curriculum (i.e. as it is in the current compulsory education model), but with

some important modifications: first, the pace and sequence of their learning is determined by adaptive technology. Second, the extent to which they dwell into a topic and the time they spend on studying the topic is determined by the child's own selection of topics. This could be through a simple rating system, with priority given to topics, which the children choose as their favourite topics. The child's ratings of personal interests could be consulted with parents and teachers depending on individual children's abilities and circumstances. Peers and friends could also feed into each individual profile to ensure shared and democratic learning can take place. Third, technology could be used to provide individualized input into the learning process of each child. With a simple keywords-based algorithm, the personalized technology software could deliver personalized news and information relevant to each individual child. Unlike in current personalized education models, however, technology would be used as a site for parental and teachers' input. The individual programmes and content would be co-created in collaboration with the children and teachers. Fourth, the teachers would support the children in curating their individualized content and ensure that there is a judicious balance between the child's personal interests and wider topics, relevant to the local and global community. The teacher's role would be that of a mediator, in alignment with Vygotsky's model of learning. Teachers will personalize, but also pluralize (see Chapter 12) children's education.

Summary

In an effort to piece together the ingredients of personalized education and the impact it might have on individual children, I reviewed the reasons for why and how has education been personalized since ancient times. I also attempted to answer the question of who can and is personalizing children's education, by listing various possible stakeholders: family/parents, teachers, technology, children and community. I argued that education personalized by a community of stakeholders would not only bring together the learning community, but it would also address the current reductionist model of personalized education. By keeping personalized education varied and open to the joint influence of a network of people, we allow for personalized education that is placed on a spectrum of possibilities and that is relevant for each individual and not just a selected few.

Notes

1 These numbers were taken from Matt Burgess' blog 'MAPPED: How many hours do children spend at school around the world?' Available online at: http://helpmeinvestigate.com/education/2013/04/mapped-how-many-hours-do-children-spend-at-school-around-the-world/.

2 In 2015, the sociology course, which has been approved by England's exams regulator Ofqual for teaching from September 2015, includes selfies as part of the A-level course (reported in the *Huffington Post UK*, July 2014, http://www.huffingtonpost.co.uk/2014/07/23/sociology-students-to-study-selfies-for-a-level_n_5612352.html).
3 vlog = a blog that features mostly videos rather than text or images. Definition taken from: http://www.dictionary.com/browse/vlog.

3

Technology-Enabled and Technology-Driven Personalized Education in the Twenty-First Century

In the previous chapter, I considered how parents, teachers or technologies can create personalized education and how the different forms of personalized education have fluctuated in the history. In this chapter, I take a critical look at the assumptions behind the potentials and limitations of the currently most popular form of personalized education: that which is digital (or technology enabled). I begin by summarizing the status quo of technology-based personalized learning in primary schools in the Western world. I divide the practices in relation to technology-driven and technology-enabled education. My critical evaluation of the current practices continues with a consideration of a business-driven aspect of personalized education and a consideration of alternative approaches. I then turn to the research and summarize the psychology and education literature concerned with the personalization effect. This literature identifies some critical distinctions in personalized learning and prompts the observation that the existing models of personalized education have strayed far from the research on which early, non-digital personalization was based.

Personalized and digital personalized education: Status quo

I have written articles and blogged on several occasions about the lack of definition of what personalized education is and I'm certainly not the only one – there have been many calls for more precise definition of personalized education for the past ten years. For example, Hartley (2007) wrote that personalization could find its biggest application in education, but educationalists need to first address the 'lack of clarity in the definition and application of personalisation' (Hartley, 2007, p. 634). Roberts and Owen's (2012) attempted a definition, with the focus on potential benefits of personalized education. According to the authors, personalized education is 'an important process, providing significant benefits to academic performance, as well as improving students' capacity to learn through the development of meta-cognitive skills; fostering student autonomy and ownership of their learning; promoting student

engagement, mainly through greater motivation; and, facilitating effective and productive peer collaborative learning' (Roberts & Owen, 2010, p. 4). It is interesting to see in Roberts and Owen's definition the mention of the individual benefits as well as a link to collaborative learning. Without a doubt, giving children choices and providing them with a sense of ownership and relevance is motivating for learning (Niculescu & Thorsteinsson, 2011). What is less clear is whether and how personalization can support effective collaborative learning. This difficulty has not been reduced, but exacerbated with digital personalization (or technology-mediated personalized education).

The current status quo of personalized learning and digital personalized education is that many educationalists recognize the potential of personalization for education, but the link between personalization and education, and in particular, digital personalization and education, remains problematic. It follows that there are many versions and flavours to 'personalized education' and the term can refer to a number of different practices. In some schools, personalized learning means that students are involved in the decision-making process about the topics they study throughout the year. This can be as small and specific as co-creating class-based books for shared reading or bigger and wider as deciding on the main themes for a given month. In other schools, personalized education is interpreted as digital personalized learning, which typically means that children use tablets with adaptive algorithms.

Against the backdrop of varied and diverse approaches to personalized learning evolved in individual schools, a new, technology-based approach has recently begun to influence the provision of US private schools. This approach is not what I would describe in the neutral terms of technology-based approaches, but what I consider to be technology-*driven* personalized education.

Technology-driven personalized education

Technology-driven personalized education is a type of provision where the tool (technology) is given priority over pedagogy and is believed, in and of itself, to have a transformational effect on children's learning. This kind of education is typically provided to children in the form of personal mobile technologies and great autonomy in the activities undertaken during a school day. A notable example here are the schools set up by the educational start-up AltSchool, which has financed a group of schools, all focused on technology-mediated personalized learning. In these schools children have individualized plans of activities (or 'playlists of projects' to use the language of the providers and the business world) and their online engagement in these activities is directly monitored by their teachers and parents via apps.

Some scholars have critically examined these practices. Selwyn (2016) succinctly summarized the problem: 'The prospect of refashioning teaching and learning in the image of Netflix might make sound sense in the mind of Newt Gingrich, but surely overlooks some of the fundamental qualities, characteristics and values of what makes for "good" education' (p. 80). Selwyn refers here to Newt Gingrich's highly controversial article for CNN in which Gingrich, an influential American politician and businessman, claimed that technology can replace teachers and described personalized

learning to be the 'education system' for the twenty-first century (see Gingrich, 2014, online). Professor Selwyn criticizes this approach by arguing that such an approach marginalizes the 'collective and communal' aspects of education. I wholeheartedly agree with Selwyn on this issue. Indeed, in an article co-written with my colleague Dr Elizabeth Fitzgerald at The Open University, we argued that the personalized learning pushed forward by technology giants such as the Silicon Valley–sponsored AltSchool initiative has three major flaws:

> First, education has always been about acquiring knowledge and skills relevant to a profession, but also about acquiring general knowledge. By feeding children only the content they're interested in, we may end up with many specialists and few generalists.
>
> Second, while learners may cope poorly with trying to learn in a way that's not suited to them, in the real world life will not always be so accommodating. Their lack of ability to compensate may mean they suffer as a result.
>
> Finally, children's preferences are not fixed – in fact they often change as immediate responses to the environment. To predict content relevant for children there needs to be sensitive, human-directed input – not automation. Otherwise we end up with what might be called de-personalized learning, and classrooms with little conversation between student and teacher. (Kucirkova & Fitzgerald, 2015, online)

In addition to recognizing the financial or commercial orientation of the technology-driven personalized education models, we need to recognize that technology-driven models of education have not transformed instruction through pedagogy. Instead, it follows an education model that is based on a business agenda and one that marginalizes pedagogy.

Technology and the business model of education

I argue in Kucirkova (forthcoming, b) that the current models of digital personalized education privileges technology over pedagogy. This is problematic, because it focuses on the resource rather than the activity supported by this resource. As mentioned in the previous chapter, Selwyn (2016) makes a related point about the business tendencies in digital personalized education. He argues that the way this technology is deployed in, and developed for, the classroom resembles a business strategy in that it is being tested on the go and through trial and error. I extend this point and argue that the current mechanism embeds personalization in the educational *resources* (rather than their use), which is based on the model of commercial personalized systems.

Take the adaptive feedback mechanism of students' reading library, for example. The algorithm developed for most digital library systems currently offered to young children follows the same logic as the recommendation programmes of Amazon or Google rankings. The system takes as its main comparison unit the book (the resource or the product to be sold to the customer) rather than the child's interaction with the book (which would in education represent the key educational opportunity). The

system aims to offer the child many new titles and keep his or her interest by offering new exciting alternatives to the latest book they read or clicked on. This system doesn't aim to encourage the children to think critically and deeply about what can be achieved with the resources they already have. This is why we argued in Kucirkova and Fitzgerald (2015) that the current models of technology-enabled personalized education focus on the commercial profit of those who produce this technology, rather than the actual learning happening with the technology.

My other reservation of a business-inspired model of personalized education is that it assumes an entrepreneur and client-oriented mentality. This mentality is particularly dangerous for early childhood education. It might undermine the social mission of education, because it assumes that all children have a fully formed identity and are self-aware of who they are and who they want to be. It privileges smart, self-motivated students who are able to take ownership of their own learning, who can build on the automated feedback mechanisms embedded in the resource and perceive the rewards embedded in the system as motivational for their future learning. There are many signs of this mentality in contemporary educational discourse. For example, when Anthony Salcito, the vice president of Worldwide Education at Microsoft, gave a talk about personalization and education, he claimed that 'personalization and the "maker" movement in education are two forces can help change students' attitudes, and re-engage them' (cited in https://marketbrief.edweek.org/marketplace-k-12/microsoft-exec-challenges-publishers-to-change-as-students-use-of-technology-shifts/). When describing how this could happen, Salcito was quoted to say: 'If my book knew I wanted to be an architect, my math problems could give me architectural examples.' This quote illustrates where the problem lies: the model assumes that the children know what they want and that, therefore, the system should give them what they demand. However, it offers little to children who are not motivated to study and who do not have educational examples at home – be these educational examples in the form of resources or real human beings. If we are to ever close the inequality education gap, we need to make the personalized education model more pedagogy driven. This is where technology-*enabled* personalized education comes in.

Technology-enabled personalized education

Technology-enabled education is a model of education that aims to harness the customization options of new technologies and, at the same time, accommodate the standardized curriculum of the past. It harnesses adaptive and customizable technologies as the technology-driven models do, but it blends them with traditional pedagogies. Again, this means that technology-enabled personalized education can mean many different things in practice. Broadly speaking, for students at primary and secondary level, technology-mediated personalized education typically happens at the *device level*. Students are provided with customized personal devices, such as tablets or iPads, equipped with a classroom management software. This presents teachers with dashboards that show visualization of students' learning in the form of graphs or tables. The data are based on students' engagement with content uploaded to

their devices. Teachers have the option to select specific content for specific students; that is, they can individualize the generic content according to students' abilities. For students at the university level, technology-enabled personalized education happens at the *content level*. For instance, teachers can customize the textbook their students read (see Pearson's personalization offer for schools) or they can provide students with textbooks that contain dynamic assessment, stealth assessment, adaptive teaching or learning analytics. Adaptive courseware includes books produced by McGraw Hill Education with the LearnSmart system (McGraw-Hill LearnSmart, 2011). LearnSmart is described by McGraw Hill as 'an interactive study tool that adaptively assesses students' skill and knowledge levels to track which topics students have mastered and which require further instruction and practice' (McGraw-Hill, 2011, online). The system can adapt to students' learning by presenting them with selected learning content. In addition, it evaluates students' confidence and memory over time (through self-evaluation tests of students' confidence and predesigned memory tests) and selectively presents them with content tailored according to the students' performance on the tests. Similar to adaptive technology designed for primary and secondary schools, the system generates reports about the students' progress which position individuals in relation to each other and to an average score. Both the device-based personalization and the content-based personalization are calibrated in relation to standardized benchmarks of progress and are used as a tool to facilitate teachers' ability to monitor students' progress (or for older students to monitor their own progress) and to offer students the option of accessing the teaching materials at their own pace.

For young children at the preschool or kindergarten level, technology-enabled personalized education is in its infancy, but it is being piloted by some organizations. For example, the US-based Global Literacy Project developed the Curious Learning System, which aims to teach children to read with the help of a suite of apps delivered to children via personal mobile devices. The apps monitor students' progress and offer them activities depending on their responses. The team behind the Global Literacy Project believes that 'children are wired to learn, even without teachers, schools or books' (http://www.curiouslearning.org/about) and has used current research on reading development to inform the design. Similar approach was followed by the non-profit organization One Billion Apps, which has developed a suite of mathematic apps and has rigorously evaluated their use in Malawi and UK schools. The apps are designed to progressively develop children's knowledge of early mathematical concepts (such as count to 10, count to 20, 2, 5 and 10 times tables). In a randomized controlled trial with 283 Malawi children, Pitchford (2015) found that children who used the apps for thirty minutes per day for eight weeks had significantly higher scores on the test of their maths knowledge than the children who received standard instruction. Dr Pitchford concludes: 'Tablet technology can effectively support early years mathematical skills in developing countries if the software is carefully designed to engage the child in the learning process and the content is grounded in a solid well-constructed curriculum appropriate for the child's developmental stage' (n.d.). The study shows that new technologies have promising capabilities and they can offer an individualized educational experience

to each child. In classrooms with high teacher/pupil ratio (such as Malawi), the tools can be a great help for teachers as they offer real-time and comparable scores of all students at one glance. They are also useful because they differentiate the sequence in which they present the learning content to individual students. Overall, technology-enhanced personalized education could be considered pedagogical, as children learn by revising their current knowledge following the use of the apps. However, unlike in non-digital classrooms, pedagogy was in these cases embedded within the device rather than around it. Given that the creation of the software programmes used for this education model follows certain pedagogical principles, and is based on empirically driven notions, it is a step further than the technology-driven model. Clearly, it is still not a teacher- but technology-based model, which socio-constructivists might struggle with. However, the main issue with this model is that it problematizes, rather than consolidates, the tension between standardized and personalized education.

Standardized versus personalized education

A simplified explanation of the relationship between personalized and standardized education in the 20th and 21st century in the United Kingdom is as follows: since the 1980s, the United Kingdom's educational system has been using national standards in the belief that standardized education can address the ills of early years and primary education. In the late 1990s and 2000s, standards have been linked to rewards and punishments for teachers and administrators. These were supposed to reflect how well teachers and administrators support children in meeting the educational standards. In the early 2000s, personalized education received official recognition in many countries worldwide (e.g. Australian National Curriculum), including the United Kingdom. However, the push for personalized education came from a few political leaders (e.g. Ed Miliband in the United Kingdom) and high-profile entrepreneurs (e.g. Mark Zuckerberg from Facebook); it was not a whole-state or international educational reform. This meant that personalized education mediated by technology is being implemented in selected schools and is limited to pockets of practice. It is hard to predict the future of this tendency in light of the large financial investments technology giants are ready to make for these projects. However, standardized assessments and international tests are unlikely to go away in the near future; in fact, there seems to be an increased interest in more standardized international assessments for increasingly young children. These efforts are heavily criticized by many educationalists (see, for example, Moss et al., 2016), but the OECD and their flagship PISA tests have a considerable authority in currently thirty-five member states. So, even if some schools offer digital personalized instruction at the classroom level, they still have to follow standardized assessments at the national level. Keeping in mind the unclear history and disputed presence of personalized education, standardized education is definitely worth reflecting upon for future models of personalized education.

One way of mitigating against the limitations of digital (technology-driven or technology-enabled) personalization is to conceptualize personalized education as a gradual and iterative process (rather than a whole-system reformation or

transformation). In what follows, I outline research which suggests that given in small doses and well applied, personalization can offer unique learning benefits.

Personalized education: Possible ways forward

Thus far, I have focused on the limitations of digital personalization, highlighting how the current models clash with Vygotsky's socio-constructivist perspective and traditional pedagogical models. This section marks a departure from this focus by introducing the idea of personalized education as a technique, instead of a system approach. Instead of attempting an educational revolution, I turn to the possibility of personalization functioning under the umbrella of standardized education and offering its benefits in specific, individual areas.

Personalized education as a set of techniques

The rationale for this approach is that if personalization is offered to schools as a set of possibilities, then it is more likely to lead to a sustainable model of education, with broader relevance and significance to children. Policymakers often forget that each school caters for different children and that within each school children have different profiles: they come from different backgrounds and they have different needs and aspirations. Teachers too, are different in each school. Even in schools with a strong leadership and shared vision among staff, we find different interpretations of the school vision among individual staff members. It follows that it would be very difficult to think of a single approach to education and hope it will transform the educational experience for all children. This is why I explore a *set of pedagogical techniques* that could be flexibly used to support personalized education in Chapter 11 (the pedagogy of creativity, design and embodied learning).

It is also worth reminding us here of the cliché that we do not know what we don't know. If we rely exclusively on technology-based personalized education, we will shut the door to children's exploration of alternative identities which might not be formed in digital spaces (e.g. dance and sculpture) and restrict many children to early specialization. In a shifting workplace landscape, where high-skill and low-skill jobs are on the rise but medium-skilled jobs are on decline (Coppola, 2014), this doesn't seem a prudent strategy.

For personalized education in the future then, it is more fruitful to think of it as *a* possibility for *some* schools and to examine the conditions and contexts in which it might work best. I will outline some of these contexts when discussing the use of touchscreens in British and Spanish preschools (Chapters 10 and 11), as well as when considering effective practices with personalized books in primary schools (Chapter 7). Common to all these contexts is the alignment between personalized and standardized education and the teachers' use of technology to enrich, not to revolutionize, the current practice. This was also the case in the eight British primary schools that were identified as 'using ICT effectively to enhance learning across the curriculum' (http://edfutures.net/NP3) in the new purposes, new practices and new

pedagogy (NP3) project in 2016. The NP3 project was a large-scale project led by Professor Peter Twining (The Open University), in collaboration with Lancaster and Manchester Metropolitan University and funded by the Society of Educational Studies. The aim of the project was not personalized education per se, but to find out, more broadly, how the NP3s play out in UK schools and impact on teaching and learning.

The project involved visits to those UK schools that have innovated their practices and have embraced new technologies to facilitate this orientation. As part of the project, I visited some selected cutting-edge schools and spent days observing their practices to get an insight into the ethos of these schools and teachers' attitudes. I noticed that in these schools technology was used as one of the many resources available, not the centre of the activities. The teaching plans and lesson objectives sometimes didn't contain the words 'digital' or 'technology', and, yet, digital tools were seamlessly integrated into the school practice and pedagogy. As for personalized education, teachers in these schools used adaptive software and personal mobile technologies as and, when possible, within the standardized system. Digital personalized education was used to make the learning process more motivational, multimedia and faster, but not radically different. These observations are symptomatic of the reality that in many innovative and effective schools, technology-based personalized education is used to enrich the best pedagogy, not to drive it.

Personalized education in the form of personalized resources

Another alternative way of integrating personalized education into current educational systems is to narrow it down to a set of personalized resources. I demonstrate this premise in this book by centring on the research and practice of children's personalized books. Personalized books combine traditional/classic texts with personal data that are embedded into the book's content. Such a story hybridization is a relatively new story genre, popularized with the recent advent of new technologies facilitating their production. For example, a personalized Cinderella story is a story in which the plot is threaded with excerpts from the traditional fairy tale but with some personal references to a particular child. For example, if the child reading the book is Emily, then instead of Cinderella the main character is called Emily, experiencing the life of Cinderella. Also, Cinderella's sisters are replaced with names relevant to Emily (e.g. Emily's friends or siblings). Unlike the example of technology-enabled personalization in the form of adaptive courseware (see section 'Personalized education: Possible ways forward' in this chapter), personalized books do not use personal data to monitor or accelerate children's learning. The primary aim of personalized books is to increase children's interest and motivation to read. The text is based on a classic tale, and contains rich literacy elements such as varied vocabulary or complex grammatical structures. This text is then combined with the personal data of the child which captures their attention and helps with their focused attention on the text. The personalized books could be thus considered to combine a standardized element (classic text which is the same fairy tale for everyone) with a personalization approach. Importantly, they do not privilege personalization above other learning mechanisms, they include

references to other unknown characters, wider, non-personalized topics and enrich child's language with new vocabulary. Research shows that well-designed personalized books can increase the reading comprehension of struggling readers (Bracken, 1982), that they can support the word acquisition of young children (Kucirkova, Messer, & Sheehy, 2014a) and foster bonding between parents and children (Kucirkova, Messer, Sheehy, & Flewitt, 2013).

Personalized books are an example of applying personalization in small doses, for a specific purpose. Personalized books call for looking for innovative ways of engaging children in traditional texts but not throwing the traditional texts out with the bathwater. In this vein, I suggest that future research and practice of personalized education should apply it proportionally and in small quantities. This suggestion is based on the evidence concerning personalized books but also other research concerned with the personalized effect. I continue this chapter with a short review of the research concerned with the personalization effect and children's language and cognition.

Extant research on the personalization effect

An area of research, where the industry could take inspiration from research for design of children's personalized resources, is the cognitive psychology research concerned with self-referential effects. A self-referential effect occurs when an individual, or when an object used by this individual, relates a piece of information to the individual. This can happen not only with the use of personal pronouns (such as I or me) or possessive pronouns (such as my or mine), but also, more indirectly, by using concepts that are specific to one individual (such as the individual's name and the school the individual attended). There are many studies examining the self-referential effect in relation to adult learners and its impact on learning as well as memory effects, that is, both in terms of acquiring new information and retaining it. These studies can give us some insight into the learning mechanisms implicated in personalized learning and lead us to some considerations concerning the design of resources for young children. Therefore, I summarize the main findings from these studies here.

Self-referential effects studied in adult learners

The studies of self-referential effects began with a detailed, narrowly defined focus on the self-referencing phenomenon in short phrases and individual words. These studies were initially about personalization and personalized learning, but in them personalization was defined only as the act of self-referencing – that is, referring the text (word, sentence or an entire passage) to the 'self', or the person reading it. So that psychologists can experimentally verify the effects of such personalization, they need to minimize any influencing factors in the learning context. These factors include the effects of technology if the personalized book is a digital personalized book, or the support provided by an adult if the book is read to a child, for example.

On the one hand, the experimental conditions reduce the usefulness of the results for real contexts, but, on the other hand, a well-conducted experiment can provide insights into theories and causal pathways for impact. These studies have shown that the self-referential effect influences learning through directly addressing the students/learners/readers as 'you' through the text. A psychology research conducted by Professor Brunye and colleagues at the Tuff University shows that the use of the 'you' pronoun is more effective than the use of the 'I pronoun' when it comes to teaching new concepts, and that both are more effective than the use of third-person pronouns (he/she or they) for learning and information processing (Brunyé, Ditman, Mahoney, & Taylor, 2011). In an experiment with thirty-six undergraduate students, Ditman, Brunyé, Mahoney and Taylor (2010) examined whether the manipulation of the personal pronouns ('I, You and He') would influence students' performance on a yes/no recognition test. They found that being addressed as an actor ('You are slicing the tomato' as opposed to 'He is slicing a tomato') is more helpful for students' retention of new information presented in this text. This would imply that books and texts written in the neutral style are less helpful for children when learning new facts than those addressing children as the main agent/actor. The researchers further identified that this self-referential effect is influenced by other linguistic cues appearing in larger chunks of texts (and especially so in prose or stories). For example, Ditman et al. (2010) note that verbs play an important role in retention, perhaps more so than the actual agent: 'Indeed verbs appear to lead to a more reliable memory trace, as readers seem to remember the described actions but not necessarily the referenced object/patient' (p. 176). Based on these experiments, we could speculate that to teach children new concepts through personalization, we need to address them as 'you' or main agents in the text and we need to link the new concepts to actions carried out by the agents. This is an interesting insight relevant to our discussion of defining personalization and understanding its possible influences when presented in the form of children's books and texts.

Other experimental studies conducted on self-referential effects show that self-referencing can affect memory processes. Rogers, Kuiper and Kirker (1977) studied how self-referencing helps with encoding new personal information. In an experiment with sixty-four undergraduate psychology students, Reeder, McCormic and Esselman (1987) tested four conditions (p. 244): '(a) self-reference ("As you read this passage, continually ask yourself whether this passage describes you"); (b) other-reference ("As you read this passage, continually ask yourself whether this passage describes Princess Diana"); (c) linguistic ("As you read this passage, continually ask yourself whether there are any misspelled words in this passage"); or (d) control ("Read this passage")'. The results were clear- cut: students recalled information best if it appeared in the self-reference condition. The second-best recall condition was the 'other-reference'. The authors conclude that 'under some circumstances at least, the self may function as a mnemonic for prose material' (p. 246). The study was field breaking because it moved from studying self-reference effects in relation to short phrases, disconnected passages or words alone to prose, suggesting wider educational implications. The study was also one of the first experiments to show that self-referencing can help students remember new facts.

Psychologists have studied self-referencing not only in terms of referring information to self, or incorporating a few personal references into a text, but also in terms of the text being presented in conversational style (as opposed to academic styles). Studies with this remit have been referring to this phenomenon as the 'personalization effect'.

Personalization effect studied in adult learners

The personalization effect has been studied in relation to deep learning, in relation to digital (computer-based spoken instructions) and paper-based learning conditions (printed instructions on a piece of paper). In these studies, the formal style is characterized by third-person monologue speech, while the personalized condition includes the conversational style in which students are addressed as 'you' and a description of a phenomenon is not neutral, but presented as something which happened to 'you', in 'your' school.

Professor Richard E. Mayer at the University of California, Santa Barbara, the United States, has been studying multimedia effects and best conditions for learning over his lifetime. The work comprises a number of studies in which he compared the presence of personalization effect in printed and digital environments. In these studies, Mayer noted that the personalization effect is medium free; that is, students learn better when personalization effect is present, regardless of whether the information is presented as printed and spoken text. To explain the effects, Mayer (2003) uses the cognitive theory of multimedia. Developed by Mayer (1997) and Mayer and Moreno (2002), the multimedia theory posits that 'personalized messages may prime the conversation schema in learners – that is, learners may be more willing to accept that they are in a human-to-human conversation including all the conventions of trying hard to understand what the other person is saying'. This effort is linked to organizing and integrating, which helps with information processing. Moreno (2001) further explains that 'according to a cognitive theory of multimedia learning, self-referencing may promote deep learning in two ways: first, by engaging students in the active elaboration of the materials and second, by using less cognitive effort to process verbal information when it is presented in a familiar style (i.e. normal conversation) rather than an unfamiliar style (i.e. monologue) of communication' (p. 5).

Overall, the studies with adult learners show that the conversational style of presentation and the change of third pronoun to the second pronoun are implicated in memory processes and, as such, can reduce the cognitive load in the learning process. The findings stand in contrast of educational practice and the anecdotal assertion that 'the more familiar something is, the more likely we are to use our memory. Framing learning around an unfamiliar context might actually encourage a higher degree of attention and potentially encourage more thinking and the retention of more new memories' (Quinlan, 2013, p. 155). Readers interested in understanding these processes in more depth might wish to consider reading upon the key learning theories applied in this branch of research: the cognitive load theory (see Sweller, Ayres, & Kalyuga, 2011) and the cognitive theory of multimedia learning (Mayer, 2003).

Personalized speech studied in young children

While self-referencing is an established area of psychology research with adult learners, there is a dearth of evidence about self-referencing in developmental psychology. However, an area that is related to self-referencing and that has been studied in depth by developmental psychologists is children's discussion of their feelings and emotions, the so-called 'emotion talk'. Emotion talk includes discussing not only how a child feels subjectively but also how the child thinks others feel. Emotion talk is an important aspect of children's development because children who frequently discuss emotions with their parents develop emotion understanding which later predicts social competence and empathy (Denham et al., 2003), that is to say skills which are crucial for social relationships and interactions. Parents who label their emotions when they talk to their children (e.g. I feel sad today) enable children to reflect and regulate their own feelings and fine-tune their emotional understanding (see, for example, Martin & Green, 2005).

Children's emotion knowledge (i.e. children's understanding of others' emotions) has been studied in relation to not only what children say to their talking partner but also how they perform on theory of mind tasks (Meins et al., 2002) or engage in joint attention with the adult (e.g. Tomasello & Farrar, 1986). There are methodological difficulties of observing and interpreting what is happening in young children's brains and the interested reader can find out about alternative measures of children's emotions in Moore et al. (1995) in relation to theory of mind tasks and in Corkum and Moore (1995) in relation to attention, pointing and general interest. What remains a fact is that there are many intervention studies aimed at supporting mothers in discussing their own and their children's emotions (e.g. the Talk To Your Baby initiative by the UK National Literacy Trust), and that there is a keen research interest in studying which contexts and with which resources might be most effective for parent–child emotion talk.

In a study with Dr Virginia Tompkins (see Kucirkova & Tompkins, 2014), we examined how mothers and children personalize their emotion talk according to a different conversational context. A literature review conducted as part of this study revealed that although much research has been concerned with children's emotion talk, researchers have not distinguished whether the emotion discussed by parents and children relates to the child, or to the parent or to a third person. Given my interest in personalization, I was keen to establish whether a particular context of mother–child conversation might influence how mothers talk about emotions to their children and how they relate them to the child or other people (i.e. whether they personalize them). It is well known that parents contextualize their talk to the child when they read a book to them or discuss a past event, but it is not known how specific aspects of this contextualization (such as personalizing emotions) may change in relation to different situations, different children and other factors. In this study, the focus was on three conversational contexts: reminiscing, reading a wordless book together and playing with a toy. With Dr Tompkins, we hypothesized that when talking about the past without any props, the mother and child will mostly focus on their own emotions, whereas if they talk about a book with a book character or play

with a dolphin toy, they will focus on the emotions of these characters. We added to the initial definition of internal state talk by Howe, Rinaldi, and Recchia (2010), who measured emotions, likes and preferences but not to whom these emotions relate. We labelled talk related to self 'personalized talk' and compared it to the talk related to the mother's emotions or the emotions of someone third, who could be the story character in the book, the toy dolphin the mothers and children interacted with or a person they reminisced about. The study was a secondary data analysis, with a repeated-measures design to control within-group comparisons (i.e. contextual differences). The three contexts of investigation were reminiscing, discussing a wordless book titled *Pancakes for Breakfast* and a play with a toy. The contexts were not limited in their length or nature, so we used proportions of codes for each category instead of total frequency. Transcript data of mother–child talk were available for all three contexts, for forty-seven American mothers and their 3- to 5-year-old preschoolers.

Emotion talk was coded in the same way across the three contexts and across mother's and child's talk. For the personalization aspect, we applied Sigel's theory and defined the personalization variable as the degree of distancing from the 'self'. According to the cognitive distancing theory (Sigel, Stinson, & Kim, 1993), parents and children need to resolve the tension between their own and the other partner's perspective to arrive at a shared meaning. So that parents and children reduce the distance between each other's perspectives, they need to engage in what Sigel calls distancing behaviours, which include comparing and contrasting each other's perspectives and emotions.

We found that when mother and child talk spontaneously in these three contexts, they mention their own emotions most when reminiscing about the past and least when discussing a wordless book together. Mother–child talk was correlated in each context, indicating that at this age children respond to the emotions discussed by their parents. This shows that some contexts naturally lend themselves to the discussion of our own emotions (such as reminiscing) and some contexts to the discussion of others' emotions (such as books). In broader terms, the study found that some learning contexts offer naturally more opportunities for adult–child personalized talk than others.

The self-referencing effect and personalized emotion talk are examples of studying personalization in the textual and verbal (oral) mode. Personalization can be also represented visually, as a pictorial clue – an approach researched by Professor Kieron Sheehy and colleagues.

Personal pictorial cues: The 'handle technique'

Sheehy (2002) took self-referencing to a different direction and applied it to the recognition of new words, important for children's word learning. He and his colleague Howe (Sheehy & Howe, 2001) compared three ways of teaching word recognition to children with severe learning difficulties: presenting them with the word alone, or with integrated picture cueing (typical procedure) or with an author-developed 'handle technique'. The handle technique was invented by Sheehy as a way of helping students remember new words by attaching a personal value to them, in the form of a small

pictogram. The 'handle' is a small visual representation of the children's meaning that is immediately understandable for the child. The children might see their own handles as being pictures, but they are usually not accessible to anyone else. These handles help children with word recognition. The picture is based on the students' own cues, something they say that the word reminds them of. For example, if a child thinks of a blanket in relation to a chair, then a picture of a blanket will be added to the chair to remind them of that connection. These personal cues are unique to each child and should be provided by the child. In an experiment with children with severe learning difficulties (intellectual disability) aged between 8 and 13 years, word recognition with the handle technique was found to be the most effective method for teaching them new words (Sheehy, 2002). Sheehy later showed that pictures can work through personalization in many different ways (Sheehy, 2002, 2005). His research thus extends the self-referential research with two important insights: it suggests that personalization could be applicable to pictorial cues; that is, personalization effects could be medium free and apply to visual as well as textual or verbal forms. It also suggests that such personalization influences recognition of previously seen information, which, in addition to recollection of information, is another key learning mechanism.

In sum, psychology research shows how personalization, which can be presented in various forms and different contexts, is implicated in the learning processes in various important ways. This knowledge can be used by children's designers/producers in the development of personalized resources and by educators when using the resources (e.g. by linking verbally the information in the text to the child). It restates personalized education with a focused, much more nuanced view on what counts as personalized and how it could benefit children.

As mentioned, to bridge the gap between research and practice, it is important to establish not only the various ways in which personalization can be embedded in resources, but also the amount of personalization necessary for a specific learning effect to occur. The current models seem to give little consideration to the latter aspect. Personalization is used either haphazardly or as a whole-classroom approach. My experience with commercial producers of personalized products for young children is that so far, the amount of personalized elements is very much hit-and-miss. Clearly, the personalization options will be different for different resources and for different contexts. My research has focused on the resource of personalized books and on the context of shared book reading of parents and children. When I started in 2011, there was no nomenclature or classification scheme to categorize the various levels of personalization available for personalized books. I approached the gap systematically, focusing on both paper-based and digital personalized books and various levels of personalization possible for them.

Levels of personalization: The case of personalized books

Personalized books and personalized resources often combine multimedia kinds of personalization into one product. For instance, with some commercially produced

personalized books (e.g. *Personalised Fairy Tales* from www.my1styears.com), we find that only a few words are personalized – the rest of the book is written in the same style for all children. In other books, for example, those produced by Mr Glue Stories, children's own drawings appear on a printed page of their own personalized book. Some books address children as you; some keep a neutral tone. In previous research, as mentioned, for Mayer's experiments the students received entire passages written in conversational style, while Ditman et al. (2010) studied a specific sentence. In Sheehy and Howe (2001), the children received a small pictorial cue to make the new and unfamiliar information personally meaningful. How can we make sense of the different kinds of personalization options here?

In in my doctoral thesis (Kucirkova, 2014), I examined the impact of paper-based and digital personalized books on children's language development (see Chapter 10 for details). To distinguish the various kinds and types of personalized books available at that time, I suggested a rubric based on three levels of personalization available for children's books. Personalization was in these research studies conceptualized as the extent to which a book was unique to an individual child, and the rubric focuses merely on the final product (the personalized book itself), which can be produced with or without the use of technology. It considers the level of personalization according to the book's content and format. Table 3.1 contains the three main levels of personalization I had identified for these books.

Table 3.1 Different levels of personalization in personalized books

Level of personalization	Format	Content	Possible to be generated by technology
1 Highest	√	√	X
2 Middle	X	√	√
3 Low	X	X	√

Source: Adapted from Kucirkova (2014)

The first row in the framework corresponds to the highest level of personalization available for digital or non-digital personalized books. Such books are created without the use of any template for their content or layout. If a child creates such a highly personalized book, his or her creativity and imagination are fully present in the final product, which is likely to be a unique artefact, with original format and content. The box in the last column in the first row indicates that, currently, such highly personalized books cannot be created with technology. This is because the use of technology would influence the format or content the book would take. Although advances in 3D printing are made on a daily basis, as yet, there are always some restrictions that mean the users have to adjust their vision to the practical constraints of the technological production process (e.g. the set of colours available for toners). Highly personalized books are therefore by and large self-made books, created with resources or materials available to the creator, but not printed by a digital printer. An example of a highly personalized book would be, for example, a set of pages bound together with a ribbon, with each page being cut out by the book's producer, with different marks of autumn

leaves on each page, or with a few pages scented with the person's perfume and some poetic excerpts or pages with scribbles or stuck glitter. The production of such books takes considerable time and effort. Such highly personalized, self-created books are often created by not only young children but also some adults, as a gift for someone else or as personal diary. They are rarely found in classrooms and schools, but they can appear in the so-called third learning spaces when they are created as part of various summer camps, workshops and youth club activities. For the most part, however, highly personalized books are hidden from the public eye; they are an intimate unique literacy artefact stored at home.

For a semi-personalized book, technology is used to provide a fixed format, and users are free to add their own content. The final product can be either digital book or a printed book. For the latter, technology runs in the background, in the book production process. In addition, semi-personalized books can also be created without the use of technology. Indeed, many teachers encourage the creation of semi-personalized books in their classrooms (without necessarily knowing they do so). Teachers can provide children with a fixed format, the same for every child (e.g. a block of blank pages) and ask each child to fill it with his or her own story. In that case, the content is personalized to the child, but the format is standardized for the class. A very similar result can be achieved with tablet/smartphone tablet story-making apps. Story-making apps provide users with a template for the story, including a set of options for the story setting and story characters or props. The users can mix these to their will and add their own content.

The low end of personalized books are books that border on customizable books. Lowly personalized books have the content and format predesigned by the publisher (book producer). The user can personalize only a few elements of the predesigned story, such as the characters' names. Often, users can choose the gender of the main characters or the colour for the background. Such books can be created by the child, but most typically, these books are created as gifts for the children by their family members or friends. For example, when buying a personalized *Snow White* book from the supermarket Asda, all a parent needs to do is to supply the system with the name of his child and a few other key facts (e.g. whether his child is a boy or girl and what the names of his/her best friends are). The system incorporates this information into the classic story plot of Snow White and generates a 'personalized Snow White' in which the main character carries the child's name. The final book is a printed book, individualized to the customer.

The levels of personalization and content/format consideration are a simplistic division of personalized books, but they enabled me to encompass the broad range of research available for personalized books. As outlined in Chapter 4, there are some interesting community-oriented studies with highly and semi-personalized books for young children. My own research has been mostly concerned with the semi-personalized books, that is, book produced by parents and children following a fixed format and open-ended content. Lowly personalized books are easy to mass produce and are the kind of books currently popular with young children. We know very little about the educational impact of these personalized resources. I listed my basic rubric for personalized books in detail here to illustrate the various levels and possibilities we

could contemplate with in regard to other personalized resources developed for young children. The framework merely focuses on the intensity of personalization and is broad to accommodate pictorial, textual or verbal kind of personalization. The content and form will be different for each type of personalized learning, but a simple three-level rubric system can help streamline the process of identification and evaluation of learning benefits.

Summary

Technology-based personalized education can be divided into two models followed by the children's designers: technology-driven and technology-enhanced personalized education. The former could be said to lack pedagogy and follow a business-oriented approach to learning, while the latter embeds the pedagogy in its design, which often clashes with the standardized assessment agenda. An alternative approach to digital personalization in schools could consider how technology enriches current best practice and apply personalization only to specific activities and specific resources. This would be more aligned with extent research on personalization effects. Extant research considers self-referential effects and personalization effects in texts, books and reading resources and could be emulated for other resources developed for personalized education. However, when applying the insights from studies with adult learners to early learning, we need to be mindful of the fact that these experiments were carried out with undergraduate, mostly male North American psychology students. We also need to be mindful of the specific level of personalization available to students in these studies. The current psychology research does not explain how the personalization effect changes with different age groups, different kinds of texts (fictional, non-fictional, narrative and non-narrative) and children coming from different backgrounds, with different skills, needs and abilities. Importantly, we cannot apply findings concerned with cognitive gains (learning, memory) to all activities mediated by personalization. In the case of reading, for example, in addition to memory effects, learning happens in the form of story comprehension; word acquisition and fact retention are important outcomes but they are not the only ones. Emotional or affective outcomes – such as parents and children having a positive bonding time together, children learning about others' stories and children forming their identity as a reader – are similarly important. The ethical implications of technology-based personalization need to be considered and better understood by future design – an aspect that I do not develop in this book but recognize as crucial future research and policy avenue. When considering the range of personalization options, the various levels of personalization available for personalized books can provide a good source of inspiration for future research. The next chapter builds on this theme and summarizes the various kinds of personalized books currently available for young children. This illustrates the wide range of personalization options potentially influencing children's learning.

4

Overview of Personalized Books: Self-Made and Commercially Produced Personalized Books

In this chapter, I offer a niche perspective on personalized education by focusing on personalized books. Personalized books and stories are an important site of innovation for personalized education in early childhood. I provide a systematic overview of the key types of personalized books currently available for young children. The review is divided according to the origin of the books/stories. This was a deliberate choice to compel the consideration of authorship, agency and authenticity of the final product. These considerations give rise to a more refined understanding of the key dimensions characterizing personalized resources developed for young children's learning. I outline these dimensions towards the end of the chapter and use them to chart possible future developments for commercially produced personalized books.

Self-made personalized books

Self-made personalized books are home-made self-created or self-authored books, produced by someone for their own or someone else's pleasure. The term 'home-made' may misleadingly imply that all home-made personalized books are produced at home. This is not always the case – homemade books can be also produced in a school or a local club. The key distinguishing feature of self-made books is that they are not mass produced and that each copy is unique. Self-made books can be digital or paper based, and the choice of the content and format is up to the books' author. When produced with digital tools, self-made personalized books become digital or multimedia stories, based on autobiographical content. Unlike oral stories, digital stories have a specific form and format and can be stored in libraries or audio, video and pictorial archives, and this more permanent form can be used to share the books with others. The extent or depth of personalization embedded in self-made books ranges from highly personal to lowly personalized books. In the examples described next, the books were based on classic stories, which the children reproduced with their own drawings or texts, or they were their own stories written in their home languages. The next section comprises the summary of my research regarding the

learning potential of these kinds of self-made personalized books for young children's literacy, learning, identity and related socio-emotional outcomes.

Educational research with self-made personalized books

Several early childhood studies have used self-made personalized books in their research, although not always explicitly referring to them as such. For this overview, I selected studies that focus on identity and language benefits associated with self-made personalized books. The books were authored by the child and the child's authorship, agency and authentic contribution were key themes across all the studies.

The impact of self-made personalized books on children's identities

The value of creating and sharing personalized books was recognized by Grainger, Goouch and Lambirth (2005), who studied British primary school children composing their own texts. The researchers focused on the children's creativity and writing and noted that the activity supported children's identity formation and the experience of alternative identities: 'Through telling personal tales children can voice their emotional, imaginative and interpersonal awareness which can motivate them to use language for intrinsic means, not external schemes, and investigate their identity in the process' (Grainger et al., 2005, p. 125). From this perspective, self-made personalized books could be considered to be crafted identities in a physical artefact. The creation and sharing process of text-making enables children to construct and negotiate their perceived identities. These processes are related to the notions of autonomy and authorship and have been studied in detail by researchers who are interested in the socio-cultural 'funds of knowledge' that children bring to schools. This line of research has been guided by the theoretical and empirical work of Louis Moll and his colleagues at the University of Arizona.

Back in the 1990s, Professor Moll and colleagues provided an alternative perspective on what children bring to school from home and what they can achieve by drawing on their household's knowledge (the knowledge they gain from within their households, specifically their social practices and cultural traditions). Moll and his colleagues (Moll & Cammarota, 2010; Moll & Greenberg, 1992) coined the term 'funds of knowledge' to describe the 'essential cultural practices and bodies of knowledge and information that households use to survive, to get ahead, or to thrive' (Moll, 1992, p. 321). Their approach to studying children's own creations and contributions to the classroom stems from a deep acknowledgement of the diversity of families' practices and children's skills.

The incorporation of funds of knowledge into children's books has been studied in detail by a number of scholars, including Professor Sudia Paloma McCaleb (2013) or Moll's colleague, Professor Kathy Short, who also works at the University of Arizona. Professor Short is known for her outstanding contribution to the study of children's literature and curriculum as an enquiry process, from which I pick out her contribution to the authoring cycle. Together with other researchers working

with her in this area (e.g. Maria V. Acevedo, Dorea Kleker and Lauren Pangle), Short understands children's personal stories as a 'way of knowing', as a process which provides space for authentic engagement with others and self. Nested in a qualitative research tradition, Short et al. have documented the importance of children (and students) critically 'reading the world and the word' (Freire & Macedo, 2005) and understanding others through personal cultural identities: 'When students recognize the cultures that influence their thinking, they become more aware of how and why culture is important to others. They no longer see culture as about the "other" and as exotic, but recognize that it is at the heart of defining who they are as human beings' (Short, 2009, p. 4). Using the thinking tools of Dewey (1938), Short adapts the notion of 'tension', necessary for children to participate in authentic, child-driven (not predetermined by adults) storying. Such storying can be supported both at home and in schools, as long as children are engaged in an authoring cycle where reading and writing are explored through enquiry. The close link between reading and writing and its beneficial impact on developing children as readers and writers is well known in early literacy literature. Equally, the notion of enquiry, that is, engaging children in deeper thinking and in reflection through problem-posing and problem-solving, is important for developing readers' and writers' identities. The notions of agency and authenticity are embedded in this process. In their project with Mexican American families from challenging economic backgrounds, Short et al. invited the children's family 'storying' by producing story boxes and story backpacks prepared with socio-culturally sensitive resources. These often invited spontaneous and unique response, with children and families telling, writing and drawing their own stories. In another example, a boy originally from Iraq recounted his story of travelling from Iraq to the United States with pictures that had been drawn by his mother in his journal.[1] Through a careful analysis, a number of positive outcomes for children who participate in such 'storying' were identified: communicative and language skills, as well as identity and social awareness for the child; recognition and active participation in meaning-making with local communities and inviting cultural and linguistic practices into classrooms.

The impact of self-made personalized books on children's language

A more quantitative account of the benefits of self-produced personalized books comes from the research conducted by Professor Judith Bernhard in Canada. Professor Bernhard's expertise lies in studying migrant families who move from Latin America to Canada and the United States. Her research includes large-scale studies with immigrant populations and refugee children, with a deep appreciation of the cultural, social and human capital these families bring with them (see, for example, Bernhard, Winsler, Bleiker, Ginieniewicz, & Madigan, 2008). The Canadian approach to self-created books had a particular focus on the tension immigrant children experience between the space provided for learning at home and in classrooms, with emphasis placed on celebrating children's own identity and sense of self in the schools.

In the 'Early Authors Program', Bernhard and colleagues studied the benefits of children's book authoring in thirty-two early childhood centres across Canada,

with more than 1,179 children from 800 families participating in the programme. Children participating in the programme were encouraged to create their own books in two languages: English and their home language (which was mostly Spanish or Haitian Creole). The focus of the intervention and of the evaluation was on 'highly meaningful language interactions' (Bernhard et al., 2008, p. 76). Rigorous evaluation of the programme found that in contrast to the control group, children in the Early Authors Program group scored significantly higher on a range of language measures after the intervention. During my Masters studies, I met with Professor Bernhard to learn more about these books. She explained to me that the content and format of the books were not fixed and that children were free to create any book they wished to share with others or take home from the school. From the perspective of personalization, it would be therefore too ambitious to claim that the success of this intervention was driven by personalization – other factors were in place too. The intervention was a rich holistic approach to children's literacy learning, and we do not know whether the positive results came about because children could take ownership of their learning by personalizing their literacy materials or perhaps because of the sensitive guidance of the adults supporting children's text-making – or because, most likely, the combination of these elements.

In another strand of Bernhard's research, children's participation in early authoring of their own books has been discussed in terms of the effects on children's sense of self in a new classroom environment. Here, Cummins (2004) argued that children appropriate artefacts (or objects of creative work) and through this appropriation they can better reflect on their own identity: 'The identity text then holds a mirror up to students in which their identities are reflected back in a positive light' (p. 91). Cummins's use of the term 'identity text' reflects the importance of the books for children's identity.

In addition, Cummins and Bernhard explored the use of the so-called 'dual-language books', that is, books written in two languages: the child's native language (or language spoken at home) and the language of instruction (or language used in the school). Dual-language books can be created by children and their families but also can be commercially produced. In Cummins and Bernhard's studies, the dual-language books were created by dual-language learners, that is, children whose native language was not the dominant language of instruction (also known as children with English as an additional language). This body of work (see, for example, Taylor, Bernhard, Garg, & Cummins, 2008) is a prominent approach within the multiliteracies literature and documents a range of positive outcomes for the children, both in the social and language domains.

Self-made personalized books and community effects

In addition to child-related outcomes, self-made personalized books can connect school and homes and act as a powerful bridge in community-based projects. The latter has been picked up by Shuker and Terreni (2013), who investigated self-made personalized books in New Zealand preschools. The researchers looked at preschoolers creating their own stories using the Microsoft PowerPoint tool. They

argued that the opportunity to connect print and digital personalized stories teaches children not only about community but also about digital literacy: 'Self-authored books present an opportunity for early childhood professionals to develop a partnership between ICT and reading' (p. 19).

Whether studied from a qualitative or quantitative perspective, researchers agree that the autonomy and agency in self-authored books, as well as their highly authentic character, contributes to children's identity formation and expression, to empowerment and positive community relations. However, not all children and not all parents or caregivers can always participate in book-making. There might be socio-cultural milieus in which a parent's active participation in their child's education or literacy is not desirable. Also, there might be practical barriers to creating or co-creating books and multimedia stories. Some children, parents or teachers may not feel competent or knowledgeable enough to produce a self-made book and many adults simply don't have the time to do so. This is where the appeal of commercially produced personalized books resides.

Commercially produced personalized books are widely used but are not widely researched. To my knowledge, there has been only one attempt to empirically evaluate commercially produced personalized books: by Demoulin and his colleagues, who were also involved in the books' production. They were involved in the development as well as evaluation of the so-called *I Like Me!* early literacy intervention in US kindergartens. The initial purpose of the books' development was not for profit, but to support children's self-esteem and positive identities. This approach thus sits somewhere in-between the mass- and self-produced personalized books; therefore, I placed it in a separate section.

The *I Like Me!* Books personalized books

Demoulin and colleagues (1996, 1999 and 2001) outlined the rationale, deployment and evaluation of the *I Like Me!* personalized books in three main articles. These articles state that the intervention consisted of schools participating in a twelve-week 'I like me' programme, run by Kindergartners Count, Inc. The intervention consisted of each child receiving an *I like me!* book. Based on their online description, the books could be categorized as low- or semi-personalized books. The books were mass produced with a cost of $9 per book and given to each child in the kindergarten. The books were customized for each child by substituting the main character's name by the child's name and by replacing names of places by the names familiar to each child. Unlike the personalized books in my doctoral study, these books did not contain new words and were not designed with the purpose of teaching children new vocabulary. Instead, the stories were 'hero stories', aimed at making children feel good about themselves and raising their self-esteem. The website dedicated to the *I like me!* programme states: 'Each child receives a hard-bound personalized book to keep – making each child a hero in his or her own life' ((http://www.ilikeme.org/programfacts.html). Research evaluation of the programme by Demoulin and colleagues found that children reading personalized books had greater levels of self-esteem and positive interactions with

parents than control group (1999). Furthermore, the website states that 'the use of the personalized I LIKE ME! reader improved reading comprehension and recall in kindergartners by an average of 46.8% over children using non-personalized readers' (http://www.ilikeme.org/programfacts.html). In addition, a pretest and post-test comparison of children participating in the programme found that, on average, children gained 7 per cent higher scores on tests of self-esteem and self-efficacy. In a follow-up evaluation there were also learning gains: books, which were customized to each child and built around the child's positive self-esteem, enhanced children's focus time, recall and motivation during learning to read (Demoulin, 2001).

Unfortunately, from the short description of the study design available in these publications it is not clear whether the 'non-personalized book' used as a control was a book carefully matched to the personalized book or whether the non-personalized book was simply any book in the classroom, which would be, by default, non-personalized. Without a careful control of the level of personalization that goes into the book production, it is difficult to establish whether the reported positive effects were due to the fact that the books were personalized or because of the overall intervention. In addition, details about how often and under which conditions the books were read and how the entire intervention was executed in the classrooms (e.g. Did parents take part? Did the teachers speak to children about their achievements and hero stories?) are necessary to determine the actual effect of personalization in the 'I Like Me' studies. Overall, though, they indicate a possibility for future development of children's personalized books by bringing together academic research and commercial design.

Mass-produced and commercially produced personalized books

In a blog for the BookSeller (which is 'the central source of industry information for publishers and booksellers in the UK') I wrote that 'the year 2016 was predicted to be the year of personalization and personalization is exactly what we are seeing in a number of products and services worldwide, including the book industry'. The blog was followed by a number of emails from children's book publishers and my informal online conversations with them. These conversations allowed me to get a good overview of what was available for young children in terms of personalized reading materials in the first half of 2016. I purposefully do not provide an in-depth market analysis of personalized books in this chapter as it could become quickly obsolete, especially if we consider the rapid developments in the digital production of children's books. Instead, I limit my review to a detailed consideration of personalized books from three publishers: Nosy Crow, Mr Glue Stories and Lost My Name. I had the opportunity to view, test and discuss the products of these three publishers/designers at a greater depth at two public workshops organized in 2015 and 2016 and consider them illustrative of current possibilities. I describe in more detail the personalization options in each product to gauge their potential for supporting children's learning. It is important to note that as yet, there is no academic research on the efficacy or effectiveness of these personalized books/stories.

The 'Lost My Name' books

If you google the words 'personalized books', it is likely that the first title that comes up in the results list is that by the UK-based children's publisher 'Lost My Name'. In 2014 Lost My Name reported sales of more than 132,000 copies of their personalized books in the United Kingdom alone and, in 2015, 700,000 books in 150 countries. In 2015, *Telegraph* reported that Lost My Name had sold 700,000 books in 150 countries (http://www.telegraph.co.uk/finance/newsbysector/retailandconsumer/11880745/Dragons-Den-backed-Lost-My-Name-launches-new-space-book.html), and their sales are still on rise. When I accessed the Lost My Name website on 30 July 2016, it listed that they have inspired 1,675,685 children in 178 countries.

I describe two titles offered by the publisher. The first title is about a girl or a boy who lost his/her name. The story plot revolves around a girl or a boy (depending on the book's recipient gender), who looks for the letters of his/her name. For instance, if your name is Karl, then your story would be about a boy who met a kangaroo, then an ant, then a rhinoceros and, finally, a lizard. Lost My Name produces their books digitally but the final product is a professionally designed printed book with high-quality illustrations. The second title produced by Lost My Name is entitled 'The Incredible Intergalactic Journey Home'. This book offers buyers the option to personalize the dedication page and the character's name, which then appears written in the stars inside the book. The story follows the main character travelling through space (this is the standard part of the story plot for all children). The personalization elements include a country's flag on the space ship, an 'epic landmark' printed as a photograph on the page (e.g. the picture of Big Ben for a UK version of the book), a Google Earth image of the child's home (based on the postcode supplied by the buyer) and the door number printed on a standard door. The story finishes when the main character returns home after his/her space journey. While the first title 'A boy/girl who lost his/her name' follows a customization principle, the second title could be considered to be more personalized because of an increased number of personal data necessary from the buyer, as well as the use of pictures and textual modes to personalize the book content. For both titles, the publisher follows a simple principle: there is a template, which needs to have a general appeal to children of a preschool/lower primary school age. The template is gender-, race- and background neutral (the use of animal characters) and contains a good, engaging story. This template is then customized with the child's personal data: name, gender and postcode. The *Incredible Intergalatic Journey* is one of the first, if not the first, children's book title, which uses geographical and personal data to personalize their printed books on a mass scale.

In addition to selling their books, Lost My Name encourage their customers (who can be former buyers of their books but also subscribers and website visitors) to take part in several personalized activities (summarized on its blog site 'Clever Ideas'). These activities are all based on the customization principle inherent in their books: there is a template and the adult only needs to supply a few personal data about the child. For example, there is an activity in which parents are encouraged to send their child secret mail from the 'Frog'. The Lost My Name website provides templates of

envelopes and letters parents can download, print out and populate with the child's name. For some activities, parents can add a personal flavour to a traditional game – for instance, there is the option of a personalized snap card game, in which the cards contain the child's name and characters from the Lost My Name book. The child's authorship and involvement in these books and activities is minimal – the child is positioned as the recipient, not maker of the personalized experience. However, from the audience's perspective, the parent can make a generic product unique for their child with a few simple clicks. In comparison to the self-made personalized books presented earlier, the Lost My Name books are perhaps more accurately described as personalized *gifts*, which are likely to excite and entertain children and introduce them to the world of books. The Lost My Name titles received rave reviews and extensive coverage in most popular media outlets including TV coverage on BBC and articles in the *Guardian* or *Telegraph*, and enjoyed great popularity among children and their caregivers worldwide. Without a doubt, the company's success lies in the ingenious idea of targeting busy urban adults and offering them a bespoke but affordable solution for their child's entertainment.

The Mr Glue Stories

Mr Glue Stories is a digital personalized book producer, considerably smaller in scale than Lost My Name in terms of company size and turnover. At the time of writing, it has one main title, which is a digital story as well as a printed book, with the following options for story customization: children can add speech or music to one of the story templates, and they can share the finished story online. In addition, the finished digital story can be also ordered as a glossy paperback, which comes with the child's name printed on the book cover and with the children's own drawings added to the book illustrations. The story characters are hand drawn and purposefully non-professional drawings, so that, as the developer says, children don't feel daunted and are encouraged to add their own drawings. Carrie Gregory-Hood, co-founder of Mr Glue Stories, explained to me that the idea of child's active participation in the book production was a key driver for Mr Glue Stories. The publisher was keen to encourage children's autonomy and active input in the book production process. This is also why the story templates for Mr Glue Stories are original stories crowdsourced from freelance writers and why all the illustrations and sound effects have been produced with a 'home-made feel'. Such an approach to personalization is, the producers believe, more likely to inspire and encourage children's authorship participation and engagement with the app.

Given that the final customized stories can be shared digitally, as well as published as printed paperbacks, children are taken through the entire publishing book cycle: they can see how their participation in the story-making process can alter the text and illustrations of a book and how it can be then printed and delivered home. In terms of child's ownership and creativity, Mr Glue Stories offer several options, although these are not open-ended but restricted by the story template. Critics might question whether such personalization is genuine (or authentic) or whether it encourages pseudo-authorship based on borrowing elements from a predesigned template. I

believe that the learning potential of the Mr Glue Stories lies in the bridge between the printed and digital format of personalized books and in the authoring options of touchscreens to encourage child-driven personalization.

Nosy Crow apps/books

Nosy Crow is an award-winning UK children's book publisher and app designer. Unlike the Lost My name or Mr Glue Stories examples, Nosy Crow does not focus on personalization or personalized books. Yet, a review of their app titles reveals a number of sophisticated personalization options embedded in the publisher's digital stories (book apps available for smartphones and tablets). The personalization features in these apps are one of the key reasons for the wide popularity of the Nosy Crow titles among young children. Indeed, independent reviews of the apps often refer to these features as the 'best feature' or as something the child especially enjoyed when reading the book (see, for example, the Apps Playground reviews by the UK app editor and the *Guardian* writer, Stuart Dredge). For example, in the Cinderella app developed by Nosy Crow, the child can add his/her own picture in one of the pages of the book. Using the front-facing camera, the child's selfie can appear with a quick tap in one of the magic mirrors in Cinderella's room. With another app by Nosy Crow, Pis and Posy (based on the same named children's printed book), the children can add their own faces to imitate various facial expressions of Pis and Posy in front of a mirror. The activity is based on the idea of a photo booth where children can make faces and save these as digital photographs. The funny faces of Pip and Posy provide a template and the child is encouraged to imitate the face, take a picture and share it with others. This feature is very similar to what is possible in a printed book titled *Making Faces* by Jacky Bahbout. In this book, children are encouraged to try out various facial expressions and they can also pretend to be specific characters. For example, they can tear out a picture from the book and pretend to wear a crown or an astronaut helmet. Multiple options are of course much easier to design in a digital format than in a paper book. While the book arguably offers 'many hours of fun', a digital format could offer limitless options. Unlike in the Cinderella example the mirroring faces feature is not part of a story plot (narrative) and there is no follow-up activity other than saving the picture and sharing it with others. Parents and teachers can of course use the pictures as impetus for talking about emotions or to begin a story but this is not part of the app's activities. Some might say that in respect to personalization, Nosy Crow has simply leveraged the touchscreen front-facing camera and capitalized on children's natural interest in human faces. Others might celebrate the publisher's novel way of igniting children's interest in classic stories and encouraging children's more active participation in the storytelling process. Overall, the personalization options in Nosy Crow apps add a layer of playfulness, relevance and immediacy to the reading activity.

In addition to personalized books and digital stories, children's books publishers use personalization for reading-related products developed for young children, which is summarized next.

Personalization in reading-related products developed for young children

A review of commercially produced personalized books needs to include reading-related and literacy-related personalized products, which are sometimes advertised as personalized stories, sometimes as digital stories, and sometimes simply as 'fun stories'. These are touchscreen apps that combine the elements of drama, story and personalization. For example, with the Puppet Pals app, developed by Polished Play, the child can insert his or her name into a story about Harry Potter and customize the character's appearance by replacing Harry's picture with the child's own photograph. There are story templates and story props for children to choose from and multimedia options for authoring the content. Such digital personalized books are currently enjoying great popularity among parents and their preschool-aged children, with download figures in the range of millions (http://www.ehow.com/how_7815808_create-potter-puppet-pals.html).

Another example of a currently very popular personalized resource designed to support children's literacy is the Me Books app. The digital library of Me Books offers the option to add users' own audio files to accompany classic tales. The app, developed by the company Made In Me, includes a number of classic tales from the largest children's book publishers. What makes the child's reading experience different – and personalized – is that the children can add their own audio recordings (or those of their family members and friends) to selected pages of the classic tales. So, for example, when reading Little Red Riding Hood, the child can add his own voiceover to the text or the parent can record a new story to accompany the book illustration. On their website, the app developers write that: 'Me Books incorporates award-winning and patented technology that allows the reader to personalize their favourite books in a unique way. By incorporating rich audio content and letting young readers add their own voices, Me Books provides a wonderfully new way to support language and literacy development' (http://www.madeinme.com/me-books/). To date, the app has had more than one million downloads worldwide. Even though the depth or sophistication of personalization is quite basic, the opportunity to add an audio recording to a classic narrative seems to be appealing to a large number of people. One could imagine the app being particularly successful in families where parents audio-record their voices and the child can listen to their voices in their absence, or for bedtime reading sessions, when the child takes the lead and personalizes a classic narrative with his or her own story ideas.

In addition to personalization embedded in a specific app, publishers and children's digital producers are increasingly interested in personalizing a wider range of reading products. This includes children's digital libraries, where personalization happens at the point of choosing and recommending a title to a specific child. There are also personalized subscription services, which provide the subscribers with personalized choice of titles on a regular basis. Although developed more for the school than home market, these services are similar to the personalized books because of their production model. For the experience to be personalized, parents or teachers need to add the child's age, gender and their reading interest (typically chosen from a set of options such as fiction, non-fiction and fairy tales). These data

don't generate a personalized book, but a personalized reading list for the child. It is questionable whether the reading list and the child's reading experience as a whole are personalized or simply customized to suit the publisher's template (and business model). This is even more questionable with the type of personalized reading services that base their recommendations on the child's reading performance (in addition to or instead of the child's reading interests). For instance, with the Lexile measures offered through Improve My Reading (www.improvemyreading.co.uk), parents and teachers can generate a 'Lexile measure' for the child, which is based on individual measures of a child's performance of reading a graded text. The measure then leads to a 'personalized' recommendation of texts based on the child's reading ability. This model is similar to an adaptive courseware system available for adult learners, which I described in the previous chapter.

Taken together, this short review of commercial personalized books indicates that in many respects, research lags behind industry developments. The Lost My Name, Mr Glue Stories and Nosy Crow products are likely to engage children in reading, which is an important contribution. However, although some publishers pride themselves on supporting children's reading, writing or creativity, their claims are not based on peer-reviewed independent research. Even if some publishers of mass-produced personalized books commission an evaluation study of their books, the evidence generated through this research is mostly based on a sample of enthusiastic users of the books and does not always adhere to the criteria of rigour and validity as academic research does.

Another key consideration related to commercially produced personalized books concerns the security measures around children's personal data collected by the publishers. Many publishers of personalized books hold the children's full name, address and picture (which is mostly of the child or of someone close to the child). Each country has different laws about the possession and distribution of personal data in digital and physical resources. The customers of personalized books, however, can be from any country in the world, with some countries requiring extra permissions for parental concern (e.g. the United States). The situation is complicated and, at the moment, gives an advantage to the publisher, but not to the consumer, who, at the end of the chain, is the child. I raised this concern in 2014 and have since organized several meetings with the industry and UK parliamentarians, which will, hopefully, lead to a national guidance ready for implementation in 2018. In the future development of children's personalized books and stories, it is essential that there is more transparency and clarity around the storage, confidentiality and later use of children's personal data.

So far, we know very little about the different kinds of personalization embedded in the commercially produced personalized books and how their personalization elements might influence children's outcomes. They differ from self-made personalized books on a number of dimensions, impeding a direct comparison. The first step towards a better understanding of their impact is to develop an accurate description and a precise consideration of their personalization features. I list here a set of personalization dimensions that future research, design and practice need to consider; these are based on the present review of self- and mass-produced personalized books for young children.

Key personalization dimensions for future research and design of children's books

As we consider more examples and varieties of personalized books, more nuances and complications regarding the levels of personalization come to fore. While in self-produced book the content was unique and authentic, in mass-produced books there were only a few elements that were unique to the child – the most part of the book was a generic template. There are differences based on the author – the book has a different educational potential if the author is the child or the parent or the provider, or all three together. There are also differences if the final product is designed to serve an educational purpose or if it is intended to be a gift for someone's pleasure. The rationale for the production of a self-made personalized book is based on a community, identity or literacy narrative, whereas for the commercially produced personalized books the impact on community relationships is often not considered at all.

In the previous chapter, I outlined a basic rubric for the level for personalization embedded in personalized books based on Kucirkova (2014). In addition to the consideration of the level of personalization possible within personalized books, this review revealed that we need to specify a number of additional dimensions relevant for the book's audience, purpose and themes. These dimensions need to be periodically updated and refined as new technological options become available. They include:

- The level of involvement of the micro/meso and macro systems in the book's production (ranging from the child's authorship through parent's/caregiver's input to an entire school or community book co-production)
- The range of multimedia options available in the book or story (includes audio, text, drawings, videos, static visuals)
- Presence or absence of templates for the storyline (includes story props as well as reliance on classic or original stories)
- The availability of digital, printed, virtual/augmented reality formats and transmedia products
- Socio-cultural relevance/diversity of the themes represented in the book (includes presence or absence of child's home language for the main story as well as individual story elements).

Future models of personalized books will also need to consider the level of personalization in relation to the different types of stories (picture books, fairy tales, concept books, fantasy books), genres (poetic books, chapter books, board books, novels, short story collections), presence or absence of a narrative, types of illustrations (watercolour, photographs, line drawings) and different literature elements (characters, plot, setting). These dimensions could be part of evaluation criteria of personalized books not only for research and design purposes, but also for innovation and literacy awards. The United Kingdom Literacy Association Digital Book Award already incorporates some of these elements (see https://ukla.

org/awards/ukla-digital-book-award). The choice of individual dimensions and their combination depends on the context and purpose of an evaluation or activity or research focus. In my own research, as explained, I have been mostly interested in the level of personalization embedded in personalized books and the impact different formats of personalized stories have on parent–child interaction and on children's outcomes. Different research studies foreground different dimensions of personalization, as the reader will note in Chapter 6, in which I consider the key themes of personalization research. In the last section of this chapter, I chart possible developments in commercially produced personalized books by imagining various combinations of the aforementioned dimensions and their potential learning benefits for the children.

Future models of personalized books/stories for children

First, the current models seem to be geared towards either template-based digital story authoring or fully produced paper-based personalized books. Publishers could innovate their products by bridging the two formats and combining publisher's and user's book authoring. The latter could lead to a more dynamic dialogue between the publisher and the reader, which would give children authentic opportunities for authorship and the publisher a deeper insight into children's ideas. An attempt in this direction has been made by the start-up Dream Letters Ltd. When parents purchase the Dream Letters package, the publisher sends the child a personalized letter. The letter encourages the child to produce a story that they post back to the publisher, who sends it back to them, and based on the child's response sends the child another letter and, in this way, continues the cycle. It would be exciting to see how children's authoring changes if more child authors are brought together in the authoring cycle and if they can exchange their ideas. Products designed for shared and collective authoring might be an exciting future avenue.

Second, I expect more publishers of personalized books to consider the options of multimedia personalized books, where various elements, including the audio, images/illustrations and a text can be determined by the user. With the use of multimedia, publishers could draw on children's reading, writing and digital literacy skills and encourage children in more active and meaningful book authoring.

Third, personalizing books with children's names seems a universally attractive technique to engage children in book reading or motivate them to pick up a book. However, this approach is based on the assumption that *all* children will be attracted to seeing their name in print. What about children who don't like their first name? Although very young children might not have fully developed an awareness of their name, for many adults this is an issue. When I googled the phrase 'I hate my name', 329,000 results were returned, including discussion threads at Yahoo, Reddit and Quora listing the difficulties people have had with their names when they were young. Here, the digital version of a book might offer a more flexible way of personalizing a piece of text. Unlike printed books, a digital book designed for a specific name can be flexibly changed to accommodate personal preferences for nicknames or changed

names. Alternatively, it is likely that the future of personalized books will be peppered with other, not name-oriented, personalization features. Some publishers are already experiencing with alternative personal data such as the child's home address (see Lost My Name mentioned earlier). There are also other options that could be used to individualize a child's book, such as their favourite colours, animals or foods. Given that neither name nor address is decided by the child, it is worth considering categories determined by the children themselves. If we are to support more autonomy and child-driven personalization, we definitely need to see more children-driven choices of personalization.

Fourth, the focus on selfies and child's own face might shift towards the inclusion of friends and others' faces. There are already apps which encourage children to insert pictures of others, but these are developed for children with special needs and do not focus on storytelling. For instance, the app 'Look At Me', developed by Samsung in 2014, targets children with autistic spectrum disorder as it aims to improve children's ability to respond to the people around them. The app was developed in collaboration between the Korean branch of Samsung and Autism Canada. Although it focuses on the use of the front camera, it is aimed to encourage children not to take pictures of them, but of those around them. This is to encourage the child to make eye contact with the people they photograph and gauge their facial expressions for predesigned templates (e.g. a template of someone having fun in the sea presupposes a happy face). I could not find a peer-reviewed journal article documenting these findings, but on their website, the developers claim that 60 per cent of children using the app fifteen to twenty minutes a day for eight weeks showed increased ability of expressing their emotions. In addition to pictures co-produced with others, it is likely that future photo-oriented personalization features will be enhanced with virtual and augmented reality options. Considering the global and unprecedented success of PokemonGo and similar virtual reality games, it is likely that publishers of digital personalized books will experiment with augmented reality features and devices' GPS capabilities to encourage alternative ways of children's physical and whole-body participation in a story.

Fifth, collaboratively produced elements of personalization would enable children achieve more in groups than they can achieve on their own (see Vygotsky's take on this described in Chapter 1) and they could enhance the quality and enjoyment of a personalized book. The future is likely to bring a merger between the self- and mass-produced models of personalized books, with more professional authoring possibilities for children and parents. With the rise of advanced self-publishing possibilities and the increasingly wider acceptance of self-publishing as a legitimate route into publishing, it is possible that we will soon see some professionally produced personalized books.

Sixth, the combination of personalization and transmedia is likely to rise in the future. In their report 'T is for Transmedia', Herr-Stephenson, Alper, Reilly and Jenkins (2013) define transmedia as 'any combination of relationships that might exist between the various texts (analog or digital) that constitute a contemporary entertainment media experience' (p. 2). In the present example, transmedia would mean the combination of various texts brought together through one personalized narrative. This is already happening for popular characters and classic stories: for instance, Cinderella is offered

as a film, doll, app, book or personalized book and digital personalized story. While a personalized version of a classic story is in the current models used as an addition or extra hook to tap into the transmedia chain, in the future it could be the driver for a transmedia production line. Notably, there could be transmedia products based on user-generated storylines and story characters. The merger of smaller publishers of personalized literacy products and a transmedia approach is likely to generate sustainable business models, targeting a range of children's skills.

Last but not the least, personalized books serve as a starting point for children to get hooked on story creation with themselves as heroes. However, with traditional, non-personalized book titles, children were taught to understand and feel empathy for others' viewpoints and behaviours, not to focus on their own achievements and ideas. As outlined in the previous chapter in relation to emotion talk, the book reading context encourages children and parents to talk about others' emotions (rather than their own) more than the play or reminiscing context. So that books don't lose this important value, parents and teachers need to optimize children's exposure to personalized books with non-personalized titles. Publishers can facilitate this process by developing school- and community-oriented authoring options and designing digital spaces where collaborative production challenges children to consider who they are in relation to others.

Summary

A review of the range of personalized books currently available for young children can elicit a number of dichotomies: free books versus paid books; books which are time consuming to produce versus those which are quick to buy; books with authentic personalized content versus books with tokenistic representations of socio-cultural diversity. This chapter streamlined the range of personalized books and stories to two main types: personalized books authored and self-produced by the user (who could be the child or the child's main caregiver) and those produced by the book publisher or digital developer. Self-made personalized books follow a different production process and research tradition than commercially produced books. Yet, in terms of design of the books, there are some noticeable parallels between the *I like Me!* personalized books used by Demoulin and mass-produced personalized books. Given the similar mechanism for the books' production and distribution to the children, it is therefore perhaps not unreasonable, or not fully unjustified, to expect children's positive engagement and some learning benefits with commercially produced personalized books.

Overall, the review highlighted the variety of personalization options in a specific product and a number of additional dimensions necessary for a full evaluation of personalization in children's literacy materials. I pondered some potential interactions of these dimensions in the future of commercially produced personalized books and suggested merging the boundaries between self- and commercially produced models of personalized books. All told, the dimensions identified in this review add to the Kucirkova's (2014) rubric – which is concerned with the level of personalization – the

notion of the book's origin and a number of additional elements, which might have an impact on the child's outcomes. The next chapter takes up the subject of personalization variety and theoretically broadens the scope from personalized books to personalized education.

Note

1 How to best describe such a journal with hand-drawn pictures telling an autobiographical narrative? I call it a homemade personalized book; Short et al. use a more encompassing term of 'family stories' or 'family narratives' or simply 'storying'.

5

Theoretical Frameworks Relevant for Digital Personalization in Early Education

So far in this book I have considered various examples of digital personalization in education, and personalized books to illustrate the variety of practices and research traditions concerning personalization in early childhood. It has become clear that there are different terms, definitions and nomenclatures describing and capturing personalization, particularly if we look at psychology research and educational practice. It is difficult to establish what digital personalization means for education if we are not clear about what personalized education is. The next step in trying to define personalized education – and to specify digital personalization – is to determine the constructs and properties that are related to personalization, but that are, at the same time, independent of it. The obvious strategy in this process is to consider the terms used together with, or synonymously with, personalization. In this chapter, I consider the terms 'customization' and 'individualization', which lie at the lower end of the personalization spectrum and are used in the industry and education for different purposes. An insight into terminology can help us better understand personalization. In this chapter, I link this understanding to a selection of theories concerned with technology-enhanced personalized education.

Customization and personalization

For many people, there is no clear difference between the terms 'personalization' and 'customization'; they are used interchangeably in business, education and other fields. In my doctoral thesis concerned with personalization in children's books, I argued that when it comes to children's books, there is an important distinction between personalization (personalized and personalizing) and customization (including customized and the process of customizing). I argued that although often used interchangeably, the two terms imply different processes and products on a theoretical, empirical and practical level. I extend my argument in this section, by highlighting the difference between customization and personalization in relation to the commercial agenda in technology-driven models of personalized education. This continues the logic discussed in the previous chapter wherein technology-driven

models of personalized education were described as lacking in pedagogy and a deep-seated judgement of what personalization is.

The commercial side of personalization

Personalization implies uniqueness, exclusivity and authenticity. Customization implies an adjustment, a change or alteration to a given template, or to a generic product. In Kucirkova (2014), I plotted personalization and customization as two end points on a spectrum line of personalized books, and argued that the key difference between personalization and customization is about the level of personal detail available within a given book. Focused specifically on personalized books, I specified three levels of personal involvement in the content and form of the books, leading to the three levels of highly personalized, semi-personalized and lowly personalized books. I argued that the lowly personalized books are the closest to the customization end of the spectrum, because their production involves less personal involvement and less personal data and elements. To explain, I use the example of the so-called 'Personalized Fairy Tales Books' for 1-year-olds, available from a range of sellers, including My First Years Ltd. and Prezzybox.com. The buyers of these books can add the child's name to the book cover and include a short message inside the book. In these books, the content is the same for everyone who purchases them, the only difference being the title page. By way of counterexample, the personalized books produced by Lost My Name publisher create a different content for each child, based on the letters of a child's name. The books in both examples are printed (physical books), with the same format and they are both described as 'personalized' by their publishers. However, because of the different levels of personalization embedded in each, the 'Personalized Fairy Tales Books' would be more accurately described as customized books and the Lost My Name books as semi-personalized books. Personalized is associated with bespoke and exclusive, while customized products, while customized has the connotations of generic and adaptable. This is probably why we find so many books (and other commercially produced artefacts) labelled as personalized rather than customized: personalization has a higher currency (pun intended) in the industry and business world.

When it comes to marketing, publishers are more likely to use the word 'personalized books' rather than 'adaptable' or 'customizable books'. Personalized products have always been more costly to produce than standardized and mass-produced products and clients are therefore more likely to pay more for something with the tag 'personalized' on. Thus, the terms 'personalized' and 'personalization' are frequently used by the industry, but they are often merely a buzzword rather than a genuine concept.

It would be too ambitious to expect that publishers will change their nomenclature when it comes to personalization and customization. However, we can demand a more precise nomenclature for research and educational practice of personalized resources. This is what I attempt to do in the next section. If we conceptualize

personalization and customization as two poles on one spectrum, we need to specify the parameters for each end of the spectrum.

The variety dimension in personalization

One parameter that can help us decide what counts as personalized and what as customized is the depth or profoundness of personalization embedded in an object. However, to talk about depth might seem abstract when faced with concrete objects and depth might be better explained as the *variety* of personalized options. I will explain this parameter by referring back to the fictional example introduced at the beginning of this chapter about a personalized gift bought for a 4-year-old girl. Imagine you are getting a 'personalized gift' for your niece Lucy and, as a buyer, you can specify the name or initials engraved on a common product such as a cup, pyjamas or book. Because your niece's name is Lucy Kallender, you could order a pyjama set with either the name Lucy or LK. However, there are many Lucys or 'L.K.s' who could receive the same pyjamas and could consider it 'personalized' for them. When buying a 'personalized pyjama set' you are not changing the fabric to suit the unique sleeping position of Lucy or sewing her favourite bedtime story characters into the garment. You are not adding pictures of her falling asleep with her favourite teddy bear. You are simply adding her name on top of a generic set, predesigned for all girls of her age (or size). The pyjamas' production and final result are based on a template; they are mass produced and only allow for one element of personalization. The level of involvement of the personalizer (the buyer of the clothes) and the personalizee (Lucy in this example) and the variety of personalization options are minimal. I would therefore argue that a pyjama set with Lucy's name would be more accurately described as *customized* rather than personalized. Had the manufacturer offered more varied possibilities for customization, it is likely that the final product could become more unique and authentic for the recipient, that is, closer to the personalized end of the spectrum.

Let us pursue this example further to clarify the kind of variety necessary for a product to become classified as personalized. Imagine, for example, that for a 'personalized' teacup you are buying for Lucy's birthday, you are presented with the following options: you can modify the cup by choosing the cup's colour, size and weight. In addition, you can add to the cup your own photograph, or the recipient's name written in a fancy font or an inscription that goes on the cup. Let us suppose that you modify all six characteristics and present Lucy with a cup that is small in size to fit her small hands, is in the pink colour (because that is Lucy's favourite colour), has a thin rim (because Lucy likes cups with a thin rim) and has a photograph of Lucy and you from a recent holiday together. Based on the logic, such a cup would be closer to the personalization extremum.

If the depth of personalization can be defined as variety of elements, then producers and designers will naturally ask whether there are a specific number of elements needed to be personalized for an object to count as personalized. Therefore, I describe next the personalization/customization distinction along the quantity dimension.

The quantity dimension in personalization

At which point does a customized cup become a personalized one? Suppose we arbitrarily decide that a product counts as personalized if it has five elements that can be personalized. These five elements can be based on an individual's characteristics, needs or preferences. For a personalized book this would mean that it would need to contain not only the child's name, but also the child's address, date of birth, names of his/her friends and favourite foods (or any other combination of five elements). The difficulty with such an approach is that it assumes that all elements are equal. This is *practically* and, as argued later in Chapter 7 in relation to the Diversity Theory, *theoretically* difficult.

Practically, let us suppose that Lucy likes a particular shade of pink (e.g. the 'punch pink') and that when you are buying the cup, you have the option to insert any colour, not just a generic set of basic colours. In that case the number of elements to personalize the design is the same (colour, weight and size), but the level of their personal significance is higher (because the likelihood that many girls like punch pink is lower; other buyers might choose simple pink or flamingo pink or watermelon pink or taffy pink etc.). Similarly, if you are allowed to add a personal inscription on the cup, it is very likely this will be unique to Lucy. You are not simply adding her name but are tagging the cup with something special that you wrote, based on your knowledge and relationship with your niece. For example, you know that Lucy loves drinking Cola Cao in the morning and that she calls it 'CC'. You could write on the cup 'Lucy's morning cup of CC'. Such a message would be meaningful only to Lucy and those close to Lucy. Together with the authentic punch pink colour, your cup for Lucy becomes very unique to Lucy, even though you only personalized three elements of the cup. It was the level of personalization involved in the production process that made a difference – the final cup is based on your personal knowledge of your niece, which would be very difficult to be quantified. A quantitative expression of personalization needs to consider the level of personal involvement within each dimension. However, just like there is no magic formula to how many attributes are necessary for a phenomenon to count as personalized (as opposed to diverse and generic), there is also no magic formula for specifying the elements that carry more personal significance than others. Considering the cup or book examples, it would be very hard to place on a hierarchical scale the different possibilities for personalizing these objects. For example, is a date of birth more unique to a child than his or her first name? For one child, the colour of the cup (e.g. the punch pink) might feel more special and unique than to another child. Personalized, as the name reveals, should be about a *personal* connection to one specific individual, which is, by default, idiosyncratic for each individual. A quantitative expression of personalization is therefore very problematic.

The variety and quantity considerations are focused on the *process* and *product* of personalization, not so much on the effects and impact personalization has on the recipient of the product – which brings me to another term, also related to personalization: 'individualization'.

Individualization and personalization

The term 'customization' is a preferred term in the business/industry, while 'individualization' is preferred in the education arena. Similar to personalization and customization, the terms 'personalization' and 'individualization' are often used interchangeably in education. Yet, the two are difficult bedfellows. Some educationalists, for example Professor Emeritus Dylan Wiliam, specify that personalized learning is not the same as individualized learning. He maintains that personalized learning is learning in which the *process* or path towards the same goal is different for every single child. Individualized learning, on the other hand, is about independent and autonomous (rather than group or collaborative) learning. However and unfortunately, apart from Professor Wiliam's distinction presented in an online video, I could not find any academic literature clearly distinguishing individualized and personalized education. Past and present research and practice seem to refer to personalized or individualized learning plans and records to the same extent. These plans and records are based on standardized learning goals/national measures but are adjusted to the level of progress of a specific pupil. The actual format of these plans varies from school to school (or teacher to teacher) but it typically consists of a template with targets/objectives (based on the national curriculum or school-specified targets for all children), description of a particular activity responding to these objectives and an evaluation or outcome box describing the student's progress. The aim of individualized plans is that they feed into future activities and capture the alignment between the stated objectives and the pupil's actual performance.

If we follow the logic of the customization/personalization distinction applied earlier, we notice that again, an arbitrary cut between individualization and personalization wouldn't make sense here. The unique and authentic nature of a student's plan depends on the level of description of the students' individual characteristics, determined by the teacher. The description can be more detailed because of the number of points/elements covered by the teacher or the variety of the teacher's descriptive items. A teacher can specify the student's level of engagement, progress and enjoyment of lessons by using the language of the national curriculum or the child's own words; they can include multimedia elements to illustrate the student's progress or simply tick a box in a template.

In my experience of inspecting individual learning plans in a range of UK preschools,[1] most plans developed for individual children were individualized rather than personalized. They were produced for each individual child but followed a generic template with only minimal adjustments to the template. However, there were some exceptions to the rule: for children described as 'children with special educational needs' or 'children with a statement' (an official statement from the school's psychologist that the child needs extra support), the plans were more detailed, with provision of care adjusted to the individual child and daily controlled. For these children the individualized/personalized learning plans would typically contain more detail, including the practitioners' critical reflection of the child's progress and photographs of the child's engagement in certain activities. Similarly, in some

settings, the practitioners developed records of progress (also called observation plans) which were bound folders (or online files) with children's artwork, pictures of their participation in the classroom activities and illustration of progress the children had made developmentally. Teachers referred to these plans as individualized or personalized interchangeably. It might be that the personalization propaganda characterizing the twenty-first-century public education system influenced teachers in relabelling individualized learning as *personalized* learning. It might also be that the use of the terms has been influenced by teachers' individual preferences and history of their professional training. Following the rationale for distinguishing personalization and customization, I would suggest that records and plans by which the teachers adjust their activities and resources according to individual children's progress are *individualized*. Records and plans, which use many and varied elements to describe the children's progress, are more accurately described as *personalized* because of the level of personal detail embedded in them. In other words, I define individualization as an educational version of customization and perceive it as different from personalization.

Moving from practice towards theories

These definitions of customization and individualization can be used as starters for contemplating what personalization is. However, the fact remains that in education and industry, there is little clarity in the use of the terms 'personalization', 'customization' and 'individualization'. Given these inconsistencies, practice cannot help us construct an understanding of what personalization might mean for children's learning. What counts as personalized and what as *non-personalized education*, and where do we draw the line? If existing definitions and nomenclatures cannot guide the research, then we need to look elsewhere. As explained in Chapter 2, from a historical point of view, it is difficult to determine whether personalization is a new label for established practices or genuinely a new force in education. On surface, it might seem that what counts as personalized education today is very different from personalized tutoring in Ancient Greece: instead of a personal tutor, children have digital tutors in the form of adaptive courseware. However, one is tempted to say, personalization is more than just the mode of delivery. In the case of personalized books, I outlined that the form as well as content of a book can be personalized and their personalization can encompass both digital and non-digital elements. In fact, a review of commercially available personalized books revealed that there is a suite of dimensions that could be personalized with children's books.

I do not aim to develop a theory that would accommodate all these dimensions and explain all possible cases of personalized education. As stated in Chapter 1, my aim is to summarize the rich set of concepts and categories subsumed under the umbrella of personalized education and propose a framework that usefully integrates these concepts and facilitates future research of personalization in early childhood. For this purpose, I will now move to a consideration of existing theories that have been developed for technology-mediated personalization in education. I focus

on these selected theories because they all deal with technology-based or digital personalized education. Whether the definition of 'personalized' is in these theories more accurately described as customized or individualized is open to debate. We can reliably say that *digital* personalized education and technology-enhanced personalized products are new phenomena. My focus on new theories is thus an attempt to explain the current movements in education. The theoretical frameworks that I summarize here inspired my work in terms of their ability to deal with novel forms of personalization, rather than the nomenclature.

Oulasvirta and Blom's perspective on personalization behaviour

Oulasvirta and Blom's (2008) theory is based on the authors' observations of adults who have been adjusting the settings and display, that is, personalizing their own phones. In their article 'Motivations in personalisation behaviour', Oulasvirta and Blom (2008) define personalization in terms of 'control over appearance and functioning' (p. 1). The authors draw on Ryan and Deci's (2000) self-determination theory to explain why people enjoy adjusting technology to suit their personal tastes. The focus in Oulasvirta and Blom's (2008) work is on the personalizer, who personalizes an object for his or her own pleasure. This introduces a new consideration into our debate, which, so far, has focused on personalized gifts and books (which are typically personalized by someone for someone else). Oulasvirta and Blom (2006) specified the psychological effects of the personalization behaviour on the 'personalizer' by applying the key premise of the self-determination theory. Namely, they argued that people personalize their own technology because the action allows them to express three fundamental needs: autonomy, competence and relatedness. Autonomy is related to origin and authorship, a technology that is personalized becomes 'my technology'. Competence in this authoring process can be perceived competence or actual competence. Both kinds satisfy the personal need for self-determination. The third element of the self-determination theory – relatedness – is about ensuring that a given technology belongs to us and not anyone else; it is about boundary setting and negotiating our own identity by making specific aesthetic choices when personalizing our own resources/possessions. Oulasvirta and Blom (2008) further explained that personalization connected to aesthetics (e.g. someone adjusting the design to make it more beautiful) is centrally based on the idea of relating to others: 'Personalization of appearance is at least partially intended to have an effect on other people rather than the user herself' (p. 10). Whether it is our phone, entire home or local area we live in, we are keen to make adjustments to the environment because we want their appearance to evoke others' positive feelings. This behaviour is conceived to be fundamental to the basic psychological needs of identity, social status and inclusion by others.

Although the theory is not quite explicit about what exactly is meant under personalization (and how it differs from customization or individualization), it provides a useful framework for understanding the possible mechanisms underlying someone's interest and ability to personalize their own technology. For theoretical purposes, Oulasvirta and Blom's theory specifies that people are interested in

personalization (or that they engage in personalization behaviour) because of the universal human need for autonomy, competence and relatedness. This is interesting as it highlights the need for personal motivation driving any personalization behaviour.

Based on this theory, we could hypothesize that if we allow for personalization behaviour to be displayed in the classroom (e.g. by encouraging children to personalize their learning environments or resources), then the children will be more motivated to learn. Given that motivation lies at the heart of empirically verified models of learning (Skinner & Belmont, 1993), personalization could be predicted to enhance the reciprocal relations between motivation and students' learning. Indeed, motivation and personalization are often linked in educational research on personalized education. However, Oulasvirta and Blom's theory is also important from a psychological perspective: it indicates that people engage in personalization behaviour because they want to be inherently independent (autonomy); because they strive for competence and because they want to relate to others. These three concepts highlight the psychological processes behind a self-driven personalization behaviour. The theory does not specify what happens when personalization 'is done to us', that is, if someone receives a personalized object without their own explicit input as it was the case in the example of Lucy's birthday gift. How would the child's levels of autonomy, competence and relatedness be affected when they are positioned at the receiver's end of the personalization process? For instance, could we expect any motivation changes in Lucy's reading if she receives a personalized book designed by her aunt? And what about interpersonal differences – would boys and girls, young children and adult learners perceive such 'received personalization' differently?

Research with adult learners provides some insights. A study by Tossell, Kortuma, Shepardb, Rahmatib and Zhongb (2012) examined how twenty-four students (fourteen male and ten female) personalized their first smartphone (the participants did not have an iphone before participating in the study) over an eight-week period. The researchers divided the personalization measures into three categories corresponding to Oulasvirta and Blom's framework (autonomy, competence and appearance). Based on several measures of personalization behaviour, the researchers found that female participants seemed to personalize their phones more for appearance reasons (e.g. changing the lock-screen picture), while the male participants personalized their phones more for autonomy and competence reasons (e.g. moving applications from one location to another). The study was small scale and correlational, but it provides some interesting insights into potential gender differences when it comes to personalization behaviour. Interestingly, Tossell et al. (2012) write that their 'findings supported previous work suggesting that user personalization increases the novelty of the device and creates a stronger attachment between the user and their customized technology' (p. 12). This is an important message for studies with young children, because we know that children can easily become attached to material possessions. It also introduces an additional consideration: the importance of attachment in personalization behaviour, which I pick up in the next chapter. In sum, Oulasvirta and Blom's theory provides a basis for explaining the motivational factors frequently linked to personalized education.

The theory is concerned with personalization at the individual (micro) level and is conceived from a psychological perspective. Next, I move from the micro-level of an individual to the meso-level of the school, and from the psychology perspective to an educational view.

Kearney, Burden and Rai's perspective on personalization

Based on a longitudinal study with teacher education communities using iPhones in Australia, Kearney, Burden and Rai (2015) created a theory and a pedagogical framework for mobile learning. These are based on three features of mobile learning: personalization, authenticity and collaboration. In this theory, personalization is one of the key elements of learning with mobile technologies. The authors define the individual elements as follows: 'the authenticity feature highlights opportunities for contextualized, participatory, situated learning; the collaboration feature captures the often-reported conversational, connected aspects of m-learning while the personalization feature has strong implications for ownership, agency and autonomous learning' (p. 14). Each element has some subcomponents. Personalization components are agency and customization, authenticity consists of situatedness and contextualization, and collaboration consists of data sharing and conversation. According to this framework, personalization supports autonomous learning and is related to the possibility of customizing, that is, adjusting the environment to one's own needs. Kearney et al. (2015) examined the extent of personalization available to Australian students who have used mobile technologies in the classroom. The researchers found little evidence for teachers providing their students with choices, in fact they found that teachers not only led most tasks in the classroom but also decided on the details of where or when specific activities occur. Out of the three concepts – authenticity, collaboration and personalization – measured by the authors, teachers who participated in the survey ranked personalization the lowest. As the authors admit, the low ranking of personalization may be because many students did not have their own personal device at the time of the study.

This theory is relevant for the context of mobile learning, that is, learning mediated by mobile technologies. Its relevance for other contexts is not known and would probably require a re-assessment of the key three elements. I fully agree with Kearney et al. that personalization is a 'distinct pedagogical feature' (p. 5) and have been following this premise in my own research concerned with mobile learning in early years classrooms. I'm in less agreement about the authors' definition of personalization. Kearney et al. conceptualize personalization in terms of adjustments to the learning environment and one's own device, and use it synonymously with customization. Such a definition appears to be geared towards practice but less towards theoretical predictions and does not resolve the tension between customization and personalization explained earlier in this chapter. Overall though, Kearney et al.'s inclusion of authenticity in theorizing technology-mediated learning is important, and has inspired my thinking about the key ingredients of personalized education.

Fitzgerald et al. framework

My ineffectual efforts to define and operationalize personalized education were somewhat remediated in a collaboration with my ex-colleague from The Open University, Dr Elizabeth Fitzgerald. Liz and I have been studying digital personalization from different perspectives and involving different age groups: I was interested in personalized books and stories in early years, while Liz studied adaptive courseware in higher education. However, we both observed some common ground in our studies, including a shared frustration concerning the lack of a guiding framework for technology-mediated personalized education. Together with five other colleagues from The Open University, we decided to map the field to develop a critical review of current personalization literature (Fitzgerald et al., forthcoming) and to propose a framework of technology-enhanced personalized education (FitzGerald et al., 2017). Collectively, the two papers lay the groundwork for future approaches to digital personalized learning and technology-based personalized education.

In both publications (Fitzgerald et al., forthcoming, and FitzGerald et al., 2017), we refer to digital learning as technology-enhanced learning (TEL) and review literature that has conceptualized technologies broadly, including mobile learning, learning with computers, interactive whiteboards or digital stories. We reviewed literature published in this area in the last fifteen years and included in our consideration both academic papers and government speeches or reports. We noted that a lot of the literature is concerned with formal rather than informal or incidental learning, which limits the generalizability of the studies to compulsory education (rather than learning overall). Personalization was in these studies defined as a way to deploy technology, and the pedagogy was conceptualized in relation to specific characteristics of learners using the technology.

We noted that the main advantages of such a technology-enhanced personalized education is that it raises learners' motivation and, in some schools, the pupils' performance on national tests. We also noted that in some schools, technology-enhanced personalized education offered a financially attractive package to the individual institutions. However, the review of studies revealed that TEL also had a number of limitations: a key limitation related to the integration of individual activities undertaken at different pace, in different places and often with different learning resources. Not all learning could happen with the same device, no matter how much the technology providers wished this was the case. Also, despite the industry promise that personalized education gives the control to the student, the vast majority of technology solutions designed for schools is based on a 'Big Brother' model where the control and adaptation are in the hands of the technology (or the teacher manipulating the technology). On a more theoretical level, the review revealed a limitation of following narrow definitions of personalized learning, particularly those definitions that are based on outdated ideas. Notably, some studies defined personalization in terms of individual learning styles or cognitive capacities, which is currently considered to be a flawed pedagogical model by many leading educational researchers (see Dunn, Beaudry, & Klavas, 2002). Cognitive capacities or preferences exclude the possibility that some learners might perform differently

in different contexts or under different circumstances – a view rejected by socio-constructivists. On the whole, the literature review led us to a framework that brought together the various perspectives on personalization in education and captured the essential aspects of technology-enabled personalization that have been documented in schools so far.

The framework for technology-enabled personalized education is described in detail in FitzGerald et al. (2017). It is based on six dimensions that can guide the research and practice of technology-enabled personalization. The six dimensions are not theory – but practice – based and are intended to map the field, identify gaps and possibilities for digital personalized education. In developing the framework, we were inspired by the categories outlined by Martinez (2002) for the design of learning objects and the key descriptors of personalized education that we could identify in government reports. Martinez (2002) specified that for designing learning objects, personalization can be categorized into five gradually increasing elements: name recognition, self-described personalization, segmented personalization, cognitive-based personalization and whole-person personalization. This model works in the design of Intelligent Tutoring Systems and Adaptive Educational Hypermedia. In these areas, personalization is put into practice through adaptive links, adaptive content or adaptive presentation of resources. The model is less useful in the area of personalized education overall or for early childhood in particular. As for the government reports, the UK Department for Education and Skills suggested, in 2004, five components for personalized education: assessment for learning, teaching and learning strategies, curriculum entitlement and choice, a student-centred approach to school organization, and a strong partnership beyond the school (see Pollard & James, 2004, p. 5). In a report written for teachers and leaders interested in personalized education, Hargreaves (2004) termed these components 'gateways' to personalized education and added four other elements: new technologies, workforce development, advice and guidance, and mentoring and coaching. We built upon these published works and the socio-constructivist approaches to learning, and arrived at six key dimensions which can be deemed to model personalization in technology-enhanced learning:

1. The focus of personalization (content, assessment, curriculum or resources)
2. The type of learning (formal, non-formal and informal)
3. Personal characteristics (demographic, personal preferences, history or needs)
4. The agent of personalization (learner, teacher or computer software)
5. The way in which personalization is carried out (adopting Martinez' framework of five levels: name recognition, self-described personalization, segmented personalization, cognitive-based personalization, whole-person and personalization)
6. Impact of personalization (the key stakeholders benefitting from the personalization process).

In our paper, we applied these six dimensions to some examples of technology-enhanced personalized education. Our objective was to consider several aspects of personalization, including the issue of control and choice – that is, the questions

of who is making decisions and who is making choices about the personalization mechanisms employed in a given learning process.

The framework could build an effective basis upon which to build a programme of research in technology-enabled personalized education and could expand the current research to the meso- and macro-levels of individuals, schools/home learning environments and communities. We applied the framework to our own research and paid close attention to the role of technology in the development of TEL and personalized books. As such, the framework could be a useful resource for designers of personalized software and educational resources when analysing existing implementations and designing future personalized technologies. The framework is thus not theoretical, but it deals with the practical application of digital personalization. The six key dimensions can be used to investigate in terms of their interaction or individual contribution to children's learning outcomes.

What the framework doesn't accomplish is to offer guidance for researchers or educational professionals interested in the pedagogy and theoretical aspects of personalization. This mantle is still to be taken up, and will take teams of researchers and years of empirical work to complete. I attempt a few steps in beginning this process in this book: I propose a theoretical framework of personalization for children's personalized books in Chapters 6 and in Chapter 12, I propose a framework for the pedagogy of personalized education.

Chapter summary

This chapter begins with a discussion of the difference among personalization, customization and individualization, which provides an appreciation of the range and variety of the personalization phenomenon. Next, the chapter brings together some key works on personalized education that have been influential in my thinking about digital personalization in early childhood. Oulasvirta and Blom's theory of personalization behaviour taught me the importance of attachment, aesthetics and personal competence in self-driven personalization. Kearney et al.'s framework of mobile learning highlighted the relevance of authenticity and its close relationship to personalization. My work with colleagues at The Open University in the area of technology-enabled learning has led to a set of six dimensions that model technology-enhanced personalized education in the extant literature. In the next chapter, I present a theoretical account of personalization, which has been inspired by the frameworks presented in this chapter and my research with children's personalized books.

Note

1 In 2007–2011, I worked as a fieldworker on the Graduate Leader Fund project, which included visiting a significant number of preschool settings in the United Kingdom (there were overall 238 UK early childhood settings visited as part of the study, each at two time points). See more details in: Mathers et al. (2011).

6

The 5As of Personalization

Personalization is often used as a convenient peg in educational practice, leading to many contrasting and vague definitions of what it actually means. A historical account and a summary of the many types of personalized books currently available to children can provide an insight into the changes to the *form of delivery* of personalized education. However, they do not specify what personalized education really is, which pedagogical elements it encompasses and which theoretical constructs it builds on. Addressing these gaps is what drives the present chapter.

In the preceding chapters, I described the key theoretical frameworks that have been developed for digital education (by Kearney et al.), for personalization behaviour (by Oulasvirta and Blom) and for technology-enhanced personalized learning (by Fitzgerald et al.). I also outlined a rubric for assessing children's personalized books (Chapter 4). These distinct works influenced my thinking concerning personalized education, and in this chapter, I synthesize them into a theoretical framework of the 5As of personalization. These 5As respond to the question of 'what is personalized education' from a more theoretical and philosophical point of view. The framework pulls together the key five themes that run through the personalization research and discussions: authenticity, authorship, aesthetics, autonomy and attachment. I describe these 5As in relation to the context of learning that I'm most familiar with and that guided the development of the framework: children's personalized books. I also summarize the humanist orientation of the 5As as it is embedded in Todorov's philosophy and provide examples from my studies to illustrate their humanist nature and importance in early education. I conclude with a working definition for personalized education, applicable to both technology-based and non-digital forms of personalized learning.

Origin of the 5As of personalized education

The '5As' presented in this chapter are five elements which I consider to be the five higher-level themes in personalized education more generally, and in education with personalized books more specifically. They are: autonomy, authorship, aesthetics, attachment and authenticity. The themes are based on my previous theoretical discussion of personalized books (Kucirkova, 2016b), and the literature review that

I conducted as part of writing this book. More specifically, in Kucirkova (2016a, b), I argued that the 'personalized' essence of personalized books is rooted in children's authorship of the books and the application of their own aesthetical criteria to the creation of the books and stories. The notions of authorship and aesthetics build on Oulasvirta and Blom's theory of personalization behaviour, and are closely linked to attachment. Attachment proved to be an important variable in empirical research that followed Oulasvirta and Blom's taxonomy and examined adults' relationship to their own personalized objects. Attachment was also a key feature in understanding children's behaviour in my research with children and touchscreens, as described later in Chapter 10. From Kearney et al.'s framework (see Chapter 5), I adopted the importance of authenticity for personalized education. Although the Kearney et al.'s framework presents authenticity as integral to personalization, I see it as a separate variable. I agree with the authors that authenticity is key to the development and implementation of technology-enhanced personalized education. The fifth A in the framework – autonomy – was derived from the review of commercially (mass-) and home-based- (self-) produced personalized books (Chapter 4). It relates to the agency of the personalizer in the book-making process or, more widely, to agency in the design and use of the educational resource developed specifically for an individual.

The 5As acknowledge the importance of the six dimensions proposed in the Fitzgerald et al. framework. The 5As focus on the child and the resources created for, or by, the child, with the aim of supporting the child's learning. This focus implies that the framework accommodates the micro-level (the individual) of Bronfenbrenner's ecological system theory, in that it centres on the individual and on the resources created by or for the individual (rather than the school or whole community). The framework speaks to both digital and non-digital personalization, which builds on the approach adopted so far: as explained in Chapter 4, digital and paper-based personalized books are often part of one educational experience and of one product (such as the stories and books created with the Mr Glue Stories app for example). The actual format of personalized education is therefore only one of many possible dimensions impacting on child's learning and parent–child dynamics (see Chapter 8).

All the 5As imply audience awareness and I therefore do not include it as a separate element. Given the socio-cultural orientation of my work, I entangle tools and people within the 5As and consider their joint influence on children's learning. For example, an object authored by a child is authentic and it generates feelings of authenticity to the life of the child – the two cannot be neatly separated. This orientation is closely linked to the key aims of the framework.

The key objectives of the 5As framework

The creation of the 5As has been due to the convergence of three key influences: the empirical insights gained from my work on personalized books; the theoretical frameworks related to personalization and digital personalization currently available; and the lack of precision in personalization research. My aim was to create a conceptual base upon which to build a theory of personalization, not a theory per se. The

framework is intended to guide present and future research on children's personalized education. It is also intended to act as a critical reflection tool for practitioners, as a lens for them to interrogate children's contribution to a learning situation and the extent to which that context honours children's agency, autonomy, aesthetic choices, ownership (attachment) and genuine (authentic) contribution.

The humanist orientation of the 5As

Before I detail the essence of the individual elements, I present a brief summary of the philosophical work of Tzvetan Todorov, whose humanist moral philosophy parallels my own thinking about the foundations of the 5As. In his books *Imperfect Garden: The Legacy of Humanism* (2009) and *On Human Diversity* (1993), an earlier treatise of the subject, Todorov applies the humanist reasoning to answer the perennial questions of free will and human autonomy. The author covers all key aspects of human existence, including liberty, social life, love, self, morality and expression, and outlines how humanism (as conceptualized by French philosophers) can be, or should be, our reasoned response to free will. This is a key point to me: in the pursuit of a definition for personalization, one could all too easily become focused on individualism and subjectivism. Todorov's writings remind us that personalization and individualization do not exist in the subjective reality, neatly separated from the influence of others. Unlike conservatism, scientific determinism and existential individualism, humanism does not predicate a separation from God, other human beings or self – it is a unifying approach to solidarity, integrity and morality. This understanding of self and the society is now new; the key ideas of human universalism and diversity were developed between the end of the sixteenth century and the beginning of the nineteenth century. What Todorov contributes is a renewed interest in these ideas and a unified view on the works of Rousseau, Montesquieu and other humanist thinkers in France. I believe that we can find the enactment of humanist thinking in several contemporary practices, including in the early years pedagogy of democracy outlined in Chapter 11 and the innovative projects I describe in Chapter 12. I thus argue that my 5As are not narrow specifications of isolated cases of personalized learning, but broad themes that run through personalization and through Todorov's philosophical enquiries into the nature of being. More specifically, the humanist philosophy affects the 5As in the following key ways.

First, for autonomy, the humanist philosophy (as interpreted by Todorov) does not propose an individual or individualistic autonomy. Rather, it asserts that collective autonomy frees human beings from the state and from God, and is the kind of liberty that individuals need in order to truly feel free in the society they live in. An individual is free and independent only if she/he does not act as an isolated agent and if she/he is part of a community. Similarly, for authenticity, Todorov (2009, p. 204) writes: 'Authentic man, who wants above all, to be faithful to himself, is neither alone nor simply egoistical: to be truly oneself, one must go through others; without his attachments, man is no longer truly man.' This implies that an individual's genuine and authentic participation in activities and authorship

of resources need to be negotiated with others' experiences and expectations; they cannot happen in isolation. This negotiation is not confined to the intellectual realm; it is about whole-body attachments: 'Our existence is made up of the whole of our attachments' (Todorov, 2009, p. 90). It follows that the aesthetical criteria we apply to others and self are about whole person engagement. Todorov describes this thesis in relation to people who strive for beauty in all aspects of their lives (these people were called 'dandy' in the nineteenth century): 'It is the entire person of the dandy, and not just his body, that must subject itself to this aesthetic ideal, rejecting any other requirement as meaningless, either because beauty automatically produces a higher good or because it excuses evil' (2009, p. 175). A humanist view is a positive or optimistic view of the humankind; it portrays people as ethical and egalitarian, striving for change and understanding. It is my wish that this view is inhabited by all stakeholders (designers, practitioners, caregivers and children) when conceptualizing and applying personalization to children's learning.

On a more practical level, I note that the humanist orientation implies that authoring and sharing personalized books is not politically or socially independent. The relational socio-cultural practices in authoring personal and personalized texts have been followed by some of the key researchers I mentioned in Chapter 4: Professor Short and colleagues with socio-culturally sensitive personalized stories and, more recently, Professor Debbie Rowe and colleagues (e.g. Rowe & Miller, 2015) with bilingual digital story-making, who have emphasized the collaborative and participatory nature of personalized texts. Also, the RealeBooks project (Harrison, 2011) points to the need of recognizing the entire book cycle, which consists not only of creating and producing but also of distributing, sharing and valuing books. Thus, the research with young children and personalized books involves creating opportunities where children can appreciate and critically evaluate their own contribution to content production in relation to the contribution of others. The latter can be constraining or empowering, depending on the context.

In the next section, I narrow down the broad philosophical perspective of the 5As to their specific application to personalized books. I focus on personalized books as an example of personalized education. The reader is invited to consider my examples in relation to other personalized resources.

Autonomy (or agency)

In her book *Young Children's Behaviour: Practical Approaches for Caregivers and Teachers* Louise Porter writes, 'Children's autonomy will flourish when they have: freedom to make choices – that is, to work towards self-selected goals; intrinsic motivation to achieve mastery or competence; self-efficacy, which is the belief that one can control events' (Porter, 2007, p. 77). Autonomy has different meanings in different families and educational contexts. Autonomy is often used synonymously with children's agency (e.g. Connell & Ryan, 1984). In book-making and story creation with technologies, autonomy refers to the choice children have when they select the content and format for their own stories. When story-making with the Our Story app, for

example, children can choose if they audio-record their story or take pictures or write a piece of text, or use all these different media together. The choice of the presentation mode encourages children's active participation and opens up spaces where children of various skills and confidence levels can actively contribute their own content. The text-, sound- and visual modes of presentation give children opportunities to display their competence and practice their skills. Some children might be very apt at writing, some at audio- or video-recording, some at drawing and some at the combination of the three. Leaving the choice up to the child is important because it gives children the space to demonstrate their skills, apply their knowledge and, thus, create a sense of autonomy.

The learning benefits of autonomy are well established. Autonomy (understood as to encompass choice, control and agency) is implicated in children's intrinsic motivation, which, in turn, influences their willingness to take part in an activity and express their thoughts and feelings. I saw this process first-hand in one evaluation study of the Helicopter story-telling project. This study was conducted with Professor Cremin (principal investigator), Dr Rosie Flewitt, Dr Dorothy Faulkner and Professor Joan Swann from The Open University (see Cremin et al., forthcoming, for details). One of the aims of the evaluation was to examine children's enjoyment of the story-making curriculum delivered at the preschool. To understand how children felt about sharing their personal stories in the classroom, we asked them to first retell the story and then tell us what they liked about it. Researchers typically interview children in a one-to-one setting, audio-recording or videoing children's answers. This method may seem daunting to some children, especially to those who are naturally shy or not comfortable with talking to strangers. In our study, we presented the children with the Our Story app, which allowed them to re-create the stories they originally shared in the classroom or to tell us new stories, depending on how strongly they felt about their original stories. There were many possibilities available to children to share their stories with us: they could use the digital pictures we took of them in the classroom or take their own new pictures; they could arrange the pictures in a sequence or focus just on one picture; they could audio-record their experiences or type a short text. The choice was entirely up to them, and we saw a huge variety in approaches among the individual children we spoke to. I remember an episode with a young boy who did not tell us much, despite several gentle prompts. However, when we showed him a picture from the storytelling session and asked him what he enjoyed about it, the boy's eyes lit and he audio-recorded a loud 'Wraaaaaaaaaaaah' sound with the story-making app. The story this boy shared in the classroom was about a dinosaur and the main plot evolved around the scary sounds this dinosaur made. The teacher told us that this boy was new to the classroom and English was not his first language. The use of the multimedia app in this instance supported the young boy's expression preferences, offered him a choice and eliminated the threat to his autonomy (and language barrier) by giving him the freedom to express his story in the way he felt most comfortable with. The key elements of the story that he had shared earlier – a dinosaur who was scary – were both delivered within a simple sound and gave the boy ownership of his story. For other children involved in the study, autonomy meant that they wanted to take new pictures of the entire class and create new digital stories with the Our

Story app. This example illustrates that when it comes to children's agency, what works for some children may not work for other children. To this boy, a seemingly small possibility to record their own dinosaur sound can make a difference to their sense of achievement and agency. This episode illustrates that some children need a structured environment to exercise their agency, while other children feel constrained by templates and guidance. In this respect, younger users can be conceptualized as non-expert users, who welcome guidelines and predefined usage options (as explained in Shneiderman & Plaizant, 2010 in the book *Designing the User Interface*). For children who are less confident in using technologies, for example, more control means less confidence, and they need guidance and support to be able to use a given resource effectively. Other children need to have the freedom to explore to be able to create something new and creative. For all children, however, a sense of autonomy is essential for children's intrinsic motivation (see, for example, Deci, Vallerand, Pelletier, & Ryan, 1991). It follows that personalized education which is spoon-fed, or simply delivered to children without their own input and control, is not truly personalized. Children's autonomy needs to be at the core of personalized education, irrespective of whether the resources are digital or non-digital. A concept related to autonomy, but distinct in the context of personalized learning, is the concept of authorship.

Authorship

Designers and book publishers of children's personalized books often claim that children are the books' 'authors', even though the authorship options vary greatly in these books. For some personalized books, children can only add their name to the book, which constitutes a very minimal authorship, if any at all. For other personalized books, children decide on the content and can make changes to the format of the book, thus *authoring* their own texts. Genuine authorship is an important consideration for personalized education. If the book's author is the app designer or book publisher, then children's engagement is not about authorship but about compliance and ability to fill out story templates predesigned for their input. Children will go through different cycles of creativity, literacy practices and feelings of empowerment and self-confidence if they genuinely author their own book or a story.

In Kucirkova (2016b), I argued that children's authorship is one of the primary applications of the Oulasvirta and Blom's personalization theory to early literacy and personalized books. I argued that children's authoring needs to involve avid as well as reluctant readers, children of any age or gender, and children from all socio-economic backgrounds. Children's authorship concerns personalized books/stories with traditional paper-based resources as well as digital tools. Such diverse and multifaceted authorship decreases the likelihood of the continuance of dominant contents and increases the likelihood of diversification of children's literature. I could reference a lot of literature in support of my argument: there are several studies and projects that document the learning benefits of children's own authorship of books and stories (see, for example, Gundlach, 1982; Cowie, 1989; Barratt-Pugh, 2003). There are

many programmes and initiatives, which support children's book-making at home: for example, The British Library Learning Centre offers the practical *Make a book!* workshop to primary schools for years three to six. While previous work has focused predominantly on children's *writing*, the range of possibilities for children's authorship expand with new technologies, such as augmented reality games or authoring possibilities connected to digital art and transmedia products.

I studied children's authorship in Spanish preschools, where children created their own digital stories with the story-making app Our Story (see Kucirkova, Messer, Sheehy, & Panadero 2014). In this study, we noted that children's sense of productive and enjoyable authorship was a result of being able to draw on the multimedia options of the Our Story app *and* the knowledge of their peers, who helped with writing the text and choice of the pictures for children's stories. The research illustrates that authorship does not need to be individual to count as personalized. Indeed, there are many exciting options for collaborative authorship afforded by new technologies. As long as the child is the primary author for crafting their own contribution to a piece, we can consider it to be part of their personalized learning journey.

Aesthetics

Another aspect closely related to autonomy and authorship is aesthetics. With the late Steve Jobs's vision of 'beautiful' technology impregnating the thinking of contemporary technology design, aesthetics are of great interest to the designers and developers of children's digital technologies. People like beautiful things and often follow arbitrary, idiosyncratic choices in adjusting the visual appeal of their possessions and local environments. Yet, although individuals' aesthetic preferences are diverse, many believe that this diversity is not random: some writers claim that our aesthetic choices are linked to some inherent human universals, and others maintain they are linked to our socio-cultural milieu (e.g. Bourdieu, 1984). With young children's authorship, we therefore need to consider the extent to which they personalize their possessions and environment to satisfy their own intrinsic aesthetic values and the extent to which they comply with scripts and templates of official or currently popular aesthetic trends. Modern philosophers (e.g. Scruton, 2009) consider aesthetics and sense of beauty to be relational, that is, something which has the quality of being shareable with others. This is aligned with the psychological account of personalization by Oulasvirta and Blom (2007), who researched the importance of aesthetics in adults' personalization behaviour. They write: 'Personalization can also be operationalized at an interpersonal level, through its appearance function. Such function pertains to the need of relatedness and benefits such as identity, social status and acceptance, and inclusion by others' (p. 10).

In my own research, children who had created books and digital stories that they considered 'pretty' and 'cool' were extremely motivated to share these with their friends or family members. Conversely, if the children were not entirely satisfied with the final look or feel or sound of their stories, they wanted to change it or discard it. I remember vividly a case in one study (described in detail in Kucirkova & Sakr,

2015) where a young girl scribbled through her drawing because she did not want others to laugh at it. In Kucirkova (2016b), I argued, 'Agency and aesthetics, endowed with reciprocity, can encourage the practice of children's meaningful book production which can make a deep and lasting contribution to the development of intrinsically appealing books' (p. 19). In supporting the expression of children's idiosyncratic aesthetic choices, I argued for less template-based educational resources, so that children can fully explore and act upon their own aesthetic and stylistic choices. This is an essential mantra for effective and humanist personalized education.

Attachment

Attachment can be understood as an emotional response to an object or experience, but also as a perceived, or actual/physical, ownership of an artefact. This is particularly important in the case of personal digital devices, ownership of which has become almost ubiquitous for increasingly young children. I revisit the importance of attachment/ownership and children's self-created books at several points in this book. For a quick example, take this study, conducted with my colleagues Dr Rosie Flewitt and Professor David Messer at The Open University in 2014 (outlined in detail in Flewitt, Kucirkova, & Messer, 2014). Through ethnographic methods, we observed how children treat their digital devices and how physical touch and haptic engagement influence these children's relationship with their touchscreens. When evaluating the results, we made the following observation:

> Indeed, we observed many instances of digital touch offering students fun ways to learn, which were often linked to affective responses. For example, following a word recognition and phonics activity with conventional flashcards in the EY classroom, the teacher handed iPads to three young children seated around a small table, and to a further three children with complex disabilities seated in supportive chairs, each with a key worker alongside. As the children waited for the teacher-directed phonics activity to begin, they cradled the iPads lovingly in their arms, stroked them and smiled happily at each other. (p. 112)

Young children develop an affective bond with many resources that adults or teenagers consider unimportant. However, when it comes to touchscreens, young children seem to be as much attached to them as adults or teens. For instance, Geven et al. (2008) observed that teenagers were very attached to their mobile devices, and adult literature (e.g. Vincent, 2005) cites that adults get physically frustrated and emotional when their mobile phones are taken away. As always, before adopting conclusions from adult studies to children's studies, the children's needs and abilities should be considered. Clearly, for adults and older children, the reasons for such a response are linked to the unique capabilities of mobile phones, which today act as wallets, typing machines, data recorders or work computers. Young children are unlikely to be aware of the multifunctionality of mobile devices; their emotional attachment is more likely to be based on a strong positive experience from the past

(e.g. remembering that they played a cool game with the phone before) or it could also be imitation of adult behaviour.

In all my studies with digital personalized stories and personalized books, children were very attached to them, regardless of whether they created them themselves or received as a gift. I have received many emails from the parents I have worked with in my studies, in which they shared with me the positive emotional responses of their children to the personalized books. Similarly, the producers of commercial personalized books report children's great and prolonged enjoyment of their products and often share children's enthusiastic responses as case studies on their social media (e.g. a child taking the book to bed or carrying it for trips). In view of children's attachment it should be noted that they get attached to their personalized books/digital stories only if these artefacts aesthetically agree with their preferences. If the children, for some reason, don't like their personalized stories, they have no, or very little, emotional attachment with the artefact. This relates mostly to the stories children create themselves – in my studies (e.g. Kucirkova, 2014a), a personalized story could easily end in the digital bin if the audio recording or pictures were not quite right. Thus, aesthetics and attachment are very closely linked.

Authenticity

The concept of authenticity might open a can of worms for those who seek precise and practical solutions. To simplify the matters, I define authenticity in terms of originality and unique value, acknowledging of course the difficulties in establishing what can count as truly original and unique.

In the last ten years, authenticity has become a buzzword in education, especially in relation to the use of digital technologies, which, arguably, offer children more 'authentic' learning experiences than those delivered through physical books and the oral explanation of the teacher. This is partially true. Reality is, arguably, more authentic than a piece of paper. New technologies represent the reality in multimedia, that is, videos, photographs or sounds. Through their multiple representation options, new technologies thus have more possibilities for capturing reality. Multimedia can imitate real experiences by engaging more senses than single function technologies. A video, for example, can capture more authentic clues than a photograph. I hasten to add a caveat here that in drawing these conclusions, the context is crucially important. While technologies and multimedia can be conducive to the authentic quality of a product or experience, in some contexts less is more. Notably in supporting intimate discussions or deep emotional processing, single-mode artefacts are more effective (Eraut, 2009).

As mentioned earlier, Kearney et al. (2015) considered authenticity to be a concept separate from personalization. There are many learning situations where this is the case. Notably, there are educational programmes that use authentic scenarios as contexts for children's essay writing, but these are not necessarily personally meaningful to them. For example, the Word Generation Project (a project run as part of the Strategic Education Research Partnership initiative, see http://wg.serpmedia.org/) for middle

school students uses authentic learning scenarios but does not claim to support personalized education. In the Word Generation Project, the objective is to teach pupils critical, widely useful academic words through specific subjects, such as language arts, math, science and social studies and thereby motivate their interest and facilitate understanding of these subjects. The words are all-purpose academic words that cut across the Common Standards curriculum content – for example, verbs such as 'infer' or 'to hypothesize' or adjectives such as 'sufficient' or 'diverse'. Students are exposed to these words in contexts that promote successful vocabulary acquisition (including repetition, explicit instruction and morphological analysis). What is interesting from the authenticity/personalization perspective is that students are exposed to the words in authentic hypothetical scenarios. For instance, students are encouraged to discuss possible censorship of rap music, a topic that is close to many teenagers. However, it could well be that in the classroom there are many students who have no personal connection to rap. It is very likely that rap is more relevant to the majority of US students than, for example, ballet and that through the possibility of adding their own insights, they can personalize the topic. In this approach, authenticity is therefore used as a way to personalization.

If we consider another example – that of personalized books, the relationship between authenticity and personalization becomes more intertwined and less sequential. First of all, authenticity is a component of personalized books, but an authentic book is not necessarily a personalized book. For instance, recall the cameo in Chapter 1 –imagine that you could get your niece Lucy an original book, based on the experience of a girl who is growing up in similar circumstances as Lucy and who is of the same age and has similar background as her. Such a book would be considered 'authentic', but the book could well have no personal relevance to Lucy, because she might be a child with special educational needs, coming from a difficult home environment and not liking 'girly' things. Conversely, a book specifically designed for Lucy (such as one created by you for her) would be original and unique (i.e. authentic), as well as personalized.

Subsuming or separating personalization and authenticity is a complex issue, and I admit that my appraisal of the intertwined relationship between authenticity and personalization rests more on a theoretical rather than practical foundation. In the short overview possible here, I limit myself to the explanation provided by Arthur Frank (2002), professor emeritus of sociology at the University of Calgary in relation to Charles Taylor's take on authenticity. In Taylor's book *Malaise of Modernity*, he argues (and Frank interprets for us) that 'personal authenticity is not, strictly speaking, personal at all; authenticity is a dialogical achievement'. The core of Taylor's argument is this:

> I can define my identity only against the background of things that matter. But to bracket out history, nature, society, the demands of solidarity, everything but what I find in myself, would be to eliminate all candidates for what matters. Only if I exist in a world in which history, or the demands of nature, or the needs of my fellow human beings, or the duties of citizenship, or the call of God, or something else of this order *matters* crucially, can I define an identity for myself that is not trivial.

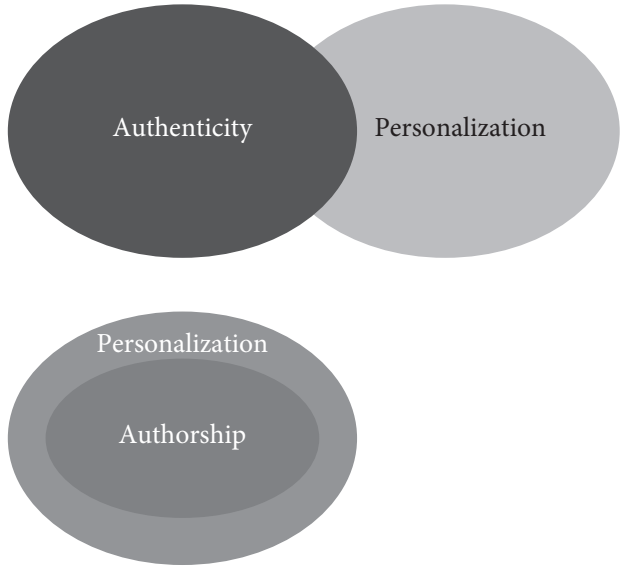

Figure 6.1 The relationship between authenticity and personalization and between personalization and authorship

> Authenticity is not the enemy of demands that emanate from beyond the self; it supposes such demands. (p. 40–41 in Taylor's book, cited in Frank, 2002, p. 112)

In other, largely simplified words, an object or experience is authentic because of their relationship with other objects and experiences. Our awareness of something as authentic is based on our awareness of everything else that is not authentic. It follows that unless we follow an a priori set of criteria, the judgement of what counts as authentic is essentially personalized and subjective. Personalization and authenticity overlap; authenticity is not subsumed by personalization. This might be more clearly understood if represented graphically, together with a counterexample. In Figure 6.1, I present personalization in relation to authenticity and authorship; I selected arbitrarily from the set of 5As, purely for illustration purposes:

The relationship between authenticity and personalization is not straightforward, but, actually, the relationships among the 5As are not straightforward either. An analysis of the interrelationships among the 5As will be an important direction for future research, and I summarize a few signposts in the next section.

The relationships among the 5As and directions for future research

I recommend that future empirical research concerned with personalized books and personalized education, more broadly, considers the 5As as five interdependent variables. Further work will be necessary to establish whether personalized education

lies in the *relationship among* the 5As or *is the* sum of the individual 5As. Even in the context of personalized books, the presence of all 5As is not crucial at all times – the context of reading, creating and sharing the books influence whether some, or all the 5As, are needed for the experience to count as personalized.

In the future, researchers working in the quantitative tradition might wish to operationalize the 5As into quantifiable variables. A scale of the same magnitude (e.g. aesthetics evaluated on a scale of 0–10; authorship evaluated on a scale of 0–10) could be applied to each of the 5As, and checklists could be developed to establish a quantitative value for each. This would enable researchers to study their correlational or cause-and-effect relationship to each other in more detail and facilitate the design of personalized resources. However, no matter how attractive and perhaps practical a quantifiable version of personalized education might be, we must not forget that in some contexts the value of a specific personalized experience is very hard to pin down numerically.

Future research and practice will need to establish the contexts for which the five elements apply exclusively and the contexts for which a few might be enough to make the child's learning experience personalized. For instance, we might find that authorship and aesthetics are key to children's positive experience of personalized books, while authenticity and autonomy play a key role in creating multimedia content. In these endeavours, I recommend following the proximal processes described by Bronfenbrenner in the bioecological theory and the PPCT model (see Chapter 1). The application of the bioecological theory to the future of the 5As' research would mean that complex interactions among the 5As can be studied over time as well as simultaneously in relation to diverse contexts.

All things considered, the 5As build on the ideas expressed in the previous chapters, which defined personalization as a spectrum that is difficult to quantify and definition of which varies from context to context and from resource to resource. There is no mathematical formula to define personalized education, and these five elements are not to be understood as an exclusive set of concepts for 'capturing' personalization. The intensity of the different elements will be different in different contexts; and there will be contexts where some elements don't apply. Consider, for instance, the scenario in which a child receives a nicely illustrated, rich personalized book that was created for her by her parent. Such a personalized book might score high on authenticity, aesthetics and the child's attachment to the physical artefact. However, because the story was personalized for the child by their parent, the authorship and child's autonomy in the process are missing.

In other contexts, one element might impact on the intensity of another element. For instance, authorship of a story can be superficial (e.g. the child copies the text from an online source) or it can be genuine and original (e.g. the child composes the text all by himself/herself). The 'depth' or strength of an individual's involvement in authoring the story affects the strength of the other elements (e.g. authenticity of the final product), but not always in a positive correlation). The aesthetics of a plagiarized text might be superior to the text created by the individual, which might be partly the reason why she/he decided to copy the work (e.g. they don't trust their artistic abilities and prefer the predesigned format of an online story). In this hypothetical example,

the strengths of authorship and authenticity are lower, but the strength of aesthetics is higher.

Furthermore, the interrelationships among the 5As will vary in relation to the context but also individual children. We could, for example, imagine a scenario where a child co-authors a book together with their parent, and where the child has the choice of the book's aesthetics, where she/he is free to own the book and share it with others. However, would the combination of all 5As contribute to a more powerful effect of personalization? Or could it be that the child's authorship negatively affects the authenticity of the content (if, for example, the child chooses to follow a particular 'story script' based on a popular story rather than invent their own)? Child's individual characteristics and his or her educational background and history are likely to influence the relationships here. I therefore conclude that instead of ticking all the five imaginary boxes of the 5As framework for personalized education, we need more research which would usefully try to disentangle the strength and nature of the relationships among the individual As.

Future research could also usefully integrate the dimensions listed in Chapter 4 in relation to personalized books and examine how these dimensions affect the expression of individual As. If we consider the issue of diversity, for children's story-making, for example, there are many 'authentic templates' that they can choose for their stories. These templates have been designed with children in mind and often draw on popular culture or generally agreed view on what children of a certain age group and culture like (e.g. templates specifically designed for Asian 3-year-olds). Surely, for some children these templates might capture their unique experience, and they might consider them original and authentic. For other children, however, the templates are foreign and inauthentic, and a tokenistic representation of their heritage. Researchers need to consider the ways in which autonomy, authorship, aesthetics, attachment and authenticity are implicated in the development and implementation of socio-culturally sensitive and empowering educational resources and spaces.

In addition, it will be important to find out how the presence of several media – texts, pictures and sounds – impact on child's effects. Which mode of representation might be most effective for child authorship and for joint parent–child co-authorship of personalized books? Is there a difference between wordless, picture-based stories and audio stories in terms of child-related aesthetics, attachment and authorship?

It would be also interesting to study how the strength or depth of the individual elements changes in relation to the agent, that is, the person who personalizes the education (e.g. a child or his parent). For instance, we could imagine a scenario where the aesthetics of a picture are largely determined by a picture-making software programme rather than the child's own making. Or there could be a situation where the personalized book is not authored by the child but by the child's parent. How would the increased involvement of adults influence the child's experience of attachment and authorship of a personalized book? And what about instances where the distance between the receiver of personalization (the child) and the creator of personalization (the teacher) is largely mediated by the technology, such as is the case in algorithm-based models of personalized education?

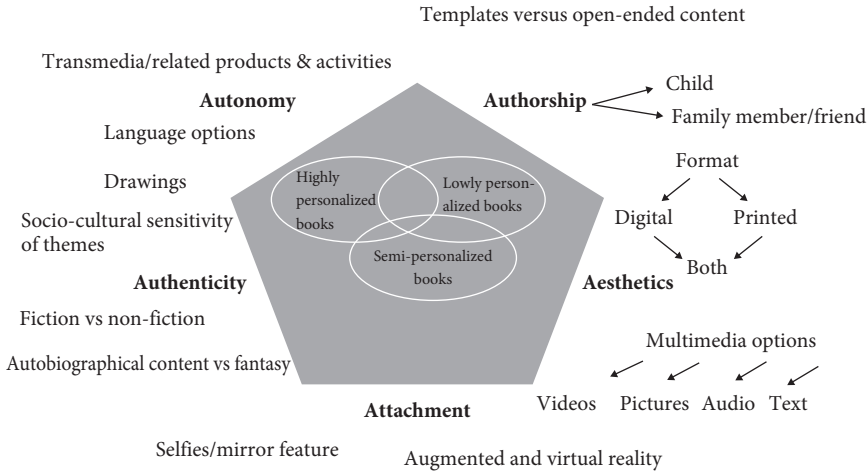

Figure 6.2 A multiset of 5As relevant for personalized books

As yet, we do not have the answers to these questions. While we wait for research to identify the relationships among the individual As, I recommend using the 5As as a multiset of elements, which are contingent on the *context* of their application. If we apply the 5As as a multifaceted lens to explore current models of personalized books/stories, we get a rich matrix, which is graphically captured in Figure 6.2. This matrix contains elements which are relevant for the content and format of personalized books and which influence the level or depth of the individual As in this context. All together, they amount to a 'multiset' of practical and empirical possibilities in relation to a particular context of personalized education.

Summary

This chapter provided a theoretical definition of personalization in relation to children's educational engagement with personalized books and stories. When we apply the 5As more broadly to personalized education, we get the following definition:

> Learning and teaching are personalized if they support children's authorship and autonomy, if they honour children's aesthetic choices and employ resources that children feel emotionally attached to and consider authentic.

This definition is kept deliberately broad, so that it can be usefully operationalized in specific research studies and contextualized in practice. The definition encompasses autonomy without privileging intra-psychological (self-focused) processes over relational aspects of personalization. It includes the process of learning and teaching as well as the resources necessary to support this process.

Through the twenty-first-century conceptualizations of children's education, the narratives of authenticity, autonomy and authorship run strongly, perhaps more strongly than the importance of aesthetics and attachment. All 5As overlap with the key theme of education – creativity – and the key theme of psychology research – identity. Therefore, the relationship between the 5As and creativity and identity is considered in detail in two separate chapters later in this book. Overall, the 5As framework is intended to serve as a reference point from which to review and critically evaluate the technology-mediated models of personalized education presented in earlier chapters, as well as to appraise the empirical studies presented in the subsequent chapters of the book. The first opportunity is in the next chapter, which presents a summary of research with personalized books.

7

Extant Research with Personalized Books

This chapter presents a summary of research with digital personalized stories and paper-based personalized books produced for, or with, young children. According to the nomenclature outlined in Chapter 4, these books could be described as semi-personalized self-produced books, with fictional and autobiographical elements, and a narrative content. For brevity and simplicity, I refer to them in this chapter as personalized books, or PBs for short. These books were produced digitally using the Our Story app or a PC software programme called RealeBooks and were printed out in booklet format or used as digital personalized stories.

The personalized books correspond to the 5As framework as follows: in terms of the child's authorship, some books were created by the children's parents or by the researcher, with or without the children. The authenticity of the books' content varied as some stories followed the same story plot for all children. The choice of the aesthetical appearance of the books was determined by the technology used for the books' final production, which was either the Our Story app for the digital stories or the RealeWriter software for the printed books.

The summary in this chapter concerns studies conducted at home, in early years' classrooms as well as primary schools. I focus on the books' impact on children's language and literacy, motivation to learn as well as family dynamics at home. I review the studies in the chronological order in which they were conducted, starting with my master's studies, followed by doctoral, postdoctoral and current work.

Extant research with *paper*-based PBs

I have been interested in studying personalized books since my master's studies. For my master's thesis (Kucirkova, 2010), I wanted to examine whether and how personalization elements engage babies in sharing books with their parents at home. For children of young age, shared book reading is an important time to bond with their caregiver and enjoy an unhurried time together (see Kucirkova, Dale, & Sylva, 2016). Reading books with children from a young age has been linked to several positive learning outcomes, including children's vocabulary acquisition and long-term enjoyment of reading (Senechal & Cornell, 1993).

It would be difficult to expect a 12-month-old child to produce a book on his or her own. For young children (infants and toddlers), personalized books are typically produced by their parents or main caregivers. Therefore, for producing personalized books for these young children, a close collaboration with the children's parents is even more important than with older children. For research carried out as part of my master's studies (reported in Kucirkova, Messer, & Whitelock, 2013), I worked with seven parents from East Midlands, the United Kingdom, who positively responded to my invitation to create a book for their child. The ages of the children varied, in the study; the youngest child was 12 months old and the oldest was 33 months old. Parents were free to choose any pictures or text for their books. The only request they had to follow was that the book needed to be about their child and about something their child enjoyed doing. To better understand how children's enjoyment of personalized books compares to other books, I created similar non-personalized books. To do so, I took the text and images parents sent me about their child and 'depersonalized them', by replacing the child's name with a similar name of another child of the same gender. I also replaced the pictures of the child in the non-personalized books with a child of similar physique (eyes, skin colour, facial expression). I also made sure that other pictures and content available in the personalized was mirrored in the non-personalized book: in the non-personalized books, I replaced all photographs supplied by the parents with stock images with similar content and renamed the names of the child's favourite toys, places and friends. For example, if a parent decided to use a picture of their child with their favourite trainset photographed outside in the garden, I would find a picture of a child playing in a garden with a similar trainset. As such, the content was almost identical across the books, but in the non-personalized books it was not the child's own. The story plot of the personalized and non-personalized books was more or less the same. Also, the personalized and non-personalized books had the same format: they were printed in colour on an A4 paper, laminated and comb bound. To see children's response to these books in an environment they are familiar with, I visited parents and their children at home and asked them to read the personalized and non-personalized books with their child, together with the child's favourite book. The order of these three books was randomized across the seven parent–child pairs. The favourite book was a book the child chose herself or, if the child couldn't choose one during my visit, the parent chose one for them. I arranged for the personalized and non-personalized books to be printed and laminated, and all children (and their parents) saw their personalized and non-personalized books for the first time when I visited them.

The analysis focused on the babies' engagement during the reading session and enjoyment of the three books. Data were analysed using the FocusII software, which allowed for a precise and detailed examination of children's facial expressions, utterances, gestures and eye gaze. The study results revealed that although the personalized and non-personalized books were almost identical, the children were more engaged in the reading session when reading books which were personalized than those which contained no personal connection to them (Kucirkova, Messer, & Whitelock, 2012). In addition, there was a positive correlation between the children's and parents' positive engagement in the activity when reading the personalized books

(positive affect/engagement was measured as the frequency of shared smiles and laughs between the parent and child). Anecdotally, the parents told me that they have never seen their babies as engaged in a book-reading session as with the personalized books. All seven asked if they could keep the copies of their personalized books. In a follow-up telephone call a year later with one of the parents who participated in the study, one mother told me that her daughter still loved going through her personalized book.

Encouraged by these results, I was keen to examine how personalized books might engage slightly older children in book reading and support positive parent–child shared book reading interactions at home. With my developmental psychology hat on, I was interested in finding out whether such personalized books might not only engage the child, but also support the child's learning from the books. Given the well-documented link between book reading and vocabulary learning (see, for example, Hargrave & Senechal, 2000), it was of primary interest whether personalized books might positively contribute to children's word learning more and above than non-personalized books.

To investigate this possibility, I used a similar design to that of my master's study. However, this time, because there were more parents and children taking part in the study and because I was interested in a specific learning outcome, I needed to make the personalized books more comparable (rather than idiosyncratic for each child). I therefore provided the parents with a template for their children's personalized books. The template was essentially a story plot about a child who wakes up one morning to find out that he/she goes for a day trip with his/her parents, has a wonderful time and then returns home. I gave the parents short questionnaires asking them about the child's likes and dislikes, for example what food their children enjoyed for breakfast and what the names of their friends and favourite toys were. This personal information was then filled into the story template to create a personalized book for each child participating in the study. Children's personalized books were then matched with non-personalized books, in which I replaced the personal information with names and facts not related to the child. I also asked the parents to send me a few pictures of their children looking happy and not featuring other children. These pictures were inserted into the personalized books and were matched for quality and main protagonists for the non-personalized books. So, for example, if the personalized book had a picture of the child having fun on a slide, the non-personalized book would have a picture of a similar child having fun on a slide too. To facilitate the production of personalized and non-personalized books, I used the freely available software programme RealeBooks. RealeBooks was developed by Mark Condon, professor emeritus at the University of Louisville and the vice president of Unite for Literacy, and Professor Colin Harrison, emeritus professor of literacy studies at the University of Nottingham. The use of the programme ensured that all books (whether they were personalized or not) had the same format, size of the pictures and text and were easy to print out. The finished books were laminated and comb bound, so that they were sturdy and easy to handle.

In order to investigate whether children learn from reading their personalized books (and whether this learning is greater than learning from non-personalized

books), I designed an experiment in which each personalized book contained eight new words. This was matched with a non-personalized book, which also contained eight target words the child didn't know before. The target words were a mixture of verbs, nouns and adjectives and were real, low-frequency words adapted from the British Picture Vocabulary Scale. For instance, the personalized book for one child contained the word 'culinary' and the non-personalized book contained the target word 'copious'. The words were randomly distributed among the children and were tested for children's understanding of their definition, pictorial representation and emotional valence. To facilitate children's learning of these aspects of the words, the story plot (i.e. the story template that was the same for all books) contained some clues about each target word used in the book. For instance, if the child's target word was 'copious', there would be a short simplified definition of the word in the text (e.g. 'copious means a lot, a lot of food'). The clues were the same for all children and were linked to the target words; that is, they appeared in both the personalized and non-personalized conditions. The target words appeared several times in the book or were repeated to the children during the reading orally by the researcher, at least two times each word. To further maximize children's learning of all words, the words' meanings were explained to the child and/or were represented in the story through the story pictures.

Given that children learn new words better if they are repeated to them, all children were read the books on two occasions; that is, each personalized and each non-personalized book was read to the child twice. I brought the books to the preschool on the day of the study and after the study took them away, to avoid a potential bias of children having a prior or additional exposure to the books. To ensure that each child receives the same amount of support for each new word, there was a reading protocol followed by the researcher who read all the books to all children. The reading happened in a standardized way, at a given time in a quiet corner of a preschool. All interactions were filmed and evaluated for consistency of reading across the children and across the personalized/non-personalized conditions. This was to ensure that the reading was consistent and similar across the children, that is that, as much as possible, each child was exposed to both the personalized and non-personalized books with similar level of enthusiasm and body language on the part of the researcher.

The study analysis compared the number of words children learnt in the personalized versus non-personalized condition, with three levels of word learning: the pictorial recognition of the words (children had to choose the right picture depicting the target word from a choice of four pictures provided by British Picture Vocabulary Scale), the definition of the word (the children were verbally asked by the researcher) and the emotional valence of the words (children had to select a happy or a sad or a neutral face when they heard the target word). Children were tested with these three tests at three points: after the first reading session, just before the second reading session and immediately after the second reading session.

There were eighteen children in the study overall, with a mean age of 3 years and 10 months. The study findings showed that there was a main effect of condition

($F(1,17) = 23.54$, $p < .001$, $\eta p2 = .58$), a main effect of testing point ($F(1.39, 23.68) = 13.77$, $p < .001$, $\eta p2 = .45$) and a significant interaction between the two ($F(1.77, 30.05) = 14.04$, $p < .001$, $\eta p2 = .45$). Children's learning of the new words was higher (or stronger) for the personalized than non-personalized condition and gradually higher; that is, their knowledge of the new words was better after the second reading session (as could be expected, given the well-documented link between word learning and repetition see, e.g., Horst, Parsons & Bryan, 2011). For the picture and definition tests, there was a clear, statistically significant difference between personalized and non-personalized condition at the second and third testing point. For the emotional valence test, there was no significant difference at any of the three testing points. Full details of this study are reported in Kucirkova et al. (2014a). This study was relatively small in scale and its design largely experimental. Acknowledging the limited study power, this was the first study that rigorously controlled for the level of personalization in a child's book and directly compared it to non-personalized book in relation to a specific learning outcome. The results are encouraging because they show that seemingly small changes to a book design can have important effects on children's acquisition of new words.

Reflecting on the 5As and the studies reported so far, the autonomy and authorship were low or non-existent in the studies: the books were designed either by the parent or by the researcher, with the parent's help. The aesthetics of the books were based on some general knowledge of what children like to see in their books; they were not adjusted to each individual child's preferences. The story format was the same for all children participating in the studies, and the content (with the exception for my master's study) was also based on the same narrative for all children. Yet, despite these 'non-personalized elements', the children participating in the studies showed a positive attachment to their books: they wanted to keep them and re-read them over and over.

Having said that, some caution is in order in the interpretation of studies with personalized books. While we might note positive outcomes for one domain, it might be that for another domain personalized books are not helpful or even beneficial. In a follow-up to the Kucirkova, Messer & Sheehy (2014a) study, I led a study in which we examined children's verbal engagement during book reading of personalized and non-personalized books. In addition to the children taking part in the earlier study concerned with word acquisition, we recruited further seventeen children, with a total sample size of thirty-five. Their ages ranged from 17 to 56 months (mean age 36.94 months). The design of the study was the same as in the previous studies: all participating children received a personalized book (with personalized text and pictures based on information supplied by the children's parents) and a closely matched non-personalized book. In this study (which is available in full in Kucirkova, Messer, & Sheehy, 2014b), I examined children's spontaneous speech – a speech that the children produce without an adult's prompt – during the reading of the personalized and non-personalized books. Given the study focus on personalization, emphasis was placed on self-referential spontaneous speech – a speech in which children relate the events to them and their own lives. I noticed this tendency when watching the videos

of children participating in the word acquisition study and was intrigued to find out whether this was a systematic difference between personalized and non-personalized books.

Perhaps not surprisingly, we found that when children read personalized books, their spontaneous speech is, by and large, self-referential. This means that if children are given books which feature them as the main characters, they are keen to talk about what *they* experienced; they create their own short stories in relation to the pictures they see. They frequently mention the personal pronouns of 'me, my and I' and spontaneously start sharing autobiographical stories about what happened to them in the past. These results made me ponder the overall value of personalized books for young children's reading, language development and understanding of stories. It seemed to be the case that personalized books act as a good prompt to eliciting children reminiscing and talking about self. This could well be because of the presence of children's photographs in the personalized books. We know from other studies that the use of personal photographs is a powerful reminiscing technique frequently used in child therapy and psychotherapy (see, for example, work of Kaslow & Friedman, 1977 in relation to the use of family pictures). Thus, if personalized books encourage more reminiscing and children's spontaneous recollection of the past, then it might be that the use of personalized books is best suited for adult-supported reading sessions.

The other observation of interest is that personalized books strongly motivate children to speak. This is important because it shows that the children pay attention to the book (the story) and this attention could be harnessed as a learning mechanism. It could well be that the increased attention to the story (because of its personal character) was the reason why children learnt more new words from the personalized than non-personalized books. Whether the neural processes underlying personalization effects are due to increased familiarity or novelty (i.e. due to memory or attention effects) is to be established by developmental cognitive neuroscience experiments.

There is also an alternative explanation of the study results. Namely, we may ask whether personalized books disrupt the traditional learning benefits we associate with book reading. The purpose of reading books with children is not just to teach them new words. Book reading is also about sharing with children alternative realities and viewpoints, building empathy with the story characters and learning about wider, global issues. Put simply, books present us with worlds we have not experienced ourselves, with characters we don't know personally (unless we read an autobiographical novel of someone we happen to know). It is about discovering the connections between these unknown worlds and our own selves. Personalized books turn this idea on its head: they are about a specific child or about explicit personal connections. As we can see in the results of this study, such a personalization encourages self-interested talk and self-oriented speech. It encourages children to draw on their memory of a past experience and share it with others.

This is a concern overall, but especially so when children read personalized books on their own. Namely, it is well established that children don't learn from books only thanks to the text and the rich concepts embedded in the books, but through parent–child conversation around the text (Snow, 1983). If we know that personalized books foster self-oriented talk, then it is even more important to encourage parent–child

conversations around the books, so that children's experiences are understood and validated. Moreover, it is important that the reading of personalized books doesn't happen in isolation from other, non-personalized books, and that it is supported by talk around the book that extends children's experiences to wider issues. As I wrote elsewhere: 'Adults' role is essential in guiding children to understand that stories should show diversity, invite co-reading and the exchange of ideas' (Kucirkova, 2015, online).

The results of the spontaneous speech study, coupled with the lack of research data on parent–child interaction during the reading of personalized books and the rise of digital personalized books in young children's lives, have motivated my further work in this area. I was especially interested in *shared* reading of personalized books happening at home, between parents and children. In addition, I was keen to see whether children's authorship and autonomy in the books' creation might add value to the reading experience and shape of personalized books. I began my studies at a time when iPads and tablets were only beginning to emerge on the market. However, in 2011, iPads and Android tablets began to be more affordable and more available. These tools were the first widely available technologies that could be manipulated even by children of toddler age and that contained three technologies in one: a camera, a typing machine and an audio recorder. All three technologies are great tools for authoring stories. In 2011, there was no app on the market which would bring these tools together for the creation of children's own stories (personalized books). In response to my research interest and this market gap, the idea for the Our Story app emerged.

The Our Story app and digital personalized stories

I named Our Story 'our' story, because of the aim to encourage shared and collaborative authoring of stories. The app was first released on the market in 2011, with regular updates over the past few years. The app featured as the second best educational app in 2011 in App store rankings and was a finalist in the MK Digital Awards 2015. The success of an app is often indicated in the number of downloads, but these tell us little about how the app was actually used and the impact it has had on the users. The scale of the success of Our Story is indicated by the number of projects conducted by scholars across the world, who repurposed the app to suit the specific needs of the children they worked with. These are summarized in, for example, studies by Kumrai (2013), Sung and Siraj-Blatchford (2015) and McPake and Stephen (2016). Examples of Our Story's use include a Nottinghamshire Pupil Referral Unit and storytelling amongst children and parents in a Haringey community project; story-making in Taiwanese libraries; community-based projects conducted with children with special needs in schools in the United Kingdom, Japan, Spain and Slovakia, as well as people with dementia in the United Kingdom; exploring stories about sound in Manchester and Sheffield museums as part of the Sound Project; and teaching Gaelic vocabulary in preschools in Scotland. The website dedicated to Our Story is regularly updated with new projects as they emerge: http://www.open.ac.uk/creet/main/projects/our-story/research-our-story.

Our Story has three options to personalize a story: a pictorial, textual and audio option. There is no template for either of these three options. The users are free to take any pictures they like with the device camera, or they can download them from the Internet or from another device. The pictures can be photographs of people or photographs of drawings or anything the users wish to use for their books. There is no limit on the length of the audio recording or text. The design of the app is iconic and adjusted to young children's age. This was a deliberate design decision to enable young children's authorship. Finished stories can be printed out or shared digitally. Similar to the range of personalization options with paper-based books, the level of personalization varies and depends on the approach adopted for the books'/ stories' creation and use.

I investigated the learning potential of digital personalized stories created with Our Story in a number of studies, which is summarized in the next section.

Extant research on *digital* personalized stories

Supporting children's narrative skills

In 2014, I was approached by a teacher who worked in an early years setting in a deprived area of Buckinghamshire, England. The teacher was keen to support the children's language skills, particularly their ability to tell coherent stories. The teacher had seen the Our Story app and reached out to me via email asking whether we could design an intervention to support the children in their setting. The study was conceptualized as a design-based study, and is reported in full in Kucirkova, Messer and Sheehy (2017). Overall, thirty-three children, aged 3 to 5 years, of mixed socio-economic background, participated in the study. The majority of them were described by their teachers as having very limited language skills, with a lack of basic vocabulary and ability to maintain eye contact with the speaker. Twenty-two of the participating children were identified as having special education needs and qualified for extra teaching support.

During the study, the key teacher received an iPad2 with preloaded Our Story and was encouraged to use it to record children's stories, as well as to encourage children's own authorship of stories in multimedia. Children's narrative skills were assessed approximately one week before the intervention started and during the last week of the intervention, using an adapted version of High Point analysis (Peterson & McCabe, 1983) and the overall number of words children produced in their narratives. The findings indicated that before the intervention, children's personal narratives contained mostly orientation elements, followed by appendages and evaluations (i.e. children's stories gave the listener information about the participants in the story but not where they were, what actually happened to them and other contextual information crucial for a meaningful story). After six months of regular use of Our Story in the classroom, there was a considerable increase in children's inclusion of not only orienting but also evaluative and supplementary information in their narratives (the difference between the pre- and post-test summary scores was t (30) = –2.158, p = 0.039).

A caveat in interpreting these results is that unlike in the experimental studies reported earlier in this chapter, this study was a naturalistic study – I did not control the many contextual factors which may have influenced children's narrative abilities during the intervention phase (such as their teachers' support or the range of other activities available to them in the classroom). Therefore, when evaluating the effects and influences of the app, one needs to be aware that these were a combined effect of other activities happening in the classroom.

Supporting parent–child engagement in book reading at home

In 2013, I led a case study (Kucirkova et al., 2013) in which we examined the parent–child interaction when sharing a digital personalized book in fine detail. This was the first empirical study to look at a parent and child reading together a personalized book on an iPad. It was small-scale (only one pair of parent–child) but it offered important insights into the interaction patterns of a parent–child who share their own book in a naturalistic setting. We used a multimodal interactional analysis approach (Norris, 2004) to analyse the data. For researchers with a quantitative orientation, a brief explanation of this approach might be needed: multimodal interactional analysis approach is helpful in disentangling the rich set of influences at play in a given interaction and in allowing a detailed analysis of the parent's and child's embodied behaviour (i.e. their gestures, gaze and language). The multimodal interactional analysis approach proved very useful in this case as it enabled us to also consider the disembodied resources for meaning-making (such as the digital book the parent and child co-created, including the digital images embedded in the story, as well as the physical presence of the iPad between the parent and child on their lap and factors such as where do they place the iPad and how close do they sit together with or without the iPad). Based on the findings, we concluded that

> The *Our Story* app exposed the mother-child dyad to a new experience of story-sharing which they responded to by orchestrating a complex interplay of communication resources. These resources were part of the app as well as of the parent's and child's own resources for meaning-making. (…) Despite a rather complex set of interaction possibilities, there was evidence of the pair achieving a way of harmonising events separated in time and space, and bringing them into a shared story space. In this respect, the observed interaction achieved a coherence which is typical of happy moments during story sharing or reminiscing (e.g. Haden et al., 1996). (p. 120)

In other words, we observed a very positive parent–child interaction with the digital personalized story, an interaction that we likened to an experience of art and one in which the digital, multimedia format of personalized stories positively contributed to the parent–child enjoyment of the reading activity. Unlike the concern in the literature and practice at that time, our study did not find evidence for digital technologies disrupting parent–child interaction during book reading. On the contrary, the digital personalized story encouraged a moment of closeness and attunement between the

parent and her daughter, and hybridized a reminiscing and reading session into a new kind of parent–child home interaction.

While in this case study, the story was created by the mother for her child, in a follow-up case study with two parent–child pairs sharing digital personalized books (Kucirkova, Sheehy, & Messer, 2015), the books were co-authored by the children too. The theoretical orientation adopted for this study was that of Vygotsky's social constructivism, mostly because of the focus on parents and their role in acting as mediators of children's learning. A close analysis of parent–child talk provided an insight into the child's leading role in the interactions and the app's facilitation of child's authorship and autonomy. Indeed, the possibility to easily embed pictures, text and audio recordings meant that the children's zone of proximal development became expanded to what Professors Karen Littleton and Neil Mercer termed as 'an intermental development zone' (IDZ; Mercer, 2000; Mercer & Littleton, 2007). IDZ is a zone where both the child and parent act as novices and teachers and where they need to jointly negotiate their understanding. When reflecting on the study findings, we wrote that 'in such open-ended, collaborative and creative contexts, a shared communicative space is created in which both the adult and child negotiate their positions in the activity and the division of learner and teacher becomes blurred' (Kucirkova et al., 2015, p. 9). The final product of the interaction (the digital personalized story) and the self-authoring process preceding its production (e.g. taking pictures, recording voice-overs, jointly typing text to go with the story) were part of a larger, 'trialogical' space. This was different from the earlier case study in which the exchange was in the form of a two-way book–child or mother–child back-and-forth process of reading. The finished story could be emailed within seconds to another family member or friend and its production could incorporate others' pictures or contributions (e.g. by accessing the Internet and downloading them into the story). Such a 'dynamic nature of co-construction of shared objects of a unique personal value' (p. 10) has resonance with Hakkarainen and Paavola (2009) and their trialogical approach to learning.

It is worth remembering that in both studies (Kucirkova et al., 2013; Kucirkova et al., 2015), the parent–child interaction was not around any personalized books, but around *digital* personalized books. Unlike printed books, the digital medium is easily editable; it affords an easy and seamless generation of multimedia personalized content. This is different from the personalized books that were used by the seven parents used in my master's study: the pictures and text in these books were fixed; they could not be instantly updated in the moment of reading. The parents had decided on the pictures and text, and, once printed, the children could either like or dislike them, but they could not change them as easily as with the digital stories created on iPads.

In spite of, or perhaps because of, these obvious differences between digital and non-digital resources, I have not conducted a study in which I would directly compare the digital versus paper-based version of a personalized book. This is a deliberate choice: I do not consider paper-based and digital books as two opposing formats. This may need some explanation in light of the long tradition of studies that have directly compared parent–child interaction with digital as opposed to non-digital books (see, for example, the informative studies conducted by Ofra Korat or Adriana Bus).

Following the research consensus reached at the international conference on children's reading on screen, organized by Professor Susan Rvachew (McGill University) in 2015, the most efficient way of comparing the different kinds of books children read is to compare them according to the books' *features*, rather than the format the books appear in. With many books today, including those produced with the Our Story app, the same story can appear in both printed and digital formats. The way in which the two formats differ is a range of features which need to be named and examined in their own right. Individual features need to be narrowly defined; for example, 'interactivity' is displayed differently in printed and digital formats. Personalization is a feature that appears in both formats. In addition, there are other five features, which I theorized in full, together with Professors Teresa Cremin and Karen Littleton (see Kucirkova, Littleton, & Cremin, 2016). These six features are personalization, affection, interactivity, creativity, shared and sustained engagement. These six features provide a useful comparison metric for researchers interested in comparing the effects of new and older reading formats in relation to reading for pleasure.

The research reported so far has focused on personalized books that support children's enjoyment of stories and narratives, that is, on the kind of reading that happens as a voluntary activity and is in the literature referred to as voluntary reading or reading for pleasure. The texts of personalized books we investigated were based on story plots, which were fictional or autobiographical, but not factual. They were books that were read in children's homes or after-school clubs, not as part of the standard curriculum. The Section 'Supporting Children's Learning in Primary Schools' complements this focus with a different scope: I describe studies in which personalized books were created by children in the classroom, following a semi-autobiographical and semi-standardized content.

Supporting children's learning in primary schools

This section summarizes a study conducted in 2014 in a lower primary school in England that was situated in an affluent, middle-class area. The study brief was developed in conversation with Professor Messer and Professor Teresa Cremin, who, like me, were interested in the learning potential of digital personalized books. Professor Cremin was mostly interested in the potential of personalized books to support children's reading for pleasure, while Professor Messer was interested in the ways personalized books could support children's writing development. I was interested in seeing whether the engagement and positive attitude towards book reading that I had noted in studies conducted in the home environment could be supported and sustained in the school environment, and with slightly older children.

The study protocol left the choice of the books' use entirely up to the teachers: we wanted to hear teachers' ideas for possible uses of personalized books/stories in their own contexts; we did not want to prescribe or suggest specific uses for the classrooms. Such an approach is aligned with the community-based approach, which honours the knowledge and expertise of all community members – who, in this case, were the teachers. We did not constrain the teachers in any way and let them use digital personalized stories for a school term. To facilitate the production of the personalized

books, I showed the teachers the Our Story app and explained how it could be used to create personalized books. The school had already invested in a number of iPads, so the teachers could use the Our Story app on the school devices or take it home and try out before using in the class. The study evaluation methods were based on researchers' observations of classroom practice, researcher's and teachers' documentation of impressions, and interviews with teachers, the head teacher and the children. The results of this study are detailed in a 'Minibook' commissioned by the United Kingdom Literacy Association (see Kucirkova, 2014). The Minibook illustrates the creative ways in which the teachers used digital personalized stories to enrich the school curriculum, as well as to support communication between school and home. The book outlines the details of tablet and computer applications that teachers can use if they wish to personalize classic stories or encourage children's authorship in the classroom. Here, I return to the examples from the English, history and math lessons I detailed in this book, to illustrate the learning potential digital personalized books can have in a primary school. Before I outline these examples, I should caution the reader that the school was, and still is, an exceptional school, with outstanding members of staff and consistently high results in national rankings. The teachers' positive attitude towards trying out new things out and innovating their practice is exceptional. It may therefore be that the examples presented here are 'ideal' examples rather than typical examples of using digital personalized books in schools. Nevertheless, they can provide some hints at the practical possibilities and usefulness of digital personalized schools for learning purposes.

The first example shows that personalized books can creatively support children's literacy experiences and also enrich history classes. A Year 4 teacher who took part in our study had used digital personalized stories to teach children about Roald Dahl's life. The teacher inserted pictures and facts from Roald Dahl's life into the Our Story app and encouraged children to complement these pictures with their own response to Dahl's books. This was a great way of combining the various multimedia possibilities available through iPads. Children could add their own texts but also voice-overs and some authentic music recordings. Children worked in groups and each group was asked to add their own 'personal touch' to one page of the collectively constructed book about Roald Dahl. When I observed the activity, I noticed that children had great fun personalizing specific dimensions of the book: some imitated Roald Dahl's voice, while others borrowed music instruments from the adjacent classroom so that they can add some authentic music tones. Other children searched for Roald Dahl's biography online to be able to add some more details to the written biography provided by the teacher.

The fact that each group could add a detail to one big digital book meant that each group felt proud of owning a part of the book. At the same time, the students needed to blend their creation with the other parts of the book to avoid repetition and ensure story coherence. The personalized dimension was thus used to enrich a given content, to increase children's motivation to do so and to recognize possible personal connection between the writer's life and their own lives. For a lesson that can be simply focused on regurgitating facts and data about a famous author, the

teacher used digital personalized stories to promote children's active engagement in the subject and help develop a broader historical perspective.

Personalized books were in this school also used in mathematics lessons. In one session in the Foundation classroom, the teacher used personalized digital stories in combination with basic counting and the 'grow your own beanstalk' task. The teacher first asked the children to set the growing stages of a beanstalk in the right sequence. Children had to put numbers against individual images of the growing beanstalk and audio-record a description of how the beanstalk grew, using mathematics vocabulary of more, less, greater or smaller. These descriptions could be typed text underneath the photographs or voice-overs. Children enjoyed the opportunity to add their own recordings, in addition to their own short sentences and arrangement of the pictures. In addition to practising their digital competences with touchscreens, they practised their authoring skills and maths skills. Moreover, the teacher connected the activity to the Jack and the Beanstalk story, thus enriching the session with concepts discussed during the English lesson and providing a cross-curricular link. The activity enabled the children to see the importance of their own narratives in relation to an old popular story and make a personal connection to the abstract world of numbers.

The last example I provide here is from a Year 2 English lesson, in which the teacher had the ingenious idea of using personalized stories instead of the traditional activity of diary writing. This teacher took the iPad with Our Story home and crated his own diary as an example to inspire the children's writing. The teacher's diary entry was about a trip to the Harry Potter studios, featuring pictures from the journey to the studios, then actual visit and returning home. The teacher shared his digital diary with the children who loved the fact that they could have a glimpse into the teacher's private life. The children were keen to share their own stories and carefully chose pictures that would illustrate their typical school day. During the classroom activity, the children needed to decide which key events they wanted to focus on for their diary entry, which pictures to take and how to enrich these pictures with audio and text. They collaborated on editing the text as they went along and supplemented it with short audio-recordings. Their final digital multimedia diary entries were shared at a classroom assembly. In this way, the children had an opportunity to blend their personal and shared school lives, to merge their lived and virtual/digital experiences and autobiographical narratives with close attention paid to correct grammar and diary structures (such as the use of first person and use of past tense).

Taken together, the examples from this school (and other examples outlined in the Minibook) illustrate the potential of personalization to positively affect children's learning through story authorship,and to motivate them to take part in traditional school activities. In all instances, the teacher's skilful use of the app together with the curriculum resources was the key to the successful interaction. Too much of personalization would mean that children are interested and motivated but they do not necessarily learn a lot of new material because they would be too focused on their own content. Conversely, too much of standardized and non-personalized content would mean that children are not motivated to learn – they focus less and consequently learn little. This is a delicate tension that is not easy to master and will be revisited theoretically in the final chapter.

Summary

This chapter provides a summary of studies on personalized books that I have conducted together with my colleagues between 2011 and 2016. The books did not always build on the child's authorship or aesthetic preference but the children showed engagement and emotional attachment to these books, giving rise to some positive learning outcomes. Thus, the studies demonstrate that for these outcome measures and in these contexts, personalization does not necessarily need to involve all 5As for a positive outcome to be achieved.

Collectively, the studies illustrate how educational researchers might go about asking *what is at the core of the personalization effect* and disentangling the elements that contribute to the potentially positive effects of personalization. Carefully designed experimental studies can help us ascertain the effect of personally relevant (or personally meaningful) aspects as opposed to non-personalized information. Detailed case studies can illuminate the complex set of relationships between personalization and adult–child interaction in home and school contexts.

Overall, the research summarized in this chapter suggests that in a supporting context personalized books can positively impact on children's language development, parent–child exchanges during shared book reading at home, children's digital literacy and their engagement in school activities across subjects and year groups. For younger children, there was a heightened focus on self in their spontaneous speech when reading personalized books, which warrants a caution about overly or exclusively personalized reading environments. In addition to these important learning outcomes, personalized books can act as effective tools to support children's creative skills – as outlined in the next chapter.

8

Personalization and Creativity

Chapter 7 suggested that personalized books can positively impact on children's cognitive outcomes and parent–child dynamics. While the previous chapter was specifically concerned with personalized books, in this chapter, the focus is expanded to show how personalization impacts on children's creative skills with a range of resources. I consider personalized education in terms of the 5As (children's autonomy, authorship, aesthetics, attachment and authenticity), and I define creativity in terms of children's individual and collaborative creativity, as well as their ability to engage in possibility thinking (as per Professor Anna Craft's definition). I note the alignments and misalignments between these aspects of creativity and the 5As and consider the aspects of creativity that the research on personalization could usefully adopt. Given that personalization is a new field of study in early childhood, its development could benefit from the body of knowledge generated for creativity. I use an empirical example from my own research to illustrate the many levels at which the 5As relate to child's individual and parent–child collaborative creativity.

The relationship between personalization and creativity

Personalization and creativity have become buzzwords in the technology and education sectors in the twenty-first century and are often used side by side to describe an educational innovation or a technology-based project. However, unlike personalization, creativity enjoys a rich body of literature concerning its definition, boundaries, pedagogies and evidence of educational impact. In contrast to personalized education, creative education has been studied for many decades, and children's creative skills are considered an essential part of children's education (although the extent of the actual teaching and assessment of creative skills in public schools is questionable). The UK Select Committee on Digital Skills stated the following in relation to creativity:

- Creative subjects should be on an equal level as the sciences.
- Creative skills can be applied to sciences – creativity is beyond the boundaries of the teaching of creative subjects.
- Creativity has a socialization agenda, helps learning and boosts engagement with the world – makes us curious.

(Available online from: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/digital-skills-committee/digital-skills/oral/11622.html)

Before attempting to discuss the relationship between creativity and personalization, it is important to agree on a working definition of creativity. In the section 'What Is Creativity?' I detail what we mean by a 'creative individual and creativity' as a term. This allows us to draw parallels between personalized as an attribute and personalization as a notion or concept.

What is creativity?

Creativity was earlier considered a special skill reserved for the art industry and those who 'create' art, such as musicians, painters or dancers. This earlier understanding of creativity implied that it is an ability, or a set of discrete skills. For example, in music, a musician is considered creative if she/he can demonstrate originality and musical sensitivity (Leman, 1999). Increasingly, however, creativity is considered an everyday skill, something all children can do – they can be creative in their problem-solving; they can be creative thinkers and tinkerers (makers). This definition implies that creativity is about imagination, about openness to solve a new problem or find an alternative route to reach an end goal. Is such a creativity something that is inherent and something all children are born with or is it something that needs to be taught and nurtured (such as children's reading skills)? The view dominant in the UK National Curriculum has been on the nurture side, that is, that creativity is a skill that can be developed with the right amount of support and guidance from others. In this respect, creativity shares some dilemmas related to the 'three As' of authenticity, authorship and autonomy of personalization.

Creativity as a set of skills

Creativity understood as a set off skills that can be taught by building on knowledge of others and nurtured through others' input is somewhat in tension with the definition of creativity as the ability to produce something original and unique. In this definition, a creative work would be more accurately described as an amalgam of others' influences rather than a self-contained, straightforward piece. Similarly, if we believe that creativity could, and should, be taught and nurtured in children, then we need to consider the judicious balance between autonomy and authorship and between guidance and collaboration in creative instruction.

This brings us to the distinction concerning the ways in which we could measure and evaluate creativity and whether this is even possible or desirable. In business and applied fields, creativity is typically measured through the final product – if a painting or a gadget is considered to be new, original or innovative, it is likely its value will be gauged in terms of its 'creative' potential. In education, there is a focus on the product but also on the process through which the product was created. It would be rare for a teacher to praise a student's essay as creative without asking the student *how* they

produced it – the teacher will want to establish the student's independent and unique contribution to the final product so that they can build a picture of the student's skills and abilities. Surely, both business and education consider the process and product of creativity but they place different emphasis on the two.

In addition to evaluating the creative process leading to a creative product, we can measure the creative capacity of an individual. This is similar to personalized products and the capacity of an individual to author an authentic piece. Assuming that there is such a thing as a creative profile of an individual, we should be able to measure it and evaluate whether one person is more creative than another person. In psychology, tests and procedures have been developed and standardized to evaluate creativity, for example the Torrance Tests of Creative Thinking. This test is based on scores from individuals who draw pictures from a curved shape and then write stories about their pictures. Another popular measurement of creativity includes the divergent thinking approach and ratings (including the ratings of teachers, parents, peers and in work environments, colleagues and supervisors) for judging a certain product or act of creativity. These measures presuppose that a piece of creativity is manifested in a final product, act or activity, and that it can be therefore rated on a scale or through a questionnaire. Other measures focus on qualitative descriptions, criterion-based evaluations or independent judgements of artists and researchers. The eclectic mix of approaches to the measurement of creativity might inspire future approaches to the assessments concerning personalized learning: quantitative tests measuring the extent or presence of the individual 5As as well as qualitative appraisals of the processes involved in authorship, autonomy and so on might produce equally enriching insights.

Creativity as a collaborative process

Another inspiration that can be gleaned from the creativity studies concerns the micro/individual level of creative processes, that is, the individual and collaborative nature of creativity. Culture plays an important role in this choice: Batey and Furnham (2006) point out that while the traditional definition of creativity in Western culture focused on something that is 'given', in Eastern culture creativity is viewed as 'the expression of personal truth or self-growth' (p. 356). The notion of individualism and its counterpart – reciprocity – is related to the fourth A of aesthetics and Oulasvirta and Blom's personalization theory (see Chapter 5). Oulasvirta and Blom (2008) outline that people make their own objects aesthetically appealing, not just for personal interest but because they want to communicate their feelings to others and to affirm to them their emotions, values and experiences. One could say that very similar factors are at play when an artist produces a piece of art – the process of authoring creative works is predicated on an audience awareness and the desire to share an artistic piece with others. In their edited book *Collaborative Creativity: Contemporary Perspectives* (2004), Dorothy Miell and Karen Littleton elaborate on these points. Miell and Littleton adopt a socio-cultural approach to understanding creativity and reciprocity. From this perspective, there is an intertwined, undividable influence of culture and context on each individual producing something new (or creative). Miell and Littleton argue that all creative acts are collaborative acts. This is because individuals are shaped

by their environments and previous experiences, and, consequently, their acts are a reflection of what they learnt and experienced in the institutions they attended, the books they read and films they watched, and the interpersonal relationships they have.

Collaborative creativity has recently become very popular in art-based practice. Collaborative creativity can give rise to interdisciplinary work and can lead to hybridization of traditional forms and contents. For instance, collaborative creativity in poetry has inspired the merging of poetry with films (the so-called film poetry or video poetry), poetry with photographs ('poetography') or poetry mixed with prose in poetic novels. Collaborative creativity is also a popular approach in many technology- and innovation-oriented companies, which aim to nurture a culture of shared thinking and encourage their employers to co-construct and 'co-create' new products together. In these environments, efforts are being made for employees to collaborate during business retreats or in shared, open-plan offices inviting discussion and collaboration. The rationale for adopting a collaborative creativity approach can be found in theoretical or ontological assumptions, but also on the practical level. *Collaboratively* produced objects and experiences build on previous knowledge and entail the creative thinking that preceded the new production. Such a process encourages critical discussion and reflection on what has been produced before. It is linked to the need to create products and artefacts, which are of appeal to more than a few individuals. Such collaboratively produced products are part of a business model that draws on crowdsourcing and democratic production strategy – both being popular approaches in the twenty-first century.

Evidently, in a collaborative creativity process the question of individual authorship, personal aesthetics, ownership of the final product and other As remain open to discussion. The structure of some institutions (such as schools) and organizations (such as business companies) affect how these questions are approached. Hierarchical structures often prevent individuals to have their creative ideas recognized or even developed. The field and area of work (e.g. a fashion school vs. education school) also affect the expectations and demands placed on individuals' expression of creativity. These factors definitely ring true for personalization, and from the above considerations we could deduce that collaboratively produced personalized products could provide new avenues in the personalization research and practice of personalized education, and they could reveal new possible combinations between personalized education and other forms of learning (to allow hybridization like the one we can observe in art practices).

However, as with all educational phenomena, effective application of creativity and personalization will work as long as they are aligned with their assessments. It goes without saying that if we want to see a change to the way personalized and creative education happens in public schools, we need to make a change to assessment too. Currently, teachers across the world are being held accountable for their ability to teach children according to national assessment guidelines and their performance is judged by the children's success in national league tables. These tables and tests pay lip service to creativity and children's autonomy, authorship or authentic contribution to content. This makes the implementation of personalized and creative education –no matter how well defined – difficult.

In the next section, I move onto considering some key theoretical frameworks developed for creativity. This provides further insight into the links between personalization and creativity.

Key theoretical frameworks guiding the creativity research

The classic creativity work in the social psychology area is the creativity framework developed by Amabile in 1983. Part of the framework (and definition of creativity) is the consideration of the abilities and factors that influence a creative process. Amabile (1983) argues that some social factors can decrease and some personal characteristics can increase creativity. Both factors have been the subject of extensive research. For example, external reinforcement systems such as rewards, organizing competitions or external evaluations have been found to decrease creativity (see, for example, Choi, 2004). However, as mentioned in the previous section, whether certain personality characteristics are indeed more prevalent among more creative individuals is unclear and largely depends on how we measure creativity. While the popular cliché of an absent-minded artist holds true for certain creative expressions, a more research-based characterization of a creative individual lists some specific personal characteristics. Feist's (1998) meta-analysis of personality for scientific and artistic creativity specifies the characteristics of autonomy, introversion, drive, self-confidence and self-acceptance, but also being a dominant, often hostile and impulsive person. This characterization might help with the practical application and evaluation of creativity. On the other hand, social scientists embody a different ontological model of creativity, one in which creativity is not fixed and measurable, but something in the process of constant construction and refinement. For instance, de Certeau (1984) described creativity as 'bricolage' (adopting the term from Levi-Strauss, 1966) and others emphasize the creative process in which people appropriate things, ideas and concepts to reclaim their own creative space (Maigret, 2000).

It could be that just as some scholars believe that creativity can be measured and some argue it cannot be precisely specified, in the study of personalization we will see the emergence of two competing camps. It could also be that in some areas of personalization, the boundaries between disciplines become more porous. In the area of digital personalization or technology-mediated personalization, interdisciplinary research is already happening. This is because technology has challenged the definitions, measurements and manifestations of many phenomena, including creativity and personalization. As Sefton-Green and Buckingham (1998, p. 59) write: 'The use of new technologies can blur the distinctions between these narrower and broader conceptions of production and of creativity: what counts as a "text" or indeed as a creative work of art-becomes subject to a wide variety of definitions.' Thus, it might be that digital personalization will not only blur the disciplinary boundaries but also revive the interest in some essential questions of what personalization is and helps us develop a more fully theorized notion of personalization. This has been the trajectory for creativity, where technology has fuelled the interest in the topic and challenged the traditional definition of creative skills and abilities. In the pursuit of the definition of

creativity, I got interested in these questions myself and conducted a study in which we looked at children's creativity with a range of text-making resources, including new technologies. This study provided some insights about the nature of digitally mediated creativity and its relationship to two of the 5As of personalization: authorship and autonomy.

Children's creativity: Authorship and autonomy

Dr Mona Sakr and I carried out a study regarding how different resources (digital and non-digital technologies) affect a child's individual as well as parent–child collaborations (see Kucirkova & Sakr, 2015). The actual activity undertaken with the digital and non-digital resources was text-making, based on Kate Pahl's (2003) study of children's text-making at home. Our text-making activity included four main activities: taking photographs, creating collages, drawing and emergent writing.

We wanted to compare parent–child text-making mediated by digital resources as compared with non-digital resources and look at the child's individual as well as parent–child collaborative creativity. We chose four currently popular resources for young children's text-making at home: crayons, collage, iPad and a desktop PC. For the iPad context, we chose the Our Story app, given my experience of studying other children using it for a variety of purposes. For the computer programme, we chose the software Tuxpaint, which is a drawing/collage-making programme. The crayons context provided the parent and child with a set of standard colour crayons and sheets of white A4 paper. The collage context included a range of materials, such as glitter, trimmings, ribbons, scissors, crayons, pieces of coloured and blank paper, craft sticks and others. The shared characteristic of all four resources was that they enabled the authoring of open-ended original content, that there were no specific templates to be filled out, and that the child and her parent were free to create any and as many creative artefact(s) they wished. For the two digital resources (iPad and PC), the final text could include sounds in addition to imagery or letters.

So that we could examine the parent–child interaction in detail and in relation to the four different resources (rather than in relation to different parent–child pairs), we chose the single case study method. The study participants were a 3-year-old girl Monika (pseudonym) and her father, who was 35 years old at the time of the study. The study was conducted in the child's grandparents' house (the father's parents' house), where Monika used to spend the evenings during the week. The case study consisted of eight episodes during which the father and child engaged in text-making with one of the four resources (two times for each resource) for about twenty minutes (minimum ten and maximum thirty minutes). The interaction was videotaped by Mona, who placed the camera in one of the corners of the room and quietly observed the sessions, taking notes of her observations.

Our analysis included Mona's field notes, but mostly focused on the video data. We analysed the video transcript using thematic deductive analysis, with frequency measures and vignette descriptions. We found that the different text-making resources provided different opportunities for the child's individual creativity and

for the joint parent–child collaborative creativity. It was not about whether a text-making activity was digital (i.e. iPad and PC) or not (i.e. crayons or collage), but about the specific features of the individual resources. Notably, even though all text-making resources supported open-ended activity, the child followed an internal script with some resources and not with others. For instance, when using crayons, Monika did not simply author what she spontaneously thought of at that moment, but she intentionally chose colours and shapes to achieve a specific drawing. She wanted to have her face and body drawn in the way she had seen it drawn before and insisted her father helped her with the drawing. For example, she asked him to draw an 'oval face' because she believed that all drawn faces should be oval. In another session, Monika asked her father to help her choose the crayon, which would product the exactly same pink as was the colour on her dress. Interestingly, Monika did not have these expectations with the unrealistic and abstract texts she created with Tuxpaint™, or with the Our Story app or collage resources. It seemed to be the case that the schemas and socio-cultural expectations related to drawing with crayons are much more influential than those available for other resources. It could also be that the familiarity with a given resource influenced Monika's creative dispositions and her perception of authentic authoring. While drawing with crayons was a frequent activity at home and in the preschool, text-making with the Our Story app or Tuxpaint™ was not. This might be why the girls' openness to authentic, new and original content was greater with the less familiar resources.

In our data analysis, we also noticed other issues at play when considering the four different technologies and creativity. Namely, the father seemed to be more involved and more willing to provide support with tux paint and the iPad app than with the non-digital resources. Again, this could be because of the socio-cultural expectations. There is a perceived need on the part of many adults that young children could break or damage technologies and, so, they are often more restrictive with children's playful exploration of these. The higher cost of technologies might warrant a precautionary concern, although, according to my many home- and school observations, young children are very careful and good at handling technologies. In fact, they are often the ones who remind adults to charge the device or to put on protective cover. An alternative explanation is that the father used the digital context as an opportunity to showcase his skills and teach Monika some digital competences. Perhaps he thought that Monika might now know how the technologies work or felt more comfortable supporting his daughter with the digital resources than with crayons and collage. Regardless of the reasoning behind the father's behaviour, the fact remains that the child's authorship and autonomy in creating something new were supported to a different extent by the father, depending on whether a digital or non-digital text-making resource was used. This influenced the creative process and the final product created at the end of the process. One might argue that it influenced the extent to which the process and final product were creative and personalized.

In addition to these influential factors, Mona and I also considered the relationships between making mistakes with different text-making resources and how these relate to the manifestations of individual and collaborative creativities. While it is quite difficult

to erase a mistake with crayons (e.g. removing an undesirable line with a rubber), it is very easy with the tux paint programme or the Our Story app (a simple click or tap removes a line or entire image). In collage, on the other hand, rather than removing an unwanted action, the parent and child decided to build on top of it and added more colour or materials to dissimulate an unwanted line or scribble. The possibility to easily delete and edit a line supports risk-taking, which is an essential prerequisite for autonomy and authorship. Therefore, although often not considered by research, the extent to which products and experiences can and cannot be modified and edited might be a useful analytical lens not only of creativity but also when considering the 5As. In another close parallel, aesthetics and children's creativity are closely aligned, as illustrated in the next section.

Children's creativity: Aesthetics and attachment

Let us consider another extract from the Kucirkova and Sakr (2015) study – this time with a specific focus on aesthetics. In this extract, the father and his daughter are choosing pictures from the photo gallery in the Our Story app. There are dozens of pictures taken by the girl, many of which seem very similar to each other as they are of the same object and of similar quality. Yet, the child seems to know exactly what she is looking for, as can be seen in this short parent–child exchange:

> Monika leans over and touches the screen: 'I want to choose!'
> Father leans back: 'ok!'
> Father starts swiping through the pictures, the girl stops him: 'Hey – that one!'
> Father: 'That one? … so shall we put the washing machine in?'
> The girl nods eagerly: 'That one'
> Father: 'Ok'
>
> (Transcript adapted from Kucirkova & Sakr, 2015)

The extract shows that the father enabled child's autonomy by giving her a choice of pictures. He then honours the child's choice, based on the child's own aesthetic preferences. This in turn has increased the child's perceived authorship of the story and attachment to it. The short extract also illustrates how the parent and child negotiated agency and ownership of the resource (iPad) and how they discussed the individual and shared nature of the text-making activity. These elements are crucial for enabling creativity, but they are also intimately linked to personalization.

Drawing on Oulasvirta and Blom's theory of personalization behaviour, I maintained that aesthetics are closely linked to collaboration and reciprocity. In the example studied here, the child made some aesthetic choices that were clearly not only based on her subjective perceptions, but on her desire to produce something that her father would perceive as nice or beautiful too. Similarly, the father was keen to ensure their final text is something the child likes. In all four text-making contexts we studied, there was evidence of collaborative creativity and renegotiations of power and aesthetic preferences. Consider this example from the Crayons context:

Father: So which is our piece of paper? Are we going to draw together or do you want to draw alone?' The father reaches over to Monika and hands her a piece of blank paper.
Child: 'We're going to draw together'
(…a few minutes later)
Father: 'What else shall we draw on the rug to make it really pretty?'
Child: 'We can draw a rainbow'
Father: 'Wow'
Child: 'A rainbow mat' Monika takes out a crayon and begins colouring
The father is surprised: 'A rainbow mat?'
Child (drawing eagerly): 'Yeah'
Father: 'With all the different colours of the rainbow? That's a clever idea.' He picks up one crayon and starts adding yellow to Monika's picture.
Child: (with eyes fixated on the paper as she fills it up with colours): 'Yah, you can do black too in the rainbow.'
Father (first surprised, then admits with a smile): 'That's a clever idea, an unusual rainbow.'

(Adapted from Kucirkova & Sakr, 2015)

This example illustrates that creativity could be understood as the 'opportunity for exploratory and combinatory play' (Craft, McConnon, & Matthews, 2012, p. 2). This opportunity provides children with a 'combination of relevance, ownership and control' (Jeffrey & Craft, 2004, p. 82), and these three aspects are closely related to aesthetics and attachment.

Children's creativity and authenticity

At the beginning of this chapter, I discussed the ways creativity is measured and evaluated (in terms of product or process). In this section, I consider the extent to which the photographs produced by the child could be described – as creative or not creative. The first extract relates to the child's use of the iPad, at the beginning of the text-making activity with the Our Story app. In this episode, the child is taking photographs around the house, which she wants to later use for her own story. The father lets the child manipulate the iPad camera on her own, following her around the house. At this point, Mona had to take the stationary camera and follow Monika through the house too. The embodied participation of the parent and child in the activity is noteworthy. It is also interesting to see the extent to which the father supported the child's independent picture-taking and honoured her agency in the activity.

The father and child are in the corridor. The child looks at the corridor through the iPad's camera. At first, the father is very much directing the child.

Father: 'You can take as many as you like … but don't go so close to things because the camera can't see it because it's too dark, look that's it, you've got to … now try and get the baby seat, the car seat, see the car seat.'

Child: 'Let's take a picture of that hoover.'
Father: 'Ok, let's go over to the hoover, we have to go over to the hoover, you have to walk to the hoover.'
1.5 minutes later the parent and child are in the bathroom. In the bathroom, the child repositions the iPad to take a photo of the tumble dryer which is next to the washing machine. She takes a photo, then quickly shifts the position and takes a photo of the spin drier, takes another picture, then leaves the bathroom. The father stands closely behind her but doesn't comment until she's finished.
Father: You're getting everything aren't you?'
Monika smiles and takes a photo of the bathroom door. (3:36)

(Adapted from Kucirkova & Sakr, 2015)

In our article, Mona and I describe the child's behaviour in this episode using the creativity framework of 'possibility thinking', developed by Professor Anna Craft and her colleagues (Cremin, Burnard, & Craft, 2006). In my reading of Craft's books and studies, I closely identified with this conceptualization of creativity because it does not just capture the immediate and visceral, but also captures 'what might be' (Craft, 2000). Possibility thinking is about being able to ask questions, engage in the process of immersion, innovation, risk-taking and acting as a self-determined and intentional person. From this perspective, the child in the above-mentioned short example is immersed in the activity and innovative in choosing to take a close-up of the hoover or washing machine. She takes risks in positioning the camera close to the object – that is, not following her father's instructions to step back. She is clearly engaged in a self-determined and intentional activity.

Similarly, we could describe the child's behaviour in this activity using the 5As framework: From the 5As perspective, the concepts of possibility thinking (child's agency, engaging in critical reflection and risk-taking, being imaginative, innovative and self-determined) all relate to the notions of autonomy and authorship. The child is in this instance an independent photo-maker; she is the author of the photographs. She consciously chooses how she takes the photographs, paying attention to the overall appearance (or aesthetics) of her pictures. She 'owns' the activity (attachment) and in the end produces authentic (as in original and unique) photographs. As such, she *personalizes* the activity to her own abilities and preferences. It would be hard to decide whether the theoretical framework of possibility thinking or of the 5As has more explanatory power in this context. Both are plausible and both bring to the fore different facets of the child's behaviour. One facet of the 5As – authenticity – merits further attention, given the problematic relationship between authenticity and creativity.

The independent, child-initiated manipulation of the device is similar to the child's authoring of a written piece of text or a digital story. By exploring the different objects around her through the camera lens, Monika gets a unique perspective on the space around her. The iPad camera allows her to easily capture her impressions and immediately record these in the form of a photograph. Within a few minutes, Monika takes dozens of pictures, many of which appear blurry or are of the same object. If we

were to evaluate these pictures as creative or not, the discussion will hit a controversial point: are children's pictures inherently authentic and therefore creative or are they simply evidence of the child's immature creative ability?

Mona and I considered this question in detail in Sakr and Kucirkova (2016). We outlined how children's art-making is often considered in terms of schemata and 'linear narratives' (see MacRae, 2011 for details) and how such an approach can be problematic if we consider the transitory, fragmentary and disconnected pictures taken by the child during her wandering in the house. Furthermore, if we analyse the child's pictures applying traditional quality markers of photographs, the child's blurry pictures of the same object might appear as immature and underdeveloped. An alternative viewpoint would be that schematic and realistic representations of the outside world are related to adult art-related criteria, but not to the child's perspective. In Sakr and Kucirkova (2016), we develop a case that considers children's creativity and art-making from a Deleuzian perspective (2004). This perspective can challenge and enrich our understanding of how children construct the 'here' and 'now' of their authentic experience and the world around them. While stillness and linear progression through space are criteria typically applied to adult photography, they might position children's efforts within the discourses of deficiency and apprenticeship. Therefore, 'instead of thinking in terms of schematic representation and linear narrative, we have suggested that the Deleuzian concepts of sense-making and the rhizomatic structure of experience can help to shift our perceptions of children's photography and the way in which children construct the "here" and "now" through their photographic practices' (p. 70). Given the close relationship between 5As and possibility thinking, perhaps a similar stance could be adopted when trying to evaluate and measure the extent to which an object could be considered as authentic or not. The evaluation measures should not centre on established linear narratives of art but rather situated, non-hierarchical evaluation criteria. This conclusion is closely linked to my concern related to quantitative measures of personalization, as raised in Chapters 3 and 7.

Overall, this case study illustrates that the distinction between digital and non-digital resources is not helpful when it comes to the evaluation of creativity and personalization – the two are influenced by factors which are medium free, such as the access points or the social schemas available for a given activity. Also, none of the four resources was neutral – it had certain characteristics and its creative potential was apparent through the way in which the parent and child leveraged it. This conclusion builds on the notion of *affordances* of technologies, a notion worth considering in more detail in relation to creativity and the 5As.

Affordances of technologies for creativity and the 5As

'Affordance' is probably the most overused and misused term when it comes to technology and education. I don't have the space to explain these difficulties in detail here but it is worth mentioning that there are several applications and definitions of the term 'affordance'. I build on the definition developed by Gibson in 1986 and later

elaborated by Kress (1993, 2010). In these, affordance refers to the physical properties of an object *as well as* the socially established or personally learned practices associated with an object. As we explain in our article (Flewitt et al., 2014): 'The term "affordance" is not merely a matter of perception, but refers to the materially, culturally, socially and historically developed ways in which meaning is made with particular semiotic resources' (p. 109). As a socio-constructivist, I cannot think of the affordances of an iPad as neutral; they exist and are either positive or negative, depending on how they are taken up by those who use them. This is clearly illustrated in the following extract where the parent and child use the iPad audio-recording feature together. The father supports the child's use of the microphone; his positive encouragement enhances the iPad's multimedia affordances.

Father: 'Now we're going to record our words… I guess we're going to tap that.'
Child: 'That looks like an ice cream' M points at the microphone icon.
Father: 'It's also a microphone. 'Before we press this button, we need to think what we're going to say about this photo.'
Child: 'Daddy and me?'
Father: 'Ok' Father's gaze returns to the iPad. 'Ready?' The father presses the recording icon.
Child: 'Daddy and me.' The child speaks with her mouth close to the screen.
Father: 'Excellent. Now we're going to do the next photo. What did we do together?'

This example illustrates that in addition to the affordances of a resource, the adult's behaviour during the child's manipulation of the resource largely influences the expression of possibility thinking, notably the extent to which the child asks questions and determines the flow of the activity. We could apply this logic to personalization and consider how the affordances of personalized resources are taken up by parents and children, and how the socio-cultural expectations around, for example, audio-recording, interact with the personalization features of the Our Story app. In other words, what I am arguing here is that the presence of an audio-recording button does not support audio-recording on its own. In this example, the child felt shy at first and needed to be encouraged by her father to record her voice. The multimedia affordance of the app was significantly altered when the father intervened. As explained in the section 'Children's Creativity and Authenticity', in the case of picture-taking, the father's involvement negatively influenced the child's authorship and autonomy, and in the case of audio-recording, it positively encouraged child's authorship. The creative affordances of a tool are therefore orchestrated differently not only depending on the context of its use but also depending on the different agents present within this context.

Thus far, the literature seems to portray the creative affordances of digital tools as negative when these are used by the child independently and as positive if the use of the technology is mediated by a parent: 'Parents see their role and that of the school as one of regulating the relatively anarchistic and risky creative affordances presented to children by new media and the virtual spaces youth now inhabit' (Corbett & Vibert,

2010, p. 10). If, however, there is no caring parent around, the creative affordances of digital resources are – by some experts – believed to undermine the child's development; they can 'stunt' children's imagination (Cordes & Miller, 2000, online). This is different from the rhetoric applied to natural resources. For natural resources, the creative affordances are often perceived to be greater and multiple. For instance, Beasley (2015), who qualitatively analysed children's play in preschools, noted in her MPhil study that in addition to creative affordances of outdoor spaces there are also active affordances, multisensory affordances, affordances for connoisseurship and affordances for connections. I return to these contrasting viewpoints in Chapter 10, where I argue that a more nuanced perspective recognizes the interrelationship between the creative affordances of digital and non-digital technologies in children's lives, such as when technologies are taken on nature trips or employed for nature projects. Regarding the personalization–creativity relationship and the notion of affordances, the triple consideration of the context of use, agents present within the context and the characteristics of the resource, must go together for both personalized and creative learning. At the time of writing, there are many digital resources developed for young children's (in the developers' words) 'authentic engagement', 'independent use' or 'fun authoring'. This chapter was intended to help parents, teachers and scholars to critically examine the extent of children's genuine 'autonomy', 'authorship' or 'authenticity' and clarify what the terms mean in each context. Chapter 11 includes a reflection on teachers' possibility to nurture creative dispositions in children and the relationship between personalized education and creative pedagogies.

Summary

In this chapter I drew on the concept of creativity to indicate some possibilities for future theorization of personalization. The development of personalization as a field of study could borrow some of the thinking tools employed for the conceptualization of creativity. Notably, for children's autonomy and authorship, there are many important contextual elements, such as the parent's and child's familiarity with the resources; the availability of social scripts, the possibility to edit and erase an individual contribution during the creation process; and the presence of templates and guidance on the final product. For aesthetics, the notion of 'here and now' values for evaluating the authentic character of a new product is useful, as is the notion of reciprocity when it comes to children's aesthetic choices. Parent's support during the manipulation of a digital and non-digital resource provided an insight into the importance of distinguishing collaborative and individual authorship of new products. Lastly, a discussion of creativity and personalization reveals that it would be difficult to posit a staunch distinction between digital (technology-based) and non-digital resources.

The reflections in this chapter revealed many connections between creativity and personalization, but this is not to say that the two are the same. In alignment with my previous work (Kucirkova et al., 2016) I maintain that personalization and creativity

should be treated as stand-alone variables, that is to say as two separate factors of empirical and theoretical interest in early childhood. In the next chapter, I frame the personalization discussion from the psychology perspective, with a zoom-in on identity. Identity is another variable or subject of study that has parallels with, but is distinct from, the 5As of personalization.

9

Personalization and Identity

A discussion of personalization wouldn't be complete without a detailed consideration of identity. Identity and personalization are both concerned with questions about the 'self' and the themes of authenticity, authorship, autonomy, aesthetics and attachment. In this chapter, I revisit some key aspects of psychology-based research on identity, relevant for these themes. Identity research is a large field and I selectively focus on aspects that can inform our understanding of personalization in early education and within this field, of children's personalized books and stories. For this purpose, I examine identity expressed through stories and narratives – identity in relation to the multimedia theory and to the diversity theory. The latter opens the discussion to other personalization practices related to self and multimedia, such as selfies and personalized gadgets. While the identity research aims to understand how individual feelings and thoughts relate to a culture or a social milieu (especially cultural, racial or social identity research), the personalization research has thus far focused on the learning benefits of personalized resources (see Chapter 4) or personalized education as an approach (see Chapter 10). Research on digital personalization and identity and on personalization and children's developing sense of self is virtually non-existent. Readers are therefore reminded that in the absence of confirmatory evidence, much of the following discussion is inevitably speculative.

Identity formation and Moreno's theory

What is self? How is self recognized, manifested and studied? Countless researchers have tried to establish the essence of a psychological sense of self – how it develops throughout childhood and whether it is ever achieved. The issue is more complicated than it might appear, because, as Zeman (2016) sums up: 'The self is represented countless times in the brain in a whole variety of different ways- it is everywhere and it is nowhere' (quoted in *The Psychologist*, 2016, vol. 29, 6). Such a conceptualization of self might seem vague, but it fittingly captures the complexity of the phenomenon.

I recognize the rich tradition of identity discussions within philosophy and within developmental psychology but do not have the possibility to elaborate on this complex psychological and deeply philosophical debate. In the space I have available here, I selectively focus on Moreno's theory of development (1946), because it deals with

children's creativity (an issue examined in detail in Chapter 8), because it found large practical application (Moreno's work was further developed and applied in the area of psychodrama and mental health issues, and this was later applied to counselling) and because it neatly separates children's development of identity into four stages and, as such, offers a developmental perspective on identity which is somewhat underdeveloped in the current discussions on personalization.

A summary version of Moreno's four-stage theory is as follows: in the first stage, mother and child have one shared identity; the child lives in the moment and remembers little about what happened. In his book *The Essential Moreno: Writings on Psychodrama, Group Method, and Spontaneity*, Moreno (1987) specifies that in this stage, 'mother and infant and all objects are a single whole' (p. 130), the children cannot distinguish themselves from their mothers and they perceive the mother as part of them (as it was the case physically before birth). In the second stage, the child is able to perceive himself or herself as separate from the mother and others, as well as from other objects. He or she gradually comes to differentiate between reality and fantasy. This is the time when the child begins to develop 'social roles', that is, roles which are conditioned by those around us. In the third stage, the child recognizes himself or herself as an independent individual, by pointing to the mirror and seeing how it reflects his or her gestures. Moreno suggests that this occurs when children are about 2.5 years old, that is, when they become aware of their autonomy and realize that they are a separate human being. This stage also marks the 'second universe', where the child can differentiate not only his or her body as separate from other bodies, but also other dimensions of reality such as space and time. This role is reinforced in the fourth stage, when the child 'places himself actively in the other part and acts its role' (Tauvon, 1998, p. 41). The final stage does not necessarily occur during child development; indeed, some adults may not have fully completed this stage. It refers to the stage when an individual fully separates from the mother–child shared identity developed after birth and understands his or her own role in the world, including creativity. We could graphically capture Moreno's individual stages as illustrated in Figure 9.1.

Next, I provide a simplified exemplification of Moreno's theory by drawing on data reported in full in Kucirkova et al. (2014b). In this study, we examined the effects of paper-based personalized books on children's spontaneous speech. The children were aged between 17 and 56 months, which, according to Moreno, would correspond to different identity stages. For the purpose of the present discussion, I revisited the data and sorted the transcripts by the children's age. I highlighted moments of self-referential speech in the personalized and non-personalized conditions and looked

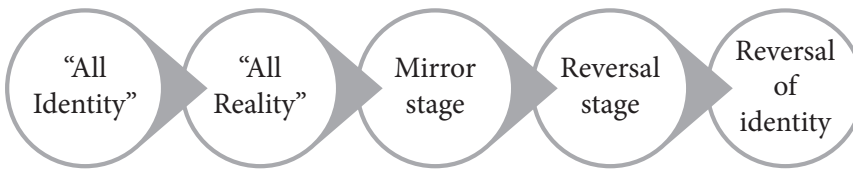

Figure 9.1 Illustration based on Moreno's theory of identity development

through the data, beginning with the child's youngest to the oldest age. Doing so, I noticed an interesting pattern: for the youngest children participating in the study: the self-referential speech was occurring in the non-personalized condition as much as, or even more, than in the personalized condition. This would be normally considered as an outlier in the study, because, as reported in Kucirkova et al. (2014b), for the majority of the children, self-referential speech occurred in the personalized condition. As described in Chapter 7, the personalized and non-personalized books were identical, but they differed in respect of the personal significance of the characters, places and images portrayed. On average, the children who participated in the study talked more about themselves when they read the personalized books. However, it seems to be the case that for the youngest children, the pattern was reverse.

This extract shows Tobias's (pseudonym, 17 months old) spontaneous speech when reading the first two pages of the personalized and non-personalized books.

Personalized condition, first page:

Oh, I don't know

Non-personalized condition, first page:

Oh, that is me!

Personalized condition, second page:

That's me

Non-personalized condition, second page:

That's me, that's me!

Similarly, when another little boy (Matias, 18 months old) saw a boy character in the non-personalized book, he thought that it was him and got confused with who is who in the two books.

Non-personalized book, fourth page:

That's not John

It's me

No, it's me!

It's me!

There were not enough young children with a similar profile to allow me to compare these age differences statistically. However, outliers can sometimes be a very informative part of a research study, albeit not always reported in academic journals. In this case, we can consider the outlier examples in relation to identity and Moreno's stages. According to Moreno's theory, these two boys are somewhere in-between the first and second stages of identity formation – they recognize that they

are individuals separate from others, but they may not have fully formed their sense of self. We can conclude that for these young children, personalization did not make much difference to their ability to talk about self (i.e. their self-referential speech). We could also hypothesize that for children aged 17 and 18 months, it is difficult to distinguish between real and fictional story characters and that this difficulty might be particularly heightened in the context of reading a personalized book.

Let me draw on another example to consider this point further. In the previous chapter, I mentioned the case studies that Dr Sakr and I have conducted over the past four years with Dr Sakr's niece Monika. We studied this child's conversation with her father and their joint engagement with a set of resources, in 2013 and then again in 2016. One striking observation that can be gleaned from comparing the data collected in 2013 and in 2016 is the child's increasing formation of identity. According to Moreno's theory, role reversal happens towards the final stages of a child's development. In 2013, we observed Monika and her father using the iPad. The child was 3 years old and her father assumed the role of the teacher, instructing his daughter how to use it. The discussion was dominated by the father, as illustrated in this short extract:

> Father: 'Do you want to drag it? You pick it up and drag it to there … keep going … woah, you did it. … You can take as many as you like … but don't go so close to things because the camera can't see it because it's too dark, look that's it, you've got to … now try and get the baby seat, the car seat, see the car seat.'

In 2016, we observed the same pair again, using an iPad together, in the same context of creating digital personalized stories. However, this time Monika was guiding her father through the user interface and he was quietly following her instructions:

> Monika: 'You need to press to see anything … then press something to see … ok, read that. … Now you are recording and you can say something … just say anything.'

Father and daughter were at ease with each other and had overall a positive and supportive relationship, which may well be 'flattening' any personalization or identity effects observed in these interactions. However, the example is a convenient illustration of a basic role reversal, which, according to Moreno, occurs when the child takes on the role of the significant other. In therapy settings, role reversal is used to help individuals understand their own position; with young children role reversal helps them gain autonomy as they grow older. The tool (the iPad app) the parent and child used was the same in both instances; however, the child's ability to use it independently and harness its affordances for content production have changed over time. Between 2013 and 2016, the child has matured, developed an increased familiarity with the device and more secure identity. This developmental progress affected the ways the child expresses and experiences autonomy and authorship.

I do not list these selective examples to validate Moreno's theory. Rather, I wish to illustrate the cases where children's experiences and their developmental maturity influence the extent to which they engage in, and connect to, the 5As. They highlight that personalization could be a potentially influencing factor in developmental mechanisms. As yet, we do not have the knowledge to predict possible positive or negative influences. However, from my discussions with teachers and parents and messages reported in popular press and on social media, I know that there is a popular view that personalization negatively influences children's development of identity. In the next section, I analyse this erroneous view.

Considering the negative impact of personalization on children's identity development

The possibility of a negative connection between children's identity development and personalization is appealing to popular press; there are many articles peppered with speculations around children's identity and personalization. Journalists are often keen to cover unusual cases and build causal connections for readers' interest. I have been often asked to comment on cases where young children display seemingly selfish or 'narcissist' behaviour when they take their own photos or selfies, or when they 'boss around' their parents with technologies. It seems easy to assume that the personalized context of interaction (such as the activity of taking selfies) can cause a heightened focus on self and, subsequently, make children ego-centric.

However, the connections are not that linear. Although there are no robust data to assume benefits or negative influences, we can draw on well-established theories to make predictions. The first key point to bear in mind is that children emulate the behaviour of their loved ones. Children's agency is a reflection of the agency possibilities they note in their immediate environment. If children want to dominate and control an activity, this is likely a reflection of what they see in the behaviour of those around them when they are in power. This is not the case of children only – our sense of agency is constantly renegotiated with others who influence our sense of self. As Bruner writes: 'For while people (at least in our culture) think of Self as proceeding "from the inside out", they also tend to think of their own Selves as not radically different from the Selves of others who, in some common sense way, are "like them"' (Bruner, 1994, p. 42). Thus, we need to be aware of the general tendencies in relation to self and separate these from personalization practices.

The second theoretical point of critical importance here is that for overall estimates of benefits, we need to be looking at the whole person, not a set of discrete behaviours, and we need to consider how these might change in a supporting context. As Vygotsky and many other key early childhood scholars remind us, there is a flow of influences between the child, adult and the resources they use. It is unlikely that the personalization features of a specific resource are causal – the child's characteristics and the parent's support can counteract or enrich children's understanding of self. In the Kucirkova et al. (2014b) study, the reading protocol prevented the researcher

from providing individualized support for each child. In real life, this is not the case and parents typically adjust their reading styles according to the child's needs. For example, Hassinger-Das, Mahajan and Metz (2016) found that parents who use supportive reading styles (the dialogical reading style) can overcome the negative effects of distracting digital books. Parents supported children's story understanding even when they read digital books with many interactive features, which are often detrimental to children's learning. Given that for learning outcomes there is a big difference between children's independent and shared use of books, we could expect the same difference for children's identity development too. It might even be that with skilful and sensitive support, personalized books could be used as an effective context for supporting the development of children's identity. At this stage of research, it is important to remember that the effects could be negative or positive and that in all contexts there is a complex interplay of child's characteristics and parent–child interaction factors.

Expanding the notion of context even further, the third theoretical point relates to the definition of personalization and development as a broader nexus of influences. If we conceptualize personalization broadly and subsume under it all self-oriented practices young children can do with new technologies (e.g. taking selfies, creating their own avatars, writing their own books and programming their own games), then there are many areas where this influence could be suspected. Rather than evaluating personalized resources and child's identity in a narrow bidirectional link, it might be more fruitful to think of their relationship in the wider context of a variety of activities and possible influencing factors, including the popular culture, media, socio-cultural values, their family, neighbourhood and peers (Bronfenbrenner & Morris, 2006). For instance, in the case of audio-recording and picture-taking, the socio-economic and socio-cultural backgrounds of a family influence how a child might wish to construct and portray their identity in the digital medium. In some families, for example some Roma families, selfies and personal pictures are considered a 'safeguarding' practice of an 'endangered culture' (Sabiescu, 2009, p. 1). Such a theoretical stance allows us to see that a seemingly bidirectional relationship between personalization and identity could be disrupted or enhanced with a network of other influences that are part of the environment where the child grows up.

In sum, we don't have the data showing one way or the other – personalized practices and digital personalization could potentially negatively or positively influence children's developing identities. I have studied personalization in children's books and reported heightened focus on self (as demonstrated through self-referential speech) with these resources. This doesn't mean that the focus is permanent or that reading of personalized books suddenly makes children egocentric. It is only with rigorously designed longitudinal studies that we can estimate the impact of earlier onset or prolonged use of personalized resources/activities. It is therefore certain that the relationship between children's identity formation and personalization will be a very fruitful future area of personalization research.

The next section is devoted to another key future direction for personalization and identity research: the examination of the relationship between personalization and narrative.

Personalization and narrative

Researchers working in a variety of fields have recognized the close link between identity and narrative. Narrative is a powerful organization tool, and, through narrative, children can organize their thoughts and feelings and thus reflect on who they are. Narrative and identity are 'not separable entities but, instead, serve to mutually constitute one another' (Gover, 1996, online). This is why Cavarero (2014) wrote that children's identity can be specified and accessed through children's own narration and story-making and why Arendt (2013) argued that 'who somebody is or was we can know only by knowing *the story* of which he is himself the hero – his biography, in other words' (p. 186, emphasis mine).

In the examples discussed so far, personalization occurred as part of fictional narratives, embedded in children's personalized books. When discussing personalization in relation to personalized books, we are thus dealing with a very specific case of personalization: one where narrative dominates, and where a potential link to identity can be expressed. In the personalized books studied in my research (summarized in Chapter 6), the text was either autobiographical or based on a fictional story with personalized elements. The text followed a chronological sequence of events, with different story characters and a typical story-arc structure of a beginning, middle (climax) and an end. It is therefore important to ponder the potential influence of narrative on the effects noted in these studies and contemplate whether the same personalization effects would be observed in a non-narrative context. First of all, let us consider the role of fiction as it is often confused with narratives.

The influence of personalization on narrative and fiction

Narrative is sometimes thought to be the same as fiction. However, as Professor Marie-Laure Ryan, prominent international authority on fiction and narrative studies, explains: 'While fiction is a mode of travel into textual space, narrative is a travel within the confines of this space' (Ryan, 1991, p. 5). In other words: 'Fiction is a knowing and self-conscious narrative of events and experiences which cannot be known to have happened' (Ashe, 2015, p. 7). Fiction can be specified as the characters of a game or of a film can be the same, but the narrative within each genre (game and film) could be different. For instance, the narrative of the Little Red Riding Hood is different in a Walt Disney film and in the original European fairy tale. The fiction, however, is the same in all versions: there is a big, bad wolf and a small, innocent girl wearing a coat with a red cap.

The fiction versus narrative difference implies that personalization could be used to influence narrative as well as fiction, but in a different way. An example of personalized fiction are the personalized products developed by Lost My Name, outlined in more detail in Chapter 4. All books published by Lost My Name follow a different narrative based on the child's first name, but the fiction is the same as the characters and the main theme of the book (a child lost his/her name) is consistent across all books. An example of personalized non-fiction was provided in Chapter 7, where a teacher added children's personal data to a mathematics session and

personalized the 'Growing a Beanstalk' activity. Personalized narrative, on the other hand, would be an autobiography, that is a personal story of an individual's life. An example of personalized narratives was provided in the first section of Chapter 4, with the focus on home-made, not mass-produced, personalized books. Narrative and fiction could be therefore used as another element of classification/rubric for personalized books and stories.

In addition, narrative and fiction could be used to clarify some nomenclature confusion mentioned in the previous chapters in relation to personalization, customization and individualization. As explained previously, 'customized' tends to be preferred in the business industry, while 'individualized' in the education sphere. 'Autobiographical' and 'biographical' are terms preferred in the literature field. In the literature domain, personalization and personalized is often replaced with the word 'autobiography' or 'autobiographical' (individualized or customized narrative is rare), or 'biographical' when a piece of text relates to an individual's life but has not been written or produced by this individual. This adds a fourth term to the triad of adjectives mentioned so far (customized, personalized and individualized). In the context of books and literature, the four terms could be placed on a hierarchical line of personal relevance, with autobiographical narratives scoring the highest in terms of personal relevance and fictional narratives the lowest. In other contexts, however, such a principle would not work, as the nomenclature tends to be very field specific.

Given the close relationship between narrative and identity and between narrative and fiction, we could hypothesize that personalized narrative and personalized fiction will impact on children's identity more than non-personalized non-fiction. It seems common-sense that reading a moving biography would impact a child's identity more than reading a book on, for example, car engines. But is it really the case? What is it that is at the core of personal relevance? The concept of a narrative arc and a reflection on fictional as opposed to factual can further bring us to the core of personalization. If we say that a piece of text is personalized, is it because we wrote it (i.e. it is autobiographical) or because we recognize it as something we experienced in the past (i.e. it is a narrative) or because it resonates with something we know (i.e. it is factual rather than fictional)? In light of limited data, such theoretical musings can help our understanding and inform future formal studies. Some support for the discussion can be found in Bruner's work.

Bruner (1990) wrote that we make ourselves through stories that we tell ourselves and stories that we tell others about ourselves. For fiction, the expectation of a possible, imagined world allows us to practice, project and perform different facets of identity. A narrative with its linear structure, on the other hand, provides some order into what would otherwise be fragments of mixed experiences. Stories thus play a dual role of projecting and performing the self. Stories in different forms and formats, with different authorship and thus different degree of the 5As, will influence the self differently. Bruner (1990, p. 43) also writes: 'Self is a conceptual structure, a system for categorising selected memories, for engendering expectations, for judging fitness.' I touched on memory processes and personalization in Chapter 3, by evoking the close relationship between memory and recognition of new words based on a personal pictorial clue or the use of the first person. If we think of identity as an organizing

device for memories, and of memories as a factual narrative, then a theory-driven explanation of personalization is that personalization is the binding mechanism, or the 'glue', between past, present and anticipated self. Such an explanation allows for multiple forms of representation of personalization, including personalized digital stories or books. These personalized resources can be said to contain elements of past self (e.g. photographs of a child from the summer holidays), of the present self (e.g. the child's audio-recordings taken as part of digital story-making) and of the anticipated self, which could be the desired self, portrayed to others in terms of stylized selfies, or the more objectively anticipated self, based on the performance on previous tests and tasks (e.g. the child's individualized reading profile based on the sums of the child's previous reading performance).

Next, I discuss how narrative ties together different versions of self or different fictional and real parts of one's identity. This leads on nicely to two key notions that are related to the trio of fictional narrative, personalization and identity: the notion of a collective identity and the notion of a distributed self.

Collective identity

In their book *Creativity and Writing: Developing Voice and Verve in the Classroom*, Grainger et al. (2005) draw on late Harold Rosen's work to remind us of the connection between stories and collective identities: 'Stories are part of an essential process, the creation and recreation of a collective identity' (Rosen, 1984, p. 16, cited in Grainger et al., 2005, p. 120). Vygotsky does not discuss identity explicitly but researchers building on his legacy maintain that identity is a collective rather than individual phenomenon. Littleton and Mercer (2013), for example, argue that individual cognition is combined with the collective cognition in the process of interthinking. The notion of interthinking, or collective thinking, leads us to the consideration of a deeper, philosophical issue of whether there ever can be such a thing as one self, one author and an individual thinking. Dyson (1997) wrote that we can 'never own meaning, because meaning only exists in the meeting of voices' (p. 180), and contemporary socio-constructivist perspective agrees that self is constituted socially. By a simple extension it follows that a child's authorship and autonomy can never be owned by a child but rather exists in the 'meeting' of multiple selves.

The reason I'm mentioning these concepts here is to make the connection to my argument in Chapters 4–6, in which I wrote that personalization is not a unified concept but rather a multiset of options, a spectrum of possibilities characterizing the self. A socio-constructivist view on identity corresponds to this definition and highlights what Bronfenbrenner and Morris (1998, p. 996) described as reciprocity and complexity in the human interaction with the immediate environment. According to the PPCT model of Bronfenbrenner and Morris (1998), there is a constant, iterative process of interaction between people, processes, context and time. The concept of a collective identity certainly fits the PPCT model better than that of an individual identity. While an individual identity fitted well with Moreno's focus on developmental progress, collective identity can help us conceptualize personalization

processes relevant for broader socio-cultural trends, such as the issue of citizenship and national identity. Collective identity also situates personalization in relation to a variety of broad labels such as 'me generation', presumably capturing the rise in personalization practices in the last twenty-five years. I alluded to the difficulties with these labels and perspectives in Chapter 2. From a socio-constructivist perspective, the process of personalization is essentially a collective process of negotiating various versions of self with others. If we describe a generation of children as self-centred, then we need to acknowledge that this characterization reflects on these children's parents and grandparents. This is not incompatible, but works alongside the notion that self is not unified, neither individually nor collectively – self is always distributed.

I therefore continue this theoretical discussion by concentrating on the notion of a distributed self that is relational and refers to contextual differences and interactions with other agents in various contexts.

The distributed self

A distributed or multiple self needs to be constantly negotiated and re-created through relationships with others, or to borrow from Hull and Katz (2006), constantly 'enacted' in relation to others. One could speculate that stories authored by children contribute to such a negotiation of identities. Hull and Katz (2006) conducted a longitudinal study in which they studied the composing of a digital story by a child and by a young adult in a community setting. Based on their findings, the authors concluded that the digital medium offered the child and the adult unique opportunities to experience their authorship, autonomy and agency. They argue that we 'enact the selves we want to become in relation to others – sometimes in concert with them, sometimes in opposition to them, but always in relation to them' (p. 47).

This quote foregrounds an interesting conundrum: Can personalization be articulated through its opposite effect, through its ability to highlight non-personalization? If we assume that the role of fiction is to provide clues about our lived reality and the role of narrative is to create order in spontaneous, unstructured life experiences, then we could assume that the role of personalization is to highlight the non-personalized aspect of a fictional narrative, to help us recognize our relationship to others (rather than oneself). From this perspective, personalization is not about subjective identity but about social relationships with others. Through personalization, social relations become meaningful; they become signifiers about our own self.

And herein lies the difficulty of personalization translated into concrete, static objects. Personalized books capture and stabilize the process of negotiating self with others; they 'freeze' a particular version of self in multiple formats (audio voiceovers, pictures, text). How might personalized books, personalized education and personalizing learning resources affect the 'gathering' of multiple selves and one's experience of identity? Sceptics might ask whether personalized narratives disrupt multiple selves by reducing them to one particular version of self (the version presented

in a personalized resource). It could also be the case that personalized narratives offer a platform to present and perform a new, alternative, version of self. This possibility has been pondered by some authors and I briefly revisit them next.

Can personalization disrupt identity?

Narrative theories are not medium-free theories: they recognize that the process of individual versus collective interchange occurs differently in oral, virtual or textual narratives. These different modes of representation influence the quality of the narrative, and consequently, the identities constructed through the narrative. Technologies with their multimedia options for narrative provide new opportunities to 'reshape stories' (Madej, 2003, p. 15). In her theoretical article, Sakr (2012) argues that new technologies can disrupt this process and influence a child's sense of self. She outlines: 'The textual artefact acts as a central means of finding coherence between the events, moments and behaviours that contribute to our subjectivity, ultimately enabling the individual to perceive their own subjectivity.' 'Imposing alternative practices or incorporating new technologies into the text-making process should therefore contribute to a new sense of self' (p. 120). Not surprisingly then, researchers are interested in better understanding how new technologies (in the form of popular culture online, social media networks and other virtual spaces accessible through technologies) affect identity.

Marsh (2004) investigated how 2- to 4-year-old children navigated popular and media culture together with their parents. In Marsh and Thompson (2001), eighteen parents of 3- to 4-year-old children kept a diary in which they noted their children's literacy practices across a range of media for four weeks. In Marsh (2004), forty-four parents of 2- to 3-year-old children completed the questionnaires, and half of them were also interviewed by the researchers at home. Collectively, these studies provide invaluable insights into the rich and multifaceted media practices of young children growing up in white working-class families living in publicly owned housing. They also provide insights into children's identity formation in relation to multiple contexts and agents. I pick out one example of young children's exploration of identity in relation to the digital media, which is relevant for the present theoretical discussion of personalization.

This example is discussed in detail in Marsh (2005) and is about a 4-year-old girl Jade, who loved the Winnie the Pooh story and had a number of transmedia products related to this story at home. Professor Marsh portrayed these as a 'narrative web' (p. 37) and detailed that this narrative web included Winnie the Pooh displayed, represented or embedded in Jade's umbrella, cuddly toy, computer game, books, nightdress, writing set, stickers and cards, lunchbox, comics, jigsaw, hot water bottle, cover, Duplo and video. These objects, Marsh (2005, p. 37) writes, 'are central to the development of a sense of identity, or ontological security (Giddens, 1991). Parents, carers and wider family members in these projects all contributed to this synergy between popular texts and identities, buying children more and more items related to a particular favourite figure'. Today, all the objects listed by Marsh (2005) are part

of the burgeoning personalization industry where family members can not only buy a product with the child's favourite character but also the child's name, date of birth or other personal characteristics. For example, parents can buy a personalized Winnie the Pooh book from Getting Personal Ltd, which the producers describe as follows: 'Every child will love to star in their own adventure story with Pooh and friends in our Personalised Adventure Book – Winnie the Pooh. You can personalise the story with the child's name, birthday and even where they live! The inside cover also includes a short dedication with the sender's names, to appear after "With love from…"'. (https://www.gettingpersonal.co.uk/). In addition to books, there are personalized Winnie the Pooh door plaques, signs, stationery, pyjamas, cards, albums, frames, mugs, bedding and thousands of other products. The gifts are affordable and attractive to young children; in fact, it may well be that if the study was conducted a few years later, Jade would have a 'personalized narrative web' of Winnie the Pooh artefacts at home.

The personalized artefacts bring together popular texts with the child's emerging identity and identification with fictional narratives. From a commercial perspective, we could perceive them as an example of a sustainable transmedia model of personalized artefacts (see Chapter 4). From an educational perspective, we could perceive them as part of a narrative that supports the child's entry into the story world of Winnie the Pooh and provides her with opportunities to practice early literacy skills. However, given the lack of autonomy and authorship in these products, we could also perceive them as potentially narrowing, commercially driven and isolating ways of supporting children's identity. In a world of millions of stories, should parents be diversifying or further personalizing children's interest in the popular culture? Furthermore, in relation to the distributed and multiple self, a suite of objects embossed and printed with 'Lucy's Winnie the Pooh' all over send a powerful message to the child about her identity. The fiction is the same (Winnie the Pooh) but the narrative can be different with each of the personalized objects. The multiple formats of the same story reinforce the same story, which, on one hand, can deepen the child's knowledge of the story and, on the other hand, can take away the possibility of diversity (and exploration of alternative selves). Do they therefore disrupt or support the child's identity? There are no single answers to these questions: a developmental psychologist and a socio-constructivist would issue different guidelines for parents. I do not want to sit on the fence but am wary of the limited research concerned with these new phenomena. I therefore highlight a few theories that are worth bearing in mind when answering these questions, regardless of the epistemological tradition adopted by the researchers or educators.

The multimedia theory, personalization and identity

The multimedia theory is a psychology theory that can provide some clues about the learning potential of personalized transmedia objects for young children. The multimedia effect has been fully researched and theorized by Professor Richard E. Mayer and his colleagues at the psychology department at the University of California, Santa Barbara. I have already mentioned the work of Professor Mayer in relation to the personalization effect in Chapter 3. Mayer studied the

personalization effect as part of the multimedia effects that I discuss here. The basic premise of the multimedia effect is that people learn better (more deeply) if the information is presented to them in several (multi) media (such as pictures and texts), than when the information is presented to them only in texts. Mayer et al.'s experiments have shown that the multimedia effect applies to both printed text with illustrations and spoken text and animation on screen (Mayer, 2003). As an explanation for the effect, Mayer (2003, p. 130) posits that learners access more channels with text and pictures and therefore information presented in multimedia is 'more likely than words-only messages to prime all the cognitive processes for active learning'.

In digital stories, that is stories created and shared through technologies, the 'self' is shared and represented through text but also images, sounds and videos (i.e. multiple media). The narrative might still follow a linear structure, but the modes of representing self are multiple, with a more visual or perhaps more concrete way of reassmbling self than it would be possible through an oral or textual narrative. With digital story-making apps such as the Our Story app mentioned in the previous chapters, children have the opportunity to explore, project and perform their selves in a variety of media. For example, they can insert a selfie using the front-facing camera which represents their physical appearance, they can portray their mood by adding an audio-recording and they can enrich this assemblage with a textual caption. They can create their own avatars and explore alternative or virtual worlds. Based on the multimedia theory, we could therefore hypothesize that personalized multimedia stories will be more conducive to children's learning than unimodal technologies. However, the multimedia effect does not specify how many media are needed for which learning situation. It would be too easy to assume that more is always better and that the more media and expression forms of identity we add to children's learning, the better is their learning. According to another psychology theory, there is a limit to how much new information we can take in at a time. The field dedicated to so-called cognitive load theory (see the work by emeritus professor John Sweller, the University of New South Wales, Australia) studies the relationship between the design of learning resources and the limited capacity of working memory. It is well established that prior experience can reduce the experience of cognitive load (Kalyuga, Ayres, Chandler, & Sweller, 2003), but as far as I know, apart from the Sheehy's 'handle' technique (see Chapter 7), no one has formally tested the possibility of reducing cognitive load through visual personalized cues and the effects this might have on an individual's memory/learning performance. It could be that personalized objects and personalized multimedia resources reduce the cognitive load and enhance the multimedia effect. However, it could also be that too many personal clues become overwhelming, defining and limiting, and that they add to the cognitive load that an individual experiences during the learning process.

Presenting Jade with several versions of Winnie the Pooh could potentially increase her understanding of the fiction, but because of the different narrative (and different depictions of the bear in different artefacts), it could also confuse and overwhelm her. If we personalize these different versions of the same story, we could potentially standardize or provide more coherence into these relationships.

Designers and developers are not typically interested in why children respond to personalized artefacts. They are more interested in how to increase their response. During my consultancy projects with children's publishers, I have been often asked about a 'magical number of personalization' – how many elements of a story need to be personalized for a child to identify with it? Designers are also keen to know whether one mode of personalization (e.g. a pictorial personalization) is more powerful than textual personalization, for example. They also want to know whether a specific kind of personalization (e.g. the use of a child's name) is more powerful than another kind (e.g. the use of a child's home address). If we translate these questions into theoretical considerations, we can run into some deeply philosophical questions, such as: At which point is our identity unique to an individual and at which point does it merge into a collective identity? How many elements do we need to define someone's originality, unique personality and authentic character? And is there a notion of self that escapes and exceeds verbal language, which can be activated through pictorial or physical modes of self-representation? These questions might sound abstract and theoretical, but on a practical level they are daily considered by children's publishers and designers.

I have already explained that there is no magical number that would define what counts as personalized and what as non-personalized. In explanation of the 'magical formula' for personalization, I offer a partial answer. A concept worth remembering in this context is what Ryan (2006) calls the paradox of choice. This applies to the often-mistaken view of business (or economics) that more choice is better. Sometimes too much choice leads to paralysis and the user doesn't know what to choose. Similarly, when defining the self, too many attributes may give rise to a confused perception of subjectivity. Alternatively, we could explain the paradox of choice with the notion of collective identity. The more attributes we use to define who we are, the more it is likely that some of these attributes belong to others too and that our individual identity becomes a collective identity. When thinking about the different attributes to define 'self', the theory of diversity can be a very useful framework.

The theory of diversity

Nehring and Puppe's (2002) theory of diversity uses the multiattribute approach to explain the concept of diversity, and as the authors write, it can act as a 'canonical conceptual framework for thinking about diversity'. Written in economics language, the actual algebraic formulation and theoretical argument of the authors is complex and detailed (see the original paper). What is relevant to our discussion here is the concept that diversity is quantifiable, but it is based on multiple attributes. Here is a simplified version of Nehring and Puppe's (2002) requirements for diversity:

1. Individual objects will be valued more highly if they realize higher-value attributes (angel is more than a stone)
2. Similarity and, hence, non-additivity are accounted for naturally (two angels are less than adding to the angel a stone)

3. The marginal diversity of an object is the total value of all its attributes not already realized by the existing set

From these premises I deduce that diversity is essentially an aggregation of dissimilarities, and that these dissimilarities are not in any hierarchical relationship to each other. I further deduce that personalization is an aggregation of similarities, again not in a hierarchical relationship to each other. For example, when personalizing a book for a child, we could use the child's name and the names of her two friends. To increase the value of personalization, we would need to use a third attribute that is not adding to the existing set but that increases its diversity. So, in this example, we would not use the third name of the child's friend but rather ask about, for example, the child's favourite toy. This is more valuable than asking for a third name of a friend if two names of friends are already provided (see point 2 above: similarity and non-additivity are accounted for naturally).

The diversity theory has not been applied to personalization before. For future applications, Professor Nehring (2016, personal communication) rightly pointed out:

> In regards to the intended implementation, I am not sure, though, where the personalization and the diversity components are supposed to enter: in the main character itself, or in his/her lifeworld/challenges/experiences. How deep does the personalization need to be to open the child to different perspectives? Perhaps one might use formal similarity and dissimilarity measures along different dimensions to find out which works best.

Thus, while we may be able to quantify personalization, we need to be careful about the individual elements we are personalizing. There is no magical formula, but the diversity theory was helpful in my own thinking and efforts towards genuine and rich (i.e. authentic) representations of self in children's products. Far too many so-called 'personalized' books and toys for children are based on scripted, template-based notions of self and on attributes that are anything but diverse.

The orientation towards multiplicity and diversity signals a departure from stage theories of developmental psychology and from economics theories interested in simple aggregates. It brings us to a more nuanced understanding of personalization, where each attribute of personalization relates to a specific aspect of a distributed and collective self. The personalization process might activate at times a more subjective and at times a more collective experience of 'self'. They might also encourage more exploration and experimentation of alternative identities. In the absence of evidence, I do not make any claims on these points, but trying to piece this puzzle together will be an interesting and challenging future work.

Before I conclude, I offer one more theoretical digression and briefly evoke theory of mind to interrogate the relationship between personalization and socio-emotional effects. The theory of mind needs to be mentioned in this chapter to redress the balance of a highly cognitive focus so far. Unlike other theories addressed in this chapter, 'theory of mind' is not a theory but a term used to describe a mental ability and it refers closely to socio-emotional skills.

Theory of mind

Theory of mind, emotion knowledge, emotional literacy and emotion talk are all essential social skills and aspects of human communication. Literature scholars know this well and countless analyses of classic texts show how the texts' structure, storylines and characters support children's socio-emotional skills. Good books are educational not just because of the words/ vocabulary they contain, but also because of how they relate to the characters' feelings. The moral story embedded in literary fiction supports children in being able to empathize with the characters, to question and reflect on their own emotions.

We know from studies with adults that different genres impact differently on adults' theory of mind. This was shown in an ingenious study by David Comer Kidd and Emanuele Castano, reported in *Science* in 2013. The researchers compared how adults' theory of mind (i.e. adults' ability to recognize affective and cognitive states in other adults) is influenced by reading literary fiction, nonfiction, popular fiction or nothing at all. The results confirmed the authors' initial hypothesis that literacy fiction is superior in supporting theory of mind (even if temporarily). The authors argue:

> Our contention is that literary fiction, which we consider to be both writerly and polyphonic, uniquely engages the psychological processes needed to gain access to characters' subjective experiences. Just as in real life, the worlds of literary fiction are replete with complicated individuals whose inner lives are rarely easily discerned but warrant exploration. The worlds of fiction, though, pose fewer risks than the real world, and they present opportunities to consider the experiences of others without facing the potentially threatening consequences of that engagement. More critically, whereas many of our mundane social experiences may be scripted by convention and informed by stereotypes, those presented in literary fiction often disrupt our expectations. Readers of literary fiction must draw on more flexible interpretive resources to infer the feelings and thoughts of characters. That is, they must engage ToM [theory of mind] processes.
>
> (Kidd & Castano, 2013, p. 378)

Although these findings have been replicated, there have also been studies that have not found the same effects that Kidd and Castano reported in their original study. The latest evidence says that the effect of literary fiction applies only to a certain group of people, only in certain contexts (*The Psychologist*, December 2016).

Nevertheless, the nub of the story remains that literary fiction with its unpredictable, inconsistent characters, influences theory of mind, that is, the ability to understand that others have a 'mind' and engage in mental processes. In traditional literary fiction, the characters are not known to the reader, and the reader has to 'personalize them', to identify with them, to be able to empathize or sympathize or at least feel some solidarity with them. Personalized books go against this identification principle: they present children with characters the reader has chosen (in the case of self-authored stories), or characters that are the reader himself/herself (in the case of 'personalized'

or 'customized' stories). For customized children's stories, the hero carries the name of the child, but experiences things that the fictional character would normally experience (e.g. in the customized Cinderella book the main character carries the name of the child but the story follows the plot of a poor girl suffering abuse by her stepmother and then marrying a prince). Although such books are very popular among young children, there is no solid data to inform us how these alterations to classic stories might influence children's understanding of the characters' emotions and of their own emotions. Unfortunately, even literacy-related and socio-cultural theories do not provide many clues on these conundrums. Vygotsky acknowledged the importance of emotions for learning (see Chapter 9) but he did not focus on intimate or complicated emotions. Bazerman (2001, p. 175) described this as Vygotsky's 'optimistic view of human interaction'. For future studies concerned with children's emotion knowledge and personalization, different theoretical frameworks, such as Martin Hoffman's theory of empathy and empathic distress, might be more useful. It should be remembered that emotional connections to literary characters are built not only mentally but also through physical touch. In this respect, Zhao and Unsworth's (2016) observations might be of interest. The researchers observed children's interactions with an interactive iPad storybook and suggested that through the haptic, direct interaction with the text and illustrations, young children become more involved with the story and emotionally closer to the story characters than with a traditional paper-based book. This is an interesting proposition, which will need to be put to test with more studies.

Summary

In this chapter, I offered a selective, and therefore limited, view on identity and its relationship (empirical or hypothetical) to the study of personalization. When defining the self and considering children's identity, there are stage theories, which assume a unified self and socio-culturally oriented theories, which highlight the collective and dispersed nature of identity. The diversity theory reminds us that the application of personalization to specific resources should not focus just on quantitative measures of attributes, but carefully distinguish which elements are to be personalized and in which sequence. Given the unprecedented multimedia options to personalize fiction and narratives, emotional aspects of identity development remain a mystery.

The insights from this chapter beg the question of balance between individual and collective self represented in personalized narratives and between quantifiable and dispersed aspects of self captured in personalized fiction. They point to a flexible dynamic 'meeting space' between personal and others' attributes and between the stable and iterative, context-dependent aspects of self. Effective personalized education nurtures these 'meeting spaces', and is not placed at their extremes. This is a premise I have followed in my empirical work and further elaborate in the closing chapters for this book.

10

Touchscreens and Personalized Education

Touchscreens have become new 'playgrounds' for teachers, researchers, designers and children. In this chapter, I use the 'playground metaphor' to stress the multifaceted and rich potential of these devices to support personalized education and outline how the effects of personalized education depend on individual children's needs, the context of their learning and the content of the activities. I focus on positive examples which, of course, are not the norm, and were, in the studies described here, influenced by the use of the Our Story app and teachers' sensitive and responsive pedagogy. This approach is intended to showcase a positive side of personalized education against the backdrop of the techno-centric approaches presented in Chapter 3, and to inject some empirical data into a predominantly theoretical discussion of personalization in the ending part of this book.

Digital technologies and young children: Search for integrated practices

If I wrote this book some five years ago, I would probably need to make the case for why it is important to discuss digital media and young children in the first place. Indeed, if we consider this quote by Parette, Queensberry and Blum (2010), we can see that not so long ago technology was not welcome in early childhood classrooms: 'Quite frequently, a visitor in many early childhood settings might think that young children were asked "to leave their technology at the door" before entering the classroom. Cell phones and other communication applications, computers and other tools may not be allowed by education professionals who use traditional teaching approaches and materials' (Parette et al., 2010, p. 336). Historically, digital technologies have been considered either good or bad for children, and although a yes/no philosophy is not so prevalent among educators now, there are still many early years settings where digital technologies are banned (e.g. in the majority of settings that follow the Montesorri model) and there are still many families where children are not allowed to use technologies (or only under strict restrictions). These approaches are often based on the assumption that young children learn better and can have richer experiences when they interact with natural materials and spend time outdoors. It is assumed

that technology-based and natural environments are not compatible and that one replaces the other. A contrasting understanding of technologies in early childhood is that the two cannot be separated and that they mutually enrich each other. As Siraj-Blatchford (2015) explains: 'ICT [information and communication technology or interactive media] is now ubiquitous and mobile, many preschools have found scope for the integration of ICT in young children's outdoor play environments and ICT also provides a means of bringing the outdoors learning environment into the classroom' (p. 18).

Rising use levels

In this chapter, I outline studies where children aged 2 to 8 years used technology as part of their early learning, with the support of their peers or teachers or parents. When discussing and conducting this research, I followed the rationale that the question of whether technology (and, by extension, digital personalization) is good or bad for young children is of little practical value. For the majority of children growing up in the Minority World, technology is part and parcel of their lives, including those of the youngest children. This is unlikely to change in the future – national and international surveys document clear growing trends of technology use among increasingly young children (e.g. Bergström & Höglund, 2014 in Sweden; National Literacy Trust Annual Survey, 2016 in the United Kingdom and Madden, Lenhart, Cortesi, & Gasser, 2013, in the United States). For example, in the United States in 2011, only 10 per cent of children under 2 had ever used a mobile device (Common Sense Media & Rideout, 2011). This increased to 38 per cent of zero- to 2-year-olds in 2013 (Common Sense Media & Rideout, 2013). For the youngest children, a nationwide survey showed that zero- to 2-year-olds are using an average of one hour and fifteen minutes of screen media per day, primarily watching TV or videos (Wartella et al., 2013). The rising use is happening among all sections of the population; for example, a study conducted in a low-income urban community showed that almost all (97 per cent) zero- to 4-year-olds who are registered with the paediatric clinic in this community had used a mobile device (Kabali et al., 2015).

My approach to digital personalization is informed by these data and the outstanding research of my colleagues and international scholars who are looking for effective ways to integrate and not separate the digital and non-digital forms of early childhood education (see, for example, the work of professors Cathy Burnett, Karen Wohlwend, Jennifer Rowsell, Jackie Marsh and many others). The more we can involve young children as authors, makers and producers and empower them to experience authentic learning opportunities, the better it is for the future generation. Clearly, the use of technology and digital personalization are broad blanket categories and we need to be asking who uses which device for what purpose, for how long, in which context and for which activities. Age is probably the most discussed factor in these considerations.

Children under the age of 2 and digital technologies

Without a doubt, the use of technology plays out differently for different children, depending on the children's age and other demographic factors. Very young children (those aged less than 24 months) may not have the maturity level necessary for purposeful use of technologies. The use of technology more generally and digital personalization more specifically for this youngest age group needs to consider some additional factors, which are fully described in the helpful guidelines produced by Lerner and Barr (2014) and the American Academy of Pediatrics (revised statement published in 2016). In sum, they need to be evaluated in relation to the development of children's specific skills (fine motor, gross motor, language); in relation to the specific context in which these young children grow up (e.g. supporting family backgrounds vs. deprived families or remote parents); and the emerging research evidence on the impact of specific features of technologies (e.g. interactivity) on the development of key competencies in this sensitive period. The period after birth and before the children turn 2 is an especially crucial developmental period, but it does not mean that 2-year-olds are a homogenous group and that they all respond to technologies in the same way. I have detailed the impact of technologies on this crucial development age period with two leading US paediatricians – Dr Jenny Radesky (University of Michigan Medical School) and Professor Barry Zuckerman (Boston Medical Schools) – in specialist articles and refer the interested reader to Kucirkova and Zuckerman (2017) and Kucirkova and Radesky (2017). I deliberately and consciously do not include children under 2 in my discussions of digital personalization and in my empirical work because of the additional considerations necessary for this age group.

I began the discussion of children and technologies more broadly and now move from the funnel approach to the specifics of digital personalization with touchscreens. 'Touchscreens' is an umbrella term for a suite of touch-manipulatable devices: iPads, tablets and smartphones, also known as personal mobile technologies, or interactive media. Touchscreens have some features that make them different from other technologies and I summarize these features next.

Touchscreens: Key features

Anyone who has seen a touchscreen would notice that touchscreens are different from desktop computers because they have a touchscreen interface and are designed to be lightweight and portable. Thin and light devices are easier for transportation between formal and informal learning environments (e.g. the same device can be used at home as well as in school), between inside and outside (e.g. tablets can be taken outside or for school trips) and for travelling (e.g. taking tablets on board of flights and for car trips). Undoubtedly, this characteristic facilitates children's learning across the traditional boundaries of school and home (Sharples & Roschelle, 2010) and across formal and informal learning environments. From the perspective of the 5As of personalized education, the key novel affordances of touchscreens are their touch

manipulation and multimedia and I will therefore focus on these two features. As explained in Chapter 8, I conceptualize these features as 'affordances', that is, not only as the physical properties of the devices but also as the learned behaviours, activities and relationships associated with these features.

Multimedia refers to the combination of several media into one device, which can produce the so-called multimedia effect. As discussed in the previous chapter, the multimedia effect can bring about potential learning benefits (see Mayer's studies). In addition, multimedia in touchscreens can offer multiple engagement options for children, as well as teachers and researchers. This is how I arrived at the playground metaphor.

The playground metaphor

The combination of several media into one device means that touchscreens can be used by researchers for a number of research activities: to collect video or audio data, to take photographs or notes, to look up and use information, to collaborate with colleagues and to curate and share files. The availability of these multiple functions within one device can foster collaboration among various stakeholders and can lead to productive design-based research (Kucirkova, 2016a). Similarly, teachers can use touchscreens for a number of activities: they can create, edit and store photographic evidence of children's activities, access and curate information about selected topics of interest, contact children's parents and install specific apps on the devices. The simplicity of the content management and distribution functionality means that teachers can easily create, compile and edit resources. This can support the accumulation and curation of a rich repository of resources over time. It can also invite contribution from parents and pupils and can lead to collaborative digital projects. I have highlighted the benefits of these multiple functions and functionalities in several professional articles (see Kucirkova, 2014c, 2015b, 2016c). What I discussed only in passing is the fact that touchscreens are a great new playground for the children too: touchscreens offer apps (programmes) for storytelling, sharing pictures and reminiscing, for writing and practising reading, building puzzles and imaginary worlds, colouring and drawing, playing matching games, recording their own voices and thousands of other options. Just like on a traditional physical playground, there is a range of different activities supporting different skills (with the main difference being the fact that with touchscreens children cannot develop the full range of fine motor and gross motor skills as they could on a physical playground).

Thus far, studies have critically evaluated the educational potential of touchscreens for young children's learning and play (Flewitt, Messer, & Kucirkova, 2015; Hutchison, Beschorner, & Schmidt-Crawford, 2012; Sandvik, Smørdal, & Østerud, 2012). These studies, together with some theoretical (Falloon, 2013; Kucirkova, 2014b) and qualitative review analyses (Neumann & Neumann, 2015), described instances of children's motivation and engagement during touchscreens' use. In this chapter, I focus on the potential of touchscreens to support personalized education (as defined by the 5As introduced earlier in the book).

The possibilities of touchscreens for personalized education

In evaluating the potential of touchscreens for supporting the 5As of personalized learning, I use three key broad evaluation criteria of screen time, as suggested by Guernsey in 2012: the importance of context, content and individual child (3Cs; Guernsey, 2012). All 3Cs are closely related to the specific affordances of touchscreens that directly influence the learning possibilities. For instance, the extent to which a particular child (e.g. a child with reading difficulties) benefits from reading a personalized digital book about oak trees (the content of the book) when visiting her grandparents (i.e. the context) depends on the book's educational features and how the child responds to these affordances.

Impact on individual children

As mentioned, two distinguishing features of touchscreens are their multimedia and touch manipulation. There is one single 'Home button' for easy finger navigation, without the need for a mouse or another extra input device. This largely facilitates independent learning by young learners or children with motor impairment who often lack the dexterity skills necessary for manipulating PCs and other technologies.

With my colleagues Dr Val Critten (who, at the time of the study, worked at a special school for children with physical disabilities and communication difficulties in the south of the United Kingdom), Jane Harwood (who worked for the charity Open Storytellers in Somerset, the United Kingdom) and Professor David Messer from The Open University, I conducted two case studies exploring the potential of touchscreens for individual children attending special needs schools. We described two case studies in our co-authored article for *Communications Disorders Quarterly* (Kucirkova, Messer, Critten, & Harwood, 2014). For convenience, I summarize the main findings from these studies briefly here. In Case Study 1, Val used the iPad app Our Story in her classroom of six boys and three girls aged 7 to 9 years. Val used the touchscreens available in the classroom with the specific aim to support children's authorship and autonomy. The activity was the creation of a collaborative digital story, based on the children's trip to a spinney. The final story contained pictures taken with the iPad camera, short dialogues recorded by the children and short video excerpts of the children acting the story out in the sensory room. Selected elements of the story were personalized by the individual children depending on their abilities and interests and the final story was a collaborative amalgam. When Val reflected on the benefits of this approach for the individual children in her classroom, she concluded that each child benefitted differently. The description of these individual gains is important to be mentioned here as it fittingly illustrates the fact that the outcomes of a personalized intervention are very much unique – or personal – to each individual child.

> For Rafiq and Lily, who had limited or no verbal output abilities, the app [Our Story iPad app] enabled them to make substantial contributions to a group story-making activity by taking pictures of each other in the costumes, which were later

> used as part of the story. Both children took the two leading roles in the drama, and due to their inability to say lines, a collective class decision was made to narrate the play so that Rafiq and Lily could mime their roles. In contrast, for two of the more advanced communicators in the class (Calum and Habib), the app provided opportunities for negotiation and insertion of appropriate dialogue excerpts during the audio-recording of the story-creation process. Both boys have physical difficulties with turning pages in books, and the app facilitated their access to the individual story parts (the boys could swipe the pages of the digital book on the touch-sensitive screen). This allowed to meet the target of independent decisions during story-creation and story-sharing. (p. 47)

There is of course a caveat to these results. This study took place in a special school where practitioners are encouraged to take time and care to evaluate the benefits for each individual child. This is different from typical/standard schools where children's outcomes and the success of an intervention are evaluated in terms of average scores and percentages of students above the optimal achievement level. Val further wrote:

> For John, who was the most able speaker in the class and the person who often monopolized speech-requiring activities, the app was used to support his social skills development (e.g., taking turns with other children who contributed to the storymaking). For the two children on the autistic spectrum (Martin and Robert), the app was used to capitalize on the iPads' attractive visual display of photographs and the resulting story. For Jane, who could not see the screen because of her visual problems, and Nina, who was unable to be left with an iPad on her own because of her erratic behaviour, supplementing the iPad story-making with an acted-out session meant that their target of sustained attention and ability to listen to others could be achieved. (p. 47)

In sum, in this classroom, the use of the Our Story app supported children's authorship of their own stories and thanks to the teacher's sensitive scaffolding, children's aesthetic choices, preferences and abilities were embraced and celebrated in the activity. This enabled each child to make an authentic (genuine) contribution to the activity and take ownership of their part of the story. Again, it is worth pointing out that such personalized learning would be difficult in a typical classroom setting where teachers follow a standardized curriculum and assess children on standardized measures of achievement.

In the second case study, Jane worked with Sally, a 12-year-old girl who attended a school for children with physical and intellectual impairment in the north of England. Sally didn't have a specific diagnosis. When formally assessed on the British Picture Vocabulary Scale test, her score reflected language skills of a six-year-old child (standardized score of 55). Jane used Our Story with Sally because she was keen to support the girl's autonomy in sharing personal experiences and opening up about her feelings. Sally took on the task with keen interest. With the iPad, the girl took pictures of several members of staff in the school, including of Jane, and added short captions expressing her feelings about these people. She also made short audio recordings and

demonstrated a clear interest in polishing and refining her story in the course of the individual sessions Jane had with her over six weeks. Jane noted that Sally became much more responsive to others during her story production: she asked the teachers whether they would like to be photographed and she also asked the head teacher for permission to take a picture of the school's main office. The possibility to take pictures and immediately view them on the big screen facilitated the brokering of photographs and led to some shared laughs as Sally was discussing the best shots with the teachers.

These early studies with Our Story and children with atypical development taught me a lot about the value of personalization in digital tools, about the importance of ergonomic design of touchscreens and the importance of flexibility when it comes to accommodating all children's needs. At the same time, they made me reflect on the value of digital personalized stories for typically developing children in a classroom. For these children, the focus of research has not been so much on individual gains, but more on the impact of specific resources (i.e. *content* of personalized education) and school environments (i.e. *context* of personalized education).

The impact of content

The content is with touchscreens created with the individual software programmes designed for the devices – the so-called 'apps' (short for applications). Unfortunately, as with many other resources developed for young children, the efficacy of the learning potential of an app is rarely reported by the app designers (see Kotler-Clarke, 2016, for a discussion on this issue). The reason is simple – it is unknown; the designers do typically not test how well an app can support children's learning. For their seal of approval, the app must provide children with fun play opportunities and motivate them to use it for repeated or prolonged time. This, many argue, is not necessarily educational.

Educational content of apps

When Vaala, Ly and Levine (2015) assessed the educational quality of 183 most popular apps (selected from the top fifty educational paid and free apps in the various app stores developed for young children), they found that 71 per cent of these apps did not provide information on an educational basis or pedagogy of use and almost half of the apps did not mention the expertise of the team who had developed them. In this book, I discuss personalized education facilitated by the Our Story app, which, as mentioned, has been developed as part of my doctoral studies, with input from teachers, parents and a team of people at The Open University. Given that this is not the trajectory of most educational apps, the results of Our Story studies are not generalizable to all learning situations with touchscreens. Our Story is a multimedia app and it works best on iPads which are touch-manageable. These two affordances work particularly well with open-ended content possibilities. Unlike most apps developed for young children, Our Story has almost no content – it is best thought of as a scaffolding for others to add their own content. As an open-ended space for

content creation, Our Story provides teachers and children with space where they can add their own materials and author their own multimedia stories. This is different from most story-making apps developed for young children because these contain story templates, story excerpts or story props and thus guide children in certain direction of content production.

The lack of content, or, phrased more positively, the availability of an open design space, is an important factor contributing to children's learning. This was documented in Kucirkova et al. (2014) with forty-one preschoolers in a Spanish preschool.

Open-ended content

In 2014, I received a personal grant from the Santander Bank to conduct a study with touchscreens in Spain. This led to a six-month-long study in two preschools in the Madrid suburban area. Together with professors Messer, Sheehy and Fernandez-Panadero, we studied children's peer talk in relation to different apps used by the children attending the preschools. The findings showed that children's use of exploratory talk (which is the most desirable type of classroom talk; see Mercer & Wegerif, 1999) was highest when children used open-ended apps (vs. predefined, closed apps). Open-ended apps are more conducive to personalization than closed apps because, naturally, they provide more possibilities for a child to express themselves. Interestingly, the open-ended nature of Our Story did not induce children into independent but into collaborative story-making in the classroom. During the story-making, children needed to talk to each other to negotiate which pictures to select from the shared classroom photo gallery, which name to type in the box describing the pictures or whose voice to record to accompany a picture. Children who were less skilled with technologies asked their more IT-savvy friends for help when they couldn't get the picture they wanted on the storyboard or when they accidently deleted the audio-recording. Children with more advanced literacy skills supported their friends when typing their names in the story box and those who were keen to make new audio-recordings or take new photographs spoke with their friends as they needed to negotiate their access to the device. The fact that the app did not provide them with any guidance or templates meant that they needed to talk to each other to use the app. In contrast, when the children used puzzle-making apps, they barely talked to each other and in silence completed their individual pieces. This is perhaps not surprising if we consider the fact that with puzzles the goal of the activity is to complete a predesigned pattern that is clear from the beginning and there is only one way to achieve that goal (to put the disparate pieces in order). However, authoring multimedia stories with Our Story meant that the children asked more 'W questions' (who, when, why) and used more sophisticated sentence structures – akin to a problem-solving scenario.

The importance of open-ended content for children's learning was also discussed by Falloon and Khoo (2014), who observed 5-year-old children interacting with a range of iPad apps in New Zealand classrooms. In addition to peers, the researchers assert that for higher-quality classroom talk with open-ended apps, the teachers' support in establishing 'ground rules' is indispensable. All told, for preschool-aged

children (between 4 and 5 years), the use of open-ended touchscreen apps with peers' and teachers' support can facilitate effective personalized education. Notwithstanding, this conclusion should be viewed as applicable to a specific learning context, namely that of a preschool where the children and teachers provide support to each other. The affordance of an open-ended content of Our Story is taken up differently in different learning contexts.

Impact of context

In 2014, I had the opportunity to examine the value of personalized education (as facilitated by the Our Story app and teacher-selected apps on iPads) in three different contexts. This was a study conducted at the beginning of the 'iPads era', between 2011 and 2012, when the devices began to emerge on the market. In those years, iPads were predominantly bought and designed for home use or high and secondary schools, but not early childhood classrooms. Intrigued by the prospect of using iPads in British preschools, Dr Flewitt, who worked at that time at The Open University, Professor David Messer, my former Phd supervisor, and I received some pump priming funds from The Open University to conduct a study to evaluate the benefits and limitations of using iPads in preschool settings. We approached three different settings: Children's Centre nursery (3- to 4-year-olds), a primary school reception class (4- to 5-year-olds) and a Special School (7- to 13-year-olds) and we observed the use of touchscreens in these three schools for two months. The teachers in these schools had not used iPads before and we therefore spent some time on professional development prior to the use of the devices. We were primarily interested in how the teachers would integrate (or not) the devices into their existing practice, whether iPads would disrupt or enable innovative pedagogy and whether the Our Story app would support personalized learning. On a practical level, we hoped that the possibility to try out the devices for a longer period of time would enable the settings to make an informed decision about the value of the devices for their settings before they make an investment and commit to a large-scale purchase of the devices. In addition to Our Story, we uploaded some simple literacy and maths apps to the devices and showed the teachers where they can find more apps and how to download them.

Given the open agenda of the evaluation and the different set-up of each setting, it was of no surprise to us that we found differences among the three settings, with the iPads playing a different role in each context. Our goal was not to compare the three schools against each other but to find common threads and similarities of use. Let me first outline some commonalities in relation to the limitations of using touchscreens overall, for any type of education.

Barriers to effective use of touchscreens in schools

In all three settings, the teachers needed to overcome some logistic and pedagogical limitations before they could use touchscreens effectively in their classrooms. The

barriers that impede any effective educational practice include: (1) cost (the cost of the hardware and accompanying systems needed to support their effective use in classrooms such as high-speed Internet, secure online storage area, protective covers); (2) lack of time necessary for professional training supporting effective classroom deployment (especially for educators who are not frequent IT users and in settings with no dedicated IT support) and (3) lack of pedagogical knowledge related to touchscreens' use in the class. As for the financial barrier to the use of touchscreens in schools, it should be remembered that the cost of hardware is not the only investment schools need to make with touchscreens. Decisions around the purchase of individual apps need to be negotiated with individual teachers. Also, in another study, we found that the limitations of the school's broadband capability were a bigger financial and logistical barrier than the actual purchase of iPads for the school (Kucirkova & Littleton, 2016). The process of incorporating iPads into the classroom took significantly longer than anticipated as permissions at local authority and information and communication technology (ICT) service provider level had to be brokered and secured. Thus, the school's basic digital infrastructure needs to be reviewed and updated before any touchscreens and personalized education discussions could take place. As for the professional training barrier, the difficulties of using iPads in the classroom, as noted in Flewitt et al. (2015), were similar to previous technology-supported interventions in schools. The key limitations of staff using or rather not using iPads related to technical problems and lack of dedicated technical support when problems occurred. Given the iPad's novelty at the time of study, many staff had limited expertise in handling the devices and often found it overwhelming to have to manage a classroom with a new device in their hands. The possibility to take the device home and explore its usability at their own pace mitigated against this limitation somewhat. However, not all members of staff were ready to dedicate their free time to learning how iPads worked and maintained that they could achieve similar goals and exciting activities without the technology (this was the view expressed especially in the early years setting). Our study strongly indicated that it is essential that teachers attend any training or induction session with a clear idea for the kind of activities they envisage to support with the touchscreens. Here, Colwell and Hutchison (2015) remind us of the need to give teachers and preservice teachers the time and confidence necessary for searching resources, which would be best aligned with their own pedagogical goals. In addition to online independent staff development, teachers can meet and collaborate with other teachers face-to-face and shadow classes where colleagues can exemplify and inspire each other with what can be achieved using specific apps. In many respects, these barriers are not unique to touchscreens – time, cost and lack of pedagogical training are the three key limitations we find time and time again in studies documenting the use of technology in school environments.

So, was there any added value of having the devices in the three classrooms we observed? One dominant theme across the three schools was that when the touchscreens were used in classrooms in a planned and careful way, they offered the children unique opportunities for enhancing their communication, collaborative interaction as well as independent learning. Conversely, haphazard use combined with little critical evaluation led to frustration (for the children as well as staff),

poor classroom management and low-concentration levels. These broad-brush findings gave way to a more detailed examination of the iPads' value for personalized education.

Benefits of using touchscreens in schools (from the 5As perspective)

A full report of the benefits we observed in the three settings is provided in Flewitt et al. (2015). We did not compare the positive effects against baseline data and we did not have information on the benefits or limitations of other technologies used in these classrooms before touchscreens. The research is therefore largely descriptive and not explicitly tied to personalized education. In this section, I pick out benefits that impact on, or are related to, the 5As.

For lessons where the teachers identified clear learning goals and purpose of the activity, the use of iPads offered children rich opportunities for independent (autonomous) as well as collaborative learning, which, in some instances, enabled them to achieve higher levels of accomplishment than with traditional resources. This has led the teachers to re-evaluate the children's competences. For instance, one teacher told us that after she had seen a 5-year-old Harry using the app Doodlefind, she realized that his spelling abilities were much more advanced than she had previously thought: 'He's been reading Level 7 reading books and all of a sudden he could read every single word that flashed up and get really high scores and I sat down with him with the reading books and we've moved him up 7 reading levels because I didn't realise' (p. 301). Touchscreens not only allowed children to demonstrate their skills but also unlock their potential in areas previously not considered or not available in the class.

In the special needs school, we observed how a 13-year-old Robert produced a colourful image by using one of the iPad colouring apps. This was the first colourful image Robert had ever produced in the classroom unassisted. The iPad colouring app offered Robert a range of templates and colours to choose from and enabled him to produce an image that he was proud to share with the class. For Robert and other children who typically struggle with independent use of resources, the touch manipulation of iPads, combined with embedded scaffolding in the app, opened new avenues for authorship. In this instance, the boy's authorship was enabled through a template-based app (not an open-ended app) as it was the case with Our Story in my other studies.

Another positive outcome noted in the studies was children's attachment to the devices, regardless of whether the devices were used for pure entertainment or for a formal learning activity. To a large extent, the iPads connected children's experiences at the school and at home. For children, who had no or minimal exposure to technology at home the use of iPads in the school afforded a new learning opportunity and enabled them to have an on-par experience with their peers. For children who already had touchscreens or iPads at home, the use of the device at school extended the home use with additional or alternative activities.

It could well be that the multimedia affordances of touchscreens, coupled with a range of apps available for young children's use and an unrestricted intervention,

influenced the range of outcomes and idiosyncratic responses of the teachers and children to the devices. This variety can be usefully explained with the playground metaphor.

The playground itself is not deterministic or judgemental – it offers certain possibilities for engagement (affordances) and these need to be orchestrated by its users. The users decide how the individual playground facilities are used, who participates in what, for how long, alone or with others and so on. While recognizing this range of options, it would be erroneous to assume that the playground itself is neutral. Some playgrounds have equipment for practising a range of skills, while others offer a limited range of facilities. Some playgrounds offer educationally designed, environmentally sensitive games areas, while others might be inappropriate or even harmful for children. A playground, very much like an iPad, is a space designed by humans, who have a certain agenda, ideas and views about children's play and childhood more generally. As mentioned in Chapter 1, these views can sometimes clash and lead to different research paths and results. I mention the obvious here because of the many large-scale government-funded initiatives that led to deployment of touchscreens in public schools and which reported mixed results – for example, in Turkey (The FATIH Project), in the United States (The LAUSD project in Los Angeles); in the United Kingdom (iPad Scotland), in Australia (department's iPads for learning trial), in Malta (Tablet Pilot Project) and in New Zealand (see for example the Tauranga's Te Akau ki Papamoa Primary School). As detailed in Chapter 3, innovative practices occur when new resources are used to enrich existing best practice, not to replace it.

I had the privilege to work with some enthusiastic professionals whose pedagogy strongly influenced the positive effects we observed in their classrooms. Yes, the touchscreens contributed to the positive effects, but when scrutinized with respect to the touchscreens' overall educational value, it is clear that the benefits came about because of the teachers' pedagogy. In 2014, I therefore advocated that we need to consider the extent to which touchscreens could 'act as an innovative pedagogical support to current classroom practices and instructional strategies' (Kucirkova, 2014a, p. 2). This chapter touched on but did not discuss in detail what the innovative pedagogical support could look like. I take on this task in the next chapter, where I present three possible pedagogies: embodied learning, design pedagogy and democratic pedagogy, which are particularly relevant for tablet-based personalized education.

Summary

From my studies concerned with children's use of touchscreens in the UK and Spanish classrooms I conclude that the educational value for individual children is very much determined by the content of the activities they engage with and the overall context supporting their engagement. Teachers need to mitigate against the practical barriers of touchscreens' use in public schools, and together with the researchers they

need to be mindful of how the interplay among the 3Cs (i.e. context, content and individual child) affects the overall educational potential of these devices for early learning. Touchscreens afford opportunities for authorship, authentic home–school connection and children's ownership of their own learning. These benefits, however, can only be achieved with effective pedagogy, which is often omitted from large-scale school technology reforms. This is why I dedicate the last two chapters in this book to pedagogies and the pedagogical techniques and frameworks facilitating digital personalization in schools.

11

Personalized Education: Pedagogical Possibilities

This chapter builds on the empirical work presented in Chapter 10 by discussing the pedagogy that could support children's personalized learning with touchscreens. I outlined how the use of open-ended content with the Our Story app supported classroom collaboration and produced different outcomes for individual children taking part in the studies. The benefits of using touchscreens also varied in each of the three educational contexts we examined in Flewitt et al. (2015). From a socio-constructivist viewpoint, the 3Cs (i.e. context, content and individual child) jointly influence the overall learning benefits. However, many scholars tend to ascribe emphasis to one of the 3Cs and discuss the educational benefits in terms of child's developmental characteristics or the context of engagement or the content of the activity. This can be a tension-generating force in research and practice. I maintain that when it comes to effective pedagogies, the 3Cs should be approached not as a conflictual question, but rather a question of balance among the three elements. All three elements are influenced by the affordances of a specific resource (such as the touch manipulation and multimedia of iPads), but ultimately, it is the pedagogy of the teachers involved in orchestrating these affordances that ensures holistic and sustainable educational experiences.

With this notion in mind, I now turn to a theoretical discussion of effective pedagogies for personalized education with touchscreens and young children. In addition to the affordances emanating from the use of Our Story, I discuss the affordance of touch manipulation and haptic engagement to propose the pedagogy of embodied learning as a positive example of personalized teaching. The possibility to easily create and share content is another key affordance of touchscreens and is in this chapter considered in light of creative pedagogy and in light of design pedagogy with a community of learners. I conclude by invoking the link between the democracy and effective implementation of personalized education in early childhood classrooms.

New pedagogies

I have critically described technology-driven personalized education at the beginning of this book and argued that we must not be complacent with the status quo. Personalized education and education, more generally, should be driven by teachers, not technology

providers. This doesn't mean that technologies cannot push the boundaries of innovation or inspire transformation in practice. Quite the opposite. In many respects, the presence of touchscreens in the classroom has renewed interest in some effective pedagogies of the past, including creative teaching and child's authorship. In schools worldwide, touchscreens inspired the so-called 'maker movement' where students actively create and co-create the teaching content. A creative pedagogy effectively supports such approaches.

Creative pedagogy

In Chapter 8, I discussed creativity in relation to the 5As, parent–child engagement and learning at home. As for creativity in schools, we find many synergies with children's autonomy, authorship and authentic engagement in the task. Based on their observations of creative teachers in British preschools, Cremin et al. (2006) proposed that the pedagogy of creative teachers is characterized by three key features: (1) the 'standing back' strategy, in which the teachers discursively position themselves as agents of possibilities or 'what if' agents; (2) profiling learner agency, where teachers actively listen to children and engage in their activities; and (3) creating time and space in which learners' ideas are taken seriously and their independence is actively sought. Creative pedagogy is therefore best understood as a set of strategies adults can use to empower and support children. These strategies are not limited to school settings – to a large extent, we observed these strategies in the home context and in the ways father supported his daughter's text-making with digital and non-digital technologies (see Kucirkova & Sakr, 2015). A creative pedagogy is a pedagogy that welcomes authorship and authenticity, and that empowers the child to be an independent learner and thinker. Creative pedagogy is therefore a perfect candidate for a pedagogy of personalized education.

Creative pedagogy has been traditionally thought of as something teachers or caregivers, that is, real human beings, can do. However, with the advent of customisable technologies, affordable multimedia devices and intelligent personal assistants, creative pedagogy can be also embedded in a specific device. For instance, there are apps for film-making which provide some tips and advice through audio-recorded prompts or pop-up messages encouraging the creator along the production process. Also, some learning programmes are designed with tracking data to issue prompts and help according to the user's progress (see Chapter 3 and the technology-enabled personalization models).

However, the design of the resources has focused on learning and convenience rather than creative activities. For adults' users, great progress has been made in terms of the personalized support provided by intelligent personal assistants, such as Siri or Google Now, developed for adults' use. These programmes provide tailored support in terms of supplying the user with requested information, and work best if they are combined with the use of several Internet-enabled devices (Internet of things) and several access points. However, the technology is used to support content delivery rather than content production and its optimal functioning necessitates the user's

input – the software can't make a pedagogical judgement a teacher could do. Creative teachers use several pedagogical techniques and one such technique is the pedagogy of embodiment, discussed next.

The pedagogy of embodiment

Embodied learning is particularly relevant for a discussion focused on touchscreens and personalization. With touchscreens, embodiment is facilitated through touch manipulation, which, when combined with the device portability, impacts on children's subjective experience of autonomy in an activity. In the next section, I therefore consider in more detail how through haptic and embodied learning, touchscreens can afford the 5As of personalization.

Touch, haptics and young children

A key affordance of touchscreens that facilitates personalized education is touch manipulation. Touch can be understood in a narrow sense of a sensory experience between our hand (fingers) and an object or, in a wider sense, of a whole body experience of the space (see Carolan, 2007). I pursue the latter understanding, which includes the 'relations, sensations, and non-representational knowledges' that a 'tactile space' can engender' (Carolan, 2007, p. 1264).

Although touch is one of our five basic communication senses (sight, hearing, smell, taste and touch), when it comes to everyday communication, it is not given the same weight as the other senses, especially in schools. However, touch is probably the earliest to develop from all communication senses. For young children, touch is essential for navigating the space and responding to others and objects within this space. Just how early touch develops and what children can and cannot understand through touch is difficult to tell. Deacon (2010) writes that touch 'is one of the most advanced senses at birth, and premature babies born as early as 25 weeks' gestation are aware of being touched'. Of course, there are many kinds of touch, depending on the purpose and context. Young children use touch to learn about the world around them; they touch things to be able to estimate the surface quality and size of objects or learn that some things are hot and some are cold. Psychologists describe this awareness as haptic awareness ('haptic' from the Greek word *haptikos* 'able to touch or grasp'; see Oxford Dictionary).

Children can develop their haptic awareness by touching and manipulating various apps on touchscreens and, in addition, touchscreens can support children's fine-motor development (Bedford, de Urabain, Cheung, Karmiloff-Smith, & Smith, 2016). Crescenzi, Jewitt, and Price (2014) argue that touchscreens can facilitate a synergistic physical-mental learning experience through the orchestration of a complex touch repertoire. The researchers examined seven nursery-aged children drawing their own pictures on paper and on iPads in a London nursery. They looked in detail how these toddlers navigate through a selection of painting apps on the iPad (Doodle Buddy app, Coloring Zoo, Fingerpaint Magic), as compared to their finger painting on paper. A

multimodal analysis found that children deployed a wider range of touch movements than when using the paper for painting. With drawing on the iPad, children had to tap, press, straight stroke, circular stroke and scratch, and evaluate a number of specific touch qualities such as estimating direction, scale/size, speed of touch, duration and pressure. As a result, Crescenzi et al. (2014) argue that the iPads facilitated a wider range of touch types than traditional resources, including 'more touches in a period of time; more continuous touch sequences; longer sequences of continuous touch and more complex sequences/repertoires of touch' (2014, p. 92). These findings are encouraging as they indicate that children's haptic awareness can be expanded with touchscreens and this could potentially impact on other knowledge domains.

Embodiment

In the educational context, embodiment refers to a deep physical and mental immersion, which can be real or virtual. For virtual embodiment, the child (or reader and player) embodies the story or (avatars or game characters) in their mind, which, we know from cognitive studies, can support problem-solving and organizational thinking (Taktek, Salmoni, & Rigal, 2004).

Pedagogy of embodiment is typically focused on the entire body and how the body moves through the classroom space (Satina & Hultgren, 2001) or through the moving body in any space (see Lindgren & Johnson-Glenberg, 2013). Pedagogy of embodied learning has various methodologies, ranging from drama, role play, using dance movements or, as detailed in this section, using a touchscreen with children with impaired mobility and dexterity.

How might the embodied experiences afforded by touchscreens relate to personalized learning? I tried to get to the answer of this question in a study published in 2014 (see Flewitt et al., 2014), in which we looked at the role of touch in supporting the communication of children's feelings. These children attended a special needs school and couldn't communicate through traditional instruction modes such as verbal participation and whole-body movements. For these children, haptic engagement was key for their embodied learning experience and communication with others and we were keen to see how touchscreens might facilitate their experiences. The study was a largely theoretical exploration and was a follow-up on some of the issues we noticed in our initial iPad research in 2013 (summarized in the previous chapter).

In addition to touchscreens, the children in the school used desktop computers, interactive whiteboards (IWBs) and augmentative communication devices for communication. However, after an initial trial of touchscreens, the school almost exclusively switched to iPads. The staff and head teacher told us that they – and the children – preferred the flexibility and light weight of iPads, enabling them to do much more than they could do with the older, more cumbersome technologies. An important factor, which the teachers alluded to in the interviews, was the fact that unlike with previous technologies children could directly touch the iPads' screen. Although the teachers did not assign particular relevance to children's haptic manipulation, haptic learning had become our focus of research interest. When we looked in detail at our video data of children manipulating their iPads, we noticed an important difference

when compared to the other technologies. With desktop computers, children needed to learn how to operate a specially designed keyboard or mouse. With the interactive whiteboard, it was often the teacher who touched it on the students' behalf. With the augmentative communication devices, it was typically the child's assistant who pressed the buttons. With iPads, however, the children were fully in charge; they could directly press and tap the screen and freely explore the content through videos, pictures or text. It was not the kind of touch experience children would get when pressing the buttons on the technology specially designed to them. iPad responded to their touch in the same way it would to anyone else touching it; the device was not specially designed for their needs but contained some exciting programmes the children were keen to experiment with. Based on our analysis of field notes, video data and interviews with the staff, we concluded that 'the portability of the iPads combined with their touch-sensitivity and the responsiveness of diverse apps opened up new arenas for learning and inclusion for many students' (p. 112).

The students described the iPads as '"great", "easier" and "better" than computers' (p. 113), and these positive attributes were also evident in the way the children treated their iPads, with great care taken around their storage and transport around the classroom. From the embodied pedagogy perspective, the children could embody the activities in which they were engaged, and, through the physicality of this experience, became more acutely aware of what was happening on the screen, being thus, arguably, more receptive to the content.

The children were not simply communicating what they already knew but also learnt new things through touch: 'Many apps not only facilitated children's self-expression by responding to swiping and tapped touch, but also rewarded them with the sensory experience of real, vicarious and virtual touch' (Flewitt et al., 2014, p. 112). Children who couldn't directly participate in activities before could create their own stories, choose their own pictures or sounds and adjust the colour of the display according to their own aesthetic preference. One teacher of Years 2 and 3 recognized children's sensory experience as 'not just touching the screen but there are things like shooting stars so each time they touch it they are getting sensory reward'. This teacher felt that the simple act of touching, unlike other technologies, enabled students in her class to 'become a little bit expert' (2014, p. 113). Thus, touch was here an important dimension to support children's autonomy, authorship of stories and aesthetics of the display. This contributed to a more authentic learning experience, and meant that the children felt enthusiastic and intrinsically motivated to take part in the activities. The affordance of touch, embedded in the touchscreen and incorporated by the teachers in the classroom, has thus integrated embodiment and personalization in one effective learning experience.

The design pedagogy

An effective pedagogy for future deployment of touchscreens for personalized education is based on teachers' and children's active input in the content design and management of activities, an approach that is often labelled the 'maker' or 'design' pedagogy.

Touchscreens, notably those developed by Apple Inc., reinvigorated the field theoretically and conceptually in relation to content creation. The technologies are equipped with several options for content creation, including a high-quality camera for picture- and video-making, a professional music and film editing software, typewriter with the possibility to record text through voice-recognition or touch-typing. There are also advanced possibilities to share content seamlessly and effortlessly across other devices, connecting to printers and 3D printers and GPS-enabled devices. For children interested in film- and music-making, Apple, Google and other key technology producers have revolutionized the possibilities for content production within a few years, bringing into the hands of young children software that used to be accessible only to adult professionals. These changes have inspired the 'hacker and maker' mindset, that is, an attitude that is inclined to create and change rather than passively consume content.

For children in their teens and teenagers, touchscreens offer many possibilities for 'digital making', that is, authoring content with, or for, digital technologies. Nesta, the United Kingdom's innovation charity, evaluated children's 'digital creativity' and 'digital making' with surveys of 8- to 18-year-olds in the United Kingdom, as well as with their parents and teachers. One of their key findings (see Quinlan, 2015) was that there is a great interest in digital making among young people as well as among teachers and parents, but there is little provision to nurture this interest. Consequently, makers and creators therefore tend to be individuals who are technology savvy, self-motivated and interested in experimenting with various ways of producing and sharing multimedia content.

I have been fortunate to work with some teachers, who could be described as enthusiastic digital makers. A study in a local primary school (documented in detail in Kucirkova, 2014b) gave me the opportunity to see an instantiation of design pedagogy first-hand. As part of the investigation, I observed and interviewed a Foundation class teacher who used digital personalized books (created with the Our Story app) for English lessons. In this case, the teacher did not create the content from scratch, but decided to personalize the 'Spot the Dog!' story by Eric Hill. The book was part of the English curriculum and was suggested to help children practise the writing of first names (with a capital beginning letter), full stops at the end of sentences and the short phrase 'is it'. The teacher had an ingenious idea of how to engage all children in the activity and harness the 'digital making' possibilities of touchscreens. Instead of Spot the Dog hiding in various places in the book, the teacher personalized the book with photographs of the children so that it is the children and not the dog hiding around the house. She used pictures taken of children hiding outside and meshed these with the book's original illustrations. She also removed text in some part of the book, so that children could add their own. The modified, personalized, version of the book was shown to the children on the interactive whiteboard as well as on their individual iPads. The iPad version enabled the children to type their own sentences as well as to add their own audio-recordings to the individual book pages.

Children's enthusiasm and sheer enjoyment of the activity were maintained throughout the lesson, especially when they discovered that their friends' (or their own) photographs are part of the book. As such, the teacher achieved the difficult

balance between engaging the children in a classic text (Spot the Dog) through a personal experience. Given that the content for the lesson was developed by the teacher (rather than by technology producers or education companies), it was directly relevant and motivational for the children in this particular classroom (it was individualized to them). The children could further personalize the content by adding their own text (short captions) and audio-recordings to the digital story. The final digital story was thus a collaborative personalized amalgam, which contained some text and illustration from the original author, from the teacher and from the children. The learning experience was more authentic for the students; they felt naturally more drawn (or attached) to a story featuring their own photographs and they enjoyed modifying its aspect through their recordings (aesthetic appreciation). A more general evaluation point to note here is that the technology was in this example used to enrich the practice and provide the children with a literacy experience that would be difficult with a traditional paper-based book. Technology was purposefully and intentionally enriching, not replacing, existing practice. I have made a similar point in Chapter 3, where I argued that most effective uses of technology integrate technology into existing good practice. In Chapter 3, I also considered the question of 'who' personalizes children's education. This is an important question in relation to design pedagogy too.

From the personalized education perspective, we need to ask: Whose agency is dominant when it comes to content production? Is the 'making' driven by the teacher or by the child? In Chapter 3, I considered the answers to the 'who' question by referring to education more broadly and to four stakeholders: family/parents, teachers, children and community. I return to the question and these four stakeholders in this chapter, by considering design pedagogy as an instruction that teaches the child through making, especially the making of educational resources. I do not consider the option of technology/technology designers leading the maker movement as I have already described the consequences of this approach in Chapter 3 in relation to technology-driven models of personalized education.

Design pedagogy: Parents/family as authors of educational resources

The words 'design pedagogy' might sound teacher-centric and technology-centric. However, for young children and especially those who are educated at home, parents are the first and foremost teachers. Parents and family members often produce their own 'stuff' with the children, which can include simple book authoring. With the changes brought about by Amazon and other technological changes in the twenty-first century, parents' making and designing has been taken to another level. I alluded to this trend in one of my blogs for The Conversation, published in 2014. In my article, I drew on two contemporary examples, widely cited in the media. One story relates to Ms Hameeda Raj – mother of Amaan, a 10-year-old profoundly deaf, active boy living in the United Kingdom – who decided to write her own book for Amaan. She became frustrated that there were not enough, if any, books for children who are deaf and hard of hearing. Her book was about a boy named Ali and his friend 'Aidy', who went on an adventure trip to a beach. So that Amaan could interpret what is happening in the

book, Hameeda added the British Sign Language signs to the book, explaining what is happening on each page. Although Hameeda thought she created a book just for her son, the title *Ali and Aidy Go to the Beach* became immediately popular across the country with those children who are deaf or hard of hearing. Hameeda uploaded the book to Amazon and began selling thousands of copies.

Parents can also create stories that validate children's feelings and present them with alternative outcomes for events they may apprehend or find difficult to deal with. For example, another mother-writer, Helen Sadler, wrote a book called *Monkey Has an Operation* for her daughter to prepare her for a lung surgery. The first motivation for writing the book was to prepare her daughter, Josephine, for a lung operation (https://www.monkeywellbeing.com/my-story/). Of course, Josephine was not the only child ever to have that experience, but there was no book addressing a child's fears in such a situation. To Helen's surprise, there were actually no books on other health- or hospital-related topics young children often have a fear of. One book thus led to another title (*Monkey Has a Blood Test*) and to another title and gradually grew into a popular series of 'Monkey's Wellbeing' books.

For both examples, the use of technology for book production and book dissemination was inevitable. The mothers could sell their books on Amazon and other online sites, enabling them to reach much wider audiences they would normally be able to reach via traditional bookstores. They demonstrated that personalization can identify niche market gaps. However, more importantly, they highlighted the very important role parents can play in supporting diversity and reciprocity related to personalization. What is special about *Ali and Aidy Go to the Beach* is not that a mother became a professional author. Many popular children's writers started by first writing books for their own children. The real interest is in the clever deployment of personalization in this example. The book is not fully personalized – although the main character is a young boy similar to Amaan, he is not Amaan (the illustration is not based on Amaan's physical appearance; the name is different). Yet, Hameeda's son could relate to his mother's book more than to other books available to him because they do not feature boys who are deaf or hard of hearing as the main heroes. Of course, the fact that the book contained the British Language Signs meant that Amaan received individualized support when reading it – again something not available in mainstream titles. The importance of the adult personalizing and then slightly depersonalizing a book highlights the 'dose' of personalization necessary for an effective learning experience. Similar to the Spot The Dog! example, it is important to note the parent's original way of combining personalization with the wider narrative, and of creating a story which grows out of a personal experience into a shared experience.

Teachers lead the way

Teachers are uniquely positioned to author educational content: they can identify areas of difficulty and areas of strength for individual learners and they can also provide experience and end-user perspective to inform future design of technology. There are some promising examples of educators who have made innovative contributions to the design of children's apps. For example, 'The Reading Train: Learn

to Read Books, Songs, & Games' is an app created by a teacher to support emergent readers. Teachers' authorship of educational resources requires time and digital competence – which many teachers don't have. Design pedagogy can be supported by the technology providers who can facilitate knowledge sharing and reduce the time it takes to produce new content. For example, the Amazon's platform 'Amazon inspire' (in BETA testing at the time of writing) aims to make educational resources developed by US teachers more 'discoverable and shareable' and turn them into a 'one-stop shop for teachers in the hunt for free lesson plans, educational materials and ultimately educational software' (https://marketbrief.edweek.org/the-startup-blog/amazon-inspire-move-will-centralize-edtech/?cmp=eml-eb-mb+20160804). Similar to the Amazon shopping website, teachers can choose, rate and comment on resources developed by fellow educators. The platform is in its Beta version at the time of writing, but promises to be a valuable tool to support teachers' design of educational content for touchscreens (in the form of apps), which, as mentioned in the previous chapter, is sorely needed in the current educational market. In addition to creating content, teachers can participate in curating and reviewing existing content. There is a growing bank of resources developed for pre- and primary school teachers to empower them in evaluating the value of specific apps for their classrooms. For instance, in a community-based online space *Teachers With Apps,* teachers share their tips and recommendations for specific apps (e.g. http://www.teacherswithapps.com/apps/). The more teachers participate in the co-creation of the content for touchscreens, the more likely it is that touchscreens will play a long-standing pedagogical role in early education.

Design pedagogy: Children in the driving seat

With devices, such as touchscreens, that are used by teachers as well as the children the possibility to create content is open to all stakeholders. Children's own participation in the content design and shape of the educational activities lays the foundations for an effective pedagogy of personalized education. In alignment with the 5As, children's autonomy (agency) in personalized education indicates the importance of placing children in an active position to the design and implementation of personalized curriculum. This is particularly important in schools where learners play a passive role, as documented in some disadvantaged English schools (Lupton & Hempel-Jorgensen, 2012). As for the importance of authoring content and adjusting the activities to suit the students' aesthetical preferences, this has been researched before, but mostly with older students. For example, Large, Beheshti and Cole (2002) worked with 10- to 13-year-olds to design web portals. The students were motivated and keen to contribute to the activity and had a strong preference for specific colours and graphics of the design. Focus group interviews with these children led the authors to a set of criteria for designing children's web portals: portal goals, visual design, information architecture and 'personalization' (under personalization the authors include possibility to change colour and graphics).

For children above the age of 8, child-led personalized education in the form of digital making is a popular model in several academies and free schools in the United

Kingdom (or charter schools in the United States). For children under the age of 8, digital making is typically more supported by the teacher; that is, it is less child led. The dynamics in these child–teacher relationships are difficult to map, as they vary from one child–teacher pair to another. I was fortunate to closely observe the child–teacher dynamics during digital making in two exceptional UK schools as part of the fieldwork of the NP3 project (see Chapter 3 for details). In this project, schools that employed 'new practices, parameters and pedagogy' had teachers who established safe boundaries and parameters within which children were free to explore ideas, create content and develop their understanding. The personalized education model was not fully child-driven but was led by the child and mediated by the teachers. In terms of children's digital making, the technology used in these schools helped to open up spaces which are often protected from children, such as the design of the learning activities or deciding on the key theme/project for a given week. Consequently, areas of control, constraint and limitation became places of joint negotiation and meaning-making. This was possible because children used technologies (touchscreens) which positioned them on par or even higher with the teachers in terms of their digital competence. The technologies supported their autonomy and authorship because they could use them to create attractive multimedia content evidencing their skills and knowledge. In addition, with the touchscreens, the children could access the Internet and the wealth of information available online; they could customize given activities according to their learning needs (e.g. adjusting the pace or display of certain reading materials) and they could also engage in science enquiries using the devices outside the classroom. The latter did not only support children's authorship and autonomy but also added an authentic flavour to their learning.

The crux of my argument relates to the nature of the teacher–child dynamics in these contexts and the teacher's agency versus the child's agency in the making process. It would be amiss to assume that design pedagogy works best if it is either teacher led or child led. For some resources and activities one might be more beneficial than the other, and it is good if they collaborate with other adults, such as in the case of teachers collaborating with professional app designers. Teacher- and child agency in design making can also work sequentially, as outlined with the Spot The Dog! example, where the teacher created the template for the story amalgam and the children personalized it afterwards.

In addition, the affordances of the particular technology used for digital making influence the making and design possibilities. As outlined in the previous chapter, for Robert, a template-based app worked well in supporting the creation of his own digital artefact, while for a group of Spanish preschoolers, an open-ended app was ideal to facilitate productive dialogue and a collaboratively produced digital story. Therefore, if we consider the digital making possibilities with touchscreens, the agency of the technology brings to bear on the evaluation of teacher-child agency. Unfortunately, although there is some support for individual child-led design and teacher-led design, there are not many technologies designed to support collaborative teacher–child digital making. There are, however, some projects that illustrate what such a collaborative design pedagogy could look like.

Design pedagogy: Creating learning communities

Teachers, children and technology providers can work together to achieve a more community-oriented approach to making and co-designing new knowledge and resources. A prime example of such an approach is the project nQuire led by a team of The Open University researchers. Scanlon, Anastopoulou, Kerawalla and Mulholland (2011) aimed to engage teachers as well as the students and support learning across various contexts (in school as well as home) in their Personal Inquiry project. Together with the software designers at the Knowledge Media Institute, they developed a software called nQuire, which grew into a number of scientific missions explored by a community of international users (see http://www.nquire-it.org/). The software runs on personal mobile technologies and supports children's own science and geography investigations in their local communities. Children are encouraged to conduct experiments and report evidence on issues relevant to their area and personal lives. Teachers monitor and author activities and support children's enquiries. A community of online users comments and further challenges the participants. In their summary paper, the researchers argue that 'personalization of the inquiries in terms of relevance and providing students with choice about the inquiries they carry out is an important part of the project's objective to engage students' (p. 516).

nQuire has grown over the years and has been successful because it brought together teachers, parents, children and the local community and engaged all stakeholders in an open-ended, creative space inviting their input. These are essential ingredients for an effective pedagogy of personalized education – as discussed in Chapter 10.

Taken together, design pedagogy, especially community-driven design pedagogy, creative pedagogy and pedagogy of embodied learning are three pedagogical techniques that teachers can consider if they wish to support personalized learning in their classrooms. All three techniques work best if they do not aim to transform the existing practice through disrupting or replacing existing practices. Instead, teachers interested in these pedagogies need to first identify their best practices and then use these techniques and technologies to enrich them. In other words, these pedagogical techniques can enable a creative renewal of classroom practice, but they need to build on extant excellence, prior experience and established professional expertise. Put briefly and suggestively, these pedagogies can hit the 'sweet spot' of personalized education by combining old and new and alternating teacher- and child-led activities.

The sweet spot of personalized education

This chapter's selective focus on three pedagogies is open to the charge that I have excluded alternative explanations of how touchscreens could support personalized education. To consider additional connections between touchscreens and personalized learning in early childhood, I invite the reader to consider the rich accounts provided by contributors to the edited volume Apps and Young Learners (published by Routledge in 2016).

My impetus for this chapter was the quest to trouble the notion of technology-driven personalized education and consider effective pedagogies related to the 5As. I suggested some links between the empirical evidence reported in the previous chapter and possible pedagogies that could explain past and promote future effective use of touchscreens for personalized learning. I described some effective pedagogies to support personalized education through children's and teachers' co-creation of content and through children's haptic engagement. In these considerations, I wrestled with the issues of presenting personalization as an exclusively independent and individual exercise. In all the effective approaches, the optimal learning moment was achieved through a balance between personal/individual and shared/collective endeavour. In my practitioner-oriented articles, I refer to this balance as the 'sweet spot' of effective personalization.

The notion of a sweet spot might imply a specific location or position. This is not what I mean – I do not see personalization as the pursuit for a single fixed point which, when activated, creates educational miracles. The optimal values will differ for different children and contexts; there is no right 'dosage' of personal and collective to serve to the children or prescribe to the teachers' or children's designers. It is a process that needs to be continuously renegotiated with the all the stakeholders involved in the process of personalized education.

With specific resources such as personalized books, we can study and evaluate in detail the amount and type of personalization necessary for specific outcomes. This is particularly important for future design of effective learning resources and addressing the gap between educational research and industry developments. The gap between industry and research is of course not unique to the personalization arena and there have been many efforts to increase the knowledge exchange between research and industry. Yet, as a regular reviewer of commercial products for young children, I find it striking how many exciting personalized and 'personalizable' digital resources have been developed for young children, with little, if any, empirical research behind their learning design and possibilities for classroom deployment. This neglect underpins my effort to increase the discussion around the *pedagogical underpinnings* of a future model of personalized education.

Reflecting on my own research engagements, I propose that the defining principle of effective personalized education does not lie in the extremes of authenticity, autonomy, attachment, aesthetics and authorship. Instead, we need pedagogical practices that integrate the 5As with the humanist principles. In the remainder of this chapter I outline how the pedagogy of design, creativity and embodiment could be coordinated into classroom instruction within a liberal-humanist and democratic framework.

The humanist orientation of personalized pedagogies

I alluded to Todorov's philosophy and to his comprehensive summary of the humanist legacy in Chapter 6, where I described the 5As of personalized education. I have to look at humanism again in this chapter in relation to pedagogies, as I firmly believe that

teachers can effectively deploy the 5As only if they follow some basic humanist values. Let me state my argument in more practical terms and draw the analogy between humanist and democratic approaches to education. I do recognize that 'there is no simple correspondence between ideological families and political regimes' (Todorov, 2009, p. 31). However, Todorov (2002) also writes that 'liberal democracy as it has been progressively constituted for two hundred years, is the concrete political regime that corresponds most closely to the principles of humanism' (p. 31). So, combining humanist and democratic approaches is very much a practical tactic to usefully connect to the rich research area concerned with democratic teaching.

I understand democracy as a system that can balance the rights of individuals and groups, as a tension, as an ethos, as human effort. I believe that managing the needs between individual desires and requirements of a group is essentially about democracy. In early childhood classrooms democracy is about creating respectful, sharing classroom communities where everyone is equal, has the same rights and responsibilities and plays an integral role in the group. This may sound utopian to some people, but there are some educators and teachers who engage in such democratic practices on an everyday basis. A prime example of such a democratic classroom ethos can be found in the storytelling curriculum developed by my early childhood heroine, Vivian Gussin Paley. In her book *The Boy Who Would Be a Helicopter*, Paley (1990) describes how she achieved an inclusive and democratic pedagogy by introducing the rule of 'you can't say you can't play' to the children in her classroom. Her pedagogy does not centre on the curriculum or technology, but on the child. As the name storytelling curriculum reveals, the central mechanism through which children in her classroom learn is through storytelling. Paley's storytelling/story-acting curriculum is not a technology-mediated curriculum; it was developed years before iPads existed. Paley (1990) understands storytelling as 'a shared process, a primary cultural institution, the social art of language' (p. 23) and to support this process, Paley encouraged the children in her classroom in the so-called storytelling/story-acting activity, also called the 'Helicopter technique' (www.makebelievarts.co.uk). The technique follows a simple routine, facilitated by the pedagogy of embodiment (i.e. drama, children act out their stories), pedagogy of design (i.e. content production, children create their own stories) and creative pedagogy (i.e. the teacher follows the scaffolding principles very similar to those described by Cremin et al., 2006). In practice this means that to begin with, the teacher asks a child to tell a story and writes the story down on a piece of paper, word by word, while the child speaks. The story can be about anything; there are no restrictions on theme or characters, and the only rule is that it cannot be longer than one page. The child is then asked who they would like to be in their story, and this character is circled on the paper. Once the teacher has collected a few stories, the story-acting part of the activity begins. This involves taping a space in the middle of the classroom into a square – also known as the 'classroom stage'. The child whose story the teacher recorded is seated in the middle of the stage, together with the teacher, reading the child's story, sentence by sentence. The storyteller child acts out the main character and other children from the classroom are called to the stage one by one, depending on how many characters there are in a story. At the end of the story, the children clap and sit down, with other

children participating in the next story. Paley (1990, p. 37) introduced some loose rules to the activity, mostly to substantiate the link between the activity and its social and moral aims (which I call here humanist and democratic). For example in relation to peer commentary, she wrote:

> Commentary is welcome at any time, but permission is required to insert a new character into someone's story. This is an easy concept to understand in the controlled setting of a staged story, easier than in the doll corner, but in both places the case for dramatic integrity is strong. It is essential aspect of the social contract and can be used as the basis for solving most behavioural problems. Do your actions belong in the scene you enter? If not can you convince the players to alter their script, or, failing to do that, will you agree to a different role? We call it socialisation, which simply means – at any age – that you play your part acceptably well in the given script.

The format of storytelling/story-acting is relatively simple, but its potential and actual learning benefits are enormous. Children's autonomy and authorship are celebrated, and the children are free to share their inner world and bring their ideas forward. At the same time, this freedom needs to be critically examined through self-reflection, as children reflect on the peer reception of their stories on the classroom stage. Cooper (2005) analysed the educational benefits of the individual elements of storytelling/story-acting and found many parallels with Vygotsky's zone of proximal development and socio-cultural theory of learning. In addition, 'the very structure of stories and storytelling makes the experience a vital, fertile opportunity for young children to learn many things directly and indirectly about language, print, and narrative, three critical components of early literacy development' (Cooper, 2005, p. 237). The story-acting helps with embodied (or psychomotor) learning and teaches children about expression of emotions and affect. The transition from the child's imagined story to verbal dictation and then from the paper to the collective acting links 'helps young children internalize the nuances of language and create pictures in their heads, both essential elements of deep reading' (p. 246). Not surprisingly then, there is a growing body of empirical evidence showing that classrooms which incorporate storytelling/story-acting approach into their everyday practice have children with improved socio-emotional relationships, peer cooperation, self-regulation and moral understanding (e.g. Cooper, 2009; Nicolopoulou, de Sá, Ilgaz and Brockmeyer, 2010; Nicolopoulou et al., 2014).

My own observations of storytelling/story-acting in action in the UK classrooms and in Boston kindergartens in the United States made me realize how critical democratic pedagogy is to supporting the 5As of personalized education. Autonomy can only work within the boundaries of a collective identity or community. Authorship means little if there is no respect for audience and the possibility to share an authored piece with others. Our aesthetical norms and standards are based on others' reactions and expressions and, similarly, an emotional attachment to an object depends on how much this object can connect us to others. Authenticity, too, has little significance in the void of others and their benchmarks. The narrative basis of the

activity is an effective way of balancing up the individual and collective needs. 'While the tensions between individuals and the group can never be fully resolved, the high level of children's investment in story – telling and acting can result in their voluntary self-restraint in order to insure the smooth functioning of the activity' (Mardell & Kucirkova, 2016, p. 171).

I do not claim that Paley found the magic bullet for personalized education, but she certainly draws on many democratic/humanist principles and incorporates pedagogies conducive to the 5As of personalized education. Tying together these elements with a narrative emphasizes the intimate link between narrative and personalization (see Chapter 9). It also illustrates that personalized education needs a democratic pedagogy regardless of whether it happens with or without digital technologies. Just like embodied learning and design pedagogy, democracy pedagogy is a pedagogy of practice. In the last chapter, I provide a more detailed appraisal of this proposition and integrate the three pedagogies – creative, embodied and design pedagogy – into a single pedagogical framework labelled 'pluralized personalization'.

Summary

This chapter outlines how touchscreen-mediated personalized education, which is consistent with the principles of embodied (haptic), creative and design pedagogy, can support children's learning. In relation to the design pedagogy, I outlined the possibilities of digital making led by teachers, children and community of users. Citing the nQuire project, I illustrated how community-based approaches to design and digital making could positively innovate the current education system. I also argued that in addition to pedagogy, we need to consider the issue of individual freedoms and democracy in a classroom. These humanist values might appear too abstract, so I outlined a practice that successfully blends humanist principles with effective pedagogical techniques and which has been studied for its positive educational impact. Paley's (1990) story-acting/storytelling approach can open spaces for individual story authorship within a shared classroom culture, and it supports the pedagogy of democracy where individual voices are respected and negotiated with the collective voice. In these spaces, personalized education is seen as fundamentally different from the technology-driven or child-centred models of personalized education currently advocated in many US and UK schools (see, for example, Bray & McClaskey, 2013). It is an example of an effective pedagogical framework that I call personalized pluralization and explain in more detail in the final chapter.

12

Personalized Pluralization

Some may argue that my account of personalized learning and personalized education has painted personalization in pure colours of an isolated practice, which, at its best, can support the enactment of the 5As (Chapter 6) and, at its worst, leads to technology-driven approaches to public education (Chapter 3). A focus on personalization in itself leads to a kind of interactional sterility. In this chapter, I aim to set the record straight and, in alignment with Bronfenbrenner's bioecological theory (Chapter 1), present personalized education as part of a personalized pluralization system. In personalized pluralization, pluralization, which is the antidote to personalization, constitutes its very existence.

I begin this chapter with a synthetic approach to the pedagogies of personalized education, with an attempt to bring them together in one pedagogical framework of personalized pluralization. I then summarize the material outlined in the previous chapters by returning to the main themes of autonomy, authorship, aesthetics, attachment and authenticity. I bring together the main concepts I have used in my account of personalization in early years and map a future for fruitful personalization studies.

What is pluralization and what is its relationship to personalization?

Before I delve deep into the 'hows and whys' of personalized pedagogy, I interrogate the question of personalized education with a short reflection on the conflictual relationship between personalization and its counterpart: pluralization.

For decades, educational reforms in the United Kingdom and the United States have been going through a conflict between, on the one hand, mass education with its inevitable need for shared student performance standards, and, on the other hand, differentiated instruction, with student-centred teaching and self-directed learning. The latter is difficult to implement, while the former has been universally implemented with prescribed guidelines for curriculum, central control and organized progression of students across levels. The issues of differentiated versus mass instruction have been positioned in a binary relationship with a variety of terms used throughout the education history, including 'responsive teaching approach' versus 'teach-by-the-

numbers approach', 'student-centred teaching' versus 'instructor-centred teaching' or, more recently, 'personalization' versus 'standardization' educational debates. These distinct descriptors are in the history of education comprehensively referred to as personalization and pluralization, encompassing the full range of either plural or singular forms of learning (Kucirkova & Littleton, 2016).

As argued in Chapter 3, if positioned in isolation to other models (cf Prain et al., 2013), personalized education can easily become techno-centric, privileging the individual-centred industry agenda over community-focused pedagogy and the collective voice of the classroom. The absence of a guiding theoretical framework in personalized education has further widened the gap between government rhetoric and actual practice, with oversimplified applications of the personalization mandate, particularly in relation to technology deployment and curriculum content. Couched in terms of individualized lessons and adaptive teaching content, the personalization movement has led to an increased use of personal mobile technologies and schools' investments in customizable educational software. This trend runs in opposition to the pluralization trend: technology deployed within the pluralized education paradigm tended to respond to collective needs and focused on large-scale hardware deployment designed for collaborative learning, such as, for example, interactive whiteboards. It goes without saying that the dynamics in a classroom are different if all students attend to their individual screens instead of one.

Technology advancements do not always run in parallel to the developments in the education sector, but in terms of the personalization–pluralization pendulum, there has been some change to the curriculum and the key skills mandated in the national standards over the past decade. In a simplified representation, the standardized curriculum places emphasis on mathematics, problem-solving, reading and grammar, while the personalized education curriculum foregrounds the so-called twenty-first-century skills such as computational thinking, creativity and collaboration across media. I can see the value of talking about specific competences being relevant for specific historical eras, but I don't see much logic in describing certain skills as 'twenty-first century skills', especially if they relate to all-time skills such as communication, creativity or collaboration. I argued in my work that conceptualizing personalization as the opposite approach to standardized education means swinging the educational pendulum to another extreme. Such a definition risks oversimplification and amounts to a reductive view on learning which 'obscures essential questions about the social and communal purpose of education' (Philip & Garcia, 2013, p. 306). In Chapter 6, I proposed that the key themes of personalization – autonomy, authorship, aesthetics, attachment and authenticity – need to be approached from a humanist perspective to realize their socio-moral objectives. In the previous chapter, I suggested that humanist and democratic versions of personalized education could act as a connecting bridge between an individual and a collective voice. These considerations are all part of my efforts to develop a rhetoric that would reflect a personalization–pluralization synergy and that would combine the personalized and pluralized (standardized) concepts of education. Personalized pluralization is a pedagogical framework that can be applied with or without the use of digital technologies. Its theoretical and empirical origins are described next.

Personalized pluralization: Origins

The motivation for my development of personalized pluralization came from the lack of such a framework for personalized education, from my existing empirical and theoretical work, and a recent collaboration on a community-oriented digital personalization project (Kucirkova & Littleton, 2017). Inspired by the humanist agenda described by Todorov (Chapter 6), Vygotsky's theory and the emerging data on personalized books, I operationalized personalized education by connecting the dots between individual/personal and collective/pluralized sides of learning.

An adequate pedagogical framework should, in addition to a statement of teaching goals, also take into account the resources supporting the teaching and the impact these resources have on individual children. With the focus on a specific resource of personalized education – personalized books – I outlined in Chapter 7 the current research concerning the benefits and limitations of using personalized books with young children. Well-designed personalized books can support children's language development, but, at the same time, they heighten children's focus on self and could potentially restrict their collective identity. Similarly, there are two sides to the learning benefits of personalized education facilitated by touchscreens. In my summary of studies concerned with touchscreens in early childhood, I cautioned against universal assumptions behind personalization and illustrated with a number of case studies (Chapters 8 and 10) that not all students are motivated and skilled enough to take ownership of their learning. I drew on findings from the cognitive psychology research (Chapter 7) and the developmental psychology perspective on identity (Chapter 9) to explain that there is a delicate balancing act involved in harnessing the benefits of personalization for motivation and guarding against self-centred orientations.

Teachers can largely facilitate and accentuate the effects of personalized learning, especially if they adopt a community-based approach to personalized education and use the affordances of new technologies for authoring and co-authoring new contents with the children. Teachers can also develop particular 'rules of play' for the learning community in a given context. For practising, researching and deploying personalization in early childhood, I call the rules of play *personalized pluralization*.

Personalized pluralization: Aims

Personalized pluralization intentionally integrates the two poles of educational practice: personalized/differentiated or individualized and standardized or collective learning. Personalized pluralization is a conceptual model, built to inspire practical application. As the name indicates, it consists of two parts: personalization and pluralization. The personalization part accommodates the 5As and the pedagogical techniques of creative teaching, design and digital making and haptic and embodied learning. Pluralization refers to standardized education, collective learning and socio-cultural approaches that foreground multiple ways of knowledge representation, the collective and communal rather than the individual and independent self. This book

is focused on the personalization part, and, therefore, I do not detail the pluralization principles – there are many other publications covering this subject in depth. For example, Anna Craft's (2011) 4Ps of digital childhood provides a useful perspective, in that she weaves plurality into other dimensions of childhood: 'plurality of identities (people, places, activities, literacies), possibility awareness (of what might be invented, of access options, of learning by doing and of active engagement), playfulness of engagement (the exploratory drive) and participation (all welcome through democratic, dialogic voice)' (Craft, 2011, p. 33). Building on this work and in the space remaining here, I offer an account of the synergistic relationship of the two sides of education. I explain the central premise of personalized pluralization by drawing on Vygotsky's theory, which integrates the personalized pluralized pedagogy with educational benefits in the cognitive, affective, intellectual and practical domain.

Personalized pluralization and dialogism

Personalized pluralization is a model of education where personal gains are balanced out with the needs of the social community and the actual or implied influence of others. It is a model that draws inspiration from the field of dialogicality and dialogism. The literature names as the father of dialogism Mikhail Bakhtin, who has advocated for the recognition of a continuing dialogue between self-within-others and others-within-self in each human activity. Readers who consider dialogic and dialectic dimensions of Bakhtin and Vygotsky as opposite approaches may need an explanatory note for why I had introduced Bakhtin's ideas to the final discussion. My understanding of the relationship between Bakhtin's and Vygotsky's theory was sharpened after reading an informative piece written by Ravenscroft, Wegerif and Hartley (2007). In this article, the three UK leading professors of community-oriented applications of learning technologies explain that 'dialectic and dialogic are two relative dimensions that are not in opposition, as they focus on different yet equally important features of the dialogue process relevant to learning' (p. 46). While the dialectic approach of Vygotsky foregrounds cognitive dimensions of learning, the dialogic approach of Bakhtin foregrounds 'emotional and interpersonal dimensions, or the sort of "relationships" and "intersubjective orientations" that enable the spaces where learning can happen' (Ravenscroft et al. 2007, p. 47). Importantly, dialogic and dialectic approaches 'will always interplay and vary in emphasis based on what is wanted from a learning situation' (2007, p. 47). It is this interplay of emotional and cognitive, of intra- and interpersonal that I adopted for the personalized pluralization model, and the reason why I chose to include Bakhtin's work in its conceptualization.

Inspired by Merelau-Ponty's dialogism, in which the 'self and other are not merely positioned, but implied in one another in a way that secures both their intimacy and their differentiation' (Baerveldt, 2013, online), dialogism addresses the question of how personal meanings dovetail with those of others, and how they circulate through the embodied action and representations of these meanings in others and selves (see Markova, 1997, 2001). A more detailed discussion of Bakhtin's influence on my

conceptualization of personalization is in Kucirkova (forthcoming). Next, I outline how personalized pluralization relates to Vygotsky's socio-constructivist orientation.

Personalized pluralization and Vygotsky's theory

Although the individual building blocks of a personalization–pluralization balance and affective/cognitive balance could be attributed to many scholars, it is in Vygotsky's writings, that we find a theoretical treatise of all aspects. Vygotsky's theory (1987) is based on two foundations: that of intra- personal and interpersonal ways of learning. Intrapersonal aspects refer to the personalization side and interpersonal aspects to the pluralized side. The two are positioned not in opposition to each other but function in an interactive and dialectical relationship of meaning-making. Vygotsky's recognition of the intertwined relationship between the two aspects comes out clearly in this quote: 'Any function in the child's cultural development appears on stage twice, that is, on two planes. It firstly appears on the social plane and then on a psychological plane. Firstly it appears among people as an inter-psychological category, and then within the child as an intra-psychological category' (Vygotsky, 1978, p. 57). In other words, Vygotsky argued that any mental or physical activity is always double-faced: it is not only about us, but also about others. As a fusion of antitheses in Janusian thinking, Vygotsky's (1978) two-layered conceptualization of mind laid down the foundations for an interchange between personalized and pluralized knowledge pursuit: a learning process in which every aspect of self operates on both personal and shared (or intra- and interpsychological) levels. The sequence or emphasis of the two depends on the learning situation and the socio-cultural context of the interaction, but the two are always present to at least some extent. According to Vygotsky (1928), the personalized and pluralized learning paths (or the inter- and intrapersonal aspects of human thinking) need to run in parallel towards one meeting space of meaning-making. In his later writings, Vygotsky (1967, 1978) positioned himself as a dialectic theorist, who emphasized the intersubjective (or pluralized) aspects of learning that are realized through shared social interactions.

Personalized pluralization and the technology–teacher synergy

As mentioned in Chapter 1, according to Vygotsky (1967), a child's learning can be extended with the help of 'more knowledgeable others' as well as meditational tools. Relevant to his time of writing, Vygotsky defined the mediational tools as 'various systems for counting, mnemonic techniques, algebraic symbol systems, works of art, writing, schemes, diagrams, maps and mechanical drawings, all sorts of conventional signs and so on' (1981, p. 137). Today, the 'various systems' would include the many technologies that expand and reflect the individual and social knowledge of our times, notably those which offer powerful personalization and customization options such as tablet and smartphone apps or adaptive courseware. Vygotsky's proposition that tools are important knowledge mediators recognizes that some technologies can extend

learning and understandings in fundamental ways. If we trace this concept back to the pluralized personalization education perspective, we can see how balanced learning is jointly constructed across the minds and bodies of individuals and communities of individuals, and how it is embedded in the objects we interact with, both in terms of the cognitive and affective dimensions. This principle has later become axiomatic to distributed cognition theories (see, for example, Dillenbourg, 1996; Salomon, 1998) in which others as well as various tools mediate the distribution of knowledge and, in doing so, they pluralize personal knowledge to various forms and contents.

Thus, according to socio-constructivists (drawing on Vygotsky's socio-cultural theory), best learning occurs with the assistance of teachers (or parents and other caregivers) as well as specific tools (i.e. teaching materials or technologies supporting learning). Technology can largely facilitate the learning process (e.g. challenging texts from various web sources, genres; using the words in various communities for discussion) but teachers are indispensable in providing learning environments to nurture students' intellectual as well as practical skills. Therefore, personalized education that is 'technology-assisted and human-powered' (Guernsey, 2016) is more visionary and theoretically sound than the current technology-centric personalized education.

Personalized pluralization: Children's skills

Personalized pluralization is built on socio-cultural and humanist principles that accommodate children's authentic thinking but also challenge them to adapt flexibly and creatively their unique strengths and weaknesses to the myriad of influences that shape children's local and global contexts of existence. Such an approach addresses learner variability and orients the 'learners towards a lifelong learning vision of their knowledge and of the world' (Leone, 2009, p. 43). The skills I perceive as crucial are aligned with what Golinkoff and Hirsh-Pasek (2016) describe as the 6Cs of interrelated skills necessary for today's children: collaboration, communication, content, critical thinking, creative innovation and confidence.

Importantly, and to a large extent contrary to the current practice, personalized pluralization should support children's social awareness and provide a way for increasing similarity as well as difference among the students. In personalized pluralization, the teacher is assigned the role of a what I think of as a 'homeostatic regulator', who needs to ensure that the opposing forces of intra- and interpsychological aspects of self are in harmony and nurture balanced dispositions. The balanced dispositions correspond to the virtues of democratic citizens and to what Pring (2012) calls 'dispositions that enable one to live the distinctively human life, ensuring a proper balance between destructive extremes' (p. 323). Balanced dispositions are acutely needed in the current times: major population shifts, large-scale migration from poor to richer countries and the resulting multilingual, multicultural and transcultural societies that we live in create challenges for everyone, including young children. 'Successful navigation of these challenges will require a new generation of citizens with the abilities and dispositions to listen, take the perspectives of others, and collaborate. It will require

people and communities to act with a shared sense of humanity and fairness; to be able to act and solve problems democratically' (Mardell & Kucirkova, 2016, p. 169).

Personalized pluralization as an integrated framework

The balance between intellectual and practical skills, or, more broadly, thoughts and acts, is an important one, particularly in the age of heightened focus on the intellectual rather than manual and corporal aspects of learning (and knowledge and work). Vygotsky picks on the strand of mind and body relationship when he writes that 'mind is not a container that stores memories and knowledge but, rather, represents a dynamic system formed and expressed in actions' (Vianna & Stetsenko, 2006, p. 85). However, there is no rigid separation between thoughts and acts as one could find, in the body–mind dualism developed through the rationalist traditions – once children master the dynamic exchange between internal and external representation, there is a mutually dependent relationship between thoughts and acts (Vygotsky, 2004).

The pluralization-personalization framework brings together several lines of learning and development: it combines cognitive learning with affective learning; the mental or intellectual with bodily/physical processes of learning and teacher- and tool-mediated. These lines run across two axes of meaning-making: the intra-psychological (personalization) and interpsychological (pluralization). Figure 12.1 summarizes these theoretical propositions.

The figure illustrates that I conceptualize personalized pluralization as a balancing act between cognitive and affective engagement and between intellectual and physical endeavours. If I was to guess an ideal educational aim, I would say that the ideal educational situation lies in the middle, in the intersection between the four

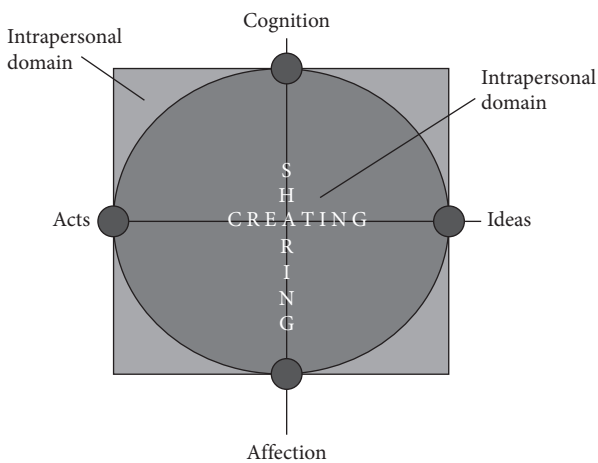

Figure 12.1 A graphical representation of the synergies and intersections of personalized pluralization

dimensions depicted in Figure 12.1. Being in two dimensions, the figure may seem to show the relationship between personalization and pluralization as an exclusive one. I intend it to be intertwined or cyclical, expanding through time and space as new learning contexts and resources emerge.

In sum, personalized pluralization advocates the development of children's emotional as well as cognitive skills together with pluralization within one learning model, as one integrated outcome approach. In light of the restrictive education systems of the past, and the countless dedicated efforts to change the status quo of public education, the personalized pluralization framework might seem as unrealistic and naïve. In the face of potential criticisms, I provide examples of projects and learning environments where the socio-individual dimensions of cognitive-affective and intellectual – practical binaries have been intersected, and where teachers and technology have jointly facilitated the learning process. These specific examples are not intended to represent some kind of gold standard of future education. The examples are an arbitrary choice to illustrate the present discussion and to assist in my efforts in ensuring that pluralized personalization becomes a pedagogy of practice, not a remote theory.

Contemporary examples of pluralized personalization

I first mention a project, which, to me, is not only a demonstration of the personalization–pluralization pedagogy par excellence but also a community-based approach to technology-mediated learning. This project is a suite of various initiatives of the OpenScience Laboratory at The Open University. The OpenScience Laboratory hosts the nQuire project I described in the previous chapter, as well as iSpot and the weSPOT projects, with a dedicated webpage for each (see http://www.ispotnature.org/communities/uk-and-ireland and http://wespot.net/). The projects are related to the teaching of scientific concepts, combined with nurturing students' personal curiosity. At the heart of the projects is the premise that 'personal experiences and insights are the key for understanding scientific concepts while classroom learning is often de-contextualized from learner's everyday experiences' (http://portal.ou.nl/en/web/wespot/coreideas). The way the projects address this imbalance is through personal and shared enquiry-based learning: discovery is combined with writing and reflecting on the value of a scientific finding. For example, the weSPOT project builds on the theoretical conceptualization of an enquiry process developed by Mulholland et al. (2012) and enriches it with animated virtual models that support the development of students' hypotheses. There is an emphasis on the learner's self-control of the learning subject, which is combined with the school curricula approach supporting a badge system of remuneration. Students are expected to interpret and engage with the data in teams and several forms of representation, which may not necessarily match their individual needs or preferences. The learning is not individualistic, but individual within a community of learners. Students learn to appreciate and celebrate their local context *in relation* to the global context. For example, as part of the enquiry process, students are encouraged to ask questions related to their local problem (e.g. 'What

are the energy sources in the classroom?'), to link this to wider issues (e.g. 'Is there a relation between external climate and energy consumption?') and to collectively (in small teams) discuss the method for data collection and analysis in order to answer their questions. Conclusions are drawn individually as well as in teams and are jointly shared with other teams, parents and school management. At the end of a scientific challenge, students are encouraged to reflect on their progress and discuss the challenges and dynamics of the teamwork, an aspect of the project which promotes cognitive as well as socio-moral development. Teachers' role is to foster a balanced manifestation of the personalization and pluralization objectives in the intellectual domain (i.e. children share their views on specific scientific topics) as well as to ensure the project has a practical impact on the community (i.e. specific activities are set up to support the local and/or global environment). New technologies, on the other hand, afford the opportunity to share students' personal discoveries with other project participants worldwide.

My second example of personalized pluralization 'in action' is the Remembrance project. The Remembrance project exemplifies the possibilities of the personalized pluralization model for early childhood and community learning. The project combined the use of Our Story with a robust technological solution developed by the company AirWatch. The study, described in detail in Kucirkova and Littleton (2017) and Kucirkova (2016d), was a ten-month-long story-writing project on the theme of Remembrance and World War II, undertaken in partnership with the local community group LoveWoburn Sands and a lower primary school. Together with Professor Littleton, we followed the work of two teachers and their classes of Year 4 children (age eight years). The analysis consisted of ethnographic observations and interviews undertaken with the teachers and the school's head teacher.

In order to create their own personalized stories with the Our Story app, the children, working in groups of four, needed to devise and conduct audio-recorded interviews with members of the local community who visited the school to share their wartime reminiscences and stories. The children then collaboratively planned, wrote and edited stories based on these accounts and their own relevant research of the war times. They used the Our Story app to support the collective creation, reviewing, editing and revision of their stories in both text and audio and used pictures from the web and from the community members. Each finished story was shared, discussed and reviewed with other children in the classroom. The Airwatch technology TeacherTools facilitated secure and efficient storage and transfer of the stories from child to child and within the local community. The final stories were shared at a school assembly and became part of the local archive, thus combining the virtual and physical experience of personal story-sharing.

The cognition–motion balance was a guiding construct in ensuring that stories created by children support the development of not only their language and literacy skills but also their socio-emotional skills such as respect for classmates and local community members, appreciation of others' memories and pro-social orientations. Final stories were not kept in the teachers' drawer – they were shared with the community, in an act of honouring the fallen of the past and appreciate the present. The project brought together elderly members of the community with young learners

and, in an intergenerational exchange, enabled the two groups learn from each other. The community members learnt from the children about iPads and digital making which were to them new skills and new resources. The children, on the other hand, learnt from the elderly about history and the reality of living in war times. Overall, the study illustrated that any learning content can carry a personal reference and, at the same time, be part of a wider collective narrative with a socio-moral purpose.

The third example is not a unified project but a set of some promising practices related to the use of the Minecraft software. I have not been personally involved in these projects and have mostly seen them documented in non-academic literature such as the teachers' and students' personal blogs online. I include these projects here because they show that personalized pluralization doesn't need to be always recognized in academic literature and that it can be part of ongoing or occasional practices, not only in the concentrated effort of one project.

Minecraft is a popular interactive game that has been available since 2009 in the United Kingdom. Minecraft 'allows players to create content using textured cubes' (Callaghan, McCusker, Losada, Harkin, & Wilson, 2012, p. 2). In 2013, there were about twenty million paying users worldwide, with many more playing a free version of the game (Diaconu, Keller, & Valero, 2013). A modified version of the game (MinecraftEDU) has begun to be used in several schools in the United States and the United Kingdom. The game has almost unlimited number of building options, and its open-ended design means that teachers can use it flexibly for a variety of subjects by incorporating curriculum-specific content (Drzewiecki, 2014). The game promotes individual learning as well as collaboration. To support personal learning and students' self-confidence, children can create their own worlds with their own characters and objects. In addition, however, players can create shared worlds and simultaneously collect resources for a joint project (e.g. building a city together). The ethos of a collaborative learning community is reflected in the numerous YouTube videos of Minecraft players who showcase their achievements and strategies with the game. In the speak of the previous chapter, the Minecraft community is a global, online community of creative makers and designers who democratically share their learning with each other and through this process enhance their personal knowledge as well as that of the group. As Risberg (2015) puts it: 'Players of Minecraft are both learning on their own and putting into practice the skill of collaborating to share knowledge and creativity' (p. 46). The development of Minecraft and the Our Story app followed different purposes, budgets and stages, but the two tools share the open-ended character of their design. I therefore draw here some parallels: I described how the open-ended design of Our Story positively influenced children's learning (Chapter 10), and I hypothesize similar effects with Minecraft when it comes to authoring children's own content in the classroom. Children are likely to develop thinking and problem-solving skills in parallel with their construction skills of the virtual worlds, and this combination is likely to open up learning in a variety of subjects, including biology, ecology, physics, chemistry, geology and geography. What is noteworthy about the affordances of Minecraft is that in addition to collaboration and creativity (Saez-Lopez, Miller, Vázquez-Cano, & Domínguez-Garrido, 2015), playing the game supports children's understanding of wider global issues around environmental awareness. This

requires the teachers' input because teachers can link the game to community actions such as a school project focused on recycling or pollution. The learning is authentic, because children work with real-life concepts; they have to mine resources from the earth and turn them into usable materials for construction. By building and inhabiting their own civilizations, students learn citizenship skills and responsibilities and they 'quickly realise that some materials are more scarce than others and that they are not evenly distributed' (Marsh & Spiller, 2015, online). Thus, similarly to the nQuire software or the Our Story app, the Minecraft game can be a suitable resource for the pedagogical framework of personalized pluralization, as it can tap into emotional, cognitive, physical and intellectual skills and through teachers' orchestration, support children's individual as well as collective authorship of authentic content.

Conclusions

In this closing section, I weave together the strands of my contribution to digital personalization in early childhood.

The purpose of this book was both theoretical and empirical. I scrutinized the character of technology-based personalized education to substantiate the claim that the current models of personalized education tend to be technology driven with little pedagogical understanding of the value of personalization. I reflected on the key ways in which new technologies such as iPads/touchscreens and personalized books could provide innovative pedagogical support for personalized education and condensed these into the 5As of personalization: autonomy, authorship, aesthetics, attachment and authenticity. Based on the insights from research with typically and atypically developing children, I proposed a sustainable pedagogy of personalized education for the future, called personalized pluralization.

Overall, this book is not a handbook of digital personalization in early years but an introduction to an emerging field. In reviewing the extant research on digital personalization, I drew predominantly on my own work in this area, thus involuntarily excluding other work and reducing the richness of my insights. On the other hand, I have attempted to offer an in-detail look at one aspect of personalization, which I hope will be inspirational for future research in this area. The book is best understood as a summary of my empirical and conceptual work in this area thus far and its main novel contribution relates to the 5As framework and its integration with the notion of personalized pluralization. The educational approaches and examples cited in the book are not intended to endorse the specific projects but rather to concretize the outlined ideas. The list of theoretical and empirical studies reviewed for the book is not comprehensive and involved a degree of selection. In presenting my research, I attempted an even-handed review that would encompass the potential benefits as well as limitations of personalized books and authoring tools in early childhood, such as the Our Story app. The key insights that I sought to offer in this publication were as follows:

In the first part of the book, I addressed the literature that describes the current models of personalized education as techno-centric and I outlined the concern that

personalized education lacks a pedagogy. These criticisms tally strongly with my own concerns around technology-driven personalized education and have, to a large extent, motivated my search for an alternative definition of personalization.

In Chapters 4 and 7, I summarized the empirical evidence and current commercial offer concerning children's personalized books and stories. I argued that identity and creativity are closely related to personalization and showed how vital research issues in creativity (from the educational perspective) and identity (from the developmental perspective) can provide important insights into the new field of personalization studies. Based on these findings and a theoretical review, I suggested that the 5As – autonomy, authorship, attachment, aesthetics and authenticity – are at the core of personalized education and could be a useful lens for assessing the degree (or level) of personalization embedded in learning resources and practices. Lastly, I proposed a pedagogical framework – personalized pluralization – to integrate the pedagogical approaches of personalized education (pedagogy of design, embodied and democratic learning) with the humanism agenda and Vygotsky's dialectics. Before closing, I add a few remarks related to the 5As and personalized pluralization.

The integration of autonomy, authenticity, authorship, aesthetics and attachment into a multiset of '5As' purports to offer a set of principles by which educators can evaluate the personalization 'dose' in a given resource or activity. The 5As also offers a set of thinking tools for future theorizing of personalization and a set of criteria for future design and development of personalized resources for young children. The framework suggests that children's experiences and resources become personalized when children's agency (autonomy), authorship and aesthetics are honoured and celebrated. It also suggests that children's attachment to (or ownership of) a resource, is linked to the overall authentic (original and unique) character of that resource. Indirectly, it accords with the view that children's ownership and agency are indispensable ingredients of genuine personalized education.

The 5As were conceptualized in the context of personalized books and should be therefore understood as a starting point for further theorization of personalization in other contexts. The individual elements of 5As are not positioned in a particular relationship to each other, and as explained in Chapter 9, they are difficult to be measured in a quantifiable or hierarchical manner. The study of cross-correlational and longitudinal relationships among the 5As will require longitudinal and collaborative studies. I listed a few questions to guide these efforts in the area of personalized books and pointed out areas of existing work that could refine the importance of the individual elements. These notions include multiplicity when it comes to identity and expression of authentic versions of self through digital stories; the concept of diversity when it comes to authorship and child-driven literature; the presence of an intertwined cognitive-affective influence on children's attachment to personalized books; the importance of individual and collaborative creativity supporting children's aesthetical choices and the understanding of autonomy as a force that is intertwined with socio-cultural enactments of the self.

By definition, the 5As invites a view of personalization as a multifaceted phenomenon and reminds us that personalized teaching approaches should not be reduced to children's authorship or autonomy. Rather, personalization should be

studied and understood as a variable in its own right, defined as the product of the 5As which affect children differently, depending on the context (domain and subject) of the activity and the affordances of the resources supporting this activity. Therefore, in addition to the 5As, educational researchers and practitioners need to consider the range of affordances of specific resources (such as format, multimedia, number of access points, options to edit and others), which interact with personalization and impact independent and collaborative learning – as we saw in the chapters focused on creativity and identity.

My focus on the personalization side of the personalized pluralization carries the danger that the 5As become understood as individualistic. It would be remiss to close this book with the implication that practices of personalized education are removed from the humanist socio-moral concerns. The 5As lie at the heart of personalization but their positive impact on children's learning is realized only if they are applied in concert with the pluralized, democratic and humanist principles. It is this conclusion that I wish to disseminate among public spheres and pursue examining in my work.

Final remarks

It is clear that technology advances, together with the broader societal changes of the first two decades of the twenty-first century, pave the way for embracing personalized education. Personalization is often perceived as panacea solution for the educational woes of standardization. The history of education is replete with examples of reductionist applications of innovative ideas and the current models of personalized education seem to be following this trend. As such, there is the danger the standardized and personalized educational systems begin to resemble an hourglass, where the personalized education bulges in the 5As, with a narrowing waist that fuses the personalized and pluralized elements. Such a model is unsustainable and short-sighted. Instead, we need a model of personalized pluralization, which leaves a large merging radius between personalized pedagogies and their pluralized counterparts. I therefore argue that personalized education can only become a sustainable educational model if it is combined with pluralization ideas and if it addresses children's holistic development, which is cognitive and affective skills and theoretical and practical understanding. The projects cited in this book make it clear that in specific curriculum subjects, with or without technological meditational tools, this is possible, as long as educators are empowered to infuse children's learning with a balanced dose of personalization. It is my hope that the ideas I shared in this book will provoke fresh breakthroughs in the study of personalization and that the snapshot of digital personalization presented in this book will be challenged and enriched through future empirical and theoretical work.

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