



# Homeschooling in a digital age: How digital technologies can help children foster a love for (self-directed) lifelong learning

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## Abstract

Opting to homeschool children is a growing trend worldwide. However, surprisingly, there is a dearth of research on understanding how digital technologies are used by learners who opt for homeschooling. Thus, in the present study, semi-structured interviews were conducted with ten homeschoolers in the United States to examine: (1) how digital technologies are being used; (2) why these technologies are being used to support learning; and (3) what digital technologies are being used. Thematic analysis revealed that homeschooled children used a wide array of digital technologies to support their learning. Children's learning projects commonly stemmed from their interaction with the real world, and a good portion of their learning was self-directed. Digital technologies afforded children access to specific materials and enabled them to collaborate with other learners. Perhaps most importantly, the homeschoolers reported a love for (self-directed) lifelong learning. They tended to learn in a self-directed and autonomous manner, and they commonly used digital technologies constructively and productively.

**Keywords** School choice · homeschooling · information literacy · self-directed learning · digital competence · digital technologies

## Résumé

L'école à la maison à l'ère du numérique : comment les technologies numériques peuvent aider les enfants à nourrir le goût de l'apprentissage (autodirigé) tout au long de la vie – Choisir l'école à la maison pour ses enfants est une tendance en plein essor dans le monde entier. Étonnamment toutefois, on manque de recherches sur la façon

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dont les parents qui ont choisi l'école à la maison utilisent ces techniques. Par conséquent, dans le cadre de cette étude, des interviews semi-structurées ont été menées auprès de dix de ces parents aux États-Unis pour examiner : (1) leur façon d'utiliser les technologies numériques ; (2) pourquoi ils utilisent ces techniques en soutien à l'apprentissage et (3) quelles sont les technologies numériques utilisées. L'analyse thématique a révélé que les enfants qui sont scolarisés à domicile s'appuient dans leur apprentissage sur une large palette de technologies numériques. Les projets éducatifs des enfants découlent souvent de leur interaction avec le monde extérieur, et leur apprentissage est en grande partie autodirigé. Les technologies numériques leur ouvrent l'accès à des matériels spécifiques et leur permettent de collaborer avec d'autres apprenants. Mais ce qui est peut-être le plus important, ces enfants scolarisés à la maison déclarent avoir le goût de l'apprentissage (autodirigé) tout au long de la vie. Ils ont tendance à apprendre de façon autodirigée et autonome et font généralement un usage constructif et productif des technologies numériques.

## Introduction

The COVID-19 pandemic affected more than 1.5 billion learners of all ages worldwide, and forced many into learning at home (Bonilla et al. 2022; OECD 2020). In countries with lockdown measures in place during the pandemic, learning at home was the primary form of schooling available and many educational institutions needed to implement emergency online instruction (Bozkurt et al. 2020; Tate et al. 2022). Such lockdown learning inevitably gave students and parents/guardians a glimpse of what it might be like to be homeschooled. But homeschooling takes learning at home a step further: it involves a process in which a child's parent or guardian serves as the main educator (Neuman 2019).

As the popularity of homeschooling grows rapidly and steadily in many countries around the world, so too do the ways in which it is carried out (Guterman 2023; Tan 2020). For example, virtual, co-operative (co-op) and unschooling are all types of homeschooling (Mitchell 2020).<sup>1</sup> The present article views *homeschooling* in terms of Michael Cogan's (2010) definition: education occurring in the home with a child's parent or guardian serving as the main educator. This definition distinguishes homeschooling from *education at home*, which typically employs an outside teacher or tutor (for either public or private education), with students learning at home.

Within this definition of homeschooling, however, there is still great variety in the way it is carried out. Homeschooling is known for offering individualised education (Bell et al. 2016; Carpenter and Gann 2016), encouraging independent learning (Gann and Carpenter 2017; Jackson 2016), catering to student interest (Bell et al. 2016; Carpenter and Gann 2016) and using eclectic approaches in curriculum and instruction (Alamry and Karaali 2016; Hanna 2012). It represents an alternative to traditional (mainstream/formal) schooling, which is based on the ideals of

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<sup>1</sup> *Virtual homeschooling* refers to online programmes, *co-op homeschooling* involves a group of families who meet together regularly and *unschooling* is an informal, learner-driven process.

“meritocracy” (i.e. individual merit) and can result in the “tyranny” of disadvantaged students feeling responsible for educational failure (Brighthouse 2022; Chen and Bland 2022; Mijs 2022; Sandel 2022). Nonetheless, a salient feature of homeschooling which differentiates it from traditional forms of education is that it commonly resembles the ideals of *self-directed learning* (SDL) (Alamry and Karaali 2016).

Homeschooling has been around since colonial times (Parkay 2013; Ray 2017). The modern homeschool movement began in the 1970s, and was primarily popularised by white, middle-class evangelicals (an international, interdenominational Christian movement) (Kleist-Tesch 1998; Kunzman 2009). Today, however, homeschoolers are a diverse group (Kunzman and Gaither 2020; Romanowski 2006). With that diversity comes numbers; for example, Brian Ray (2017) estimates that homeschooling in the United States (US) is growing at 2–8 per cent per annum, while the National Center for Education Statistics (NCES 2018) puts the number of homeschoolers in the US at close to 2 million. This growth is reflected in many countries worldwide (see Guterman 2023; Tan 2020), making homeschooling an important educational context to study. There are multiple reasons for choosing homeschooling, including family-related decisions and personal safety. However, research has repeatedly found that homeschooling becomes the preferred choice when parents/guardians are dissatisfied with the quality of education within the available formal schooling system (Neuman 2019).

Overall, homeschooled children perform as well academically as their traditionally schooled peers; however, studies suggest that the homeschooling instructional strategy used, and thus the child’s *learning process*, might be different when compared to traditional schooling (Bennett et al. 2019). With regard to the learning process, Courtney Gann and Dan Carpenter (2017) found that homeschoolers commonly used self-directed study as an instructional strategy. Likewise, in a study by Ann-Christine Vallberg Roth (2012), homeschool participants reported using a myriad of SDL opportunities. While homeschooling naturally lends itself to SDL, very few studies have explicitly looked at its role in this context. Of those that have, specific components – such as science, technology, engineering and mathematics (STEM) education (Gann and Carpenter 2017), achievement motivation (Bell et al. 2016) or flipped instruction<sup>2</sup> (Alamry and Karaali 2016) – have been the focus. As such, this study seeks to add to the knowledge base of SDL and investigate its role in homeschooling.

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<sup>2</sup> *Flipped instruction* refers to an emerging form of blended learning, where students individually watch online lectures prior to class and then utilise class time to engage in learning activities with peers and instructors (Lee et al. 2017).

## The importance of SDL: A meta-competence for meeting the demands of our rapidly changing world

SDL provided the theoretical lens for the present study. It represents a process in which learners take primary responsibility for directing their learning means and objectives in order to meet their personal learning goals (Knowles 1975; Kranzow and Hyland 2016; Morris 2019a, 2020). SDL competence is particularly important in adulthood as it helps provide the ability to: (1) adapt proactively to changing contextual conditions, thus avoiding knowledge and skill obsolescence; (2) deal effectively with changes in economic conditions; and (3) grow and adapt to change (e.g. Alonderiene and Suchotina 2017; Brassil et al. 2017; Caruso 2018). In a recent review on SDL, the first author of this article and Matthias Rohs (Morris and Rohs 2023) argue that SDL is a fundamental competence for living and working in our digital age because it enables learners to meet the demands of changing conditions.

However, other empirical studies have identified that many adults are not competent self-directed learners; therefore, they highlight the importance of fostering this competence in childhood schooling (e.g. Beckers et al. 2018; Kicken et al. 2009; Morris and Rohs 2021). SDL competence is defined as “the ability to pursue self-directed learning with success and efficiency: to proficiently direct one’s own learning means and objectives in order to meet definable personal goals” (Morris 2019b, p. 302). In sum, SDL represents a process in which learners take primary responsibility, with or without the help of others, to direct their learning process. Moreover, education during childhood is a crucial opportunity to foster this competence (Knowles et al. 2015).

Some researchers have claimed that SDL has not caught on as a primary goal of formal education in many traditional settings (e.g. Kranzow and Hyland 2016). In addressing this point, Joanna Dunlap and Scott Grabinger (2003) affirm that, consequently, some people find that traditional forms of education are inadequate for their needs, especially those preparing for careers in complex fields. This is particularly relevant in our digital age, where conditions are changing rapidly.

## The role of digital technologies in SDL

A recent systematic review (Morris and Rohs 2023) examined the potential for digital technologies to support children in their SDL efforts in traditional childhood educational settings. A key insight was that, commonly, children schooled in traditional settings may be competent in using digital technologies (e.g. for gaming), but less able to use these technologies for “educational” purposes. In this respect, Sahin Gokcearslan (2017) conducted a mixed-methods study in Turkey with 414 high school students, concerning SDL using “tablet computers” (tablets). Students found tablets somewhat useful for researching information and were competent in using them for gaming; however, for educational purposes, tablets were often a “distraction” to learning progress.

Similar findings were reported in a mixed-methods quasi-experimental study in North America with 706 Kindergarten to Year 12 (K–12) technology and engineering students (Bartholomew 2017; Bartholomew et al. 2017). In this study, learners worked in small groups to complete design portfolios and construct prototypes (“maker learning”), with or without access to mobile devices. The study concluded that mobile device access led to an improvement in portfolio quality but did not improve final product design. Mobile devices supported some students by enabling access to a rich source of information, but they were a distraction for others who used the devices for playing rather than working.

Moreover, an empirical study by Janette Hughes et al. (2019) trialled the use of iPads for inquiry-based learning with middle school (Year 6) Canadian students with behavioural, language or learning challenges in an attempt to address bullying. The authors reported that the students felt overwhelmed due to a lack of digital literacy skills; this was a key barrier to using digital technologies for educational purposes. This finding was mirrored in the conclusions of the systematic review conducted by the first author of this article and Matthias Rohs (Morris and Rohs 2021), on adults and their use of digital technologies for SDL. That study concluded that even in adulthood many learners still lack the necessary information literacy skills for successful SDL using digital technologies. As a result, they often become lost in a sea of information – the internet.

## SDL in the homeschooling context

To our knowledge, there are, somewhat surprisingly, very few studies that have explored the process of SDL in homeschooling settings. For instance, Gina Riley (2018) examined 28 adults’ experiences of SDL in terms of learning how to read during childhood homeschooling. The participants said that choice was essential to enjoyment and progress in their learning process and reading competence. However, the study did not investigate how digital media may support homeschooling. Moreover, the second author of the current article (Pannone 2017) conducted document analysis, as well as interviews and surveys with homeschoolers. A key finding was that SDL can foster homeschooled learners’ desire to become an entrepreneur and increase their propensity to engage in entrepreneurial activities.

The dearth of research on SDL in homeschooling settings is surprising given that the salient features of the SDL process fit so well with homeschooling (see Bell et al. 2016; Gann and Carpenter 2017; Jackson 2016). Indeed, it has been proposed that the process of homeschooling is commonly built around the concept of SDL (Beese and Watson 2016). This may be because, during the homeschooling process, learners commonly take responsibility for planning, undertaking and reviewing aspects of their learning (e.g. Alamry and Karaali 2016; Gann and Carpenter 2017; Vallberg Roth 2012).

However, at present, little is known about how digital technologies can support SDL in a homeschooling context. Despite this, the broader SDL literature does provide some clues. For instance, Fatimah Albedah and Chwee Beng Lee (2017; as per McCarthy and James 2017) theorise that digitisation has transformed

**Table 1** Semi-structured interview questions

Interview question	
1.	What are the main reasons for your student/s being homeschooled?
2.	What types of digital media are being used in your homeschooling environment?
3.	Why have you chosen these digital technologies in particular?
4.	If you had ultimate freedom, what digital technologies would you like to use in your homeschooling environment and why?
5.	What digital technologies would you recommend for homeschooling and why?
6.	How are you supervising or controlling the use of digital devices?
7.	How are your student/s cooperating with other students for the purpose of learning using digital technologies?
8.	Why are you using digital technologies instead of non-digital technologies?
9.	What do you think are the benefits that the students gain from using digital technologies?
10.	Is there anything else related to homeschooling and digital technologies that you would like to share that I have not covered in my questions?

out-of-classroom rather than in-classroom learning. Christophe Lejeune et al. (2021) suggest that digital tools can assist with goal-setting. Moreover, David Cook et al. (2017) describe how digital technologies, especially the internet, influence our learning habits. On the other hand, Jamie Cooper (2018), and other studies explored above (Bartholomew 2017; Bartholomew et al. 2017; Gokcearslan 2017; Hughes et al. 2019; Morris and Rohs 2021, 2023), have noted some challenges involved in children and adults using digital technologies for SDL.

Even though such empirical studies were conducted outside the context of homeschooling, they suggest that the nature of SDL in informal and non-formal contexts has changed, especially due to digitisation. Additionally, findings from studies focusing on SDL in homeschooling contexts, such as those reported by Riley (2018), might already be outdated. As digital technologies continue to change the nature of our SDL behaviour, this is an important area to study – especially given the rise in popularity of homeschooling. Therefore, the purpose of the present study was to answer the following research questions with regard to SDL and homeschoolers:

- (1) *How are digital technologies being used?*
- (2) *Why do homeschoolers use these technologies to support their learning process?*
- (3) *What digital technologies are they using?*

## Method

Prior to data collection, ethical approval was granted for this study (IRB Exemption 4027.102919). After providing participants with information about the project and obtaining their informed consent, we conducted semi-structured interviews (see Table 1) with ten homeschooling parents/guardians (all female,  $M$  age = 38.88,

**Table 2** Themes and codes for the study

Final theme	Code/initial theme
1. Collaboration	Talk online; Social interaction; Teamwork; Cooperatively; Partners; Connect; With other kids; Teams; Works with others
2. Supervision	Independent; Trustworthy; Hands off; Let them pick; Close by; Watch with them; Direct oversight; Check-in; Track; Aware; Parental controls; Regulate; Monitor
3. Interesting topics through enjoyable learning means	Interesting; Enjoyment; Love; Follow interest; Want to learn; More engaging; Able to choose; Autonomy; Personalisation; Flexibility; Excited; Comes alive
4. Digital technologies as necessary	Experience; Part of our world; Necessary skills; Technological world; Comfortable with technology; Used to it; Everything digital; Familiar with computers; Prepares for future; Can't get away from it
5. Digital technologies as a means for accessing supplementary learning materials	Look at a lot; Look up; Finding everything; Do a lot; Get ideas; Find the material; Use a lot; Flexibility; Spontaneous; Go along with what we are learning; Easier; Never-ending supply of ideas; More to learn; Amount of access; So much information; Convenient
6. Learners directing (digital) means to meet their learning objectives	Pick a subject; Interested in; Self-directed learner; Decided; Own pace; Freedom; Independence; Follow interest; Best for that individual

$SD = 5.38$ ) in the US. We aimed to examine what, how and why their homeschooled children ( $N = 22$ ) used digital technologies to support their learning process.

Interview questions were original to the present study: we specifically designed them to derive answers to our research questions. Each parent/guardian participating in the study homeschooled between one and three children. The children ranged in age from 3 to 12 years, with an average age of 9. Participants were from the East, South or Midwest of the US and were recruited via social media posts and *snowball sampling*.<sup>3</sup> All the families had begun homeschooling prior to the COVID-19 pandemic; thus, they were long- rather than short-term homeschoolers. Due to participants not living in our locale, in-person interviews were not feasible. As a result, we contacted the interviewees via a combination of online video conferencing and telephone. Interview length ranged from 11 to 28 minutes, and participants were given the opportunity to add any details they felt might be pertinent to the study. Interviews were audio-recorded and later transcribed by hand. In addition, we asked the parents/guardians to answer ten survey questions online via SurveyMonkey. These

<sup>3</sup> *Snowball sampling* utilises the network of a small number of originally selected study participants to increase the size of the sample.

questions were designed to collect a combination of demographic information, multiple-choice responses and open-ended responses.

Our thematic analysis of the interview data followed six phases (see Braun and Clarke 2006): (1) becoming familiar with the data; (2) generating codes; (3) arriving at themes; (4) reviewing themes; (5) defining and naming themes; and (6) writing the report. We used hand coding to manually enter data into a Microsoft Excel file and, beginning with inductive (open) coding (based on the data), we assigned one or more codes to parts of sentences, whole sentences and groups of sentences. In the second round of coding, we defined new codes and revisited the initial analysis; data were re-coded if necessary. Themes were redefined a number of times.

Table 2 details the codes and initial themes used to arrive at the final themes. At times, the data organisation was complicated by the overlapping of data into the themes. When this occurred, we took a “best-fit” approach to data classification.

In the following section, we present the findings from our study, grouped by theme. Pseudonyms are used to preserve participants’ anonymity.

## Findings

### How are digital technologies being used?

#### Theme 1: Collaboration

Half of the parents/guardians reported that their learners collaborated with other children through the use of digital technologies. Others noted that while collaboration is important, they felt that their students were either too young or preferred in-person collaboration. For example, Shanida shared:

“People say computers are so isolating, but my son has a whole group of homeschooled friends, and they all talk online via Discord [a voice, video and text chat application]. So even if they are playing like Roadblock or Minecraft, there is a lot of like team effort: they have to plan out strategies. I hear them say ‘Okay, you go in first and then I’ll do this’. I feel like there is a lot of social interaction, teamwork and team building. Also, as homeschoolers, a lot of his friends don’t really live close by so I feel it’s very important that he use the technologies so he can socialize.”

Tina also referenced the cooperation involved in video gaming: “Even in Minecraft where he builds historical places and things of that nature, there are times when he absolutely plays with other kids cooperatively in that manner.”

Several participants referenced more traditional collaboration methods, like online classes. For example, Katherine said, “My oldest has really, really loved doing the class online, like in a classroom setting with other students – that has been really fun for him”. Stephanie had a similar experience: “When they used the online writing class it was in sort of a classroom chat session.” Finally, Celina identified that her son used collaboration throughout his online class for building and programming robots:



“When he did that Sphero [programmable robot] class, they had partners that they worked with. The Sphero could do different things like a maze or a race and they would be racing the other kids.”

In sum, it was apparent that collaboration was important for most parents/guardians and that some digital technologies enabled collaboration between learners.

## Theme 2: Supervision

When asked how they supervised or controlled the use of digital technologies in the homeschool environment, participants were split: half reported monitoring the use, while the other half adopted a more hands-off approach. For the latter, participants felt that their students needed to be independent and could be trusted. For example, Tina related that she did not implement strict supervision because she trusted her son to use digital technologies appropriately: “I’m sure every parent thinks their kid is super trustworthy; I believe my child is super trustworthy.” Stephanie also said that she trusted her children to work independently:

“My kids are now [aged] 10 and 12 so my husband and I decided to take that [software regulation] off and sort of let them independently regulate themselves in a way. We felt it was important. If we just leave them alone with it, they kind of get bored with it. We don’t really monitor their time as much. We just trust our kids.”

Erin felt that technology use was a time for her students to practise independence: “I don’t supervise that [digital technologies] very much. That’s their independent time; go take it and do it.” Finally, Katherine shared:

“We are pretty hands off [in supervising or controlling digital technologies]. There are certain things I would not let them watch that are really geared towards an adult audience, but aside from that we pretty much let them pick.”

On the contrary, about half of the parents/guardians adopted a monitoring style of supervision. For instance, Celina related:

“Anything that they do digitally we are close by, like when we are watching the videos on YouTube, I am watching them with them. So, most of it is just kind of direct oversight – I am with them while they are doing it.”

While Shanida did not sit with her students while they used digital technologies, she shared that she liked to regularly check in with them:

“I check on him regularly, just kind of pop in, just to check up and see what they are looking at. Their dad is a CTO [chief technology officer] so I do tell them that everything they do, or delete, etc., we can track; everything they search on. If they google something bad, we are going to see it.”

Pamela used a similar style of monitoring: “YouTube videos aren’t always appropriate, so those ones I monitor more closely”.

There were some examples of heavy monitoring supervision styles. For instance, Crissy said, “On the computer, we do it only at the dining-room table and he is only allowed to go to the website that I put him on”. Moreover, three participants used the parental control features in digital devices as part of their supervision. For example, Pamela shared: “They have the Amazon FreeTime, so they are only able to use certain apps that I have approved for them.” Similarly, Elena explained that she used parental controls to monitor what her kids were doing on their digital devices: “With the Kindle FreeTime, you choose what books and stuff they are allowed to use on the Kindle and the Echo [hands-free voice-controlled speaker].” Interestingly, two participants said that they had previously but no longer used parental controls.

### **Why do homeschoolers use these technologies to support their learning process?**

#### **Theme 3: Interesting topics through enjoyable learning means**

Overwhelmingly, participants shared that the choice to use digital technologies in the learning process was because of student enjoyment and the promotion of interest-led education. For example, Katherine said:

“My kids really love the way stories can be told in movie and show format – they love interacting with games. They love being able to learn things from a video, like actually seeing the graphics and things.”

In a similar vein, Elena and Celina both felt that digital technologies allowed for better learning in some areas. Elena stated, “It [technology] just makes it come more alive with the videos instead of just reading words on a page and looking at pictures”. Celina related:

“It is hard to grasp the concepts without seeing it, like the orbit around the sun or something like that – you cannot really observe that from our vantage point, but you can watch a video about it that really helps with their understanding.”

Stephanie simply said, “I think it holds their interest more”. Elena echoed her sentiments, stating that “It catches their attention more”. Similarly, Crissy shared that “using technology really keeps their interest a lot more”, while Erin said, “The novelty of it [schoolwork] being on the iPad helps them get it done”.

Tina went further. She said that not only did her son enjoy using digital technologies, but using them in the learning process allowed him to follow his interests:

“There have been many times that my kid popped off with some history fact or geography fact and I know that we didn’t do that or talk about that. And it’s just because he can follow his own interest online so there’s a lot of value in kids having that screen time and freedom and I think that we don’t think about that when we are thinking about formal learning.”

In the same vein, Pamela related that digital technologies allow for easier interest-led education than books alone:

“I’m a huge advocate of ‘child love learning’ and we have tons of books and they are like, ‘I want to learn something’, so let’s see if we have a book or go to the library and get a book, so that’s important. But online stuff does the same thing, and even more.”

Pamela added, “I am seeing how it [digital technology] actually piques their interest more”. Shanida perhaps stated it most clearly when she shared: “Overall, I feel like online is more engaging and you can really get to what you are interested in.”

Not only was the decision to use digital technologies in the learning process a result of emphasising enjoyment and interest-led education, but most participants also said that being able to focus on interest-led education was a deciding factor in the decision to homeschool. For example, Pamela said:

“My kids just thrive in being able to choose what they are interested in versus kind of being stuck in a US school where they don’t really have a choice about what they can learn about.”

Similarly, Katherine related:

“I would say that our number one reason [to choose homeschooling] is that we think kids should have autonomy on how they use their time and what their interests are and what they learn and how they learn it.”

Likewise, in the survey, when asked what subjects were emphasised in the home-school environment, Shani responded: “Whatever they [the students] are interested in.” Stephanie also referenced child-led interest when she noted that her decision to homeschool was “to have more flexibility to learn different things; like childhood interest, I suppose”. Celina said much the same: “It is just the personalization aspect of education that I like.” Shanida, however, had tried traditional schooling with her son, but found that it did not work very well for interest-led education:

“He’s basically interested in computer programming, so he went to try middle school as they have a computer programming technical track. Unfortunately, that was very basic; kind of a waste [of time].”

#### **Theme 4: Digital technologies as necessary**

The majority of homeschool participants believed that using digital technologies was necessary, given their widespread use throughout the world. For instance, Erin stated, “Getting comfortable with technology at this point is going to leave them not lost as they get older in jobs and things”. Elena felt much the same:

“With everything today being digital, getting them used to it on a basic level with just playing Minecraft or something, then when they are older, they are familiar with it and it’s not as much of a struggle to learn how to use Google Docs or something if they are already using it.”

Similarly, Celina said:

“I think they kind of have to have that experience with technology – I don’t think they are growing up in a time where they cannot have any experience with technology and still be able to thrive in a more advanced setting.”

Katherine echoed the other participants’ thoughts when she shared:

“It [technology] is such a part of our world, you just can’t get around it. [There are] skills that will be necessary in the digital world that we live in. Job skills are becoming increasingly technological, and the huge access to information – that can become overwhelming, but they need to learn how to navigate [it].”

Finally, Pamela summed it up when she said:

“Just knowing the way that the world is going, everything is so digital. I think it’s important now that they learn how to appropriately use these things, because they are going to have them their whole life and they can do whatever and access whatever and if they don’t know how to kind of limit it in an appropriate way then that won’t help them then. I think it is good for interest and just learning to interact with our growing technological world.”

## **What digital technologies are they using?**

### **Theme 5: Digital technologies as a means for accessing supplementary learning materials**

Homeschooled children in this study used a wide array of digital technologies – including laptops, tablets, televisions, cell (mobile) phones, desktop computers and/or gaming consoles – to access both centralised curricula and, more commonly, learning materials that were outside of (i.e. supplementary to) the core subjects.<sup>4</sup> Laptops and tablets were the most commonly used devices. For example, Elena shared:

“We look at a lot of YouTube videos to go along with what we are learning. If we are learning about different insects, we will look up a video about those insects so that they can visualize it more than just a picture on a page.”

Likewise, for Pamela, a wide variety of supplementary sources were accessed through digital technologies:

“For media they do a lot of where they are watching TV stuff, like Netflix. They both like documentaries. We also have Curiosity Stream; they love that. We do have some educational videos, but I am finding everything we want through YouTube or Netflix. Also, we have got Disney+ and they have

<sup>4</sup> According to My Homeschool, homeschooling is legal in all 50 federal states of the US, but there is “no set curriculum ... The main requirement is that a child educated at home should be taught well and regularly – at least as well as they would be taught if in a registered school” (My Homeschool n.d.).

that National Geographic [channel], which is really cool, so we have been using that lately.”

Tina also highlighted the supplementary nature of their digital technology use: “We do a lot of current events, a lot of keeping up with politics, a lot of YouTube videos.” Of those families using digital media for specific courses, mathematics was overwhelmingly the most represented, with four of the ten participants using digital media for instruction in this subject.

Most participants also reported that even if they had ultimate freedom (i.e. if time and money were not an obstacle) to choose new digital technologies, they were happy with what they had or would purchase more of what they already had. For those who did want additional digital technologies, these were primarily specialty items like a “smart board” (interactive whiteboard) or a digital microscope.

### **Theme 6: Learners directing (digital) means to meet their learning objectives**

Some parents/guardians said that deciding on digital technologies was a collaborative effort, while others allowed their children full choice. For example, Shanida explained:

“He’s interested in Japan and wants to learn Japanese, so we’ve been using some Japanese apps and Japanese tutorials. And, basically, that’s the best way to find the material he is interested in.”

For Shanida, not only did her son help to choose the type of digital technology, but he also had a say in whether digital technology was used at all:

“We did try using a lot of math programs – he did online math, like CTC Math for a couple of years, [and then] Beast Academy, but now he has just gone to a math textbook. He decided he doesn’t really like online math.”

Tina shared:

“I very firmly think that every family and every child will have a different path in homeschooling if they are doing what is absolutely best for that individual. I think keeping your options open and being open-minded [is important].”

It was clear that for most parents/guardians, the nature of the learning objectives, and their children’s preferences in terms of the means of learning, were important factors in digital technology use.

## **Discussion**

In this section, we will discuss each of the research questions in turn, again grouped according to the themes that emerged during analysis.

## How are digital technologies being used?

### Theme 1: Collaboration

In our study, the learning process of a number of the homeschoolers included collaboration with other learners via digital technologies. Collaboration took multiple forms, and digital technologies enabled connection with other learners even when they did not live close by in geographical terms. Previous studies discussing SDL in childhood using digital technologies have reinforced the notion that technology can support collaborative learning. For example, Ting-Chia Hsu (2017) examined 38 Taiwan third-graders' ( $M = 9$  years old) completion of a task-based English vocabulary game using augmented reality on a tablet. She reported that it was conventional for learners to work together. Likewise, an empirical study from Thieme Hennis (2017) discussed the effectiveness of a learning intervention (across multiple countries) to engage at-risk migrant youth through SDL with the use of information and communications technology (ICT), in particular Web 2.0 (the current internet), and interest-based collaborative learning activities.

The present study adds to the literature and confirms that digital technologies can enable a collaborative homeschooling learning process through multiple means. Homeschoolers in our study used digital technologies constructively and productively. In addition, collaboration was common among homeschoolers, and digital technologies were employed successfully as a tool for collaboration.

### Theme 2: Supervision

An interesting finding from our study was that when parents/guardians were asked how they supervised or controlled the use of digital technologies in the homeschool environment, participants were split. As noted in the findings section, half reported a monitoring approach, while the other half were more hands off. This finding confirms that there are different approaches to homeschooling (see Mitchell 2020). For those adopting a hands-off approach, participants noted the importance of promoting independent learning. The nature of this learning process closely reflects theoretical frameworks of SDL. For instance, Randy Garrison's (1997) model highlights that SDL concerns both self-monitoring (responsibility for the learning process) and self-management (control of what and how to learn). Similarly, Ralph Brockett and Roger Hiemstra's (1991) classic personal responsibility orientation (PRO) model emphasises that SDL starts with an orientation in which students take responsibility for directing their learning process.

On the other hand, some of the parents/guardians in the present study adopted a monitoring style of supervision. It was not possible to examine the reasons why homeschoolers chose this style of supervision due to how the study was set out and undertaken. Potential reasons for this observation could include: the widespread phenomenon of educators wanting to maintain control of students' learning processes (Tough 2002); educators approaching the learning process differently due to the personality characteristics of individual learners – including their tendency and propensity towards SDL (see Alharbi 2018; Kirwan et al. 2014; Slater et al. 2017);

and/or concerns about risks and dangers of online learning – this was a particular concern during the COVID-19 pandemic, and it remains a key issue (e.g. UNICEF 2020).

### **Why do homeschoolers use these technologies to support their learning process?**

#### **Theme 3: Interesting topics through enjoyable learning means**

A key dimension of SDL is that students choose their learning means and objectives (Knowles 1975; Morris 2019c). In the present study, digital technologies were overwhelmingly used to enable learners to study topics of interest through enjoyable learning (i.e. digital) means. In terms of SDL theory and research, the majority of studies on childhood formal schooling rarely depict a learning process in which students have primary responsibility to direct their learning means and objectives (see Morris and Rohs 2023). In contrast, a sizeable proportion of the homeschooling students in the present study were habitually responsible for directing their learning means and objectives, in a personalised learning environment (see Bellarhmouth et al. 2023).

Many of our interviewees highlighted that learner choice, in terms of learning means and objectives, is a salient feature and advantage of the homeschooling process. This includes choice in the use of digital technologies. Moreover, parents/guardians highlighted that such SDL – habitually undertaken with digital technologies – satisfies learners' interests, attracts their attention, increases their enjoyment and fosters a love for learning. Importantly, the majority of the homeschoolers specifically stated that having the ability to focus on interest-led education was a deciding factor in the decision to homeschool.

#### **Theme 4: Digital technologies as necessary**

A key theme in the present study concerned digital competence and information literacy (see Rapchak et al. 2015 for further discussion). Specifically, homeschoolers highlighted the importance of fostering learners' digital competence and literacy, and believed that homeschooling with digital technologies was an opportunity to do so. Competence and literacy in digital technologies is a central and common means of SDL, and many of the homeschoolers incorporated it in their learning environments. It was clear that they saw digital technologies as a normal and crucial part of life and work.

The findings of our study – that homeschoolers can foster digital competence and literacy due to the regular practice of SDL through digital technological means – contrast with studies in childhood formal educational settings which often report a lack of competence in using digital technologies for learning purposes (Hughes et al. 2019; Morris and Rohs 2023). In comparison, we found that SDL with digital technologies could be considered second-nature for homeschooled children, as they have the opportunity to foster their digital competence and information literacy, and

use a range of digital technologies, on a regular basis over an extended period of time.

## What digital technologies are they using?

### Theme 5: Digital technologies as a means for accessing supplementary learning materials

A strong theme in our study was that participants used a wide array of digital technologies to access learning materials which were considered “supplementary” to a pre-planned or specified curriculum. It was clear that many of the topics of learning seemed to flow as natural and organic projects that stemmed from children’s interaction with the real world, such as learning about current events, politics, other cultures and nature. In other words, a good portion of homeschoolers’ learning was SDL. This supports previous literature that has found the central presence of SDL in homeschooling to differentiate it from traditional forms of education (see Alamry and Karaali 2016; Bell et al. 2016; Gann and Carpenter 2017; Jackson 2016).

It is interesting to note that to access these SDL materials, homeschoolers in our study primarily relied upon laptops and tablets as devices to access several internet-based learning resources, including websites, educational videos and documentaries. Most of the homeschoolers noted that they were free to choose new digital technologies that they preferred in order to enable their individual SDL pursuits. These findings support the speculation of scholars that advanced digital technologies available today present an opportunity for and support the process of SDL (e.g. Bonk and Lee 2017; Rohs and Ganz 2015).

Importantly, in our study it appeared that choosing digital technologies and using them for constructive and productive learning purposes was habitual to the homeschoolers. This contrasts with studies in traditional schooling settings which have reported that children may be competent in using digital technologies for gaming, but may struggle to use them for educational purposes, and even find them distracting (e.g. Bartholomew 2017; Bartholomew et al. 2017; Gokcearslan 2017; Hughes et al. 2019; Morris and Rohs 2023).

### Theme 6: Learners directing (digital) means to meet their learning objectives

Studies have historically and consistently identified that many people go through childhood educational processes without having the chance to practise SDL or become competent self-directed learners (e.g. Bonk et al. 2018; Canty et al. 2019; Gatewood 2019). Indeed, the classic scenario in traditional educational settings is that children are exposed to a teacher-directed learning process over many years. Then, when they are suddenly tasked with SDL, some learners find the process stressful and difficult (see Kasworm 1983; Kicken et al. 2009; Knowles 1975).

Curtis Bonk and Mimi Miyoung Lee (2017) note that it is somewhat surprising that facilitating SDL and fostering SDL competence is not, yet, considered a primary goal of education, in the majority of formal education systems, given that its



importance has been noted by scholars for decades (see Rogers 1969). Elsewhere, Morris and Rohs (2023) point out that, consequently, it is disconcerting that these learners will not be able to take advantage of SDL throughout their lives. In addition, the potential benefits enabled by SDL – a fundamental meta-competence – might be lost across a person's life course.

On the contrary, in the present study, homeschoolers were habituated to learning in a self-directed and autonomous manner. They reported choosing digital technologies and using them constructively and productively to achieve their learning goals. It may be argued – at least based on the experiences of the homeschoolers sampled in our study – that calls by scholars such as Jeannine Kranzow and Nancy Hyland (2016), for a holistic education system that captures the ideals of the self-directed inquiry process, can be met via homeschooling.

## Conclusion

In our study, homeschooled children used a wide array of digital technologies to access learning materials. In addition, many of their learning topics stemmed from their interaction with the real world. Specifically, we found that, for the majority of children in our study, homeschooling represented a process in which SDL was habitual, natural and normal. This evidence supports previous research by Gann and Carpenter (2017), who found that homeschooling parents/guardians used self-directed study as a common instructional strategy. Our findings, coupled with those of Gann and Carpenter, imply that homeschooling is not only well-suited to SDL, but that SDL is regularly practised by homeschoolers.

Our findings on parents/guardians' supervision or control of digital technologies highlight the different approaches to homeschooling, a common theme in home-school literature. The hands-off homeschoolers emphasised the importance of independent learning and felt that their students could be trusted to self-manage and regulate their learning process. This closely reflects theoretical frameworks that aim to capture the key dimensions of SDL. Given that the participants were split on their style of monitoring, however, our findings imply that there can be difficulties implementing technology in the classroom and home, particularly with regard to younger learners. Investigating the reasons behind the monitoring styles would be an interesting topic for future research.

Moreover, the learning process of a number of the homeschoolers included collaboration with others via digital technologies. Collaboration took multiple forms, and digital technologies enabled these connections even when other learners and/or friends did not live close by. Many of the homeschoolers encouraged learners to fully direct their own learning means and objectives, supported and afforded by the use of digital technologies. This benefited learners in a variety of ways, including fostering a love of lifelong learning. Indeed, the ability to focus on interest-led education was a deciding factor in the choice to homeschool for the majority of participants.

In sum, the homeschoolers in this study were habituated to learning in a self-directed and autonomous manner and were likely to use digital technologies

constructively and productively. However, while the number of participants was in keeping with qualitative research standards (Creswell and Poth 2018), the small sample size and female-dominated participant pool was a limitation and does not provide for study generalisability. As a result, although this study provides some clues on how homeschoolers use digital technologies in a self-directed and autonomous manner, we do not claim external validity. Further studies in a variety of contexts are required in this emerging research field.

## Declarations

**Competing interests** The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this article.

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